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Narratives of Nepali school mathematics teachers on classroom questioning techniques

Niroj Dahal [1*]

[1] Department of STEAM Education, Kathmandu University School of Education, Lalitpur, NEPAL
***Corresponding Author:** niroj@kusoed.edu.np

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ABSTRACT

This article examines the impact of Nepali math teachers' questioning methods on current classroom practices in mathematics pedagogy. In this collection of short stories, four high school math teachers of Kathmandu Valley, Nepal share their experiences. This investigation used a criterion-based selection strategy to select high school math teachers. This article aims to focus on the difficulties students face in the classroom using questioning techniques. Behaviorist, social constructivist, and constructivist theoretical frameworks are employed in this study. "How do high school math teachers describe their questioning techniques?" was the research question for this study. I listened to four math teachers' perspectives to learn more about the power dynamics in the classroom, specifically who is valued and whose voice can be heard when students ask questions in the context of a narrative inquiry for meaning making. Most high school math teachers initially appear to conformists to perceived appropriate method of questioning but later become nonconformists, which is defined as being more adaptable in their questioning technique. Many high school math teachers also ask a wide range of questions, from simple to complex, in the belief that this encourages students to participate in the mathematical discussion.

Keywords: questioning, mathematics, perspectives, narrative inquiry, approaches, mathematical discussion

INTRODUCTION

Based on the research question, "How do high school mathematics teachers narrate their questioning techniques?", this article aims to examine the questioning techniques employed by teachers in high school mathematics classes. As a common teaching and learning strategy in mathematics classrooms, questioning has been identified as a common technique. When people interact with one another and participate in discussions, they can learn a lot (Vygotsky, 1978). As a result, both the sociocultural perspectives of the high school mathematics teacher and the sociocultural perspectives of the students have an impact on the social and cultural interactions that occur in the mathematics classroom. Throughout this sociocultural investigation of classroom practices, a strong emphasis has been placed on language as a critical component of culture and as a singular criterion by which individuals form their thinking through questioning. According to teachers who follow this model, the student-centered instructional model holds that students are active participants in the process of knowledge construction, rather than passive recipients of information from the teacher (Dahal, 2017; Dahal et al., 2019; Seung et al., 2011). Therefore, teachers require a student-centered approach to provide opportunities for students to gain knowledge through hands-on learning experiences (Polly, 2014). Consequently, effective communication in the classroom is essential for both teaching and learning (Dahal, 2013; Dahal et al., 2019), and specifically, questioning is an important experience to consider in this context. Teachers' questions are intended to direct instruction toward a specific learning objective while also extending and solidifying students' understanding of a subject matter (Chin, 2007). An understanding of what students must learn and know to be successful in mathematics instruction and strategies for challenging and assisting them in doing so are required for effective mathematics instruction (NCTM, 2018). Teachers must be knowledgeable about the types of questions to ask in order to engage and differentiate learning for students who have a diverse range of knowledge, according to NCTM (2018). In the mathematics classroom, questioning is one of the most effective instructional strategies that teachers can employ (Cotton, 1989). During my own classroom experience, I found that the strategy of questioning was a valuable tool for students in developing confidence and understanding.

Also worth considering are the findings of Edwards and Bowman (1996), which are as follows: Researchers discovered that the questioning of teachers is an important element in the interactions that take place in mathematics classrooms. This is likely because it allows teachers to identify the mathematics needs of their students. It is recommended that teachers use a variety of questions to determine whether or not students are familiar with the mathematics they are about to learn as their primary instructional strategy in this regard. Mathematics teachers incorporate a variety of skill categories into their instruction, including

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problem-solving, critical thinking, and reasoning, but are not always aware of which skills are truly beneficial for students when it comes to mathematics (Sahin et al., 2002). Caram and Davis (2005) discovered that effective teachers can improve student learning by encouraging critical thinking skills, reinforcing understanding, correcting mistakes, and providing feedback to students. This investigation into the manner in which mathematics teachers ask questions in class has the potential to have an impact on mathematics teacher pedagogy in the long run. Moreover, according to Croom and Stair (2015), mathematics classroom questions are the most effective experimental teaching and learning tools for promoting academic improvement and evaluating students' critical thinking skills in mathematics. Vogler (2005) agreed, stating that questioning can aid in the formation of connections to prior knowledge and can inspire cognitive expansion in those who engage in it. Moreover, according to Hill and Fly (2008), the difficulties associated with teachers' questioning in mathematics classrooms are caused by teachers' failure to consider students' capacity, which frequently results in poorly organized questions that do not reinforce student understanding (Luitel, 2009). Mathematics teachers must know the art of questioning and the various types of questions in order to improve students' understanding, and this research has the potential to be a revelation for all mathematics teachers, as demonstrated by the results of this study.

Teachers' questioning techniques can benefit students' reasoning abilities by encouraging and promoting them, which is essential for involving them as active participants in the learning process (Van Zee & Minstrell, 1997). Researchers have studied teacher questioning in mathematics classrooms and discovered that 93 percent of teacher questions are "lower-level" recall questions that require basic knowledge of the subject matter. The fact that student performance in mathematics is generally below average is not surprising as a result of these factors. A teacher's skill set should include both subject-matter knowledge and pedagogical knowledge and expertise. It has already been stated that essential pedagogical knowledge for teachers includes not only a knowledge and understanding of the types of questioning strategies that engage students in mathematical conversations (such as starter questions, questions that encourage mathematical thinking, assessment and discussion questions), but also a knowledge and understanding of how best to scaffold learning in order to support students' learning. If a mathematics teacher wants to facilitate classroom discussion, he or she must be familiar with a framework for categorizing questions that can be used to guide or technique for asking productive questions and demonstrate how questioning helps to establish productive norms in the classroom (Goos, 2004). On the topic of question types, Cotton (1989) synthesized relevant research and established a dualistic system in this area of study. There are two broad categories of teacher questions in the mathematics classroom: low-level questions and high-level questions. Direct, closed, knowledge, and recall questions are all terms used to describe questions at the low level of difficulty. High-level questions that are open-ended, interpretive, evaluative, probing, inferential, emergent, and synthesis-based are an alternative. Additionally, Goos (2004) emphasized the importance of teachers allowing students "wait time" to respond before moving on to the next question. Allowing students to respond with higher-order thinking skills is made possible by allowing for processing time. McCrone (2005) conducted extensive research on the best ways to begin and end a discussion, and the results of this research have contributed to the body of knowledge in mathematics education regarding teacher questioning and discourse, as well as the promotion of deep level student learning.

When it comes to developing students' personal math confidence and competence through questioning in Nepal, I found that teachers' roles were insufficient. Many math teachers are unable to ask insightful questions during class, which can lead to poor student outcomes in the subject area of mathematics. Some math teachers assume that students are already familiar with the material in the classroom. Algebra and geometry are two examples of this. Teachers of mathematics who lack a thorough grasp of the subject may also find it challenging to come up with engaging class exercises for their students (Danielson, 1996). Math teachers' questions are examined in the following research article, which focuses on their comprehension and use of questions. A lack of understanding and application of effective questioning techniques may be a contributing factor.

