

Teaching-learning practices of mathematics in semester system: A case study of Tribhuvan University, Nepal

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Citation: Acharya, B. R., Rai, I. M., Acharya, L., Panthi, R. K., & Dahal, N. (2023). Teaching-learning practices of mathematics in semester system: A case study of Tribhuvan University, Nepal. *Journal of Mathematics and Science Teacher*, 3(2), em038. <https://doi.org/10.29333/mathsciteacher/13165>

ARTICLE INFO

Received: 18 Nov. 2022

Accepted: 30 Mar. 2023

ABSTRACT

This study explores the practice of mathematics teaching and learning in the semester system in Nepal. Three teachers and six students of Master of Education from the Faculty of Education, Tribhuvan University (TU) were selected purposively for the interview. In addition, 21 students were also selected for focused group discussion (FGD), and classroom observation and FGD were used to collect information from the participants in the study. Thematic analysis is used in the study. It is concluded that the semester system at TU, Central Department of Education, particularly in mathematics, has a radical shift in pedagogical practices. There is the provision of supportive internal and external evaluation systems to promote multiple skills and knowledge in mathematics or the holistic development of learners. The assessments were to encourage and motivate the students in learning. The study supported to enhance the weakness of teaching-learning activities in the semester system. It is the supportive document for effective teaching-learning in the semester system for Nepal.

Keywords: teaching, learning, semester system, mathematics

INTRODUCTION

Context of the Study

The semester system in Nepal is intended to be a radical departure in Nepali higher education (Kathmandu University and Tribhuvan University (TU), among other universities) to support students' meaningful learning (Bhardwaj, 2019; Maharjan et al., 2022). A semester system was introduced at TU in 2013 for adapting to international educational practices was deemed necessary (Baral et al., 2019). However, there was no adequate preparation for significant changes in the curricular practices. The semester system is a reform approach to address lapses in the annual system (Matlakala et al., 2019). But the fundamental question is how it can be conducted smoothly, systematically, and effectively (Gupta, 2010). It could shift some weights of teaching to learning, knowledge to skills, exams to diversified assessment, degrees to disciplinary identity, and change in the classroom to the culture at large (Handayanto et al., 2018; Sharma, 2018). The semester system was introduced to realize the several weaknesses of the annual system. The annual system represents the syllabus-based subject matter and guides students to memorize the content at the end of the year or the session. On the contrary, the semester system represents the detailed achievements of students within a few months (generally at six months). This system supports the students with the basic knowledge and skills that have been achieved. The annual system seems to create boredom for students because of its long-term process evaluation, whereas the semester system evaluates the students' achievement many times in many forms like presentations, group work, project works, tests, etc., in a year, which encourages students to be curious, enthusiastic and self-motivated in learning. Besides, the students become self-aware in learning.

For the last nine years, TU has been implementing a semester system for master's degrees in each faculty from the Central Department of Education, with an expectation to replace the old annual education system through competent performance (Dahal, 2018) among students. However, it has not been found as it was expected. The main aim of the semester system is to implement practices like knowing what to do, and a written examination to diversified assessment (Bhutia & Subba, 2015; Dahal et al., 2022a; Tripathi et al., 2019). But, educational courses, more or less, continue the annual system (Rai & Acharya, 2021).

In the Nepali context, many educationists and experts still argue that the semester system is not producing the output as expected (Bista, 2016; Chongbang, 2014; Subedi, 2019). As we experienced, various components of teaching-learning practices like objectives, contents, teaching-learning strategies, evaluation procedures, the orientation of the nation, globalization of

knowledge, explosion of new knowledge, etc., certainly influence the degree of success of any academic program (Sugilar, 2019). Despite various weaknesses and limitations of the annual formal education system, they have not been perfectly evaluated and improved. Even though the semester system is expected to overcome those weaknesses, it is not seen. From the beginning days of its implementation, we have experienced most of the classrooms with a large number of students as in the annual system. It affects the teaching-learning process and hinders better learning outcomes. Though the norms of higher education in the semester system are expected to be based largely on different practical, project-based, problem-based activities, it is still given priority in the time-limited test. Also, the courses in the semester system are the split halves of the annual system course. Similarly, the perception of teachers and students towards internal assessments is not still positive; they just perceive it as a formality rather than evaluating students holistically in most cases. This paper is guided by the questions--how are the existing practices of mathematics teaching-learning activities in the semester system at Tribhuvan University, Nepal? and in what ways the teaching-learning and assessment strategies have been implemented in the semester system at Tribhuvan University, Nepal?

