Strategies for Making Mathematics Classroom Discourse Student Friendly:
An Intercultural Perspective

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Abstract: The major concern of this paper was to explore the strategies for making mathematics classroom discourse from intercultural cultural Perspectives. To carry out this investigation, I set up research objectives as to investigate existing classroom discourse of mathematics class of basic level students and to explore the ways for making classroom discourse students’ friendly from intercultural perspective. In order to achieve these objectives, I selected the qualitative research design with case study approach. Shree Kuleshwor Secondary School is the study site of my study. Two mathematics teachers, two mathematics educators, and four students were the sample and selected these samples by purposive sampling procedure. Classroom observation and interview guidelines were the main tools for this study. The collected data were analyzed by linking theories. Then it was concluded that existing classroom discourse in mathematics classes focus on elaborative and recapitulation phases. Furthermore, it was also concluded that present scenario of classroom discourse was teacher center. Further, it concluded that though culturally-based pedagogy, using different strategies in teaching–learning mathematics in the classroom, by replication of communities of practice in the classroom, avoiding rote memorization, by implementing co-operative learning, through sharing with acculturation and enculturation, through multiple representations making classroom discourse students’ culture friendly.

Keywords: Classroom discourse, Intercultural perspective, Strategies, Student friendly, Culture friendly

The Context

The classroom teaching and learning activities based on the process of interaction between teacher and students. This interaction was performed by classroom discourse. Classroom discourse refers to the language that teachers and students use to communicate with each other in the classroom through talking or conversation is the medium through which most teaching takes place. The National Research Council (1989) purposed that students learn mathematics well only when they construct their own mathematical understanding which requires them to examine, represent, transform, solve, apply, prove, and communicate. The National Council of Teachers of Mathematics (NCTM) called for instruction that promotes classroom discourse in which students listen to respond, and question the teacher and one another, initiate problems and questions, make conjectures and present solutions and rely on mathematical evidences, and argument to determine validity (NCTM, 1991). Thus, students’ mathematical communications are as a viable proponent of mathematics learning and achievement.

In present Nepalese Mathematics education, community tends to consider mathematics as culture free subject. This shows orthodoxy prevalence in the academic circles. However, ethno mathematics is different because it is the study of a cultural group's mathematics. It examines how different cultural groups use and discourse mathematics.

Although Mathematics is considered as a universal language, the way of teaching and learning mathematics such as simple operations, counting, estimating, calculating are culturally dependent and are different. At early stages, the learning of mathematics depends upon learner's natural cultural background. In those stages, there is no difference between ‘using mathematics and doing mathematics’. Using mathematics enables learners’ to perform operations but doing mathematics is culturally dependent. In both cases, there is direct relationship between culture and mathematics. This demands the requirement of mathematics curriculum to suit with the culture.
Challenges in education have occurred where local culture and decentralized practices go against each other.

In order to improve the qualities of school mathematics education; different trainings seminars and workshops were carried out and different institutions have been established but the achievement level of mathematics in the school level is not satisfactory. The pass percentage and the average achievement scores of students in the SLC examination are not encouraging (SLC Study Team, 2005 as cited in Acharya, 2013). Several studies, conducted by Department of Education (DOE) in the year, 1998, 1999, and 2008 show that average achievement of mathematics was 26.58%, 27.25%, in grade five and 31.7% in grade eight. These data revealed that the achievement of mathematics of school level is very low which is below the pass percentage. This scenario has raised very big question: what are the reasons behind it? Therefore, this paper focuses for Strategies for Making Mathematics Classroom Discourse Students Friendly: An Intercultural-Perspective.

Objectives

1. To investigate the existing mathematics classroom discourse in basic level students.
2. To explore the ways for making classroom discourse students’ friendly from intercultural perspective.

Conceptual Framework

The conceptual framework is devised through the literature studies facilitated to attain research objectives, get the answer of the research questions (Acharya, 2015). Analyzing various literatures in relation making mathematical classroom discourse students friendly, I have developed a conceptual framework as shown in figure below:

![Conceptual Framework Diagram](image-url)

Source: (Sinclair & Coulthard, 1975)
In the above diagram, on the top shows the first phase, such as preparatory which is related to the plans of teaching in the classroom. A prepared teacher prepares the lessons with objectives, designs instructional activities to achieve the objectives, collect or prepared teaching materials for classroom use, and set him or herself for the delivery of instruction.