LITERATURE REVIEW

Inquiring about a problem or dilemma is an attempt to determine whether or not the student has the ability to provide an appropriate response to the problem or dilemma in question. "A question," according to Seime (2015, p. 5), is defined as "a statement that calls for a response." People use the term "questioning" to describe the process of determining what a learner will do with a concept in mathematics class. As a result, there has been a significant amount of questioning in the classroom for an extended period of time. In this section, I'd like to discuss the concepts of Socratic questioning and the concept of a verbal jigsaw puzzle in greater detail. Additional goals include deconstructing logical reasoning and discussing how questions should be phrased. To understand the mechanics of Socratic questioning, it's important first to understand the great philosopher Socrates himself. Socrates used probing questions to compel his students to think about, clarify, and justify their assertions, and he was successful (Harrop & Swinson, 2013; Newton, 2012).

The ability to distinguish between what can be proven and what is reasonable in light of the facts and what to inquire about in math class is essential for a Nepali speaker. While critical thinking is defined in mathematics as "the ability to reason clearly and logically," students are also encouraged to think creatively and independently when they pose math-related questions to their classmates and teachers in class. Consequently, when it comes to making logical connections in math lessons, critical thinking skills are essential. Making sure that a process of questioning and responding supports your own beliefs and values is the best way to think critically. In math classes, critical thinking is essential because students' attention is drawn to a set of innovative questions that serve as a tool for gaining a better understanding of the subject matter while also allowing them to retain information and generate new ideas. It is possible to learn critical thinking skills in the classroom and then apply them in the real world after graduation. Important to remember is that critical thinking goes beyond simply recalling facts from math class. It's also about having the ability to think about things in a different way. To solve algorithmic math problems, a critical thinker, on the other hand,

must be able to gather relevant information and draw conclusions from an analysis of known facts, which requires the use of logic. Education reform in the twenty-first century will be impossible without the development of critical thinking abilities on a high level (Bulach et al., 2011; Dahal, 2017). The use of critical thinking in math classrooms creates a thought-provoking environment that encourages both students and teachers to engage in higher-order reasoning skills. Critical thinking helps students better understand math because it allows them to think critically about the subject matter. This not only assists them in learning more about mathematics, but it also assists them in thinking more precisely about mathematical concepts and problems.

The questions used in high-stakes assessments were found to be related to students' performance in this study, but how did they come to that conclusion? (Beyer, 2000). It is customary for a teacher to be the one who leads a math class, and he or she will also be the one who speaks the most (Treffinger & Isakson, 2001). According to experts, student reflection and the formulation of sound responses for their peers must be given more attention in the classroom (Blosser, 2000). A question's purpose becomes clearer when asked, making it easier to determine why it should be asked (Anderson, 2001). It is not simply the case that individuals who are more interested in mathematics will ask more questions during class. Students' thoughts and feelings about the subject matter should be elicited by the manner in which and what questions are asked; according to Clarke (2006), mathematicians discovered that good questions are easy to understand. Also discovered was the ability to modify the materials in order to accommodate students with varying levels of ability in any math class. Students can benefit from effective questioning when comparing, inferring, forecasting, applying, relating, making generalizations, and solving algorithmic math problems, among other things. As Farrant (2008) points out, when questions are used appropriately, they can also assist students in developing creative thinking skills as they design, test, and solve algorithmic math problems.

THEORETICAL PERSPECTIVES

Through narrative inquiry, I can gain a more in-depth understanding of how math teachers use questioning skills in the classroom from a different standpoint. The purpose of this study was to investigate the beliefs and understandings that underpin teachers' use of questioning in teaching and learning in order to clarify the theoretical perspective, and the findings revealed that using learning theories such as behaviorism, constructivism, and social constructivism as theoretical referents, this study seeks to determine whether or not they are effective.

When applied to the mathematics classroom, behaviorist learning theories investigate how students form stimulus- response associations and how this influences their actions. In accordance with Orey (2012), math teachers use these strategies in order to ensure that their classrooms run smoothly and efficiently. Students' attitudes and beliefs about math learning in the classroom were addressed in this study, which revealed that questioning in the classroom helps students accept the relationship between attempting and succeeding by addressing their attitudes and beliefs about math learning in the classroom (Pitler et al., 2007). An association exists between your actions and the amount of effort you put forth. After studying behaviorist learning theory, I can now see how questioning strategies are used in today's math classrooms, which I did not realize before. There are numerous instructional strategies that are compatible with behaviorist principles, regardless of the learning theory being used. For example, behaviorist theory is still relevant in math classrooms when it comes to questioning students.

An educational perspective known as constructivism holds that students create their own knowledge by drawing on their prior knowledge and experiences while also questioning what they have learned (Gunstone, 1995). A consensus has been reached on four primary characteristics of constructivist teaching in the mathematics classroom, which are as follows: acquiring prior knowledge, creating a cognitive gap, assessing the relevance of acquired knowledge through feedback, and reflecting on learning. One of the central tenants of constructivism is that rather than memorizing concepts provided by teachers, students should be encouraged to create their own knowledge. Techniques such as structured teacher interrogation are used to accomplish this goal. Constructionist theory holds that students construct their own knowledge, both independently and with the assistance of their teachers. The role of the math teacher is to set the stage, establish the challenge, and provide support to students as they work to build their mathematical knowledge through investigation. Constructionist perspectives on mathematics teacher questioning assert that the ways in which students make, build, and extend meaning should complement and push against one another, and constructivism impacts how teachers and students learn across a range of subjects through the use specific teaching and learning methods. Instead of simply drilling and practicing correct procedures and facts in order to obtain the "correct" answer, teachers in constructivist math classrooms ask questions that encourage students to think critically about problems and concepts rather than simply drilling and practicing correct procedures and facts in order to obtain the "correct" answer.

This approach emphasizes social interactions (such as those that occur in the classroom) and culture's role in the production of knowledge. Furthermore, whereas the constructivist focuses on individual experiences (e.g., teachers or students), the social constructivist focuses on social interactions and culture in the classroom. In order to understand how math teachers and students communicate in a math classroom, it is not enough to simply look at how cognitive concepts are passed around. Additionally, you must consider how social experiences can assist students in their academic endeavors. For this study, social constructivism provided a clear picture of the higher cognitive processes that can develop as a result of social interaction. Vygotsky (1978), a seminal figure in the field of cognition theory, asserted that higher cognitive processes emerge as a result of social interaction. He was one of the first to make this claim. Its central contention is that students' involvement in mathematics is a process of cognitive development, as they explain mathematical problems or tasks and construct mathematical facts as part of their learning process. In other words, their inquisitive and interconnected theoretical framework is a natural fit within the field of mathematics. The same way, Bauersfeld (1992) asserts that children must learn to be constructive in the mathematics classroom through social interaction with their teacher and peers. Students, on the other hand, begin to learn how to do math with the help of their teacher as soon as they begin school (Cobb et al., 1992). When it comes to mathematics, teachers play the role of navigator, assisting

students in making the transition from everyday concepts to the world of mathematics. The use of questioning techniques can assist students in making the transition from abstract concepts, symbols, and practices to real-world community math applications.

