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Exploring Teachers' Strategic Communicative-based Difficulties in Teaching Physics

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Abstract

Effective communication is crucial in Physics education, which has complex concepts and problem-solving that require clarity and precision. Despite its significance, strategic communicative competence (SCC) among Physics teachers remains underexplored, particularly in the Philippine setting. Thus, this study aimed to exploring teachers' strategic communicativebased difficulties in teaching Physics within the Schools Divisions of Batac City, Laoag City, and Ilocos Norte. Focused on public secondary schools offering the Science, Technology, Engineering, and Mathematics (STEM) strand for the 2024-2025 academic year, the study involved 34 Senior High School teachers instructing General Physics I and II in Grade 12. Data were collected using an interview guide which was subjected to validation. The validation process was carried out by three experts from Mariano Marcos State University, all of whom hold doctorate degrees. Findings reveal that the teachers face notable strategic communicative-based difficulties, particularly in adapting their communication to meet the diverse needs of learners and in effectively integrating technology into instruction. Issues such as limited access to digital resources and insufficient training in educational technology were cited as barriers to achieving fully interactive and student- centered teaching.

Keywords: *communication, difficulties, physics, strategic communicative competence*

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Introduction

Physics, as a vital branch of science, plays a crucial role in understanding the principles governing the natural world. Recognizing this, the Philippine K to 12 Curriculum emphasizes mastery of these principles through innovative teaching methods such as spiral progression and practical applications, aiming to deepen students' understanding and engagement (Pacala, 2022). These reforms are designed to foster scientific literacy and prepare learners for future scientific endeavors.

However, despite these curriculum initiatives, the Philippines continues to lag behind international standards in Physics education. Recent assessments reveal persistent deficiencies in student performance and engagement, highlighting the urgent need for more effective instructional strategies to bridge these gaps (Moro & Billote, 2023). This situation calls for a critical reevaluation of both teaching practices and the support systems in place for Physics educators.

In response, the K to 12 Physics curriculum seeks to enhance students' scientific literacy and engagement by employing innovative teaching methods alongside the spiral progression approach, promoting mastery and practical application of key concepts (Pacala, 2022). Yet, the success of these reforms heavily depends on teachers' preparedness—not only in their content knowledge but also in their ability to communicate complex ideas effectively in English. To this end, administering an English proficiency test for teacher applicants has proven valuable in assessing their communication skills (Rompis et al., 2025). Supporting this, Dotollo (2022) found that positive perceptions of this test correlate with higher levels of teacher preparedness, underscoring its importance as an essential assessment tool.

Further strengthening this perspective, studies by Badmus and Jita (2024) and Liu and Sun (2020) emphasize the pivotal role of teachers in enhancing students' understanding of Physics. Badmus and Jita (2024) highlight the benefits of addressing mathematical deficiencies through structured guidance and integrating Math within Physics instruction, thereby improving problemsolving skills and content comprehension. Meanwhile, Liu and Sun (2020) stress the necessity for teachers to cultivate competencies in Physics, scientific literacy, and humanistic literacy to effectively support student learning. Collectively, these findings underscore the dual importance of subject mastery and pedagogical skills in the successful implementation of the K to 12 Physics curriculum.

Addressing these instructional difficulties requires a focus on strategic communicative competence. Mahdi (2023) describes this competence as teachers' ability to use varied communication strategies, adapt to diverse learning needs, negotiate meaning, utilize feedback, and incorporate visual aids and technology to enhance learning outcomes. Despite recognizing its importance, many teachers still struggle to fully develop and apply strategic communicative competence in their classrooms. Consequently, previous research highlights the need for targeted professional development to strengthen these skills (Mane, 2024; Konotop, 2023).

Mane (2024) further explores the critical role of strategic communicative competence in facilitating effective classroom interactions, identifying key factors that influence this competence, such as assessment methods and pedagogical enhancement strategies. Complementing this, Konotop (2023) emphasizes teachers' ability to address language deficits through diverse strategies, including leveraging their knowledge, skills, and interactive activities—essential for overcoming communication difficulties, especially in foreign language contexts (Sharma, 2024). Together, these studies reveal the multifaceted nature of strategic communicative competence and its foundational importance in education.