In the second introductory phase, the teacher provides outlines for classroom assessment and manages the teaching procedures. In this phase, teacher introduces the topic, organizes activities, reflects the objectives motivates students toward lesson, uses appropriate methods of teaching according to situation, create warm environment in the class, builds up relation in the class by linking student’s knowledge with the lesson and provides opportunities to explore the new ideas.

In the third elaborative phase, teacher elaborates the ideas and topic, provides clues for difficult concepts or ideas, give encouragement, makes maximum use of prepared materials for effective teaching, responses to the students, reduce the confusion.

In the fourth interactive phase, teacher provides extended activities to strengthen students’ ideas, reward learners’ attempts and success, speaks, writes and communicates clearly, engages all students in the classroom activities, links ideas and activities of the lesson, gives responses and feedbacks, creates a pleasant learning environment.

In the fifth phase, teacher recapitulates his/her saying, evaluates students’ classroom achievement, summarizes the whole lesson assigns students further task and concludes the lesson systematically. Therefore, I applied this above framework for data collection and analyzed process.

Methodology

Methodology describes how the purpose of the study conducted to achieve the objectives and answering the research questions. Particularly, this chapter discussed design, study site, sample, sampling, tools, process of data collection and analysis briefly.

The design of this study was qualitative with case study approach. Qualitative research is multi method involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researcher study things in their natural settings, attempting to make sense of or interpreted phenomena in terms of the meanings people bring to them (Denzin & Lincoln, 2005). Shree Kuleshwor Secondary School is the study site of my study. The participants of this study were 2 mathematics teachers, 2 mathematics educators and 2 eighth grade students and 2 seventh grade students. Altogether 8 persons were the research participants in this study. I used purposive sampling to select the participants for my study. The tools of data collection were classroom observation, and interview guideline of this research. The collected data were analyzed by using different theories. For the data, analysis I made the themes and subthemes emerge from participants views such as follows:

Existing Mathematics Classroom Discourse in Basic Level Students

Mainly classroom discourse moves through five phases are as preparatory, introductory, elaborative, interactive and recapitulation phases. For this, I observed classroom, employed the interview with teachers and students.

It was March 5, 2017, when I visited and met the head teacher and informed my purpose. The head teacher arranged f Grade 8 for observation that day.

When I entered into teacher T1 classroom the teacher graduated with major mathematics who was teaching mathematics in grade eight. With introduction of topic first, he was using lecture method discussion method also using teaching materials. The teacher had good relation with students in the class. However, there is no use of teaching materials.

From the above classroom observation, it was claimed that the teacher started his class with specific objectives and he used the educational materials in an organized ways. The teacher tried to motivate the students to learn mathematical subject
matter. That means the teacher follows the phase first and second. Teacher elaborates the ideas and topic, provides clues for difficult concepts or ideas, gives encouragement, maximum use of prepared materials for effective teaching, responses to the students, and reduces the confusion. But, the teacher did not the interactive phase was satisfactorily. Teacher recapitulates the lesson summary, gave instruction to the students but he did not do systematically. In this regards, Vygotsky (2009) claims that discussion with each other and teaching learning subject matter will be meaningful.

After classroom teaching the teacher T₁ came out of the classroom and discussed about the classroom activities. I asked him “Did you have prepared written notes/lesson plan before entering the class?” The teacher replied,

Actually, I know that as a teacher, I prepared lesson plan but I prepare note I am well prepared about my teaching subject matter.

This means that teacher was well known to prepare the lesson plan before entering the classroom. Theoretically, the teacher was well known about to prepare lesson plan but practically he was unable to practice in actually classroom teaching.

