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Saludsod: Questioning as a cross-disciplinary practice in facilitating learner's classroom interaction

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Abstract

This study investigates the role of questioning as a cross-disciplinary practice in fostering learner engagement across Science, Mathematics, and English classrooms. It addresses the identified research gap concerning the nuanced effects of questioning techniques on diverse learners, considering cultural, socio-economic, and cognitive differences. The research explores how tailored questioning methods support varied student needs and promote equity in learning environments. Ultimately, the study aims to provide insights into optimizing questioning strategies to create stimulating learning environments and improve student outcomes across disciplines. Effective questioning is confirmed as an essential instructional strategy, fostering critical thinking, engagement, and deeper comprehension within Science, Mathematics, and English (SME) classrooms. Teachers strategically employ subject-specific questioning methods to promote inquiry, facilitate problem-solving, and stimulate literary interpretation. Integrating structured questioning, technology, and differentiated strategies enhances student participation and knowledge retention. A teaching primer on effective questioning is recommended to guide educators in implementing optimal practices, ensuring questions assess knowledge and cultivate meaningful discussions and higher-order thinking skills.

Keywords: questioning techniques, learner engagement, cross-disciplinary, classroom discourse, Science, Mathematics, and English (SME) classrooms

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1. Introduction

Educators and researchers have a long-standing interest classroom discourse and how they might influence learners and their learning processes. The classroom is an environment in which communication is facilitated, whether between teachers and students, or among students themselves. Interactive discussion plays a major role in the teaching-learning process. Furthermore, interaction in classroom is considered as an important thing which cannot be ignored. Specifically, his interaction involves the interaction between teacher and students as part of the teaching and learning activity and proves crucial in the communicative language teaching. Interactions between the teacher and students are essential to the teaching and learning process. One of the most important aspects of the teaching-learning process is classroom interaction. In this interaction, asking question is one of the many ways to engage learners in interaction.

Asking questions in the classroom is a powerful instructional strategy that promotes student engagement, enhances critical thinking, and supports deeper learning. It encourages students to participate actively, reflect on their understanding, and make connections between ideas. Through both teacher-initiated and student-generated questions, the classroom becomes an interactive space where knowledge is co-constructed (Dargue et al., 2020). Effective questioning strategies can guide classroom dialogue, reveal student misconceptions, and foster a culture of inquiry where curiosity and discussion are valued (Chong & Kong, 2020). By promoting dialogue and encouraging exploration, questioning contributes significantly to student-centered learning environments (Liu & Stapleton, 2022).

Asking questions in the classroom is a dynamic instructional strategy designed to stimulate critical thinking, foster engagement, and deepen understanding by encouraging students to actively process and articulate ideas. It enables educators to assess learning gaps, prompt reflection, and scaffold knowledge construction through dialogue. Effective questioning aligns with active learning principles, where open-ended or higher-order questions challenge students to analyze, evaluate, and create, fostering metacognitive skills (Hattie & Clarke, 2018). It also supports formative assessment, allowing teachers to adjust instruction in real time based on student responses (Wiliam, 2018). Questions can democratize participation by inviting diverse perspectives, promoting equity in discourse, and building a collaborative classroom culture (Chin, 2018). Research underscores the role of questioning in developing students' communication skills and confidence, as articulating answers reinforces learning and clarifies misconceptions (Walsh & Sattes, 2015). When framed thoughtfully, questions bridge prior knowledge with new concepts, aligning with constructivist approaches that emphasize learner-centered inquiry.

Studies on asking questions in the classroom have explored various techniques and their impacts on student engagement and learning outcomes. For instance, Soysal and Soysal (2023) conducted a phenomenographic study that identified different levels of sophistication in question-asking among teacher educators. They found that effective questioning involves not just cognitive but also emotional and metacognitive dimensions, highlighting the complexity of good question-asking practices1. In contrast, Whitver and Lo (2017) focused on the tools and techniques used by librarians in the classroom, emphasizing the importance of visual aids and storytelling to engage students. Their study showed that the frequency and type of questions asked can significantly influence student participation and learning.

Another study by the Liberty County School District (n.d.) examined effective questioning and classroom talk, emphasizing the role of structured questioning techniques in promoting deeper understanding and critical thinking among students. This study highlighted the importance of using a variety of question types to cater to different learning styles and cognitive levels. On the other hand, Hampton (n.d.) explored questioning strategies

in lesson plans, finding that open-ended questions are particularly effective in encouraging student exploration and discussion. This study underscored the need for teachers to be flexible and adaptive in their questioning approaches to foster a more interactive and engaging classroom environment.

Comparing these studies, it is evident that while Soysal and Soysal (2023) and Whitver and Lo (2017) both emphasize the importance of sophisticated questioning techniques, they differ in their focus on the types of questions and tools used. Soysal and Soysal (2023) delve into the hierarchical sophistication of question-asking, whereas Whitver and Lo (2017) highlight practical tools like visual aids and storytelling. Both studies, however, agree on the critical role of questioning in enhancing student engagement and learning outcomes12. In contrast, the Liberty County School District (n.d.) and Hampton (n.d.) studies focus more on the practical application of questioning strategies in the classroom. The Liberty County School District (n.d.) emphasizes structured questioning techniques, while Hampton (n.d.) advocates for the use of open-ended questions to stimulate discussion and critical thinking. Despite these differences, both studies highlight the need for teachers to be adaptive and responsive to student needs, reinforcing the idea that effective questioning is a dynamic and context-dependent practice.

Effective questioning techniques employed by teachers in Science, Mathematics and English lessons significantly enhance student engagement and critical thinking skills. Research indicates that well-structured questions are not only promote deeper understanding but also encourage students to explore concepts actively (Chin, 2022). However, despite the recognizes importance of questioning techniques in enhancing student learning across Science, Mathematics and English, significant research gaps remain in understanding the nuanced effects of these techniques on diverse learner populations. Current studies often focus on general strategies without delving into how cultural, socio-economic, and cognitive differences influence the effectiveness of questioning methods (Dillon, 2023). Furthermore, while there is substantial literature on questioning in individual subjects, comparative analyses that explore cross-disciplinary approaches to questioning are limited. This gap underscores the need for more comprehensive research that examines how different questioning techniques can be tailored to support varied student needs and promote equity in learning environments (Smith et al., 2023). By strategically using questioning techniques, teachers can create a more effective and stimulating learning environment, ultimately leading to improved student outcomes (Wiggins & McTighe, 2022) Hence, this study was conceptualized.

The strategic use of questioning in the classroom is a powerful instructional tool that promote student engagement, critical thinking, and deeper learning. The studies reviewed showed the different techniques and approaches that can be used to enhance the effectiveness of questioning, from refined hierarchical methods to practical and structured strategies. Addressing these gaps through comprehensive and comparative research will be critical in applying questioning techniques to support different student needs and promote equity in learning environments. Ultimately, by improving effective questioning strategies, educators can make a more interactive, inclusive, and stimulating classrooms that lead to enhanced student outcomes.

1.1 Framework of the Study

This study is grounded in several educational theories that elucidate the significance of questioning in the learning process. This framework will explore three primary theories: Constructivist Learning Theory, Socio-Cultural Theory, Communicative Language Theory, Schema Theory, Transformative Learning theory and Transactional Theory of Reading and Writing, including Socratic Method. Each of these theories provides a unique lens through which to understand the role of questioning in fostering learner engagement.