Expanding this insight, Akeshova et al. (2023) investigate the development of strategic competence in English language teaching through information technologies. This research suggests that the need for strategic communicative competence extends beyond language teaching and is equally critical in Physics education. Just as English teachers must overcome communication difficulties, Physics teachers also require these competencies to effectively convey complex concepts. This connection highlights an opportunity for new research initiatives focused on enhancing the strategic communicative competence of Physics teachers.

A further gap identified by Alem (2020) pertains to the application of strategic competence—a key aspect of communicative competence—in language teaching contexts. This gap signals the need for more exploration of strategies to improve communication in education, particularly for Physics teachers who face difficulties in explaining complex concepts clearly. Strong communicative strategies are essential to engage students and facilitate understanding in this discipline.

Within the Philippine context, the Department of Education prioritizes communicative competence and multiliteracies in the English language component of the K to 12 Curriculum, shaping the training and practices of English language teachers nationwide (Quinto & Plata, 2022). However, difficulties persist in other subject areas. For example, a local study by Calzada and Antonio (2024) examined the communicative competence of school administrators in Ilocos Norte, yet no localized research has been conducted on teachers' communicative competence, particularly those teaching General Physics. This reveals a significant gap.

To address this, the present study aims to explore the strategic communicative difficulties faced by Physics teachers within the Schools Divisions of Batac City, Laoag City, and Ilocos Norte. Building on Calzada and Antonio's work, this investigation seeks to provide valuable insights into communication dynamics in education and support efforts to enhance overall teaching effectiveness.

Literature Review

Physics in the K to 12 Curriculum

The K to 12 Curriculum aims to provide a comprehensive science education, with physics playing a vital role in developing learners' scientific literacy and critical thinking skills. Within the Senior High School STEM strand, Physics introduces students to fundamental concepts and principles that explain natural phenomena, encouraging them to explore and understand the physical world. This dual focus on theory and practice is essential for building a strong foundation in science.

Langbeheim et al. (2023) emphasized that the K to 12 Physics Curriculum balances theoretical knowledge with practical application through performance tasks, experiments, and reallife problem-solving activities. This hands-on approach not only makes abstract physics concepts more accessible and meaningful but also prepares students for further studies and careers in science, technology, engineering, and mathematics (STEM). The

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curriculum's emphasis on inquiry-based learning fosters the critical thinking and innovation skills necessary for addressing contemporary scientific and societal difficulties.

Central to this instructional approach is the use of English as a Medium of Instruction (EMI), which plays a critical role in enhancing comprehension and communication of scientific concepts. According to Qamariah and Yuliani (2024), EMI improves students' access to scientific literature, fosters international collaboration, and strengthens communication skills. This language integration bridges the gap between science and language learning, equipping students with essential skills for academic and professional success. However, Kovrizhnykh (2022) cautions that the effectiveness of EMI largely depends on the English proficiency of Physics teachers. Teachers with limited language skills may struggle to clearly convey complex physics concepts, underscoring the need for targeted professional development in both content and language proficiency.

As students transition from K to 12 to higher education, these language and content difficulties become more pronounced. Fulminar (2022) noted that many K to 12 graduates face difficulties in college Physics due to gaps in conceptual understanding and English communication skills. This highlights the critical importance of ensuring that the K to 12 Physics Curriculum not only delivers robust content but also strengthens language competencies to better prepare students for the demands of higher education.

In summary, the K to 12 Physics Curriculum integrates theoretical and practical learning with the strategic use of English as the medium of instruction. This combination aims to develop well-rounded learners equipped with both scientific knowledge and language skills, ready to succeed in STEM pathways and contribute to scientific innovation.

Communicative Role of Teachers in the Classroom

A teacher is an essential element in education, performing multiple educational roles from being a curriculum writer, an implementor and evaluator, a role model, and a second parent, to pedagogical functions. Over the years, the teacher's role has changed, shifting from a traditional teacher-centered approach to a 21st-century learner-centered teaching. As educators, they are not only teachers but also guides and leaders, and they change the way they teach based on their students' needs and the demands of society. According to the theories of Piaget and Vygotsky, every child is unique, and teachers must adjust their strategies to provide effective instruction. The role of the teacher extends far beyond mere day-to-day interaction with the students, as it greatly shapes the entire personal development of the learners.

The communicative role of teachers in the classroom is an important part of the teaching and learning process (Mandal & Banerjee, 2022), as they influence student learning outcomes and academic achievement. Several studies have investigated the role of teachers' communication abilities and techniques in promoting student knowledge and engagement in different topics, including Physics.