![Class Observation of Grade 7](image)

It was the day of March 6, 2017; I again went to my sample school. When I reached the school it was the time of 9.45 a.m. Some students playing on the ground. The bell was rung at 10 a clock. All the students entered the classroom. Mathematics teacher entered into the grade 7 all the students stood and bade good morning, the teacher replied good morning class and sit down. The teacher started to teach the students. The topic was profit and loss.

When I observed his classroom activities as a researcher, I found that he was telling a story about educated person and uneducated person to encourage and motivate learners to learn mathematics. In the same time he was teaching the definition of profit and loss by giving examples. First, he introduced the topic of profit and loss. He tried to engage the students to learn the subject matter. His smile face and learners’ active participation tried to match between his perceptions and classroom activities. At last, the teacher summarized the whole lesson that day he taught and evaluated the students verbally.

From the above classroom observation it was found that the teacher motivated the students to learn and summarize the concept which taught is that period. In the above classroom observation it was showed that, the teacher maintained the diary note to teach the students. The teacher evaluated the students work. The effective teaching or teacher’s characteristics are: lesson clarity, instructional variety, teacher task orientation, and engagement in the learning process. It means teachers’ responsibility play a prominent role for effective classroom instruction.

Having finished classroom observation, I asked my teacher participant T₂ “How do you discourse classroom activities in the class?” The teacher said

I try to focus on group activities within the classroom to make the students interactive and engaging. Sometimes I make different small groups among learners and make them competitive with each other. It encourages learners to participate actively in instruction. I motivate them in teaching learning activities. Generally, I focus on using instructional materials as well as students’ activities. I use instructional materials according to the demand of subject matter. As a mathematics subject teacher, I use chalkboard, textbooks and other essential materials.

From the above perceptions, I sensed that active participation of learners in classroom activities is a good technique of making classroom more productive. According to Vygotsky (1978) an effective teacher would always try to bridge between what is in theory with what takes place within the classroom. Instructional materials also play a vital role in good classroom discourse.

It was the day of March 7, 2017, I again went to my sampled school Shree Kuleshwor Secondary School at Kuleswor for the purpose of data collection. It was my third classroom observation. My observation class was grade 7 of the sampled school. The main purpose to observe the classroom was how to deliver the subject matter to the students. That day the teacher taught the students on the topic ‘set’.

The teacher’ teaching topic and objective were clear and enough and specific.
The class was humorous and he had made frequent eye contact with students.

He frequently encouraged the students for solving the mathematical problems.

He was confident in his teaching concepts.

He evaluated the students after taught by asking the questions related to set and concluding the lesson.

From the above classroom observation I found that teacher was well prepared about the teaching subject. I found that the teacher evaluated the students appropriately. Furthermore, it claims that the teacher concluded the lesson.

Having finished that day classroom observation I communicated the student about the classroom discourse. I asked my student participant S$_1$ “Do you enjoy learning situation in the classroom discourse?”

The student replied that in classroom iteration between students and teacher it is alive the class. It developed cooperative learning environment in the classroom.

From the above interview, it is clear that good classroom discourse held between teacher and students and students to deliver the subject matter to the students easily.

In the day 9 March, 2017, I observed grade 8 students in my sample school. It was my fourth class observation. I observed mutually how the teacher discourse the preparatory phase, introductory phase, elaborative phase, interactive phase, recapitulation phase in the classroom teaching.

When the teacher entered into the classroom, all the students greeted the teacher. I also entered the class with the permission of the head teacher and the mathematics teacher. The teacher was teaching the lesson construction of triangle of grade 7. The teacher did not use the any teaching materials except daily use teaching materials but he gave opportunity to discuss with each other.

After finishing my classroom observation, I asked the teacher participant T$_1$ “Which are the teaching methods you use in classroom to have good classroom discourse?”

He replied that, “Theoretically, we use the teaching methods are collaborative, cooperative, and constructivist that means we use students centered teaching method but I use traditional teacher center deductive method in many cases.”

From the above interview of teacher, it was claimed that teacher was theoretically aware about students’ center methods that we have to use. However, practically they did not use it in their actual classroom teaching. In this regards, Vygotsky (1978) posited group interaction as one source in the development of mental operations. He suggested that students gradually internalize the talk that occurs in groups. They begin to challenge themselves, ask for reasons, and in general monitor their own mental work as others do their public speech.