METHODOLOGY

The narrative inquiry method was used in this research article to gather information (Clandinin, 2013). Through interviews (Creswell, 2007), the narrative inquiry method was used to elicit teachers' experiences with mathematics questioning and to develop personal narratives about teachers' mathematics questioning techniques in the classroom. Interviewing, recording, and analyzing teachers' responses to their questions provided me with insight into their experiences as secondary school mathematics teachers. It is proposed in this article that teachers' personal experiences, referred to as "the truths," should be supported by an experience-centered approach that focuses on retelling student and teacher experiences and is remembered as highly motivating. When it comes to conducting a narrative inquiry study, there is no one-size-fits-all approach. In this study, the author sought to describe, analyze, and interpret the culture of questioning in mathematics classrooms as seen through the eyes of mathematics teachers in the Kathmandu Valley. This was accomplished through the use of a criterion-based selection strategy when selecting participants for the study (Cohen & Crabtree, 2006; Roulston, 2010). The criteria-based selection procedure ensured that only the most qualified participants were chosen based on their ability, knowledge, and comprehension of the questions posed during the interview process. Each participant was required to share their own personal experience with the phenomenon under investigation in their own words (Creswell, 2013). Taking into consideration the research's time constraints, four narrative stories were developed.

In this investigation, the narrative stories of four research participants and the researcher are presented as co-constructed narratives about questioning techniques in the mathematics classroom, with the researcher serving as the central figure. Each story has also been analyzed and interpreted in order to establish links between the narratives and a variety of theoretical perspectives and practices for meaning-making (Mitchell, 2011). The narrative data was analyzed thematically, with an emphasis on the participant's own personal experience. It was necessary to conduct a second interpretive review in order to identify and document the various perspectives on teacher interrogation. It has been compiled the perspectives of individual teachers on questioning and the stories of teachers organized around broad themes. Teachers' values, personalities, and personal interests can be discerned from the information gathered through this process. Through four interviews with mathematics teachers, I was able to develop the initial set of themes or "nodes" (Riessman, 2008). A node-based organization of the themes was used to identify segments of interviews that were relevant to each teacher's narrative, which were then tagged or attached to the relevant themes as a result of this organization.

DISCUSSIONS

This section discusses the overall spirit of the research, which is based on the research question and methodological map that have been established. The stories of four mathematics teachers from four different schools in the Kathmandu Valley have been developed and presented. Here are four types of such stories.

Sudha's Story

I was warmly welcomed into Balkumari Secondary School for an interview with Sudha ma'am. She is the Head of the Department of the Department of Mathematics. She seems pleased to see me. I was not new to her at all because we often meet in various seminars and conferences. Once the introductions have been taken care of, I explain my background and purpose of the research. After we get started with the discussion, she indicates that I can start to record the interview and she begins formally with her introduction and continues in a rehearsed way. Her interview is recounted, as follows:

> She has been engaged in the teaching profession for more than ten years. She has completed her bachelor's degree in commerce, also B.Ed. in mathematics education from Lalitpur Campus. Now, she is continuing with her master's degree in mathematics education at Tribhuvan University. She used to teach any subjects assigned in school, but mathematics has always been her favorite one. So, she has selected mathematics as her major subject in her master's degree.
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> According to her, she has divided her school-level education into the primary and secondary levels. She found all the subjects quite easy during her primary level, and algorithmic mathematical problems were solved easily. She said, "but sir, the chapter 'volume', while I was in class five, was a bit challenging to me". The question asked by the teacher in the mathematics classroom was to calculate the volume of water pipe whose length is 20cm and radius is 14cm. The teacher helped with her problems and also kept inquiring if she understood it. Thereafter her teacher assigned the questions of the same patterns as homework but, to her dismay, she could not solve the problems at home. Then, she realized that though she understood the process in the mathematics classrooms, even when she tried to solve the same problem at home, she failed. So, her mind was totally occupied by that unsolved problem. It took her whole month to understand and solve the algorithmic mathematical problems.
>
> She was very good at arithmetic but not algebra because algebra was not included in the mathematics curriculum (in their school) until grade 6. She was studying in "Amar Sisu" school and her friends in Gyanodaya school, where algebra was

taught from grade 4. When she saw her friend's practicing algebra, her curiosity made her go to her friends but her friends could not support her. Her parents had changed her school from grade 6 where algebra was also included but her mathematics teachers of new school used to teach grade 6's algebra in grade 5's and accordingly. She said, "Imagine sir, what happened to me at that time when I was at zero level in algebra?" Without any basic knowledge and foundation, she had to go ahead with her friends. So, she was almost in tension and anxiety. She said "When in bed, I fell asleep thinking all about algebra, I even dreamed of some questions regarding it, then made a note of it the following morning. Later when I opened the mathematics book, there seemed to be similar types of questions. I looked up the watch, it was 4 AM in the morning and I started solving those questions till 6 AM". This practice became the foundation of algebra that boosted her level of confidence and she never worried about algebra.

Her mathematics teacher in secondary level was always punctual and started the class with relational questions like "Have you completed your homework? Do you have any confusion regarding the previous class? Can you solve the question on board?" Those who could not complete their homework or had any confusion in the algorithmic mathematical problems, the teacher made a point to help them individually. The teacher also used to repeatedly inquire them to confirm their progress and understanding in mathematics. For that, her teacher used to ask questions like, "Why did you choose this problem-solving method? Can you find a more effective strategy? Do you think this would work with another number? And what do you notice when you have completed the assignment?" For example, in the topic fraction, her teacher used to ask algorithmic mathematical questions like "If two fractions have the same numerator, which fraction is smaller? How do you know? If two fractions have the same denominator, which fraction is larger? How do you know; what happens to the value of a fraction if the numerator is increased by 1, but the denominator stays the same?" etc. She could relate some algorithmic mathematical questions to their textbook and some from practice books. He used to ask exam-oriented algorithmic mathematical questions and assign those types of questions for homework as well. She used to practice them a lot without knowing any significance of them.

During her university-level education, the professor rarely asked any questions. Sometimes her professor asked questions like finding out the facts about the topic and the latest research on the topic? Have you thought about all possibilities? etc.

She has started her teaching for more than 10 years before. During her childhood, she used to act as a teacher to her juniors as a role player. In absence of her juniors, she used to treat bags, pillows, books, tables, etc. as her juniors and used to check her senior's copy, given them tick mark and remarked as 'good' and 'very good' and sign just below the tick mark in absence of seniors; and she used to ask questions like Did you understand? Did you copy the homework? etc.

After completing bachelor degree, one of her friends asked her for home tuition, she agreed, but at the same time she saw three vacancies in the newspaper and she applied for it all. Each school she applied for, offered her the job but she joined Balkumari Secondary School and is continuing her teaching career, in the capacity of head of department till date.