Alternative Assessment a Way as Semester System

Alternative assessment practices are guided by the alternative view of pedagogies, such as constructivism, progressivism, transformative learning, performance like performance-based assessment, portfolio-based assessment, interpretive exercises, open resources examination (Rai et al., 2020). The framework for using alternative assessment in the class includes considering learners as constructors of knowledge, finding authenticity in materials and activities, employing dynamic, ongoing evaluation tools, and empowering students through the semester system (Janisch et al., 2007). Likewise, Janisch et al. (2007) explained that alternative assessment has the characteristics such as assessing the choice of teacher based on a constructivist view of learning whereby the students, text, and the context that impacts the learning outcome. For promoting alternative assessment that emphasizes on the learners have varying levels of knowledge in the classroom and expiring with testing and classroom-based assessment they are encouraged alternative assessment own instructional content and within their frame of reference (Janisch et al., 2007). Classroom behavior self-assessment tools can be supportive to the teachers to understand students' learning readiness and learner types to design each lesson for everyday instruction and guide students for their learning promotion (Kunwar et al., 2021). For the better performance of students, we can generally use formative assessments such as project work, classwork, unit test, remedial support, field visit group discussion, which are the key to the semester system (Acharya, 2019; Dahal, 2019). The improvement of students' mathematical communication skills and self-confidence is necessary, which can be achieved through the teaching-learning model of think pair and share (L et al., 2021).

REVIEW OF THE STUDY

Aslam et al. (2012) conducted a research study evaluating the factors affecting students' satisfaction with the semester system. The study concluded with various factors like the role of the teachers, types of courses, duration of time, the teaching-learning process, and work in a group, which has a significant role in shaping the satisfaction level of the students studying in the semester system. Pathak and Rahman (2013) have researched exploring the perception of students and teachers towards the semester system among 133 undergraduate students and 44 teachers. The survey questionnaire was categorized into five subheadings: semester system curriculum, syllabus coverage and regularity of classes, teachers and methods of teaching, evaluation and feedback, and availability of resources. Finally, the study concluded that the internal assessment and overall evaluation are absurd. The respondent feels the CGPA system of grading is confusing. The study also suggests for the management of enough of resources. The University Education Commission of Pakistan, in the education system, in 1948 stated, "If we were to suggest a single reform in education, would be of examination." This view helps us to realize the importance of an evaluation system to judge the degree of success of the overall system. An annual system is a traditional method that gives students an ample chance of two years to understand and grasps concepts and sits for a comprehensive exam of three/ four hours at the end of two years (Hashim et al., 2021).

RESEARCH METHODOLOGY

Three constitute campuses of Kathmandu valley that run the mathematics education program was the research site in this study. These campuses were chosen because they run the semester system first and they practice long periods rather than other campuses. The teachers and students have long experience of teaching-learning, assessment practices, and challenges faced by them while implementing the semester system, so we selected this area for the study. Qualitative, research could select small samples and it studies in depth. Considering this fact, three sample teachers who are teaching mathematics at the masters level under the faculty of education from Kathmandu valley were selected in such a way that allow us to collect information from multiple perspectives like the perspective of male and female teachers and teachers building expertise in conducting semester systems. Similarly, six students who were studying M.Ed. in mathematics education in Kathmandu valley were selected as samples for an interview. Additional to these six students, 15 other students adding to the total of 21 were selected for focused group discussion (FGD) (Rezat et al., 2013). As the study is planned to conduct within the framework of qualitative research, purposive sampling is used to select the key respondents. Purposive sampling involves the researcher using his/her judgment to select a sample that is most useful to the purposes of the research. As we planned to adopt the ethnographic design for the study, the following data collection tools were developed and used interview, observation and FGD.