It was 10 March 2017, I observed Grade 7 students in my sample school. It was my fifth class observation. I observed mutually how the teacher discourse the preparatory phase, introductory phase, elaborative phase, interactive phase, recapitulation phase in the classroom teaching.

From the class observation, it was observed that the teacher was aware of preparatory phase and the teacher elaborate ideas on the lesson. However, the interactive phase of the lesson was not satisfactory through the teacher. The teacher did not use any instructional materials except daily used materials.

The teacher recapitulated the lesson summary but he did not do it systematically meaning that there was no evaluation of the students’ learning during the class that day.
As a researcher, I found that the teacher in solving the exercise adopted the discussion method. Besides this, it seems reasonable to conclude that discussion method was adopted in-group and lecture method in the presentation of the lesson. Some students did not give attention to the teacher, it seems that those students did not understand what the teacher taught in the classroom or they could not understand the language spoken by the teacher. Mathematics teacher may not be able to describe individual and cultural perspectives of the students. Banks (2006) states that from school’s curriculum and teaching and learning activities, the students from diverse racial, ethics and social class group will experience educational equality.

To find the opinions of students about classroom discourse, I asked my student participant S2. Do you find a two-way communications as in classroom discourse?

He replied that, “Yes, our teacher some time gives opportunity to discuss the subject matter to the friends. Some time we two way communicate with teacher but most of the time teacher did himself.”

From the above information of my student participant S2, it was claimed that in the classroom discourse the teacher provides the opportunity to communicate each other and teacher too. Most of the time teacher did solve the problem himself sometime we did also. In this regards, Yetkin (2006) claim that opportunities to students to experience success by engaging with the tasks and activities through multiple representations during collaborative as well as individual learning activities.

It was 14 March 2017, I observed grade 8 students in my sample school. It was my sixth class observation. I observed mutually how the teacher discourse the preparatory phase, introductory phase, elaborative phase, interactive phase, recapitulation phase in the classroom teaching. The observed lesson was percentage of Grade 8 students.

That day the teacher had planned the lesson with well-stated objectives. However, there was inadequate preparation for classroom assessment and management. The teacher started teaching of concept of percentage by asking questions to the students without introducing the topic. The students seemed to be excited for learning. The class taking seemed to focus on delivering to make it as elaborative as possible. The teacher was mostly descriptive for keeping the students engaged in the subject matter. The students were given time for exploring ideas in the class. Some of the students were interested but majority of them remained inattentive in the classroom despite the teacher trying to reduce their confusion. In the interactive phase, the teacher provided a lot of information to the students by trying to create a pleasant learning climate. He had given opportunity to the students for their response and feedback to their concern. Nevertheless, the students were not attentive to the teacher’s delivery in the class because of poor time management. The teacher summarizes the lesson at the end of the class.

From the above classroom observation, I found that teacher wants to manage the phases of classroom discourse. The teacher’s focus of his teaching was elaborative phase. However, the teacher tries to manage preparatory phase, introductory phase, elaborative phase, interactive phase, recapitulation phase in the classroom teaching.

To find the opinion of student about classroom discourse, I asked my student participant S3, What types of activities your teacher used to conduct classroom discourse in your class?

He replied, “In our classroom teaching, most of the time our mathematics teacher delivers the subject matter himself. After teaching, the teacher asks questions if there is any confusion. Some time our teacher gives the opportunity to discuss with each other.”

From the information of student S3 it concluded that the activities used by mathematics teacher focused on delivery of subject matter that means the teaching process is product oriented rather than process oriented. This means that his teaching disagreed Bruner theory of learning which claims that teaching learning is process oriented not product oriented.

It was 16 March 2017, I observed Grade 8 students in my sample school, which was my seventh class observation. I observed mutually how the teacher discourse the preparatory phase, introductory phase, elaborative phase, interactive phase, recapitulation phase in the classroom teaching. The observed lesson was unitary method of Grade 8 students.