She recalls the very first day of her mathematics class which was so noisy and massive. When she started teaching each step of the problem/s with genuine logic, the class became calm and quiet within a week. The class was active and they seemed to be overjoyed when she started to connect the mathematics class with their daily life. During the early phases of the class, she asked questions like: How are you? Can you remember something about yesterday's class? Have you solved the given question? Is there any confusion about yesterday's class? She used to connect mathematical concepts with real life as far as possible. She said, for example, when she has to teach the topic of patterns. She used different materials like potatoes, garlic, tomatoes, etc. When she keeps them in a pattern such as at first potatoes, second garlic, and last tomato, after making two patterns, she asked the students what should be kept after potatoes. After completing and sharing examples, she used to define the word 'patterns' relating with their answers. One day when she was sharing the example of patterns, a child said that his mom smiles sometimes and cries sometimes and again smiles. Is this also a patterns ma'am? To this, she answers 'yes, this could be a type of pattern'. Sometimes the class becomes boring, at that situation, she often asks, "Can you sing a song for me? Does anyone want to share a joke?" She uses imagination and meditation technique for the class such as "please close your eyes, imagine that we are not in classroom…, we are on swimming pool, we see clean water there and start to swim. After swimming for 15 minutes, we take ice-cream and sing a children song by the time we have returned to school. Now you are on the school ground. Then, I say please open your eyes. After this imagination meditation technique, all the students seem to become active and I can continue with my class".

She likes her students asking questions. Her students used to ask "how and why" types of questions. She used to ask the following questions in between the mathematics class: Do you see everything clearly? Do you know how to derive the formula? Can you give some examples? Are you feeling sleepy? She also said that she had to be careful if her students were not asking any questions. If they have not asked any questions in between, she realizes that this teaching technique is not working for her students, or they are not interested in the topic.

In her thought, the uses of real materials are more effective than the pencil, paper, and blocks, to arouse the students' interest, as it is a must because without interest any teaching strategy will not work perfectly. She used to ask questions about the topic relating to the previous knowledge. She said, "When I have to teach the lesson 'time,' I used to ask what time is it now? What time did you reach home yesterday? What time did you get up today?" If I have to teach the lesson "shape", I used to ask, have you seen gas cylinder? Have you eaten ice-cream? Which shape of ice-cream did you eat? Is there anything of triangle shape in your home? She mentioned that if her students could come up with the proper answers

to her questions, she was somewhat successful; otherwise, she would have to modify her strategies in teaching and learning in mathematics class.

She recalls, “one day, I had to teach the topic ‘fraction’ so I have prepared bread and brought them in the class. After chopping it in equal two parts and I asked, holding one part in my hand, what is the piece of chopped part (of whole bread)? I chopped the half-breed in two equal parts again and asked what is chopped part of the whole bread? Now, before starting it all, I had asked the students, how many pieces would be there if I chopped all of these pieces again? Some of them told sixteen and others told 12. But before I have chopped all the bread they had already told the correct answers. Hence, I related it to the topic, that class became memorable for both of us, the students and me”. She said that all the students understood the topic “fraction”.

She narrates her teaching days like this: One day, she had established the ‘model market’ and had asked students to buy some materials making uses of real money and asked the same question in an examination, their language was not so much good, but all the students identified the note (piece of paper money). She also said teaching is more effective if she can relate the topic to the students’ favorite cartoon, film, song, etc. Her questions varied according to the level of her students, she posed simple questions for average ones, hard and tricky questions for talented students and some easy questions for less talented students. She was satisfied with the three-quarter part from her questioning patterns, but she could not find that remaining part, could be, because of her fault or that of her students, she had no idea at all.

Her keen observation led her to realize that roughly three-quarters of the students cannot understand more word problems, leading to only one-fourth of students understanding and solving them. But she strongly opines that students should solve any type of question in any situation. She asked direct questions and word problems in equal proportion in the examination. Now, she is thinking about how to help them in a more effective way to strengthen the students’ understanding in mathematics.

In Sudha’s narrative story, it seems that she is a highly flexible mathematics teacher and uses the democratic practices in her mathematics classroom while questioning. Additionally, as Sudha is habitual with the notion of behaviorism (Cherry, 2014) but to some extent, she follows constructivism approach of asking questions to the students for meaning-making. Additional to categories of questions, Sudha asks average level of questions almost, but she includes a hard and tricky question for talented students and some easy questions for less talented students (Anderson, 2001). In Sudha’s narrative, she is aware of her teaching and learning practices to enhance students’ understanding and is satisfied with the three-quarter part from her questioning patterns. Sudha seems to be highly influenced by algorithmic and day to day life practices in mathematics classroom while questioning.

Lal Bahadur’s Story

Before the sun rises up in the sky, I walk up and head to Lal Bahadur’s home at Jadibuti for an interview, which we had fixed on a particular day. I had often consulted Lal Bahadur for an interview. That very day, he was there and was happy to welcome me in his home. He served me milk tea and we sat on the top floor. He speaks consciously and seriously because he has been working as a mathematics teacher for a decade, but oftentimes, he breaks into a smile or laughter in between our conversations. After getting into the discussion, he indicated that I could start recording the interview and formally begin his introduction. I have narrated his interview, as follows:

He has completed a bachelor’s degree in mathematics from Tribhuvan University and has been studying master degree in the same university. He has been engaged in the teaching profession for 10 years.

Lal was interested in learning mathematics from his childhood. He was curious and active student in his school. He always enjoys reading and practicing mathematics. In his childhood, his father used to bring bananas and would ask him to serve it to all the family members one by one, and would ask him to tell the numbers of the bananas he distributed? How many members are there in our family? Sometimes his father used to send him to buy sugar, biscuit, razor, etc. and asked him to tell the price of each of them. These daily asked questions were the foundation of his mathematics.

While in grade three, his mathematics teacher would start the class with questions like, “Have you completed your homework? Are there confusing questions? Can you solve yesterday’s algorithmic mathematical problems?” etc. He would give the whole exercise as homework. His teacher used to praise those students who could solve the questions even if they were wrong, but he would punish those students who had not even tried. As a punishment, the student who had not done the homework was slapped by the one who had done it; and Lal Bahadur was one who usually completed the homework.

At that time, mathematics was considered to be a tough subject; his teacher would ask, “Have you solved the mathematical problems, even in the tiffin time?” In mathematics class, his teacher used to ask, “Have you tried to solve the algorithmic mathematical problems?” If yes, he should submit the copy to his mathematics teacher. Sometimes, some of his friends lied that they had forgotten the copy. Then, his teacher asked to submit the copy the next day. The next day, they were punished because that was not the truth and also they had no new copy to solve the algorithmic mathematical questions.

In grade five, his mathematics teacher used to ask, “If one angle is 45^0 of supplementary angle what will be another angle?” While teaching “set” in grade six his teacher used to make uses of placards of A, B, etc. and ask questions like, “What does

it indicate? What is the meaning of AB? How can you explain AB?" Similarly, in grade eight he had read about "simple interest". After returning from his school, he had been to his uncle's home, where his grandmother was receiving money from someone and asked him to calculate the interest of Rs. 5,000 at the interest of Rs. 3 per month of Rs. 100, which he could not do.