Theories Related to Questioning. Constructivist Learning Theory posits that learners construct knowledge through their experiences and interactions with the world around them. This theory emphasizes the importance of active participation in the learning process, where questioning serves as a vital tool for students to explore concepts and clarify their understanding. Effective questioning can bridge the gap between theory and practice,

enabling teachers to facilitate deeper cognitive engagement among students. This aligns with the assertion that questioning not only promotes critical thinking but also encourages students to take ownership of their learning, thereby enhancing their engagement in the classroom.

Socio-Cultural Theory, as articulated by Vygotsky, highlights the role of social interactions in cognitive development. This theory suggests that learning occurs within a social context, where dialogue and questioning are essential for knowledge construction. Questioning techniques serve as a critical tool for facilitating dialogue between teachers and students, promoting collaborative knowledge construction and language development. By using strategic questions, educators can create an interactive learning environment where students are encouraged to think critically, articulate their ideas, and engage in discussions that deepen their understanding. These interactions foster a dynamic exchange of thoughts and perspectives, which aligns with Vygotsky's concept of social constructivism, where knowledge is co-constructed through dialogue (Vygotsky, 1978). When teachers ask open-ended or probing questions, they not only challenge students to articulate their reasoning but also guide them in refining their language skills as they express complex ideas. Furthermore, such questioning techniques encourage students to listen to their peers, consider alternative viewpoints, and build upon each other's contributions, which enhances both cognitive understanding and language development. This shared discourse fosters an environment in which language is not only used to communicate knowledge but also to negotiate meanings and solve problems collaboratively, thus advancing both academic learning and communicative competence (Mercer, 2000; Wells, 2000).

Communicative Language Teaching emphasizes interaction as the primary means of language learning. Questioning techniques are integral to Communicative Language Teaching (CLT) as they encourage meaningful communication, providing students with opportunities to practice language in context and develop fluency through authentic dialogue. In CLT, the emphasis is on communication as the primary goal of language learning, and questioning techniques help create a dynamic environment where learners actively engage in conversations and negotiate meaning (Richards & Rodgers, 2014). Open-ended and interactive questions prompt students to respond creatively, make decisions, and solve problems in the target language, thereby reinforcing their ability to use language functionally and spontaneously. This process of engaging in real-life conversations fosters fluency, as students are required to think on their feet, adjust their language to fit different situations, and collaborate with peers to clarify ideas. By asking and answering questions, learners practice not only vocabulary and grammar but also develop pragmatic skills, such as turn-taking, clarification, and repairing communication breakdowns. Ultimately, questioning in a CLT framework transforms the classroom into a space where language is used for genuine communication, enhancing both linguistic competence and communicative confidence (Littlewood, 2004).

Schema Theory focuses on how prior knowledge and experiences shape understanding. Questions that activate students' existing schemas play a crucial role in enhancing comprehension and retention by helping them make connections between new information and their prior knowledge. According to schema theory, learners use mental frameworks or schemas to organize and interpret information (Anderson, 1984). When teachers pose questions that tap into these pre-existing frameworks, students are prompted to recall relevant experiences and knowledge, which facilitates deeper understanding and integration of new concepts. By linking new content to familiar ideas, learners are better able to make sense of the material and retain it over time. Additionally, activating prior knowledge through questioning encourages students to actively process information, engage in critical thinking, and make meaningful connections, all of which enhance long-term memory retention (Bransford, et.al 2000). This approach not only improves comprehension but also supports the construction of new knowledge by building on what students already know, making learning more relevant and accessible. Thus, well-structured questions that engage prior knowledge are a powerful tool for enhancing cognitive engagement and supporting meaningful learning.

The Transactional Theory of Reading and Writing who was proposed by Louise Rosenblatt that emphasizes the dynamic interaction between the reader, the text, and the context. Questions that provoke

thoughtful responses are essential in encouraging students to engage deeply with texts, fostering critical analysis and interpretation. Such questions challenge students to go beyond surface-level understanding, prompting them to examine underlying themes, make inferences, and consider multiple perspectives (Paul & Elder, 2006). These types of questions often require students to analyze the author's intent, evaluate evidence, and explore the implications of the text, leading to more sophisticated interpretations. By stimulating deeper cognitive processing, they encourage students to question assumptions, identify biases, and construct well-reasoned arguments, all of which are integral to critical thinking. Furthermore, when students are encouraged to respond thoughtfully to such questions, they are more likely to engage in reflective thinking, which enhances their ability to synthesize information and apply it to different contexts (Bloom, 1956). This process not only deepens comprehension but also cultivates the skills needed for independent thought and scholarly inquiry. Ultimately, thoughtful questioning promotes a higher level of engagement, supporting students in becoming more critical and analytical readers.

Transformative Learning Theory, developed by Mezirow, 2007, focuses on the process of critical reflection and the transformation of perspectives through learning experiences. This theory posits that questioning can serve as a catalyst for transformative learning by challenging learners' assumptions and encouraging them to think critically about their beliefs and values. Transformative education encourages learners to question their frames of reference, leading to personal and social change. In the context of the current study, questioning styles employed by teachers can significantly impact students' engagement by prompting them to reflect on their learning experiences and consider alternative viewpoints.

Asking Questions. Teacher questioning in English classroom is an important diagnostic tool for teaching as well as measuring the academic progression and comprehension of the learner. While teacher questioning enhances student learning and self-assessment of the teacher's lesson delivery effectiveness, if not presented properly can have negative impacts on the student learning process.

Questioning Techniques. The Socratic Method, rooted in the philosophical teachings of Socrates, is a form of cooperative argumentative dialogue that stimulates critical thinking through questioning. This method emphasizes the importance of dialogue and inquiry, encouraging participants to explore complex ideas and challenge assumptions. It is characterized by a series of questions that lead individuals to discover answers and insights on their own, rather than simply receiving information from an authority figure. This approach is particularly effective in educational settings, where it fosters and encourages learners to articulate their thoughts, challenge assumptions, and engage in reflective dialogue, thereby enhancing their critical thinking skills (Le, 2019; Dinkins & Cangelosi, 2019; Badil et al., 2023).

Recent studies have shown that the Socratic method can be effectively applied across various educational contexts, not limited to traditional classroom settings. For instance, Skrefsrud discusses how the Socratic dialogue method facilitates intercultural understanding in diverse classrooms, allowing students to formulate their own opinions while being intellectually challenged by peers and educators Skrefsrud (2024). This approach not only promotes critical engagement but also nurtures a democratic atmosphere conducive to learning. Integrating the Socratic method into educational curricula presents both opportunities and challenges. On one hand, it encourages active participation and fosters a sense of community among students, which is essential for collaborative learning (Dinkins & Cangelosi, 2019). For example, the method has been shown to enhance student engagement in subjects such as history and social studies, where discussions can lead to transformative dialogues about complex issues (Magill & Magill, 2023).

Moreover, Hafina *et al.* (2022) illustrate that the Socratic Method not only improves critical thinking but also enhances writing skills and overall academic performance. The study found that students who participated in Socratic dialogues exhibited a significant increase in their ability to articulate thoughts and arguments effectively, which is essential for academic success. This aligns with findings from Mahmud and Tryana, (2023), who noted that the Socratic questioning method led to improved reading comprehension and critical thinking

among students, as evidenced by higher mean scores in assessments following the implementation of this method.