When the teacher enters the classroom all the students stood up and greeted. The teacher replied, “Good morning class and sit down”. The teacher tested the student’s pre- knowledge of the subject matter and he checked homework of three students.
After then the teacher thought the topics of unitary method. First, he asked, have you ever listened about unitary method? One student said yes sir then teacher told him to tell about it, student said it use to find the unknown price and quantity with comparing unit price. Teacher said good and asked if he could tell him an example. Then student become confused. Teacher gave an example about the price of Chocó fun telling if the price of one Chocó fun is Rs.5, how much Chocó fun you can buy for Rs.60. Most of the students solve it. At the end of the period the teacher tried to summarize the lesson.

From the above classroom observation, it was concluded that the teacher started the knowledge of student’s prerequisites. It means his introductory part was motivating the students. His teaching was more focusing on elaborative way rather than interactive phase at the end of the class the teacher summaries the lesson, which touched that period. It was also found that the teacher frequently encouraged the students for solve the problem. After classroom observation, I asked my student participant S₄.

“Are you satisfied from the classroom discourse”? Why?

The student S₄ replied that, “Yes, our teacher started the lesson by motivating the students. His appearance was good. Our teacher some time participated to learn ours. He did not used ICT based instruction, it is better to use ICT in our teaching mathematics.”

From the above information of my student participant S₄, it concluded that the teacher motivated the students to learn mathematics and the first impression of the teacher was good. The better to use the ICT added pedagogy. In this issue, Acharya (2017) claims that the effective use of ICT resources enhance creativity, problem solving, high order thinking skills and reasoning.

The 8th class I observed was on 19 March 2017. The observed class was grade 8 students in my sample school. I observed mutually how the teacher discourse the preparatory phase, introductory phase, elaborative phase, interactive phase, recapitulation phase in the classroom teaching. In that day the teacher thought the lesson ratio and proportion of grade 8 students. In the classroom the teacher did the following activities:

In 10:15 the teacher entered the grade 8, all students stood up and greeted good morning sir and the teacher replied good morning class and sit down. He wrote the topic in the white board. The teacher gave some examples related to the topic ratio and proportion. After that the teacher summarized the lesson and at last evaluated the students’ achievement.

From the above classroom observation I concluded that his teaching strategies were mainly focus on elaborative phase and recapitulation phases. The opening of the class was good and makes the students attention to learn. He has the good command on subject matter and sequential presentation.

In the 9th class observation, the observed class was grade 7 in my sample school.

The mathematics teacher started to teach the topic “fraction”. The teacher introduced the teaching topic and started his elaborative activities. He first asked the students preliminary concept about the fraction. The teacher illustrated with example the problem related to fraction. He tried to make the class more elaborative. At the end the teacher summarized the lesson and evaluative the students achievement by doing exercise.

From the above classroom observation, I found that the teacher teaching strategies focused more on elaborative and recapitulation phases but less focused on interactive phase. In addition, during my classroom observation I found that the teacher was helpful to the students in learning mathematical concept fraction. In this context Herman (2007) believes that teachers need to use all forms of representation equally and not show bias towards a certain form and students will pick up on this preference and tend to favor the form chosen by the teacher.

Strategies for Making Mathematics Classroom Discourse as Students Friendly

In this section, I will deal for making mathematics classroom discourse students friendly. For this, I have taken the interview with mathematics educators and school mathematics teachers linking their views with theories. On the basis of view of my participants, I have generated the following themes for making mathematics classroom discourse as students friendly.

Cultural- Based Pedagogy

Teachers must incorporate a variety of teaching strategies that appeal to and consider all of the learners in their classrooms. Students who were not of the dominant culture have suffered because they were not given a fair opportunity to adapt to the norms of the classroom. In this regards, my
research participant mathematics educator E₁ said that,

_to make mathematics classroom discourse student friendly, our teaching-learning activities links with students daily life activities. Likewise, teachers can use teaching strategies that acculturate and enculturation of the students in their classroom._

From the above views of mathematics educator, it was claimed that for making mathematics education students friendly, we have to our mathematics classroom discourse based on students daily life activities sharing their cultural norms in our daily learning process. In this regards, teachers need to rethink traditional approaches and provide their diverse classroom community with opportunities for deeper mathematics learning. As teachers and students strive to meet the standards set by NCTM (2000), it would be irresponsible for educators to disregard the needs of diverse learners. Students from all culture deserve to be taught in a way that ensures that they will understand mathematics. Teachers can use teaching strategies that acculturate and enculturation the students in their classroom teaching process.