Physics, as a subject, is considered a challenging subject due to its complex concepts and the level of abstract thinking. Yunzal and Casinillo (2020) said that it is a subject in high school where students have little interest due to its sophisticated and abstract nature. Priadi (2020) emphasized the importance of teachers in effectively communicating these concepts to make learning more understandable and engaging. This stresses the essential role of teachers in bridging the gap between challenging subject matter and student understanding.

Marcellita (2018) further emphasized the importance of teachers in shaping students' understanding through effective communication in the classroom. Historically, Paulo Friere proposed the banking model, where teachers were viewed as dispensers of knowledge, and students were considered empty accounts to be filled by the teacher. However, the idea was challenged by more recent educational theories that highlight the teacher's function as a facilitator of learning rather than a mere provider of information; and their communicative interactions with students play a crucial role in fostering a conducive learning environment (Zvorska et al., 2023) and shaping students' understanding of the physical world, and inspiring the next generation of scientists, engineers, and informed citizens.

English and Mathematics were the foundational languages through which the principles and concepts of Physics were communicated and understood (Schad, 2023). In the Philippines, English is used as a medium of instruction in science subjects, and teachers play a vital role in effectively communicating scientific information to students. Executive Order No. 210 establishes the policy to strengthen the use of English as a medium of instruction in the education system and orders that English shall be the primary medium of instruction in all public and secondary schools, including vocational and technical institutions. This policy points out that the Philippine education system is committed to using English as the medium of instruction to ensure fluency and effective interaction with scientific information. This emphasis on language proficiency highlights the critical role of educators not only in conveying information but also in shaping the learning experience to meet international standards of education.

Such educational standards are integral to the global objectives outlined in the Sustainable Development Goals (SDGs). Teachers play a crucial role in achieving SDG 4 by educating students about sustainable development, integrating SDG concepts into lessons, and fostering critical thinking on sustainability difficulties (Dhaka, 2024). It aims to ensure inclusive and equitable quality education and encourage lifelong learning opportunities for all. The quality of education is not just about the content delivered but also about how it is communicated. Teachers who effectively communicate their subject matter contribute to a higher quality of education by making learning more understandable and engaging (United Nations Educational, Scientific and Cultural Organization) (UNESCO).

Strategic Communicative Competence of Teachers

The term communicative competence, also known as communication competency theory, was coined by a linguist, Dell Hymes in 1972 as a response to the concept of linguistic competence introduced by Noam Chomsky. Hymes' theory expanded the definition of language proficiency to include not only the tacit knowledge of language structures but also the ability to use the language effectively. Nordquist (2019) highlighted that communicative competence is the key to achieving social acceptance. Additionally, the theory suggests that effective communication goes beyond linguistic knowledge or grammatical competence; it also requires an understanding of the social and cultural context in which communication takes place (Calzada & Antonio, 2024).

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This study focused solely on strategic communicative competence (SCC) due to its critical role in enhancing the efficacy of teaching and learning in Physics education. While communicative competence encompasses various components linguistic, sociolinguistic, strategic, and discourse. Strategic competence is particularly vital for educators in effectively conveying complex scientific concepts and engaging students in meaningful dialogue.

According to Bondarchuk et al. (2024), strategic communicative competence encompasses the skills necessary to effectively convey information, handle communication breakdowns, and adapt to varying learning environments. In Physics education, teachers frequently face the challenge of helping students navigate complex theories and concepts. By employing strategic competence, educators can leverage alternative explanations, analogies, and visual tools to foster deeper understanding and retention.

There are seven components of strategic competence. These are the communication strategies, adaptation strategies, negotiation of meaning, use of feedback, problem-solving skills, utilization of visual aids, and use of technology. First are the communication strategies. Addimando (2024) underscored that these are the techniques employed to convey messages more clearly and effectively, such as paraphrasing, rephrasing, and providing examples. Paraphrasing and providing examples are crucial skills for teachers to utilize in Physics classrooms. These techniques not only help students understand complex concepts but also foster their ability to apply knowledge in real-world situations.

When teachers paraphrase, they articulate concepts in their own words, allowing students to understand the meaning without depending solely on textbook language. This technique fosters active listening and promotes deeper processing of information rather than passive absorption (Bowman, 2019). Additionally, by providing examples, educators connect abstract concepts to tangible applications, making the material more relatable and comprehensible (Campana, 2009).