He enjoyed algebra, Indices but never knew any significance of them. His arithmetic teacher used to ask, "According to the rate of electricity charge Rs. 8 per unit for 0-50 units and Rs. 9 per unit for 51-150 units. How much will be charged for the consumption of 150 units?" He calculated the charge but never knew about the significance of the topic because there was neither electricity nor charging in his village. He realized the importance of topic when he enrolled himself in 10+2 level in Kathmandu Valley. In between the class, his teacher would ask the algorithmic mathematical problems like "In a survey of a community, it was found that 55% of the people preferred summer season, 20% liked winter season, 40% did not like both the seasons, and 750 liked both seasons, illustrate it in Venn-diagram."

In his school days, he found additional mathematics a bit tough. He could not recognize any significance in those topics except in "height and distance", sequence and series and all the questions his teacher used to ask were from an exact textbook, no new and creative questions were ever introduced. His teacher started teaching from practice books and question collections set just before SEE (now SEE). There were hard and tricky algorithmic mathematics problems like, "A man gained Rs. 3,000 by selling a watch allowing 10% discount on the market price. If he allows a discount of 5% on the marked price, he would have gained Rs. 4,000. Find the market price of the watch." His teacher used to ask questions like: "Who can solve it? What would be the solving procedural for this problem? What will be the answer? Can you guess it?" etc. He was talented among his friends and was often asked such questions.

In his bachelor's level, his teachers rarely asked the questions by calling name but his teacher used to ask questions to all students like: "How are you doing? Are you maintaining your notes? Do you have any questions? How can I help you?" etc.

He has started his teaching profession in 2007, from a government school and after a year switched the job to a private school mathematics teacher. He began his class by recalling the problems of previous class either from reference book or asking questions like, "Do you remember about previous class? Can you tell me the formulae of the previous topic? Can anyone of you solve question no. 1a. of exercise 1.2?" According to the need of the students, he used to revise it, providing hints about the topic. Sometimes he used to ask one of the students, "Can you explain about it? Can you relate it with formula?" If he had to teach the mathematics problems in relation to formula, he first discussed how the formula has been derived with the help of various activities related to the topic.

If he had to teach about shapes, he discussed the topic relating it to the real object and explain the relation within shapes and asked the students if they had ever thought about it; if they could describe other shapes inside the classroom. He used to ask algorithmic mathematics questions from their textbook and from another reference book.

Mainly, he used to ask these questions in between any class, such as "Did you understand? If not which are the steps, I need to revise? Are you able to use a formula?" etc. He used to ask objective questions, yes/no questions, short answer questions, long questions, etc. Further, from his experience, logical questions are used to develop critical thinking skills in mathematics, such as the difference between 4x and x4? How the sum of angles of a triangle is 1,800? etc. Sometimes he used to ask direct questions in mathematics.

Similarly, in almost every class, he used to ask, "How many of you have exactly understood the process? Can you share an example of when we can apply this problem in our daily lives?" If he is teaching about "cuboid", he asks his students to find the LSA (lateral surface area) and TSA (total surface area) by relating to their classroom. If he is teaching the chapter "triangle", he asks, "Why is the sum of the angles of a triangle 180^0?" At last, he asks, "Do you have any questions about today's mathematics class? What are main ideas that you learned today? Can you represent the solution in other ways also?" If you have any problem I am here to help you all.

In his mathematics class, he used to ask questions without any discrimination, such as "Someone tell me the definition of the set. Can anyone give me an example of the null set? Who wants to tell me about this topic?" To make his class active and interesting, he asks the questions like, "How would you describe the problem in your own word? What is your prior knowledge regarding this topic that would help you figure out solutions? Can you make some similar questions like this?"

He used to ask five categories of questions in the mathematics classroom. They are multiple-choice, true-false, yes/no, match the short answer, and formula derived questions. In his experience, students were confused in objective and logical questions but found the formula-derived question and short-answer questions are easy.

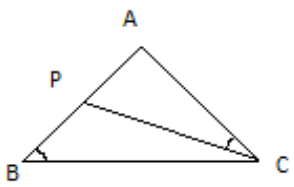
I found the sociocultural perspective of teaching and learning in Lal's narrative story while questioning. Lal is to some extent, conformist to nonconformist mathematics teacher and well known about the democratic practices in his mathematics classroom while questioning. Additionally, Lal is habitual with the notion of behaviorism to constructivism (Cherry, 2016) because he binds his classroom in learning by doing thoughts. Lal is well aware of daily life mathematics practices in his mathematics classroom. In addition to categories of questions, Lal is habitual with asking five categories of the question in the mathematics classroom: multiple-choice questions, true-false questions, yes/no questions, match the following questions, short answer questions, and

formula derived questions in any mathematics classroom (Anderson, 2001). As I noted, it is clearly seen in his narrative, Lal is not rigid in using one type of questioning, but he used varieties of questioning in his mathematics classroom.

Iswar's Story

Some days later, I had to see another mathematics teacher, Iswar, who works at Aksharaa School. But while some of the discourse and content is possibly overlapping, the contrast between Lal Bahadur and Sudha sharing, appearance, and attitude could not be more marked. His story started as follows:

> He is from the Shankhuwasava district of Nepal and has completed his master's degree in physics from TU. He has been teaching about nine years in different schools in Kathmandu Valley as a fulltime and part-time mathematics teacher. He remembers his school days around15/16 years ago, the source of teaching and learning mathematics; at that time, he used to have a book only. There were no teaching-learning materials and his teacher never related the mathematics class with the real world. At that time mathematics was taken as a tough subject but he never took it as a tough subject. However, his secondary level mathematics teacher has completed BSc in botany. The teacher had many obstacles, but then he gave his continuous support to him. His continuous practice from practice books, question bank, and group discussion helped him to reach the target.
>
> He remembers that his mathematics teacher usually used to enter in the class with a stick. Those who had completed their homework and submitted their copies on time were his favorites as an old system. But those who were weak at mathematics found it much harder to deal. Further, he shared that mathematics classes were not tough for him in the secondary level. His hard-working habits made the time memorable, whereas it was not so for the teacher. In regular classes, his mathematics teacher used to ask the algorithmic mathematical problems like, "In algebra, expand, $(a+b)^5$, in arithmetic formulae of profit and loss, in coordinate geometry formula of distance between two points, in trigonometry, if $\sin 30^o=1/2$, find the value of $\sin^4 30^o+\cos^2 30^o$, in geometry, who can define center and inscribed angle standing in the same arc," etc.
>
> Addition to, his mathematics teacher asked the questions like: "Who can do it? How can I help you? Are there any alternative ways to find the solution?" etc. One of his friends had to solve the given problem on the board each day by the time. Students who were incapable of solving the given problem had to take support from the talented one and therefore he had to support his classmates a lot. In his university-level study, his mathematics teacher used to ask questions like: "Do you know it? Do you have any confusion? Do you need my help?" but he rarely asked questions to his teacher. He used to mug up the entire contents; accordingly, he did in his examination.
>
> He has started his teaching career after completing his BSc. At the beginning of his teaching career, he used to follow the same patterns and techniques followed by his own mathematics teacher. Now, he realizes that mathematics is not so much difficult subject but their fixed mindset about the subject itself, made it seem difficult. He has started to gain sound knowledge about teaching-learning practice with the help of technology. He realizes that his teaching-learning practices had to be improved. Further, from his experience, he believes that teaching and learning in mathematics should be followed by linking it with day-to-day life. So, that the mathematics class becomes more enjoyable and interesting.
>
> At the beginning of his class, he used to ask simple questions on any particular lesson. In place of asking, "Do not you know this?" he used to ask, "What did you know about this topic?" These types of questions made the students interesting and were motivated to some extent. Accordingly, he was able to understand the student's basic level of understanding to react for questioning. His way of questioning is, "How many students have understood it?" He also cross-checks either they have maintained their standard level in a previous academic year or not. He used to recall and identify any topic (curriculum) background for basic requirements so his mathematics classes would be more effective.
>
> Basically, he used to link mathematics to the day to day life. It was easy to relate to their daily arithmetic life, but it's a little hard for students to link up in geometry and algebra. In that case, he used to ask algorithmic mathematical problems like "Factorize a^2+6a-8, simplify $\frac{3^{x+2}-3^x}{4x3^x}$, solve if x=3y and x+y=16 and in geometry from given figure below, PC=8cm, $\hat{B}=\hat{C}$, AC=6cm, and BC=10cm, find the length of AB uses the concept of similar triangles". Further, he used the above questions to access their level of knowledge. He further asked the following questions like, "Did you notice anything special in those topics? Give me an example? Can you show the steps of solving this problem in the board? Can you relate these problems with real materials?" This way, he used to link up his mathematics classroom with the day-to-day affair, which shows effective changes in recent trend.



In his views, in some cases, he used to ask an algorithmic mathematics question like “the ratio between the ages of Ram and Sahara is 2:1. After 10 years, their ages will be in the ratio of 3:2 then find their present ages” and ask the questions to whole class like, “Do you need help? How can I help you? Do you know how to solve it? What is your answer rather than pointing one student at a time?” He also asks cross-questions to an individual by giving them the opportunity to raise their hand if they knew the answer to the questions directed to them.

He also gives the whole class time to share things if they have any ideas on the topic corresponding to the lesson which was being discussed. He also uses a random method to find out the level of students and see whether they are able to answer and solve the problems that they have in the specific chapters. From this, he can find out and observe an individual’s level of understanding whether they have got clear ideas of the lesson which they have studied or not.

According to him, it is easy to relate it in arithmetic like in unitary method, he can directly link. For example, if the cost price of x pen is Rs. y, find the cost price one x dozen of the pen. Further, students may make a visit to any market with their parents and have an experience of buying the goods like vegetable and daily needed things and have experience of bargaining, discount, selling price (SP), cost price (CP), fixed price and various things that they have already learnt in school, and can relate it to their regular life. Instead of asking the questions directly, he would link the questions with their buying procedure experience by jotting it down on the whiteboard, for that, he used to ask algorithmic mathematical problem like, “A man gained Rs. 3,000 by selling a watch allowing 10% discount on the market price. If he allowed a discount of 5% on the marked price, he would gain Rs. 4, 000. Find the marked price of the watch.” Yet again, he used to ask: “Can you solve it? What are the various ways to solve it? What is your answer? Can you solve it on the whiteboard?” etc. to strengthen students’ understanding.

To fulfill the objective of the lesson, in the mathematics classroom, after testing the level of knowledge through procedural teaching, he used to ask algorithmic mathematics question like, “In algebra, two numbers are in the ratio of 4:5 and H.C.F is 15 find the numbers.” Thereby he used to ask the questions like, “How many of you can solve it? Have you ever seen these questions before? Can you change this word problem into the equation? Does anyone have a question related to this question?”

There are different levels of students in his classroom. Some of them are sharp and talented but some are not. He used to treat each of them differently, keeping in mind their levels, so that none of them would be humiliated and deprived of knowledge. He prefers these strategies for the positive mathematical environment, for sense-making questions. Some exemplary questions are as follows: “Does anyone know if …? Can anyone here give me an example of …? Okay, who wants to tell me about …?” He said that after completing any lesson, it is not necessary to treat them as students because after getting the knowledge from the teacher they are also of the same level.

From the beginning to the end of the mathematics classroom, he used to ask varieties of questions. They are: yes/no questions, true/false questions, and one-word-answer questions. Thus, he prefers interesting types of questions to the long questions. For encouraging students in mathematics class, he uses many examples. If he is going to teach mensuration topic, he asks, “Calculate the area of the gas cylinder you have been using at home”. Such problem is closely related topic to our daily life. At the end, he used to ask the questions like “Do you have any questions? Do you have any confusion on today’s’ class?” etc. He used to ask positive and requesting types of questions.

At the end, whatever the problems, he used to support them in the classroom sometimes on the whiteboard and individually according to the need. He was habitual in asking the following types of questions in his mathematics classroom namely: “Can anyone of you explain its procedure in details? Do these types of methods work for all problems or not? Are there any better methods to answer the problems? Did you develop the possible solution or not? Did you develop any patterns?”

Finally, from his experience, he has concluded that, the art of questioning plays a vital role in teaching and learning process in the mathematics classroom. He used to pause and ask questions. According to his experience, the mistake is the root of success. So he always motivates and encourages his students to ask the questions in mathematics classroom from a different perspective. Similarly, to enhance the level of understanding in mathematics, he asked several questions: “How many of you understood these problems/solutions? Can you understand the procedure and explain it for us? Do you want to repeat the process again?” He followed the procedural process with some examples for an illustration like in set question by using Venn-diagram. At the end, he used to raise the questions like, “Do you have any questions?” and ended any mathematics class.

As I noted, Iswar’s teaching practices and questioning are totally different from that of other participants mentioned above. So, Iswar concludes his narrative stories saying, “the art of questioning plays a vital role in teaching and learning process in mathematics classroom”. Iswar tries to engage students by asking various questions and further he pauses and asks the questions which are simple to complex (Anderson, 2001). Iswar was also convinced to the fact that mistake is the root of success. So, he always motivates and encourages his students to ask questions in mathematics classroom from a different perspective. In contrast, to enhance the level of understanding in mathematics, Iswar asks the questions like “How many of you understood these problems/solutions? Can you understand the procedure and explain it? Do you want to repeat the process again?” Iswar follows procedural process with some examples. Indeed! Iswar raises the question, “Do you have any questions?” and ends class.