In the same issue my other participant school mathematics teacher T₁ opinioned his view as,

_our teaching learning-learning activities, evaluation technique all are links with students’ culture the classroom discourse will be student friendly._

From the above view of mathematics teacher, I concluded that making mathematics classroom discourse students’ friendly teaching-learning process should be links with students’ daily life activities. In these perspectives, Ladson-Billings (1994) uses the term culturally relevant pedagogy to denote a type of teaching that incorporates student culture in order to preserve it and overcome obstacles that may arise due to the weight of the dominant culture.

Using Different strategies in Teaching-learning Mathematics in the Classroom

Students may come into the classroom with notions formed from their individual and cultural experiences, teachers can be sensitive to these differences and incorporate into the classroom community and achieve academic success. In this regards, my participant mathematics educator E₂ said,

_by exposing students to different strategies, teachers may help students become familiar to the practices preferred in any given school and community. Nevertheless, while teachers may try to create their own mathematics classroom practices based on the needs and experiences of the students in the class, the pre-set curriculum and local, state or national educational regulations will in some instances limit the types of classroom practices that teachers will be able to utilize. Then mathematics classroom will be discourse student friendly._

From the above information it is found that the capacity of learning styles of student are different, so the teacher should use different teaching methods and techniques in classroom teaching. While conducting the classroom discourse, teacher may try to create their own mathematics classroom practices based on the needs and experiences of the students in the class the classroom discourse make students friendly. In this regards, to meet the standards NCTM (2000), teachers must incorporate a variety of teaching strategies that appeal to and consider all of the learners in their classrooms (Gay, 2000). In the same issue my other participant school mathematics teacher T₂ share his view as,

_by not applying single strategy of teaching-learning mathematics, we apply different teaching-learning strategies in the delivery of the subject matter to the student by creating child friendly environment in the mathematics classroom for making classroom discourse student friendly._

From the above information of school mathematics teacher T₂ it was found that while conducting the classroom discourse in mathematics classroom in delivery of subject matter the teacher not only use the single monolithic teaching approach instead of we apply the multiple approach according to the nature of subject matter. Then the classroom discourse becomes student friendly. In this sense, Gay (2000) suggests that teachers must incorporate a variety of teaching strategies that appeal to and consider all of the learners in their classrooms involvement in learning mathematics.

By Replication of Communication of Practices in the Classroom

Classroom is the replication of the society. Students must be active participants in the classroom community for the group to obtain benefits. In this vein my participant E₁ share his view as,

_if students do not feel a part of the classroom community, they will likely not be able to learn. The content of mathematical knowledge is properly and intimately defined by the culture in which it develops and in which it is included. Thus, students_
can create an appropriate mathematics culture in the classroom if given the opportunity. If teachers allow students to be active participants in the classroom, those students will mold the mathematics culture in ways best suited to their learning needs.

From the above view of mathematics educator E1, our classrooms are becoming more diverse. The teachers can use strategies that encourage acculturation and enculturation i.e. teachers can remain true to the necessary constraints of the schooling institution and still provide an inclusive classroom teaching and rewarding learning experience for their students it is unreasonable for teachers to demand that all students adopt the norms set by traditional viewpoints. In this vein, Cobb, Wood & Yackel (1993) suggest that teachers need to socialize students into the norms and practices of the mathematics classroom then the classroom discourse become student friendly.

Avoiding Rote Memorization

While learning through rote memorization is still popular in Nepalese mathematics classroom. The Western classrooms have turned away from this method of learning. This changing approach has much to do with cultural beliefs regarding how students learn best and what each culture values in its students. In my concern for making classroom discourse student friendly, my informant mathematics educator E2 expressed his view as,

Only the rote learning without understanding the subject matter destroyed the student critical thinking. It kills the creativity of the learners. So the primary concern of the teacher is for the students enhance their creativity and enjoying learning the subject matter. Teachers are now incorporating more problem-solving and investigation activities to replace the traditional skill and drill exercises that were previously used in our schools then ultimately classroom discourse student friendly.