Classroom Interaction. Over the years, classroom questioning practice has been the focus of numerous education researchers for many years. Although it is widely assumed that classroom questioning promotes student thinking and learning, research in actual classrooms indicates that current practice falls far short. Questioning technique in educational contexts has garnered significant attention in recent research, particularly concerning its impact on the student engagement and learning outcomes. The questioning teaching style, as opposed to indoctrination methods, encourages students to actively engage with the material, fostering critical thinking and self-directed learning. Gao's study indicates that 72% of students felt capable of previewing and understanding content before class, highlighting the effectiveness of questioning in promoting independent learning (Gao, 2021). This aligns with Hedrick *et al.'s* findings, which illustrate how specific conversational techniques, particularly the use of "wh-" questions, can enhance children's memory and recall by directing their attention to particular aspects of an event (Hedrick et al., 2009). Such elaborative questioning not only aids memory retention but also supports the development of children's cognitive skills, including their theory of mind, as evidenced by Taumoepeau and Reese's intervention study that demonstrated increased memory elaboration through mothers' open-ended questions (Taumoepeau & Reese, 2013).

Moreover, the integration of questioning technique into pedagogical practices can significantly influence learning outcomes across various educational settings. Rinehart et al. discuss the importance of recognizing different cognitive styles and how they can be leveraged to improve educational practices, suggesting that tailored questioning strategies can enhance interpersonal communication and learning effectiveness (Rinehart et al., 2015). This is further supported by the work of Maya *et al.,* which indicates that cultural and educational contexts play a crucial role in shaping learning styles and preferences, thereby influencing how questioning can be effectively implemented (Maya *et al.,* 2021). Overall, the evidence suggests that a thoughtful application of questioning styles not only enhances student engagement but also contributes to deeper learning and cognitive development. However, educators must be mindful of the potential pitfalls associated with its implementation. If not executed thoughtfully, Socratic questioning can create an intimidating environment, leading to student anxiety rather than fostering open dialogue (Stoddard & O'Dell, 2016). Therefore, it is crucial for educators to develop effective questioning strategies that promote psychological safety, allowing students to feel comfortable expressing their thoughts without fear of judgment.

The advent of technology has further expanded the potential applications of the Socratic method in education. With the rise of online learning platforms, educators have begun to explore innovative ways to incorporate Socratic questioning into virtual classrooms. For instance, Mukherjee and Thakur highlight the importance of continuous feedback and active learning methodologies that leverage Socratic questioning to enhance student engagement in online settings (Mukherjee & Thakur, 2021). Additionally, the integration of artificial intelligence (AI) tools has been proposed as a means to facilitate Socratic dialogue, allowing for personalized learning experiences that adapt to individual student needs (Chukhlomin, 2024). This technological integration not only enhances the accessibility of the Socratic method but also aligns with contemporary educational trends that prioritize student-centered learning.

Despite its advantages, the Socratic method also requires careful consideration of its impact on student learning outcomes. Research indicates that when implemented effectively, Socratic questioning can lead to improved critical thinking and problem-solving skills (Sim-Sim et al., 2022). For example, studies have shown that students who engage in Socratic seminars demonstrate higher levels of analytical thinking and are better equipped to tackle complex problems (Robinson, 2022). However, the effectiveness of this method hinges on the educator's ability to create a supportive environment and to ask questions that genuinely provoke thought and discussion. This necessitates ongoing professional development for educators to refine their questioning techniques and to understand the nuances of facilitating Socratic dialogue in diverse classroom settings (Roberts et al. 2019).

Primer in Asking Questions. A primer in asking questions serves as a foundational guide for understanding the principles, purposes, and strategies behind effective classroom questioning. It instigates key concepts such as the types of questions (e.g., open-ended, closed, higher order), the role of questioning in facilitating dialogue, and its impact on student engagement and cognitive development. Effective questioning is grounded in pedagogical theories that emphasize inquiry-based and learner-centered instruction, where questions are used not merely to test knowledge but to encourage reflection, discussion, and deeper understanding (Chong & Kong, 2020). Recent research highlight that strategically structured questions can activate prior knowledge, encourage metacognition, and support formative assessment (Dargue, Phillips, & Sweller, 2020; Liu & Stapleton, 2022). Moreover, the primer outlines how teachers can adapt questioning techniques to different learning contexts and student needs, reinforcing the importance of inclusivity and responsiveness in educational practice. By establishing this groundwork, the primer equips educators and researchers with the conceptual tools necessary to explore and implement effective questioning strategies in the classroom.

In conclusion, the integration the theories provide a comprehensive framework for understanding the art of questioning in teaching. These theories collectively highlight the importance of questioning as a pedagogical strategy that enhances learner engagement across various subjects. By employing effective questioning techniques, teachers can create a dynamic learning environment that fosters critical thinking, collaboration, and transformative learning experiences.

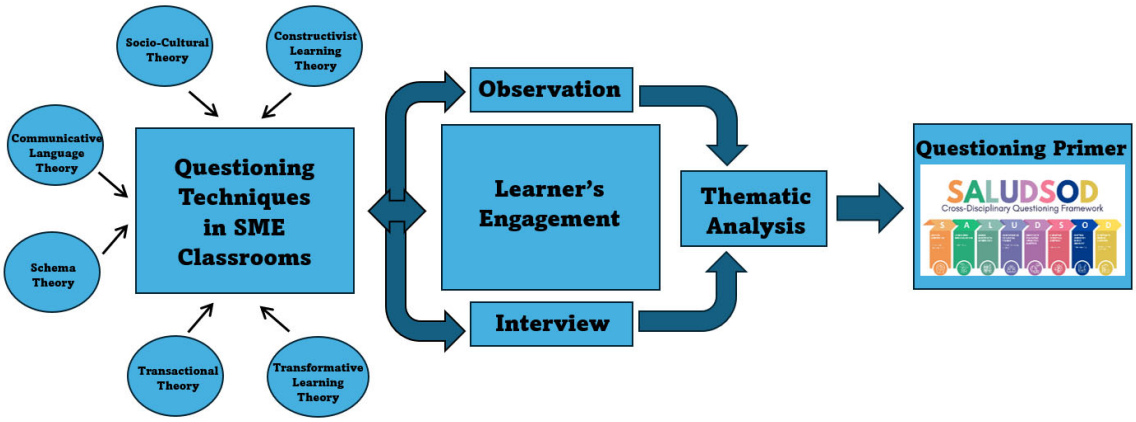

Figure 1. Schematic Presentation of the Study

Figure 1 shows how the study was implemented which shall provide directions to the steps that researcher undertook. As can be gleaned from the figure, the focus of the study is how the questioning techniques of teachers in SME class helps in stimulating learner's engagement inside the classroom. This was determined through observation and interviews substantiated by document analysis. Then, the observations and interviews were recorded and transcribed to produce the extended text. After that, thematic analysis of the extended texts was employed. Finally, the output of the study is a primer in questioning.

Statement of the Problem - This study aimed to describe and analyze the questioning techniques of teachers in Science, Mathematics, and English (SME) classrooms. It sought to answer the following questions:

- What are the questioning techniques of teachers in a SME class?
- How do the questioning techniques of teachers ignite learner's engagement in classroom discussion?
- What valid primer in asking questions can be developed?