The second component is the adaptation strategies, which involve modifying language use and instructional methods based on the audience's comprehension levels. This includes simplifying complex concepts and employing relatable analogies (Sparano, 2024). Takmaz et al. (2023) underlined that effective communication necessitates speakers to consider the audience's existing knowledge, adjusting their language accordingly. Additionally, techniques such as monitoring listener responses contribute to communicative success by allowing speakers to tailor their messages to align with the audience's understanding.

For instance, this concept is particularly relevant in educational settings, such as in teaching Physics, where complex concepts are often encountered. The study of Ispal and Ishak (2022) found out that teachers must elementarize Physics content and integrate it with students' alternative conceptions, simplifying complex concepts and using relatable analogies to bridge the understanding gap between everyday language and scientific concepts, particularly in teaching energy fundamentals. This approach not only enhances student engagement but also fosters a deeper comprehension of challenging topics, serving as a prime example of how adaptation strategies can be applied in real-world contexts to facilitate effective communication and learning.

The third component is the negotiation of meaning, in which teachers engage in dialogue to clarify misunderstandings and find common ground, which often involves asking questions and checking for understanding. For instance, in a General Physics I course on projectile motion, after delivering an explanation, the instructor might pose the question, "Can someone explain what happens to a ball thrown upwards when it reaches its highest point?" This not only invites students to articulate their understanding but also allows the teacher to identify and address any misconceptions through follow-up inquiries, thereby enhancing overall comprehension.

Similarly, during a General Physics II discussion on wave properties, if some students exhibit confusion regarding the concepts of wavelength and frequency, the teacher could prompt exploration by asking, "What do you think happens to the sound if we increase its frequency?" This strategy encourages students to collaboratively examine their preconceptions and facilitates a deeper understanding of the material, demonstrating the critical role of negotiation in the teaching-learning dynamic.

Moreover, Da Silva Coraiola and Higa (2021) highlighted that Physics teachers emphasize the need to invert interaction logic to enhance argumentative activities, facilitating dialogue that clarifies misunderstandings and fosters common ground, thereby influencing participation and critical discussion within the school culture.

The fourth component is the use of feedback, which involves both providing and receiving feedback to adapt communication strategies and teaching methods in real time based on student responses and needs. A study by Purba and Hwang (2024) found out that teacher feedback significantly influences students' involvement in learning activities, enhancing participation through asking and answering questions, active posting, and task completion. This feedback contributes to improved learning achievement and cognitive development, as evidenced by the experimental group's superior performance.

Similarly, Molin et al. (2021) stressed that Teacher feedback positively affects learning gains in Physics, with the largest improvements observed when combined with peer discussions. The study indicates that effective feedback strategies during formative assessments significantly enhance students' understanding and performance in Physics classrooms. These findings underscore the critical role of feedback in promoting a dynamic and interactive learning environment.

The fifth component of strategic competence is problem-solving skills. This involves the ability to identify and address communication difficulties or misunderstandings that arise during instruction, such as finding alternative ways to explain a difficult concept. Singh et al. (2023) emphasized that effective problem-solving skills in Physics instruction are crucial for addressing student misconceptions. They highlight the use of strategies like Peer Instruction and modeling, which enable teachers to communicate complex concepts more clearly. These approaches allow educators to adapt their explanations in real time, thereby enhancing student understanding and engagement. By employing these techniques, teachers can create a more interactive and responsive learning environment that supports deeper comprehension and encourages active participation.

The utilization of visual aids is the sixth component of strategic communicative competence. This involves employing diagrams, models, and other visual representations to support verbal explanations and help students grasp complex ideas more readily. For example, Hahn and Klein (2023) found out that visual tools

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facilitate cognitive processing and improve conceptual comprehension, particularly in areas like vector fields and classical mechanics. help students grasp complex relationships quickly, reducing cognitive load during problem-solving.

A similar study by Lamanepa et al. (2022) showed that students who engage with graphic models, like free-body diagrams, demonstrate an improved understanding of force systems and motion directions. By visualizing these concepts, students can better analyze and interpret the relationships between different forces, leading to a more effective learning experience.