Rajkumar's Story

Rajkumar is well established and one of the renowned mathematics teachers at Middle Point School. He is seen in a formal dress. He speaks politely, and at times his voice sounds sympathetic. I have visited the school he teaches in, and I know about his popularity in mathematics and classroom practices that he has been using to understand the questioning method in mathematics. The main excerpts from the interview are in narrative story form below:

> Rajkumaris enrolled in master's degree in mathematics education in the Kathmandu University, School of Education. He has completed his BSc. from Tribhuvan University and started his teaching career just after BSc. He has selected mathematics for his master degree because of his inclination in mathematics. He has been engaging in the teaching profession around 10 years. During his school life, the classes were only of 45 minutes and the only thing his mathematics teacher did was make them read and recite the difficult ideas they had to follow without any comments or complaints. Similarly, he would repeat the same schedule day by day. When he reached the upper grade, but when he decided that he would solve different questions in different ways, the foundation of his mathematics was then set in his mind. His teacher used to ask algorithmic mathematical questions from textbook such as: if f(x)=2x+3 and domain D={0, 1, 3, 5} find the range of the function, expand and evaluate $\sum_{n=1}^{4}(-1)^n(n^3-2)$, solve $\sqrt[3]{3x+1}$=4, construct 2×2 matrix whose elements are given by a_{ij}=i+3j. Those questions were exam oriented, and his teacher used to ask the questions like: Have you understood? Will you able to solve it? Regular questions asked by his teacher were like, "Can you tell the formula of simple interest?" Usually, no questions were raised from the student's side because there were more than 75 students in a single classroom, so asking questions or having any sort of interaction was very rare. Interaction among them was possible only in grade IX which was when he started understanding mathematical questions easily. His teacher had begun teaching from practice book and question bank only just before SLC (now SEE).
>
> In his 10+2 and bachelor level, there was very less interaction among his friends and teachers since teacher-centered teaching and learning practices were in practice at the time. But, in master degree there are quite a different questioning practices, students are motivated to search and create new ideas. His course facilitator used to ask: "Do you need any help? How can I help you? What reading materials do you need?" If you need to meet me, please visit my chamber, etc.
>
> He has started to teach additional mathematics since 2005 from lower secondary level. There were no any new ideas for teaching and questioning. So his teaching technique and questioning practice were akin to his own mathematics teacher. During the initial days of his teaching career, he also would ask the formulas mainly and he would solve few questions as an example, and let them practice rest of the questions on their own. He had asked questions without analyzing them in-depth. But after working in this field for three to four years, his thoughts changed which led him to search different process of solving the same problem and ask questions that were different from that of a textbook (e.g., Do you know the uses of trigonometry in day to day life? Can you share the ideas to use coordinate geometry in local knowledge? etc.).
>
> These types of questioning have changed the mind of students' minds, increased their interest, and motivated them. Nowadays, before starting the topic, he has made it a rule for himself to ask about the topic for example: if he is going to teach the topic 'sequence' he asks "Have you heard about this topic? Have you studied about this topic in your previous grade? Can any of you give an example of the sequence? Do you know about the increasing and the decreasing order?" After asking these questions, he defines the sequence relating to students' answers. He also uses real materials of shapes and asks the students to analyze the interval of each shape. In between, he again asks the questions, like, whether they are repeated in the fixed interval or not. At last, he defines the sequence as the pattern followed by a fixed rule. Mainly, numbers are kept in sequence and those numbers repeated in the fixed interval and the rules govern them.
>
> Sometimes, he thinks that an active student might sometimes lead the whole class for good because his response gives answers before completing the questions. To facilitate the situation, he asks the questions like "Can anyone share an example of sequence expect Hari?" For Hari, he would ask another question. Sometimes, students respond differently which cannot be forgotten. For example, a student asked, "Is traffic light not an example of patterns sir?" He used to ask the questions between the class: "Have you understood this process? What will be another step? Can you explain me about this step?" Please solve question no. 14 of exercise 2.2 in your copy.
>
> At the end of the class, he asked planned questions to know whether he has fulfilled his objectives. The questions were asked verbally or in a written form such as in the topic 'height and distance': "If the angle of elevation is x^0 and angle of depression is y^0 calculate the height of a man." This is an example of written questions. In topic 'set' he asks the algorithmic mathematical question like; there are 50 total students in class 20 of them like tea only, 15 of them like coffee only, 5 of them like neither tea nor coffee, how many students like both tea and coffee? Represent the above information in Venn-diagram (this is an example of the question whether the students can present the word problems in the diagram or not).
>
> Further, he asks in a right angle triangle: if two sides are given, find the third side. He thinks that teaching-learning practice will be effective if they ask logical questions rather than direct questions. He appreciates those students who bring new ideas in the mathematics classroom to motivate his students. He used to ask questions like "How $h^2=p^2+b^2$ in the right-angled triangle? What is the meaning of this formula? Where can you apply this formula?"

He is not completely satisfied with his question preparation practice because he should prepare the questions based on the Nepal government's curriculum, which is a pre-requisite for securing good grades. He thinks the question should also be connected with their daily life such as if he has to teach billing, he used to ask the students to bring electricity bill and asked the following questions: "What is the unit of current month? What is the unit of previous month? How much unit is consumed in this month?"

According to him, the questions asked on the topic "time and work" are not so much relevant for example, "If 5 people can complete a work in 10 days, how many people are required to complete the work in 1 day?" Here, it is hard to complete the work in 1 day by many people though they work together. To teach time and work, he prefers to take the students to the field/site and asks questions like "Why are you all here?" After student's response, he makes it clearer.

Accordingly, to calculate mean, median, mode of certain observations in statistics, he used to survey the student's mathematics marks in any terminal exam and list them on the whiteboard. Thereby, dividing them into different groups, he assigned them different calculations: mean, median, mode, etc. For this purpose, he asks the following questions: "Do you know how to calculate mean, median and mode? What does mean, median and mode indicate? What is the use of statistics in our daily life?"

The different types of questions he often asked the students in the mathematics classroom are knowledge and understanding-based question: he asks these types of question in the beginning of class; skill-based questions: in between the class to confirm whether the students understood the concepts or not; and higher ability questions: for talent and active students.

Sometimes, some questions posed by his students puzzled him as these questions were of higher level or they asked questions relating to another topic. In this situation, he used to ask them to find out the solution by themselves at first. Later, students would find the solution but sometimes he discussed the problems with them and find out the possible solution. He usually asked questions based on the curriculum. He used to prepare somewhat easy questions for lower-level students and did not set any boundaries for the talented students, and they could even explore a higher level of questions.

In Rajkumar's narrative story, I found, Rajkumar is to some extent, conventional (at the beginning of teaching career) to radical mathematics teacher and well known about the democratic practices in his mathematics classroom while questioning after having two to three years of teaching experience. Rajkumar also believes in the notion of behaviorism while questioning at the beginning of the teaching career but after two to three years of teaching, he has incorporated various teaching strategies while questioning. Rajkumar has started to engage students while teaching by relating mathematical ideas by questioning daily mathematics practices and letting the students develop the mathematical concepts for meaning-making, which is highly driven to the constructivist approach (Cherry, 2016). In addition to categories of questions, Rajkumar is habitual with asking knowledge and understanding-based, skill-based, and higher ability questions (Cotton, 1989). As I noted, it is clearly seen on his narrative also, Rajkumar is not rigid in using one type of questioning.