Scope and Delimitation of the Study - This study was limited only into analyzing and describing the questioning styles. Specifically, this study is delimited only into the ways of teachers in soliciting answers from the students through their questioning styles. This study involved 10 teachers from the Junior high department of

the Regional Science High School for Region I who were using English as their medium of instruction. The teachers involved must be teaching in the following subjects: Science, Mathematics and English. This study was conducted within the Fourth Quarter.

Significance of the Study - Guiding teachers through analysis of questions they ask and the responses they get from students can enable them to recognize both effective and ineffective questioning practices in their literature classroom discourse. This study could enable teachers who are using English as their medium of instruction to be well prepared in their questioning practices in English classroom discourse; it may enable teachers' question more effectively to prompt their students and engage them in critical thinking. Specifically, the findings could be beneficial to the teachers, learners, curriculum planner and researchers.

Teachers. The study could provide teachers with a better understanding of how questioning techniques and discourse patterns impact language learning. This knowledge could help teachers develop more effective teaching strategies to engage students and enhance their language acquisition. By investigating how teachers use questions and discourse in the English language classroom, the research could help improve communication between teachers and students.

Learners. Understanding effective questioning and discourse patterns in English language classrooms could also benefit students who are learning English as a second or foreign language, potentially contributing to greater proficiency and multilingualism. By optimizing questioning styles and discourse patterns, students can benefit from a more inclusive, motivating, and effective language learning environment.

Curriculum Planner. The study could be valuable for teacher training programs, as it can guide the development of curricula that better prepare future English language educators. These programs could incorporate the insights from the research to help trainees become more effective instructors.

Future Researchers. This research study offers future teacher's valuable insights, practical guidance, and the tools needed to become effective educators in English language classrooms. It could significantly contribute to their professional development and ultimately benefit the students they will teach in the future.

2. Review of Related Literature

This section presented literature and studies both from foreign and local sources which were relevant to this investigation. They were reviewed to support the problem being studied. The relationship between questioning techniques and classroom discourse has been a focal point of educational research, particularly in understanding how different questioning techniques can influence student engagement, critical thinking, and overall learning outcomes. Various studies have highlighted the significance of questioning strategies employed by teachers and their effects on classroom dynamics.

Questioning Techniques. According to a study by Rahman and Irawan (2024), a study on questioning strategies in English literature lectures at a university in China has shown that the use of various questioning techniques leads to a significant improvement in student engagement and critical thinking. Students claimed these techniques improved their comprehension of the subject matter and helped them remember previous lessons. The same study suggests that teachers commonly use presentation, referring, follow-up, and rhetorical questions in their English literature classes (Rido *et al*., 2020). These techniques help learners in express their ideas and start conversations while also helping them in determining the level of their comprehension. It is important to realize that the earlier-mentioned benefits of asking questions depend on the teacher's ability to use this method effectively. Depending on personal characteristics, teachers‟ questioning methods may also vary. Teachers‟ questioning goals, the level of their questions, question types, use of probing questions, waiting time for follow-up questions, to whom they direct their questions (individual, group, whole class, etc.), and their reactions after asking questions demonstrate this variance in strategy, Dos *et al.,* 2016.

Learner's Engagement Through Questioning Techniques. One of the key components to creating effective teaching and learning processes is the method of questioning or questioning techniques used by teachers. Questioning by teachers in the teaching and learning process is one of the many interactions that occur in the classroom. Questioning techniques are one of the tools for achieving goals and stimulating students' mental activity. Questioning techniques is important because it can stimulate learning, develop the potential of students to think, drive to clear ideas, stir the imagination, and incentive to act. It is also one of the ways teachers help students develop their knowledge more effectively. (Questioning techniques and teachers' role in the classroom. (2020). An Indonesian study by Ismalinda *et al.* (2023) examined the kinds of questions English teachers asked each other in the classroom. The results showed that remembering and comprehending questions were more frequently used by teachers, especially at the start and middle of classes. In order to improve student understanding and participation, different techniques were used, such as providing waiting time and asking follow-up, searching, and rewording questions.

One prominent study by Yuliawati *et al.* (2016) examines the impact of teachers' questioning on students' critical thinking in English as a Foreign Language (EFL) classroom. The authors argue that effective questioning not only facilitates student participation but also stimulates deeper cognitive engagement. They emphasize that teachers who employ a variety of questioning techniques can enhance students' critical thinking skills, which is essential for academic success. This finding is supported by Wilen (1987), who reviewed multiple studies and concluded that specific questioning techniques correlate positively with student achievement gains. Wilen highlights that the act of questioning is fundamental to maintaining student participation and encouraging critical thought, reinforcing the notion that questioning is a vital pedagogical tool.

In the context of mathematics education, Shahrill and Clarke (2014) investigate teachers' perspectives on questioning in Brunei's mathematics lessons. Their research indicates that low-level cognitive questions often lead to chorused responses, which can stifle individual student engagement. They advocate for the adoption of effective questioning techniques that include planning relevant questions and phrasing them clearly to promote higher-order thinking among students. This aligns with the findings of Othman *et al*., 2022, who assert that questioning techniques are crucial for dialogic teaching in mathematics. Their study reveals that teachers view questioning as a primary tool for fostering dialogue and active learning in the classroom, further emphasizing the importance of effective questioning strategies in promoting student engagement.

Gao (2021) contrasts Chinese and Western teaching styles, highlighting the effectiveness of questioning as a teaching strategy. Gao suggests that a questioning teaching style can significantly enhance students' confidence and academic abilities, advocating for a more individualized approach to teaching that considers diverse learning styles. This perspective is echoed by Hui-Fang and Gillies (2021), who assert that different types of teacher questions can create varied learning opportunities, thereby increasing cognitive demands and enhancing student involvement in the learning process. Their findings suggest that well-crafted questions can provoke cognitive conflict and challenge assumptions, leading to deeper learning experiences. Gao's study (2021) on the comparative analysis of Chinese and Western teaching styles emphasizes the importance of questioning as a pedagogical tool. The research indicates that a questioning teaching style fosters a more interactive learning environment, allowing students to engage in critical thinking rather than merely receiving information passively. Approximately 72% of students reported feeling capable of understanding material before class, yet they struggled to apply this knowledge flexibly. This suggests that while students may be prepared, the traditional indoctrination style limits their ability to think critically and engage deeply with the content.

In the context of English as a Second Language (ESL) classrooms, Jusoh *et al*. (2020) explored the use of question modification strategies. Their findings reveal that teachers often adapt their questioning techniques when students struggle to respond, indicating a dynamic interaction between teacher questioning and student engagement. This adaptability is crucial for maintaining classroom discourse and ensuring that all students have the opportunity to participate. Similarly, Rahman *et al.* (2023) investigated the types of questioning strategies used by English teachers to stimulate student curiosity and active participation. Their research underscores the

effectiveness of varied questioning techniques in enhancing student engagement and fostering a more interactive classroom environment. Additionally, Park's (2022) analysis of questioning in STEAM classes for students with intellectual disabilities highlights the prevalence of lower-order questions, which may limit students' cognitive engagement. This finding aligns with the broader discourse on the necessity of incorporating higher-order questioning techniques to promote critical thinking and deeper understanding among students. The emphasis on cognitive and evaluative questioning is crucial, as it can lead to more meaningful classroom interactions and improved learning outcomes. The role of teacher questioning strategies is further supported by Sujariati *et al.* (2016), who conducted a discourse analysis of English teachers' questioning strategies in EFL classrooms. Their study revealed that effective questioning not only facilitates student participation but also impacts the overall learning activities within the classroom.