The interview is a process of communication or interaction in which the subject or interviewee gives the needed information verbally in a face-to-face situation. This tool is used in exploring the experiences of teachers regarding the practices of assessment strategies and teaching-learning modalities with its opportunities and challenges and envision for making the semester system students friendly from the perspective of teachers and students. The participant makes the researcher a part of the group and allows the researcher to observe the phenomenon in a natural setting. This tool is used mostly for exploring more about teachers' practices in classroom instruction. A focus group is a form of a group interview to generate a common understanding of the research issues (Morgan, 1988). Both students and teachers use the FGD to create a common understanding regarding the teaching-learning and assessment strategies of the semester system.

Data Collection Procedure and Data Analysis

At first, we took permission from the sample teachers and students to administer the research tools. In the first phase, an in-depth interview was taken with the sample teachers and students. Then, the actual classroom observation was done regularly for a few days. Then, in the third phase, FDG was done separately among teachers and students. And, in the final phase of the study, the sampled teachers were requested to present reflective writing based on their experiences relating to the research issues (Aldahmash et al., 2021). And the responses collected from the respondents are considered the study's data. Qualitative data analysis identifies, examines, and interprets patterns and themes in textual data and determines how these patterns and themes help answer the research questions (Creswell, 2002; Taylor & Luitel, 2019; Thomas, 2006). There are different techniques for analyzing qualitative data, such as thematic analysis, thematic network analysis, general inductive approach, and constant and comparison approach; among them, we used the general inductive method (Thomas, 2006) to analyze the data.

The General Inductive Method

In qualitative research, we use the general inductive method for analyzing the data that can produce valid and reliable findings. For this, we condense raw textual data into the summary format, and establish clear links between the research objectives and the summary findings derived from the raw data (Thomas, 2006). The generative approach provides an easily used and systematic set of procedures for analyzing qualitative data that could produce reliable and valid findings (Thomas, 2006). The general inductive method allows us to generate the themes under study by identifying, analyzing, and reporting patterns within data (Braun & Clarke 2006). The procedures for the inductive analysis of qualitative data are the preparation of raw data files ("data cleaning"), a close reading of the text, creation of categories, overlapping coding, continuing revision and refinement of the category system, generating themes, revising themes, naming themes, producing the reports (Creswell, 2002).

DISCUSSION

The research questions of this study are how are the existing practices of mathematics teaching-learning activities in the semester system at Tribhuvan University, Nepal? and in what ways the teaching-learning and assessment strategies have been implemented in the semester system at Tribhuvan University, Nepal? To answer these research questions, we observed the classroom teaching-learning practices held in mathematics classes and interviewed teachers and students. We asked them questions individually in the interview. We presented the agenda in a focus group discussion. All the participants shared their experiences differently. After listening to their voices many times, we recorded, coded, and categorized their feelings to develop themes.

The major themes that we generated are, as follows.

Initiatives of Communicative Learning

In the semester system, good communication has been established between teachers and students. The teachers create a friendly environment with the students in the classroom. Students should talk to the teachers politely. When students do not understand, teachers must teach repeatedly and correctly. The teachers shared their knowledge. In this direction, one of our student participants, S1 shares his views:

In the semester system, classroom teaching is very different from the annual system in many ways. Courses are based on the need of the students and their interests, and they want to know what students need in the semester system. Good communication skills of teachers with students, is the basic need of students' academic success. We are focused on student-centered learning, with good communication with teachers and student for construction of mathematical knowledge.

Similarly, S2 student participant shares his view:

In the semester system, teachers use constructivist classrooms to create a mathematics learning environment for students. The teacher creates an environment, where students can actively participate during mathematics learning. Learning mathematics for students must be attractive to teachers, and students and the teachers must be good at communicator with the good delivery of the subject matter.

Likewise, student participant S3 shared her point of view:

In the semester system, teachers and students communicate with each other in mathematics learning. Teachers make students friendly classroom. Effective mathematics teaching requires good communication with teachers and students. Face-to-face communication is the most effective way to learn mathematics. Communication is a dynamic process, and one needs to learn mathematics. The communication process will be successful when we have a clear and easy-to-understand knowledge of mathematics.