Last is the integration of digital tools and resources to aid communication, such as using simulations, interactive presentations, or communication platforms to engage students. For example, digital practical work (DPW) complements traditional laboratory experiences, allowing students to engage with concepts like electrodynamics more effectively (Moloi & Matabane, 2024). Furthermore, technologies such as AR and virtual reality (VR) create immersive learning experiences, making abstract concepts tangible and easier to grasp (Prayogi & Verawati, 2024).

The incorporation of these digital tools not only fosters student engagement but also significantly enhances understanding and critical thinking skills. By promoting personalized learning experiences, AR, VR, and adaptive learning platforms make complex concepts more accessible and address the limitations inherent in traditional teaching methods (Prayogi & Verawati, 2024).

To build on the findings discussed, future research should focus on empirical investigations targeting the specific impacts of strategic communicative competence on student achievement in Physics. This would provide valuable insights into tailored instructional strategies that maximize educational outcomes.

Teacher professional development programs should also emphasize fostering these communicative skills to empower educators with the tools necessary for effective classroom interaction. By equipping teachers with strategic competencies, educational institutions can facilitate environments conducive to collaborative learning and increase student agency.

Methodology

Research Design

The study employed a descriptive research design to provide a comprehensive overview of the teachers' strategic communicative-based difficulties in teaching Physics.

Locale of the Study

The study was conducted in three DepEd divisions: the Schools Division of the City of Batac, the Schools Division of Laoag City, and the Schools Division of Ilocos Norte. It focused on all public secondary schools offering the Science, Technology, Engineering, and Mathematics (STEM) strand during the School Year 2024–2025. Specifically, four STEM schools were identified in SDCB, one in SDLC, and 23 in SDOIN, bringing the total number of participating schools to 28.

Population and Sampling Procedure

This study focused on Senior High School Physics teachers and involved participants from three school divisions in the province of Ilocos Norte. There were 39 identified teachers handling General Physics I and II in Grades 11 and 12 during the 2024–2025 school year. However, only 34 teachers willingly participated in the study. These included five teachers from the Schools Division of the City of Batac, 1 teacher from the Schools Division of Laoag City, and 28 teachers from the Schools Division of Ilocos Norte. A total enumeration sampling method was used to survey all willing participants, ensuring comprehensive data collection on their strategic communicative-based difficulties in teaching Physics.

Research Instrument

The interview guide consisted of five open-ended questions designed to explore teachers' strategic communicative-based difficulties in teaching Physics. These questions delved into specific scenarios, experiences, and perceptions related to teaching and communication in the classroom. The interviews aimed to gain in-depth qualitative insights into the unique difficulties and experiences of Physics teachers. The open-ended format allowed participants to elaborate on their thoughts, providing rich details.

Using the survey instrument validation rating scale adapted from Oducado (2020), the interview guide was validated by experts in research to ensure clarity, relevance, and appropriateness. Results indicated that the interview guide is highly valid, receiving a mean score of 3.62 (Strongly Agree), suggesting that the questionnaire is suitable for the study. Suggestions from the validators were incorporated. Notably, they commented that the statements were very satisfactorily constructed and aligned with the study's statement of the problem.

Data Analysis

In the analysis of interview data, the Braun and Clarke Model (2006) was followed in the generation of themes. This model is a widely used method for thematic analysis that guides researchers through a systematic process of identifying, analyzing, and reporting patterns or themes within qualitative data. In this study, applying the Braun and Clarke Model allowed the researchers to generate meaningful themes related to teachers' experiences and perspectives, providing rich insights into their strategic communicative competence.

Ethical Considerations

This study complied with the University Research Ethics Review Board (URERB) of Mariano Marcos State University and obtained permission from the Schools Division Superintendent (SDS) of Batac City, Laoag City, and Ilocos Norte. Approval letters were sent to public secondary school heads to coordinate data collection. Participants were fully informed about the study's purpose, procedures, risks, and benefits through written and verbal explanations, enabling them to make voluntary and informed decisions. They were asked to participate during their free time to avoid disruption of duties and were assured of confidentiality and the right to withdraw at any time.

Data gathering took place over two months, scheduled according to participants' availability. All physical data were securely shredded after retention, while electronic data were encrypted, password-protected, and stored with limited access. Backup copies would be kept separately to ensure data security. The informed consent process was carefully managed by researchers or designated team members, who provided clear explanations and obtained signed consent forms, safeguarding confidentiality. Any potential conflicts of interest among the research team or funding sources were disclosed and managed following ethical standards to prioritize participant welfare and research integrity.