This is echoed in the work of Jiang and Zhang, who examined the influence of teaching styles on student engagement, noting that a supportive questioning approach can significantly enhance students' motivation and learning experiences (Jiang & Zhang, 2021). This literature specifies that questioning styles play a crucial role in developing student engagement and promoting critical thinking across different subjects. Effective questioning techniques facilitate classroom interaction and promote higher-order thinking and individualized learning experiences. It also encourages active participation and promotes critical thinking and deeper learning among students. The incorporation of diverse questioning techniques is important for creating a dynamic and supportive learning environment that caters to diverse student needs. It helped recognized the main strategies that are proven to develope student engagement, critical thinking, and communication skills. The literature also foregrounds the significance of aligning questioning techniques with pedagogical theories such as constructivism, schema theory, and the socio-cultural framework. However, this study stands far from past research by focusing on a cross-disciplinary analysis of questioning practices in a localized setting, specifically within junior high SME classes using English as the medium of instruction. Unlike earlier works that focused on a single subject area or general questioning strategies, this research integrates theory and practice to develop a localized and valid primer (SALUDSOD) catered for diverse learners in specific content areas. The combination of findings from different educational contexts also revealed many gaps: several prior studies be in need of comparative analysis across disciplines, failed to address the cultural and linguistic dynamics of questioning in multilingual classrooms, and seldom provided practical outputs such as a ready-to-use guide for teachers. This study addresses these gaps by presenting both analytical insight and a concrete instructional tool designed to support equity, engagement, and learning outcomes in a localized educational setting.

3. Methodology

Research Design - This research employed qualitative research. The qualitative research is a type of research which is based on deep understanding of people and issues. It focuses on numerical data and statistical analysis, qualitative research emphasizes meaning, perspectives, and underlying reasons through non-numerical data such as interviews, observations, and textual analysis Creswell and Poth (2018). Classroom Ethnography is a qualitative research methodology that involves the fascinating, systematic study of classroom environments to analyze the social, cultural, and interactional dynamics shaping teaching and learning. Rooted in anthropology, it asks researchers to engage deeply within the natural classroom setting, often through prolonged participant observation, interviews, and analysis of artifacts (e.g., lesson plans, student work). This approach prioritizes understanding the "insider" perspectives of teachers and students, focusing on how they construct meaning, negotiate power, and enact routines within the broader ecosystem of the classroom. By looking into the language use, nonverbal communication, and cultural norms, classroom ethnography shows implicit practices - such as how authority is established, participation is encouraged or suppressed, and equity issues manifest. Its strength lies in revealing nuanced, lived experiences that shape educational outcomes, making it important for understanding the complexities of real-world learning environments.

Population and Locale of the Study - The study was conducted at the Regional Science High School for Region I, Ma. Cristina East, Bangar, La Union during the fourth quarter for the school year 2024-2025. The

participants of the study were the junior high school teachers (Grade 7-10) who were using English as their medium of instruction. They include SME (Science, Mathematics and English) experienced teachers who have been teaching the subject for 3 or more years.

Data Gathering Instrument - Observation protocol with the aid of audio recording was the major instrument for the present study. The protocol used to get the questioning skills and the type of teacher and learner's talk. Lastly, MP3 recorder was used to collect discourse data from the junior high school English class. Focus Group Discussion (FGD) protocol was used to collect information about techniques of the different teacher participant of the group discussion. It is also used to collect insights from a small group of participants about a specific topic, issue, or phenomenon. FGDs encourage open dialogue and allow participants to express their views, share experiences, and reflect on ideas in a group setting, providing rich, detailed data for research.

Data Gathering Procedure - Prior to the commencement of data collection, approval from the Ethics Committee of the College was obtained to ensure that the study adheres to ethical standards, including informed consent, confidentiality, and the secure handling of recorded data. This approval guarantees that all procedures align with established ethical guidelines for research involving the participants. The data were collected from the learners in Science, Mathematics, and English class with their teacher in the Regional Science High School for Region I and each class consisted of 31 learners. The class was audio recorded and then transcribed for analysis. Using a tape recorder, the researcher attended the class, observed the classroom teaching and learning talks. The researcher did not intervene the natural classroom teaching and learning process and the verbal behavior of both teacher and learners and just observed classroom activities and took field notes to facilitate data transcription and analysis. The observation lasted for 45 minutes per class. The researcher observed the total 30 classes. The teachers were properly asked if they permit the researcher to observe in their class. After each class, the data collected were transcribed and analyzed.

The procedure for conducting a Focus Group Discussion (FGD) involved several key steps to ensure the gathering of meaningful data. First, the researcher clearly defined the objectives and purpose of the FGD, which guided the selection of participants and the development of the discussion guide. Participants were chosen based on specific criteria relevant to the research topic, typically consisting of 6-10 individuals who provided valuable insights. Once the participants were selected, the researcher prepared a structured discussion guide with open-ended questions designed to encourage rich, in-depth responses. At the start of the FGD, the facilitator introduced the purpose of the discussion, set ground rules (such as confidentiality and respect), and ensured informed consent for recording. The facilitator guided the conversation, encouraged all participants to share their views while managing group dynamics to ensure balanced participation. Throughout the discussion, the facilitator asked follow-up questions or probed to delve deeper into responses, while actively listened and steered the conversation back on topic when necessary. The session was typically audio, recorded to capture all verbal and non-verbal cues, and field notes may be taken to document the observations. After the discussion, the facilitator concluded the session by summarizing the main points and thanking participants. The recorded data was transcribed and analyzed for themes and patterns, providing valuable insights for the research objectives. The entire procedure was conducted with attention to ethical considerations, ensured that participants' privacy and consent were respected throughout the process.

Analysis of Data - The data were gathered using audio tape recorder that were transcribed, analyzed and interpreted using a thematic analysis approach. Thematic analysis is a method of qualitative research used to identify, analyze, and interpret patterns of meaning, or "themes," within qualitative data. It involves systematically coding and organizing data to identify recurring patterns, concepts, or topics that are relevant to the research question or objectives. Thematic analysis can be applied to various types of qualitative data, including interview transcripts, focus group discussions, survey responses, and observational notes. It is also typically used to describe a collection of text, such as transcripts.

Thematic analysis is a flexible approach to qualitative analysis that enables researchers to generate new

insights and concepts derived from data. It is a qualitative research method used to identify, analyze, and interpret patterns of meaning, or "themes," within qualitative data. It involves systematically coding and organizing data to uncover recurring patterns, concepts, or topics that are relevant to the research question or objectives, Braun and Clarke (2019). Thematic analysis enables researchers to conduct an in-depth exploration of qualitative data, uncovering underlying meanings and patterns embedded within the data. Themes emerge directly from the data through a systematic process of coding, where researchers assign labels or codes to segments of text that represent different concepts, ideas, or themes. This process follows an inductive approach, allowing themes to emerge organically from the participants' own words and experiences. Thematic analysis is often an iterative process, involving multiple rounds of coding, categorizing, and refining themes to ensure thoroughness and rigor in the analysis. Ultimately, thematic analysis provides researchers with a systematic approach to analyzing qualitative data and generating rich, nuanced insights into participants' experiences, perspectives, and behaviors.