DISCUSSION OF THE FINDINGS

The stories of the mathematics teachers who took part in the research were put together and used to guide the discussion. To start with, math educators agree that effective questioning is important for effective teaching, and that teachers who do not know how to be effective questioners may not be able to be effective questioners because they do not know how to be effective questioners. Enhancing their understanding of the skills they need to ask questions would show them how important it is to ask questions. There are many ways to teach the same thing, and math teachers need to accept this and let go of their preconceptions about how to ask questions based on their students' abilities. Recognizing one's own flaws in question asking allows math teachers to take corrective action to improve their performance.

When math teachers ask questions, they should keep in mind that democratic participation is important in the classroom. They should also be aware of social norms and values, like the fact that all students should have the same opportunities and rights. It's also important for traditional math teachers like Rajkumar and Lal Bahadur, who started their careers following these accepted behaviors or established practices, to think about their students' equal opportunities when they ask questions and collect answers. Teachers of math who use a democratic method of talking about math must set an example with how they act (e.g., Sudha and Iswar).

In order for a lesson or test to be well-balanced, it must include both low- and high-level questions. This means that questions that emphasize major positions and encourage lively discussion must be chosen. This study found two types of teacher questions in math classrooms: low-level and high-level. Closed, direct, recall, and knowledge questions are all low-level questions. When it comes to higher level questions, on the other hand, they are open-ended and interpretive, and they are also evaluative and probing. As a result, giving students questions at both the elementary and secondary levels allows them to practice both types of questions and help them answer them correctly. To put it another way, lower-level questions are those that come from Bloom's revised taxonomy and are asked at the levels of remembering, understanding, and simple application. It is thought that higher-order questions are important for students to learn how to think critically in math class. Analytical, creative, and evaluative skills

are needed to answer more complex questions. It was found that the approach that asked all higher-order and some lower-order questions was the best way to go (Khadka, 2021).

It is very important to plan questions for math lessons in advance. As a result, teachers need to think of questions before they go into the classroom. if they write down their questions in advance, they will not make grammatical mistakes and will be clear about what they want to know. In the same way, question development and questioning help math teachers figure out what kinds of questions students will ask in the classroom. When they are used in the teaching process, pre-planned questions in math classrooms help structure the introduction of new concepts, focus the discussion on a specific topic, guide the discussion in a specific direction, and figure out how well students understand or feel about the subject. As a result of the discussion and specific answers to the previous questions, new questions came up. Teachers must be able to think quickly and positively answer these questions during the discussion in an honest and quick way. Rebina, Sudha, Lal, and Iswar used both planned and spontaneous questions to help students understand, as shown by their strategies.

CONCLUSIONS

In the end, stories about how high school math teachers were told how to ask questions in the classroom would be a revelation. According to this study, there are a lot of different ways to classify questions based on their subject matter expertise, critical pedagogical perspectives, algorithmic and everyday life practices, and so on. Teachers like Sudha, Lal Bahadur, Iswar, and Rajkumar may be a model for future teachers who want to use math questions. Since ancient times, questioning has been used as an instructional tool, and its continued use in the modern era shows that it is important for math teachers to have this tool. Teachers' understanding and use of questioning has gotten better in recent years because of new curricula, instructional materials, instructional methods, and the use of ICT in the math classroom (Newton, 2012).

Another conclusion is that, even though most high school math teachers at first seem to be conformists, they soon become more flexible in their questioning. In addition, most research participants asked simple to complex questions, with an emphasis on low-level questions, saying that this encouraged students to talk about math. I found that math teachers' lower-level questions showed that they did not use questioning well in their lessons. Cotton (2004) says that questions at the low level of thinking focus on facts that are easy to remember. This type of question may limit students' ability to fully understand the subject or make them think critically in class. As a result, teachers should make sure that their questions are not just a way to figure out what students have learned. Tan (2007) said that when teachers use lower cognitive level questions, a lot of lower cognitive level questions do not help students make their own decisions through analysis, evaluation, or creation. On the other hand, higher-level cognitive questioning asks students to think or reason more complexly. On the other hand, effective questioning takes a lot of planning and practice. Effective questions pique students' interest in new math topics, ideas, and challenges, and they also make them think about their own beliefs, assumptions, and understanding. Using what they know about questioning as well as what their students can and can not do, teachers figure out how high their questions are and how they can connect them to daily life with the types of questions they ask their students (Good & Brophy, 2003).

Teachers who do not know how to ask good questions well may ask questions that their students do not get good answers (Morgan, 1994). To help students understand more, teachers should know how to ask questions that are effective and how to respond. As a result, teachers' questions in the classroom are seen as both good and necessary for the math lesson. When teachers ask questions in the classroom that are not backed up by research, the teaching-learning process can be hurt. In addition, this study found things that made it hard for teachers to ask questions in the math classroom, like not enough time for teachers to wait, teachers' beliefs about students' abilities, and not enough interaction with students. The information presented above enables teachers to assist their students in becoming better questioners by anticipating difficult words in their questions and planning a variety of strategies for dealing with them. Additionally, teachers could create a series of questions that begin with simple material and progress to more difficult material. Finally, prior to the discussion, the teacher should allow students to refer to prior knowledge or background information about the lesson's subject and ask questions that provide sufficient information to allow students to think critically and write meaningful responses to the questions. The teachers whose stories were used in this study stated that they were aware of the types of questions they used; however, their categorization of questions at different levels of their lessons appeared to be inconsistent throughout. As a result, when math teachers are learning about questioning levels, it is believed that knowing about the taxonomy will be beneficial.

Implications

Learning more about how to ask questions in math classroom can benefit novice teachers, novice teacher trainers, and educational researchers, according to the findings of this study. It is anticipated that this research will benefit math teachers by allowing them to learn more about how to use questioning to gain students' attention and improve their students' math skills. This research has a significant impact on how math teachers instruct their students, particularly when they are working on algorithmic math problems. It will be a revelation for teachers who have not previously considered questioning strategies in mathematics classrooms because it will expand questioning techniques and increase student discussion, which will aid students in gaining shared authority in the construction of mathematical concepts and will encourage them to think more critically about mathematics (Chin, 2007).

Teachers of mathematics should be able to distinguish between lower-level and higher-level thinking questions (Andorson, 2001; Dahal et al., 2019; Harris, 2000), convergent and divergent questions (Cotton, 1989; Woolfolk, 1989), and the teacher's relative role and responsibility (Andorson, 2001; Dahal et al., 2019; Harris, 2000). In addition, if mathematics teachers were more deliberate in their questioning, they might be able to think more deeply about their own and their students' roles in learning,

possibly re-examining or reconstructing their own belief structures in the process (Seung et al., 2011). This has resulted in a re-calibration of the purpose of questioning in order to promote students' mathematical reasoning abilities. In this study, I discovered that teachers who are familiar with mathematical concepts and the relationships between representations and topics can ask questions that encourage students to think mathematically. Furthermore, this research will assist policymakers and curriculum designers in incorporating research on questioning strategies into their classroom practices for mathematics students.

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