Special attention was given to potentially vulnerable participants, ensuring clear communication, ongoing support, and emphasizing

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their right to decline or withdraw without penalty. To protect privacy, participants' identities were anonymized through codes or pseudonyms, and data access was restricted to authorized personnel. The study involved minimal risks such as time commitment and possible mild emotional discomfort from reflecting on professional experiences, with participants reminded they could discontinue participation anytime without consequences. This comprehensive approach ensured ethical compliance, participant protection, and data integrity throughout the research process.

Results and Discussion

Table 1 presents teachers' strategic communicative-based difficulties in teaching Physics. Based on the participants' responses, three key themes emerged: communicating complex concepts, engaging diverse learners, and facilitating student expression. These themes highlight the communication-related barriers that impact teaching effectiveness and student comprehension. Each theme reflects specific difficulties and the corresponding strategies employed by teachers to address them in the classroom setting.

Table 1. Teachers' strategic communicative-based difficulties in teaching Physics

Theme	Codes	Particulars
Communicating complex concepts	– Abstract and symbolic content – Learners' misconceptions – Difficulty applying formulas	…use analogies and real-world examples… …hard for learners to grasp concepts… Students struggle with applying formulas…
Engaging diverse learners	– Varied learning styles and prior knowledge – Low motivation and engagement – Student intimidation toward Physics	…variety of academic backgrounds and ways of processing information. …students view Physics as this daunting, irrelevant subject. …technical nature of Physics can be intimidating…
Facilitating student expression	– Fear of using English – Hesitant to participate – Limited communication confidence	…feel anxious about using English in class. …students hesitating to participate… …feel their contributions are valued.

Communicating Complex Concepts

Understanding and communicating the abstract nature of Physics is one of the primary difficulties teachers face in General Physics. Physics involves intricate theories, symbolic representations, and mathematical formulations that may be overwhelming for many students. These concepts are often not directly observable—such as energy, force, or electric fields—and are represented using symbols, equations, and abstract models. This makes it difficult for learners to grasp the content intuitively.

Teachers must strategically simplify and scaffold these concepts to support comprehension. The responses revealed three major difficulties: abstract and symbolic content, learners' misconceptions, and difficulty applying formulas.

Physics teachers must strategically simplify and scaffold complex ideas to support student comprehension. The responses from the teachers highlight the necessity of using analogies, reallife examples, and visual representations to make abstract content more tangible and relatable.

Many students enter Physics classes with pre-existing misconceptions about how the physical world works, such as believing heavier objects fall faster than lighter ones. These misconceptions can interfere with new learning and require intentional instructional strategies to uncover and correct them. Teachers often employ guided questioning, conceptual discussions, and experiments to challenge these false notions and facilitate conceptual change.

Moreover, translating theoretical understanding into mathematical applications poses a significant challenge. Even when students appear to understand concepts, they often struggle to identify the appropriate formulas or apply them correctly in problem-solving contexts. Teachers mitigate this by teaching structured problem-solving frameworks, offering step-by-step instruction, and using varied practice to reinforce understanding. These techniques help students not only memorize formulas but also apply them meaningfully.

Effectively communicating complex Physics concepts requires teachers to adopt diverse pedagogical strategies such as analogies, visual aids, and real-life examples. Addressing student misconceptions demands diagnostic teaching methods like formative assessments and conceptual discussions. To support formula application, teachers must strengthen students' problem-solving and mathematical skills through guided instruction and scaffolded practice. Instructional materials should be simplified and made more accessible, and teachers need ongoing professional development to improve their strategic communication in delivering abstract content.

This is supported by the statements of the respondents as follows:

> *I often use analogies and real-world examples to make abstract ideas more concrete. - Teacher 4*
>
> *I found it hard for learners to grasp concepts that are too high for them... I often use vocabulary to build up to introduce them to the basic concepts first. - Teacher 23*
>
> *Students struggle with applying formulas and reasoning through Physics problems systematically... I teach problem-solving frameworks, like using step-by-step breakdowns. - Teacher 5*

The findings coincide with the study of Pospiech (2023), which emphasized that the complexity of Physics tasks spanning physical, mathematical, and computational domains poses significant communicative difficulties for teachers. Effectively conveying

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these concepts requires not only subject mastery but also strategic communication skills to maintain clarity without oversimplifying. Similarly, Tiwari (2024) found out that diverse student learning needs demand differentiated instruction and inclusive communication strategies, presenting further difficulties for Physics teachers in effectively engaging all learners.