Moreover, to attain credibility and corroborating results, the researcher had the triangulation process to add an in-depth analysis and credibility to the research. Specifically on the triangulation of the FGD transcriptions with the thematic analysis to corroborate. In addition, the localized primer created by the researcher undergone validity. Validation sheets were given to six (6) experts who were aligned to the field Science, Mathematics and English specially in implementing questioning techniques in the classroom to achieve the validity. The result of the validity assessment yielded to a mean score of 3.62, indicating a very high level of validity.

Point Value	Statistical Range	Descriptive Equivalent
1	1.00-1.75	Low Validity (LV)
2	1.76-2.50	Moderately Valid (MV)
3	2.51-3.25	Highly Valid (HV)
4	3.26-4.00	Ver Highly Valid (VHV)

Ethical Consideration - There were some ethical considerations that the researcher should keep in mind as the study was conducted. First and foremost, plagiarism was avoided by using the American Psychological Association (APA) writing style and properly attributing all sources used in the research paper. The participants were assured that no harm would be inflicted in them. Finally, all the date collected from the participants were used only for research data; thus, utmost confidentiality was ensured.

4. Results and discussion

This section comprised the results, analysis, and interpretation of the findings resulting from this study. The analysis and interpretation of data were carried out based on the results of the interviews with the participants. The data were presented in textual form in accordance with the specific questions posed in the statement of the problem. Interestingly, the primary goal of this study was to investigate, describe, and analyze the questioning techniques, ways on how questioning techniques of teachers facilitate learner’s engagement in classroom discussion, and of teachers in Science, Mathematics, and English (SME) classrooms, and solicit ideas and insights on the valid primer in asking questions that can be developed from the teacher-respondents.

Questioning Techniques of SME Teachers. Questioning is one of the most powerful teaching strategies that fosters critical thinking, engagement, and deeper learning in Science, Mathematics, and English (SME) classrooms. Although questioning techniques vary across disciplines, they all serve the common goal of prompting students to analyze, evaluate, and apply their knowledge rather than merely recalling facts. Based on the transcriptions of lessons in Science (Genetic Dominance), Mathematics (Law of Sine), and English (Romeo and Juliet), this study explores how teachers use questioning to facilitate classroom discussions, engage students, and encourage higher-order thinking. The research focuses on three key areas: the questioning techniques used by teachers, how these techniques support student engagement, and the development of a valid primer for effective questioning.

Teachers in SME subjects use a variety of questioning techniques suited to their discipline. In Science,

teachers utilize **open-ended and probing questions** to encourage hypothesis generation and real-world application. The transcription reveals that the teacher asks students to predict outcomes, challenge assumptions, and explore ethical dilemmas related to genetics, such as: **"Should scientists intervene to remove harmful dominant traits?"** Similarly, in Mathematics, **guided discovery and problem-solving questioning** are prevalent. Teachers help students break down complex problems by asking structured questions, such as: **"What happens if we change the given values? Does your answer still make sense?"** This approach scaffolds learning and helps students develop confidence in applying mathematical formulas like the Law of Sine. Meanwhile, in English, **Socratic and scenario-based questioning** is a primary method for literary analysis. The discussion on **Romeo and Juliet** features questions like: **"Did Romeo truly have no choice, or did his emotions overpower his reason?"** These types of questions challenge students to interpret character motivations, make connections to real-life situations, and critically analyze Shakespeare's themes.

Facilitating Learner Engagement Through Questioning. Effective engagement strategies include **Think-Pair-Share, real-world applications, and follow-up questions** to deepen discussions. In Science, students remain engaged through **scenario-based questions** that require critical thinking, such as predicting how recessive traits can resurface in future generations. The **real-life applications of genetic dominance** make the lesson relevant, sparking curiosity and discussion. Similarly, in Mathematics, **student engagement increases when teachers connect concepts to real-world problems,** such as using the Law of Sine in navigation and astronomy. The **progressive questioning approach** helps students construct knowledge step by step, making problem-solving feel like a discovery rather than memorization. In English, **engagement is facilitated through dramatic and hypothetical questioning**, where students analyze **Romeo's impulsive actions** and explore the role of **fate versus free will**. The teacher asks reflective questions like: **"If you were directing this scene in a modern adaptation, how would you portray Romeo's emotions?"** This encourages **creative thinking and personal engagement** with the text.

Developing a Valid Primer for Effective Questioning. To enhance the **art of questioning**, a structured **primer** can be developed to guide teachers in designing effective classroom discussions. This primer should include a **classification of question types**, differentiating between **recall, analytical, problem-solving, and ethical questioning** to ensure a balance of cognitive skills in SME subjects. It should provide **discipline-specific strategies,** such as **hypothetical and inquiry-based questioning in Science, step-by-step problem-solving in Mathematics, and Socratic questioning in English.** The primer should also incorporate **scaffolding techniques,** offering **progressive questioning models** that begin with basic recall and lead to higher-order questions requiring synthesis and evaluation. Additionally, **technology-integrated questioning** can enhance engagement, with tools like **Kahoot, Quizizz, and Padlet** providing interactive ways to assess student responses in real time. Finally, the primer should include **strategies for handling student responses**, encouraging **student-generated questions, inclusive questioning for diverse learners, and effective follow-up techniques** to promote deeper learning.

4.1 Questioning Techniques of High School SME Teachers

The researcher used the term ***SALUDSOD*** to integrate the answers of the respondents on the first research questions which was all about the questioning techniques, wherein there are various tactics used by teacher participants to apply such questioning techniques and strategies in their classes were elucidated by the analyses of the intelligently transcribed interviews. These strategies were classified under the following themes: **S**- Socratic Questioning, **A**- Asking open-ended questions, **L**-linking questions to gamification, **U**- using questions through recall and recognition, probing questions, **D**-directing to real-world application questions, **S-** simplifying conceptual questions, **O-** Omitting unnecessary words to create guided discovery question, **D**- diverting to probing questions.

Socratic questions - The Socratic method is a questioning technique that uses thought-provoking questions to uncover underlying assumptions and promote critical thinking. It fosters self-confidence and intellectual

growth through exploratory, spontaneous, and focused questioning. This method encourages students to ask their assumptions and see diverse perspectives, which is pivotal for developing critical thinking skills. Here are some of the respondent's claims:

> *"We have the Socratic questioning which involves a series of questions to stimulate critical thinking, and the fact-based questions in order to assess students' recall of specific scientific facts or concepts." (P1)*

> *"I am using* ***…Socratic Questioning" (P6)***

The effectiveness of the Socratic method is supported by literature that focused its role in challenging students' thinking and promoting deeper understanding. For instance, the Socratic method helps students question assumptions and explore different angles, which is essential for critical thinking (Kidtivity Lab, 2024). Additionally, it models curiosity and encourages self-questioning, leading students to develop similar habits (Cultures of Thinking, 2019). By using this method, teachers can create an environment where students feel encouraged to explore their thoughts without fear of being judged, thus enhancing their intellectual growth. Moreover, there was a study published in 2023 by Universitas Journal wherein they investigated the effectiveness of the Socratic Method in promoting student engagement and critical thinking in an online science class during the COVID-19 pandemic. The quantitative findings revealed significant improvements in participants' understanding of scientific concepts, as seen through higher posttest scores compared to pretest scores. The qualitative analysis highlighted the benefits of the Socratic Method, including stimulating critical thinking and fostering attentive listening. However, challenges such as lack of motivation and technical issues were identified