From the above view of my participant, it was found that without understanding the subject matter, the only rote memorization is meaningless to learn mathematics. Therefore, the primary concern of the teacher is for the student to acquire the content through understanding the subject matter. In this vein the student-centered, modern, Western classroom, society views education to be a positive experience in which students should enjoy a pleasurable learning experience. In this regards, Yetkin (2006) claimed that students were given opportunities to experience success by engaging with the tasks and activities through multiple representations during collaborative as well as individual learning activities.

By Implementing Cooperative Learning

Cooperative learning is the instructional use of small heterogeneous groups of students who work together to maximize their own and each other’s learning. This learning can focus on academic and social development. The instructional processes used in cooperative learning can range from simple to complex. The simple processes tactics and the complex processes strategies. Many researchers have studied and continue to study the use of cooperative learning in the classroom and the variety of strategies and tactics available for teachers to apply in the classroom. For making classroom discourse students friendly in this issue my participant E1 shares his view as,

Cooperative learning allows for discussion and reflection, thus alleviating the stress for students of needing to come up with a quick response as required by some other teaching strategies. In this approach every child can learn mathematics by sharing their ideas. So if the teacher uses this type of teaching method then our classroom discourse will become student friendly.

From the above information, I found that the cooperative teaching is the best way of making classroom discourse student friendly. For this method the students are provided the opportunity to communicate with every students and teacher also. The NCTM standards (2000) suggest that teachers create instructional programs in which students can communicate their mathematical thinking coherently and clearly to others, thereby solidifying a role for cooperative learning in the mathematics classroom. In addition, Zaslavsky (1996) argues that the cooperative learning can be valuable in meeting the needs of a culturally diverse classroom. Similarly, Vygotsky (1978) states that adults, teacher or parent or a child’s peers can help student development and that teacher can use cooperative learning to increase the understanding of mathematics by students of all backgrounds. In this context, my other teacher participant T2 gave his views as, follows:

Cooperative learning, using multiple representations gives all students opportunities for discussion in the classroom for mathematical understanding. Students can also practice and develop their communication skills. The challenge of communicating their understanding in a written and oral form can be overcome by teachers exposing these students to as many forms of
representation as possible. This exposure allows students to improve their communication skills.

From the view of mathematics teacher E₂ it was claimed that through the cooperative teaching approach the students provide to communicate friendly environment in the classroom. Through this practice it is overcome the challenge the communicative skills of the students. In this instance, the zone of proximal development is revisited and students will improve their mathematical understanding through exposure to other, more complex representational forms as presented by their peers. Teachers can facilitate the scaffolding of more complex representation forms and allow students to discuss the representational form and their corresponding mathematical understandings that they bring with them to the group. Teachers need to use all forms of representation equally and not show bias towards a certain form, since otherwise students will pick up on this preference and tend to favor the form chosen by the teacher (Herman, 2007).

Through Sharing With Acculturation and Enculturation

The process of acculturation is to ask students to adapt to dominant classroom norms. For this teachers need to socialize students into the norms and practices of the mathematics classroom. Likewise, through enculturation teacher also needs to adopt the students’ culture in the mathematics classroom teaching. Mathematics is associated with sets of social practices, each with its history, person, institutions and social locations, symbolic forms, purposes and power relations (Acharya, 2017). In this issue, my research participant E₂ shares his view as:

While in the classroom discussion the mathematics teacher adopted the students’ culture and student’s, make sure the culture of the classroom teaching and blending them. The inclusion of students’ cultural and linguistic backgrounds can be a significant source for student motivation in the mathematics learning. So that students will feel a personal connection to the concepts being taught and will be more motivated to learn mathematics.