Additionally, Sultanalieva et al. (2021) revealed that integrating technology into Physics instruction introduces new communicative demands, as many educators lack sufficient training to effectively use digital tools to clarify abstract content. These studies collectively underscore the multifaceted nature of the communicative difficulties faced by Physics educators and highlight the urgent need for continuous professional development in both content delivery and strategic communication.

Acknowledging these significant communicative hurdles, it becomes evident that effective pedagogical strategies are crucial for making complex Physics concepts accessible to all students. This necessitates approaches that go beyond traditional lecture methods and incorporate flexible, inclusive communication techniques.

Engaging Diverse Learners

Engaging students in General Physics can be challenging due to the wide range of learning styles, prior knowledge, motivation levels, and attitudes toward the subject. This diversity demands a flexible and responsive instructional approach that acknowledges and accommodates the varied needs of learners. Teachers must navigate these differences to foster meaningful participation and sustained interest. The responses revealed three major issues that affect engagement: varied learning styles and prior knowledge, low motivation and engagement, and student intimidation toward Physics.

Students enter the Physics classroom with varying degrees of readiness—some possess strong foundations in mathematics and science, while others face difficulties in basic concepts. This variability necessitates differentiated instruction, such as peer teaching, tiered tasks, and flexible grouping, to ensure equitable access to content.

Teachers must tailor their strategies to meet individual learning needs, thus creating inclusive environments where all students, regardless of their starting point, can engage meaningfully with the subject.

Moreover, many students perceive Physics as a difficult or irrelevant subject, resulting in a lack of interest or enthusiasm. To counter this, teachers use real-world applications and inquirybased activities that connect Physics concepts to everyday life. These strategies help students see the value and relevance of the subject, thereby increasing their motivation to learn.

The technical nature of Physics often leads to anxiety or self-doubt among students. This intimidation can cause learners to disengage or hesitate to participate. Teachers mitigate this by creating a supportive environment, using encouraging feedback, and breaking down complex topics into manageable parts to build students' confidence gradually.

This implies that engaging diverse learners in General Physics highlights the need for instructional differentiation, where teachers are equipped to recognize and address variations in student readiness, learning styles, and prior knowledge. Curriculum content must also be made relevant by integrating real-life applications and inquiry-based tasks that enhance student interest and motivation. Additionally, cultivating a positive and supportive classroom environment is essential to alleviate student anxiety and build confidence, especially among those intimidated by the subject. Lastly, continuous professional development is vital to help teachers effectively manage diverse classrooms and foster inclusive and motivating learning experiences.

This is supported by the statements of the respondents as follows:

> *I have seen first-hand how my students come in with a variety of academic backgrounds and ways of processing information. To make sure everyone can thrive, I try to use differentiated instruction, like peer teaching and flexible grouping. It really helps me reach those who might struggle with the material and ensures that all my students feel included. - Teacher 1*
>
> *I often find that many of my students view Physics as this daunting, irrelevant subject. To change that perception, I make it a point to connect our lessons to real-world applications. When they see how Physics concepts apply to things they experience daily, their interest and motivation really start to grow. - Teacher 7*
>
> *I know that the technical nature of Physics can be intimidating for a lot of my students, which sometimes leads to anxiety or self-doubt. To help with this, I focus on creating a warm, supportive classroom atmosphere. I offer lots of positive feedback and break down complex topics into smaller, manageable parts, which helps my students build their confidence over time. - Teacher 4*

The findings coincide with the study of Caingcoy (2024), who contended that culturally responsive teaching strategies, such as recognizing students' backgrounds and tailoring content accordingly, enhance engagement and achievement among diverse learners, especially in subjects like Physics that are often perceived as difficult. Similarly, Gulzar et al. (2024) revealed that inclusive pedagogical practices, which include differentiated instruction, collaborative learning, and multimodal teaching, significantly improve participation and academic performance among students from varied linguistic and cultural backgrounds. Farooqi et al. (2024) emphasized effective teaching strategies for diverse learners, including the integration of technology, individualized learning, and peer learning, which can support engagement through visual aids, real-life examples, and discussions tailored to various cognitive styles and preparedness levels.

In addition, Pejaner and Mistades (2020) observed that when Physics teachers intentionally connect content to students' lived experiences and cultural contexts, it fosters a sense of relevance and belonging, resulting in more active learning and persistence in STEM pathways.