Participant, S4 shared her point of view, such as:

Teacher with good communication makes mathematics learning easier to understand. Effective communication skills are useful for teachers to teach mathematics, management of the classroom, and interactions with students in the classroom are important factors. The communication skills of the teachers are the basis for students to succeed. Teacher's poor communication skills may be the cause for students' mistakes. Students need to understand what is right and what is wrong depending on the teacher's communication skills in the classroom. So in the classroom, our teachers should be aware of good communication with students.

Similar views were obtained from other participants S5 and S6 like S1, S2, S3, and S4.

From the above information about students participation, we understand that there is good communication between teachers and students. The course and delivery of instruction address students' problems, interests, and needs. The teacher creates an environment, where students can actively participate during mathematics learning (Foshee et al., 2016). Good communication makes mathematics learning easier to understand. Teachers create good conditions of communication with the students. Learning mathematics must be attractive to teachers, and students must be good in communication. If the teachers' and students' communication skills are poor, it may lead to failure of students. In the semester system, a good relationship between teacher and students is well established in the teaching-learning process through good communication among them (Dahal et al., 2019, 2020). In this regard, Han and Tosten (2016) claimed that the level of teacher-student communication is high, the level of students' achievement is also high. Similarly, Vygotsky (1978) believes that high-level psychological functions have a social form and are spread through culture. Cognitive development is regulated by the language dialogue between knowers (teachers) and learners. He believes that educational information is gradually changing from teacher-student dialogue to internal discourse. In this discourse, students' thinking becomes organized and becomes an internal mental function. Furthermore, Vygotsky (1978) argued that understanding how knowledge develops requires understanding the social and historical origins of knowledge and of changes in that knowledge. Vygotsky (1978) argued that human knowledge originates in socially meaningful activity and is shaped by language.

Likewise, Sudhakar (2019) suggested that to create an interactive classroom environment by addressing different cultures as well as learning beliefs, values, customs, and perspectives of others, there should be a natural part of the curriculum and use of high academic standards. Students should be instructed to adopt a curriculum that fosters cultural competency, demonstrate respect for students' identities and welcome a diverse community to participate in schools, acknowledge students' diverse learning styles, ensure qualified personnel for all students and provide extra help for schools and students who need it. Likewise, Freire (1970) and Hiremath (2015) share that traditional methods like the lecture method do not tend to foster interactive, critical thinking, creative thinking, and collaborative problem-solving. So, teachers at present are beginning to show an increased awareness of the importance of the interactive way to students learn. Similarly, for the validity claim of the participants, we managed class observation of sample campus. It was 16 November 2021. The principal investigator was waiting for the day to be in one of the valley's old education campuses, which is a bit far from a crowded area. The environment of the campus was not new for me. I have always found it interesting to enter the peaceful environment of the campus. With a huge eagerness to visit the campus time and again, I reached the campus gate in the early morning at around 7 am. As it was early in the morning, the sky was also clear, without any dark clouds. Most of the teachers reached there and started preparing for their duty. The mission of reaching the ground of that campus was different for that time than other times as I usually used to be there for the class observation for our research work. I went directly to the newly managed staff room on campus and greeted the teachers who were there. My eyes were looking for my respondent in the staff room, but I could not see her. Thus, I immediately got information that she was in the classroom. I was waiting for her in the same room for her arrival. Just after around 10 minutes, she entered into the same room and came near me with the formal greetings:

Respondent: Namaskar sir (her face seemed quite surprised to get me as I had not informed her about the particular day for observing her class. I informed and took permission from her informally).

Me: Namaste ... hi, how are you? I am here to disturb you.

Respondent: (Smiling for a while) fine sir. Your presence will never disturb me ... it's my pleasure.

Me: Thank you ... I was just joking. I also feel the time spent with you is meaningful in many ways.

Respondent: Thank you, sir ... I feel great to hear this from you.

Me: I got rich information regarding the implementation of the semester system from you through the last week interview. I am again thankful to you for your kind co-operation. However, I am here to observe the students' involvement/encouragement/practices in the classroom.

Respondent: Sure sir. My class is in M.Ed. final semester. It will begin at 7:30 am. Of course, we will go together.