The mathematics teacher E₂ has the similar view in this issue. From the above information of mathematics educator and teacher, it was claimed that through sharing with students’ culture and classroom culture make mathematics learning productive and classroom discourse student’s culture friendly. For this initially teachers are pressurizing their students to change their culture to adapt to the norms of the school as set by the teacher. Sometimes, this reworking of cultural patterns may be necessary for the student to be successful in the school context. Enculturation, on the other hand, occurs when teachers include a variety of cultures of the students in their practices to reflect and serve their multicultural classroom (Malloy & Malloy, 1998). Similarly, students will feel a personal connection to the concepts being taught and will be more motivated to learn the subject matters. In this regard, Cobb, Wood and Yackel (1993) suggest that teachers need to socialize students into the norms and practices of the mathematics classroom.

Through Multiple Representations

Social interactions in the form of cooperative learning are beneficial; teachers can also look for more ways to give students in cultural diverse classroom an opportunity to understand mathematics. The use of various representation forms, which help students make connections and communicate their mathematical understanding in multiple representation forms, is another effective strategy of classroom discourse. In this issue my respondent mathematics educator E₂ suggests as,

When students use various forms, they have more opportunities to communicate their thinking. A representation form can stimulate dialogue with peers and teachers, and enable students to discuss the merits of their chosen representation form and be able to compare it to other forms. Once a student is able to represent a concept in different ways and can explain how each of the representation forms relates to the others, it can be said that they truly understand the concept of subject matter.

From the aforementioned views of mathematics educator E₂, it was concluded that the multiple representation of the single concept helps understand the mathematical concepts easily. By pursuing this type of classroom discourse, mathematics classroom becomes student culture friendly. In this context, Pape and Tchoshanov (2001) suggest that there are many types of representation forms and they can be grouped into two categories: internal and external. External representations come in the form of numerical tables, physical materials, pictures, symbols, graphs, and algebraic formulas whereas external representations are as cultural tools. In this regard my other teacher participant T₁ claims that,

Similar to cooperative learning, using multiple representations gives all students opportunities for discussion to deepen their mathematical understanding. Students can also practice and
develop their communication skills through the classroom discourse.

From the view of mathematics teacher T,, it was found that the good classroom discourse can be carried out through cooperative learning approach. Through multiple representations, all students should be granted equal opportunities for discussion about the mathematics subjects matter and develop the communication skills. In this sense, Ohtani (2007) argues that combination of cooperative learning and multiple representations also allows students of different backgrounds to bring to the classroom discourse the cultural tools with which they are already familiar. Through cooperative learning, students can heighten their mathematical understanding by sharing their understandings as represented through their own tools and learn about other students’ cultural information. As the community of practice begins to include all of these different tools, students will reach a certain comfort level with different approaches and different tools in the classroom.

Results

From the analysis and interpretation of data, it was found that the teachers were theoretically well known about to prepare lesson plan but practically they were unable to practice in actual classroom teaching. The teachers were theoretically aware about students’ center methods that we have to use but practically they didn’t use in their actual classroom teaching. The teachers used monoculture practice in multicultural classroom situation. In the collaborative-method of teaching, there is opportunity of good classroom discourse but this practice was seen less in the Nepalese school. Teaching was more focus on elaborative phase and recapitulation phase.

Similarly, by applying cultural-based pedagogy, using different strategies in teaching-learning mathematics in the classroom, by replication of communities of practice in the classroom, avoiding rote memorization, implementing cooperative learning, sharing with acculturation and enculturation, making multiple representations classroom discourse student culture friendly.

Conclusions

In the context of Nepal, the existing classroom discourse in mathematics classes focus on elaborative and recapitulation phase so we can follow the Preparatory Phase, introductory, and iterative phase also. It was concluded that present scenario of classroom discourse was basically teacher-centered which should be made student-centered. Further, it was concluded that for making classroom discourse students’ friendly by applying cultural-based pedagogy, using different strategies in teaching-learning mathematics in the classroom, by replication of communities of practice in the classroom, avoiding rote memorization, implementing cooperative learning, sharing with acculturation and enculturation, making multiple representations classroom discourse student culture friendly. So our classroom discourse should be focused in this direction.

Reference

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