Asking Open-Ended Questions - Asking open-ended questions is a technique designed to get detailed responses from students. These questions encourage respondents to elaborate on their thoughts without being constrained by specific answer choices. Open-ended questions are effective in assessing critical thinking and reasoning abilities by requiring students to analyze, interpret, and explain their ideas in depth. Here is a claim from the respondent…

> *"We have the open-ended questions: to encourage students to think critically and explain their reasoning…" (P1)*

> *(Science): "I use open-ended questions to encourage students to think critically about dominance in genetics. I ask, "How would inheritance patterns change if dominance did not exist?" (P2)*

Open-ended questions are widely recognized for their ability to promote critical thinking. They are often used to "dig deeper" into students' understanding by asking "how," "what," or "why" (Kidtivity Lab, 2024). This approach helps students develop their analytical skills and encourages them to provide thoughtful responses. Moreover, open-ended questions facilitate discussions that involve multiple students, ensuring that everyone is engaged in the learning process (Kidtivity Lab, 2024). Additionally, a study on Open-Ended Questions in Indonesian Elementary Schools by Sarwanto, et al. (2021) wherein the researchers developed an open-ended question assessment instrument to measure students' critical-thinking skills in Indonesian elementary schools. The results showed that open-ended questions are valid, reliable, and practical for assessing critical thinking. They require complex thinking, leading students to analyze, interpret, and explain information critically.

Linking Questions to Gamified Questioning - Linking questions to gamified questioning involves incorporating game-like elements such as points, levels, and challenges to enhance learning outcomes. This approach makes the learning process interactive and enjoyable, increasing motivation and focus among students.

> *"For me, I prefer the gamified questioning for my students because this is very interesting to them and maximizes their classroom engagement and motivates them to answer the questions." (P3)*

While specific literature on linking questions to gamified questioning is limited, the concept aligns with broader educational strategies that emphasize engagement and motivation. Gamification in education is known to enhance student participation and enjoyment, which can lead to better learning outcomes (Hamari et al., 2014). By integrating game-like elements into questioning techniques, educators can create a more engaging and interactive learning environment. Moreover, another study by Agustín (2023) that highlighted the role of gamification in enhancing school engagement by incorporating game design elements into educational settings. Gamification contributes to the development of experiential, participatory, and creative skills, making learning more engaging and interactive.

Using Questions through Recall and Recognition - Understanding questions involve recall and recognition, where questions require retrieving information from memory, and recognition questions involve identifying correct answers from provided options. Both types are essential for evaluating knowledge retention and comprehension.

> *"I use recall and recognition question since it requires retrieving information from memory, and recognition questions involve identifying correct answers from provided options" (P7)*

Understanding questions are fundamental in assessing students' grasp of material. Recall and recognition questions, in particular, help deepen understanding by encouraging students to retrieve information from memory and explain their reasoning (Kidtivity Lab, 2024). Recognition questions, on the other hand, are useful for evaluating students' ability to identify correct information from a set of options, which is crucial for knowledge retention (Best Practice Strategies, 2013). Moreover, another study was on the analysis on the use of recognition questions in multiple-choice tests to assess students' ability to identify correct information. The results showed that recognition questions are effective in evaluating students' knowledge retention and comprehension, especially when used in conjunction with recall questions (Lee & Lee, 2023).

Directing to Real-World Application Questions - Directing questions to real-world applications involves connecting theoretical knowledge to practical situations. This approach bridges classroom learning with real-world challenges, enhancing relevance and engagement while fostering critical thinking and problem-solving skills. Here is a claim from the respondent:

> *"The following are the questioning techniques I use in my review class: open-ended questions, Socratic questioning, and real-world scenario-based questions." (P5)*

Real-world application questions are supported by literature that emphasizes the importance of connecting theoretical knowledge to practical scenarios. This approach helps students explore the implications of their knowledge in diverse scenarios, promoting critical thinking and problem-solving skills (Kidtivity Lab, 2024). By applying theoretical concepts to real-world situations, students can better understand the relevance and utility of what they learn in the classroom. Moreover, there was an article that highlights the importance of incorporating real-world examples into classroom learning to increase engagement and foster critical thinking. By connecting theoretical concepts to real-life scenarios, students can see the practical applications of their knowledge, making learning more meaningful and relevant (Cronin, 2024). Furthermore, another study that discusses the use of simulations to create real-world contexts for learning. Extended simulations allow students to practice responding to challenging situations in a safe environment, which enhances their ability to apply theoretical knowledge to practical problems (Way et al., 2021).

Simplifying Conceptual Questions - Simplifying to conceptual questions focuses on understanding abstract ideas and encourages students to apply knowledge to new situations. This approach fosters deeper understanding and higher-order thinking skills by prompting students to think critically about underlying principles.

> *"I use conceptual questions because I do believe that these will focus on understanding abstract ideas and encourages students to share their knowledge to new situations". (P4)*

Conceptual questions are essential for developing higher-order thinking skills. They encourage students to apply abstract concepts to new situations, which is a key aspect of critical thinking (Kidtivity Lab, 2024). By focusing on conceptual understanding, educators can help students develop a deeper grasp of subject matter and improve their ability to apply knowledge in novel contexts. Moreover, another research examined how conceptual questions can be used to promote higher-order thinking skills among students. The study found that conceptual questions encourage students to engage in critical thinking and problem-solving, leading to improved academic performance and deeper understanding of subject matter (Lee & Kim, 2022).

Omitting Unnecessary Words to Create Guided Discovery Questions - Guided discovery questions lead students to uncover knowledge through structured inquiry, often involving hands-on activities or leading questions. This approach aligns with research on learning and emphasizes active engagement and deep learning.

> *(Mathematics):" I rely on guided discovery questions in my lesson on the Law of Sine. I start by asking students, "How do you think we can find missing angles or sides in non-right triangles?" (P2)*

Guided discovery is supported by educational research that highlights the importance of active engagement in learning. By using structured inquiry and hands-on activities, students are encouraged to explore concepts independently, which enhances their understanding and retention of information (Cultures of Thinking, 2019). This method also promotes deep learning by engaging students in meaningful interactions with the subject matter. Moreover, a study examined the impact of guided discovery learning on students' academic performance in basic science. The findings showed that guided discovery significantly enhances students' understanding and retention of scientific concepts by promoting active engagement and problem-solving skills (Mgbomo et al., 2024).

Diverting to Probing Questions - Probing questions delve deeper into initial answers, pushing students beyond surface-level responses to engage in more exploratory thinking. This involves explaining their reasoning or providing examples to support their answers.