Me: Thank you so much.

(Just after around five minutes, we went to the class together)

Students got surprised to see me with their teacher.

With their formal greetings, we entered into the class. Meanwhile, students were looking at each other with curious face. Then, I immediately responded to the students saying,

Me: Dear friends, today I am here just to experienced/recall my college life as a student. Please perceive me as your friend.

Then, I felt that they took me in the class normally (just after saying that) their teacher (my key respondent) started her class.

She: Ok dear students; let us begin our formal class. I think you all have read the document I shared last week via email.

(Oh good, I feel happy to know that they have well communication through another digital mode of communication, I immediately noted it.)

Students: (some of few) Yes mam, but it was very difficult to understand the paper.

She: Thank you so much for your nice attempt.

(Then pointing to those who did not respond to her.) She further said,

Only a few of us have tried to understand it. Did not you get time to read it?

(Looking at her targeted students.)

(I think it was great to know that she observed students' activities and involvement in the assigned tasks at home.)

Most of her targeted students kept silent.

She further added,

Please I always request you to read the documents at least once that I shared before getting to the class. It directly helps us to understand the content deeply.

(Her encouraging words impressed the students. Her activities were matching with her responses in the interview as she said as I always encourage students for reading the shared documents before entering the class.)

Then, students were symbolizing in some ways, they would read then onwards.

She further adds (looking at the students who had read the documents):

Would you please share your understanding about the documents?

(Ok, it was interesting to see how she encouraged students to active participate in the classroom as well.)

(Just after a few seconds, one of the students tried to explain his understanding among them.)

She thanked him, and requested for others,

Anyone else?

(The class was silent for a while.) She added,

Ok, let's begin our discussion.

(Her words should encourage for students.)

Then, she started her lecture. Meanwhile, in her teaching, she continuously inspired students for participation in the discussion. And, at the same time, she cross checked the understanding of the students by asking questions.

From the above classroom observation, it was concluded that there was room for communication between teachers and students in teaching-learning mathematics in the semester system. The teachers encouraged the students for learning. The teachers used different strategies in learning mathematics. Moreover, the teacher provided learning resources before the formal class. In this context, Han and Tosten (2016) believed that students are expected to play an active role as a teacher; communication effectiveness is closely linked with the effectiveness of education. Teachers' communication is affected the learning environment. Likewise, they believed that teachers perceive their behavior to establish a positive relationship and to be able to predict the response of students effective communication is required (Han & Tosten, 2016).

The teacher encouraged all the students to learn the subject matter. In this line, Mezirow (1997) explains, that transformative pedagogy encouraged the practitioner to learn and be involved in classroom discussion. In this context Tripathi et al. (2019) asserted the need for greater is balance by moving the weight of education from teaching to learning, knowing to doing. Likewise,

a diversified assessment like classroom tasks given individually or in a group, group discussions in the given task, class presentation, home assignment, writing paragraphs, reviewing writing pieces, and writing articles can be included to make assessment practical. This saves time and the task of both the teachers and the students.

Blended Mode of Teaching-learning: More Emphasize on Use of ICT Tools

The semester system has been implemented at the master's level at TU. Four semesters have been fixed by adjusting the curriculum of the two-year annual program conducted earlier. As one semester of 6 months has been fixed, there is a provision to complete four semesters in two years. In the prescribed period, we conducted the different types of teaching-learning activities in the semester system. I asked our student participant (S6) about the teaching-learning practices of the semester system, she shared her view as,

The teaching and learning activities of the semester system are very different from the teaching and learning activities of the annual system (Tang & Logonnathan, 2015). The teaching-learning activities of the semester system are mainly based on technology. The teaching activity is carried out by showing the slides prepared in PowerPoint through a projector. Teaching-learning is done through discussions methods and projects work. To facilitate students to learn various mathematics subjects, some teachers also showed digital work, and in some subjects, like algebra marker pen white boards, are used for teaching. To increase students' participation in theoretical subjects such as the foundation of mathematics education, and studies in mathematics education, a large number of project work and group work are given to students in the period of mathematics teaching (Johns & Mills, 2021), which is related to students' internal evaluation.