Facilitating Student Expression

Facilitating student expression is crucial in Physics education, especially in diverse classrooms where language barriers can hinder participation. Many students may feel hesitant to express their thoughts and ideas due to a fear of using English or a lack of communication confidence. To foster a more inclusive environment, teachers can adopt strategies that encourage open communication and create a safe space for students to share their understanding without fear of judgment. By allowing code-

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switching, encouraging participation, and nurturing a supportive classroom culture, educators can help students overcome these barriers and express themselves more freely.

Fear of using English. Many students, particularly non-native speakers, may fear using English in a Physics classroom due to worries about making mistakes or not being understood. This fear can lead to reluctance to participate in discussions or ask questions To address this, teachers can create an environment where mistakes are seen as a natural part of the learning process. Emphasizing that everyone is learning together can help alleviate this fear and encourage students to practice their language skills in a supportive setting.

Hesitant to participate. Students often hesitate to participate in class discussions, particularly when they feel uncertain about their knowledge or language proficiency. This hesitancy can result in missed opportunities for learning and engagement. Teachers can combat this by implementing structured group activities or think-pair-share exercises, which provide students with lower-pressure opportunities to share their thoughts with peers before speaking in front of the whole class. This approach can help build confidence and encourage more students to contribute.

Limited communication confidence. A lack of confidence in communication can significantly impact a student's willingness to express their ideas in Physics. Students may feel that their contributions are not valuable or worry about how their peers will perceive them. To boost communication confidence, teachers can foster a supportive classroom environment by providing positive reinforcement and recognizing students' efforts to participate. Encouraging peer feedback and collaborative projects can also create a sense of community, making it easier for students to share their thoughts without fear of judgment.

In summary, facilitating student expression in Physics education involves recognizing and addressing the barriers that prevent students from participating fully. This implies that facilitating student expression in Physics education emphasizes the importance of creating an inclusive, supportive, and interactive learning environment.

This is supported by the statements of the respondents as follows:

> *I have noticed that many of my students, especially non-native speakers, feel anxious about using English in class. To help them, I create an environment where making mistakes is part of learning. I emphasize that we're all in this together, which encourages them to practice their language skills without fear. - Teacher 9*

> *I often see students hesitating to participate because they're unsure of their knowledge or language proficiency. To combat this, I implement structured activities like think-pair-share, which give them a chance to share their ideas in a lower-pressure setting before speaking to the whole class. This really helps build their confidence. - Teacher 11*

> *I focus on creating a supportive classroom atmosphere where students feel their contributions are valued. This makes it easier for students to express their thoughts and ideas without the fear of being judged. - Teacher 12*

The findings coincide with the study of Surrain et al. (2022) accentuated that teacher codeswitching and small-group instruction significantly enhance the classroom participation of dual language learners, reducing language anxiety and promoting inclusivity. Pajrina et al. (2022) found out that structured activities like think-pair-share and the use of positive reinforcement can significantly boost students' communication confidence and willingness to participate in class. Keown-Murray et al. (2023) highlighted the value of fostering a classroom culture of acceptance and mutual respect, which encourages students to share ideas without fear of judgment. Likewise, Chrismaretta and Abrar (2024) underscored that collaborative strategies improve students' speaking comprehension and build their confidence in articulating scientific ideas, particularly in Physics and other STEM subjects.

Collectively, these findings reinforce that facilitating student expression requires more than language support, it necessitates a shift toward culturally responsive and emotionally supportive pedagogy. Teachers must intentionally design interactions and environments where students feel safe, valued, and confident enough to express their understanding. This holistic, communicative approach not only strengthens individual learner outcomes but also builds a classroom culture conducive to equity, engagement, and scientific inquiry.

Conclusions and Recommendations

Physics teachers face significant challenges in communicating abstract and complex concepts, highlighting the need for strategic simplification and varied instructional approaches to enhance student comprehension.

Differentiated instruction and supportive classroom environments are essential to engage diverse learners, address varying readiness levels, and increase student motivation in Physics.

Facilitating student expression requires creating inclusive, safe spaces and employing interactive strategies that build communication confidence, particularly for students with language barriers.

Overall, effective Physics education depends on integrating content mastery with strategic communication and inclusive pedagogy, supported by ongoing professional development for teachers.

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