> *"I am a kind of teacher who gives probing questions because this will make them think in a deeper way." (P10)*

> *"Proving question makes them analyze and think critically." (P8)*

Probing questions are widely recognized as effective tools for encouraging deeper thinking. By asking follow-up questions like "Can you tell me more?" or "What makes you say that?", educators can prompt students to expand on their ideas and provide more detailed explanations (Kidtivity Lab, 2024). This approach helps students develop their critical thinking skills by requiring them to justify their responses and explore their thoughts more thoroughly. Moreover, there was research highlighted the importance of probing questions in fostering critical thinking among students. By prompting students to provide detailed explanations and examples, probing questions encourage deeper analysis and reflection, leading to improved critical thinking skills (Lee & Lee, 2022).

Ways by which Questioning Techniques Facilitate Learner Engagement - Based on the respondents' answers, these questioning techniques: These strategies were classified under the following themes: **S**- Socratic Questioning, **A**- Asking open-ended questions, **L**-linking questions to gamification, **U**- using questions through recall and recognition, probing questions, , conceptual questions, guided discovery questions, **D**-directing to real-world application questions, **S-** simplifying to conceptual questions, **O-** Omitting unnecessary words to create guided discovery, **D**- diverting to probing questions, facilitate learner's engagement in classroom discussion through a collaborative way such as think-pair and share, problem-based questioning, and scenario-based questions while asking the various questioning techniques. These justify the following responses of the teacher-respondents:

> *"For me, using the techniques in questioning while incorporating the think-Pair-Share works*

well in all subjects because students can discuss before answering, reducing anxiety." (P7)

"In my Math class, problem-based questioning leads to more engagement because students enjoy solving real-world applications of the Law of Sine." (P8)

"In my English class, scenario-based questions work best. When I ask, "If Romeo and Juliet lived today, how would their relationship be different?" students get excited to share their thoughts." (P9)

The Think-Pair-Share strategy, which aligns with the response of P7, has been widely studied for its effectiveness in creating a collaborative learning. Based on the study of Hennessy *et al*. (2020), this way encourages students to engage in peer discussions, reducing anxiety and promoting deeper understanding through shared reasoning. Similarly, Yang *et al.* (2020) found that collaborative questioning techniques like Think-Pair-Share enhance student participation and critical thinking, as students collectively construct knowledge through dialogue. Moreover, problem-based questioning, as highlighted by P8, is particularly effective in subjects like Math. Research by Afsyah (2019) demonstrates that problem-based questioning encourages students to apply theoretical knowledge to real-world scenarios, increasing engagement and motivation. This approach aligns with R8's use of the Law of Sine in practical contexts, where students actively solve problems, fostering both critical thinking and enthusiasm for learning.

Lastly, the scenario-based questions, as mentioned by P9, are highly effective in promoting engagement in English classes. Lin *et al.* (2020) found that scenario-based questions, such as reimagining classic literature in modern contexts, stimulate creativity and critical thinking. This technique encourages students to connect literary themes to contemporary issues, making learning more relevant and engaging. P9's example of asking students to reinterpret Romeo and Juliet in a modern setting corroborates these findings, as it sparks excitement and active participation.

4.2 Localized and Valid primer for Questioning Techniques

Rationale. This localized primer on questioning techniques straightly addresses the crucial need for high school SME educators to promote deeper understanding and engagement of the learners. By providing subject-specific methods grounded in Bloom's Taxonomy and integrated to the local curriculum, the primer empowers teachers to move beyond rote memorization and cultivate critical thinking skills essential for success in STEM and literacy. Its viability, on-hand templates and implementation tips ensure that educators can readily incorporate effective questioning into their daily classroom practices, making the learning environment into one that prioritizes inquiry, analysis, and meaningful participation for all students. The primer's validity stems from its alignment with research-backed pedagogical frameworks and its adaptability to diverse classroom contexts. By focusing on clear objectives—equipping teachers with targeted questioning strategies, increasing student participation, and addressing specific learning gaps—the primer ensures that questioning is intentional and impactful. This localized resource promotes a systematic approach to developing higher-order thinking skills, ultimately supporting curriculum standards, enhancing student achievement, and creating more dynamic and engaging learning experiences in high school Science, Mathematics, and English classrooms.

Objectives: This SALUDSOD primer for SME teachers aims to:

- Equip teachers with subject-specific questioning strategies to assess and deepen student understanding in Science, Mathematics, and English.
- Increase student participation rates by 30% through targeted questioning techniques within one academic term.

4.3 SALUDSOD: A Localized primer on questioning techniques for SME Teachers:

Based on the responses of the participants, the primer must contain the necessary techniques in questioning were classified under the following: **S**- Socratic Questioning, **A**- Asking open-ended questions, **L**-linking questions to gamification, **U**- using questions through recall and recognition, probing questions, conceptual questions, guided discovery questions, **D**-directing to real-world application questions, **S-** simplifying to conceptual questions, **O-** Omitting unnecessary words to create guided discovery, **D**- diverting to probing questions. The SALUDSOD Primer provides a comprehensive framework for questioning techniques tailored for SME teachers, emphasizing various strategies to enhance student engagement and learning. At its core, the primer includes techniques such as Socratic questioning to encourage critical thinking and dialogue, asking open-ended questions to stimulate discussion, and linking questions to gamification to engage students through interactive experiences. Additionally, it incorporates using questions for recall and recognition, directing questions to real-world applications, simplifying complex concepts, omitting unnecessary words to facilitate guided discovery, and diverting to probing questions to encourage further exploration. The purpose and objective of each question are crucial, as they must align with specific learning goals, whether to assess understanding, stimulate discussion, or foster critical thinking. This clarity ensures that questions are effective in achieving their intended outcomes, as highlighted by researchers such as Pandey (2022) and Jiang (2014). The primer also advocates for a mix of open-ended, reflective, and evaluative questions to cater to diverse learning needs. Open-ended questions encourage discussion, reflective questions help students connect new concepts to their experiences, and evaluative questions promote critical thinking, as noted by Ruiz-Primo (2016) and Furtak (2017).

5. Conclusion

This study confirms that effective questioning is a vital instructional strategy that enhances critical thinking, engagement, and deeper comprehension in SME classrooms. Teachers utilize subject-specific questioning methods to promote inquiry, facilitate problem-solving, and stimulate literary interpretation. The integration of structured questioning, technology, and differentiated strategies strengthens student participation and knowledge retention. The development of a teaching primer on effective questioning is recommended to guide educators in implementing best practices, ensuring that questions not only assess knowledge but also foster meaningful discussions and higher-order thinking.

5.1 Recommendations

Based on the findings and conclusion of this study, the following recommendations are proposed by the researcher to refine questioning techniques and maximize their impact on student engagement and learning in Science, Mathematics, and English (SME) classrooms:

- Educators may apply or employ differentiated questioning techniques to accommodate diverse learners. Teachers may use scaffolding questions to support students with varying levels of prior knowledge. Design tiered questions that progress from basic recall to higher-order thinking (aligned with Bloom's Taxonomy).
- Educators may encourage an environment where mistakes are viewed as learning opportunities. This can reduce fear of participation and promote risk-taking in answering challenging questions.
- Educators may integrate interactive tools such as Kahoot, Quizizz, or other gamified platforms to make questioning more engaging and inclusive. Use these tools to create quizzes or polls that assess understanding while maintaining student interest.
- Future researcher could create a comprehensive guidebook for teachers that outlines best practices in questioning strategies tailored to SME disciplines. This primer should include examples of

subject-specific questions, such as open-ended questions for Science, problem-solving inquiries for Mathematics, and Socratic questioning for English.

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