From the above information of our student participants, we learned that the teaching-learning mathematics implemented in the classroom are mixed types. Some teachers use ICT tools frequently such as presenting PowerPoint, showing videos, searching resource materials, using different search engines but other used marker board as the nature of the subject. In this line, GON (2015) mentions that there will be an expansion of access to the internet to all schools; development of human resources, and special IT programs for students and teaching/learning in all schools. Accordingly, the ICT master plan (2013-2017) it aims to provide students with ICT skills and use ICT as an important tool to improve classroom delivery; increase access to learning materials; and improve the effectiveness and efficiency of educational governance and management. Periodic plan (2017-2018) aimed at integrating ICT in all aspects of education by using ICT in education to increase access to quality education in rural areas (Lieberman et al., 2019; Shin, 2022). Again, first author managed time for class observation of the Central Department of Education, Department of Mathematics Education fourth semester students.

The same routine but mission was different. I was with my laptop, my field notes, my research participants' voices, and many unanswered questions in my mind, at the same place as usual with the same table and chair. I was working on the same research project for digging out the key points through the discussion with my participants for the last five hours. My wife knocked at the door. I was still denying her saying 'wait ... wait ... wait for a while ...' Then she started shouting, 'will not you go to the college today?' Then I immediately turned my head towards the clock hanging on the wall. I got surprised to find out it was already 9:30 am. Even it was too late, I feel proud of getting too engaged with my work. I requested my wife serve me food and prepare to move towards the campus.

It could be the day of Nov 17, 2021. I was speeding the speed of my bike to reach the college on time. It was not usual day for me at the college. I planned to observe the classroom practices of one of my teaching staffs who have been teaching in the same system since the beginning of the semester system.

No doubt, everyone was attracted by the environment of the University campus Kirtipur. I waited for my targeted staff in my room with warm sunny rays. I opened the laptop in front of me for the same mission. Just then, I came to hear a sound, 'Sir namaskar ...'

Me: Namaskar sir ... (looking towards him), I am waiting for you.

Respondent: Oh? It means, you are going to observe my class today, are not, you?

(He guessed as I informally shared a few days ago for taking permission to observe his class.)

Me: Sure. You have a good estimating capacity.

(Both laughed ...)

Respondent: It's ok sir ... let us move to the class ...

(We both moved towards the classroom.)

We: Good morning, dear students.

Students responded to us saying

Good morning, sir.

My colleague (key respondent) immediately said,

Ok we two are here today. Do not get surprised. Our sir (showing me) will support us.

Then I moved to the last desk of the classroom and sat.

My colleague got ready for the regular class. He at first took out his laptop from the back and connected it to the projector.

(It was really good to know, my teaching staff has been continuously using such ICT tools in classroom teaching.)

My colleague then opened a well-animated Power Point file, showed the list of major headings designed for that particular class, and started his lecture.

His gesticulation showed he was well trained in ICT tools and software. He showed many images and videos files that were supported well for his lecture. However, as he was teaching more theoretical mathematics content, ICT-based activities for the students were not found well.

From the classroom observation, it was found that teachers used different tools of ICT in mathematics classes. ICT tools helped the students visualize the three-dimensional figure easily. In addition, students were less activated in classroom presentation as they were habituated with theoretical knowledge. On top of that, though we are in the transitional phase of the semester system, teachers were well motivated to use ICT blended classrooms. However, students were more confused in using ICT tools properly.

Moreover, to deal with the research question having a theme of pedagogical practices of mathematics in semester system, we conducted an FGD with the Center Department of Mathematics Education students with six students as our research participants. We conducted FGD after college time, which took approximately 55 minutes. The discussions were open-ended; the theme guided them under investigation. We found from the FGD that some teachers followed the traditional teaching methods, and some were using digital tools to teach their classes. Teachers having little knowledge of ICT and operating digital devices prefer the traditional teacher-centered lecture method of teaching. In the class, students were trying to become active learners, courses remained incomplete, and students' learning was limited. Teachers who have good knowledge of ICT, used ICT-based teaching and learning as they have a good command over ICT and digital devices (Dahal et al., 2022b). In such classes courses were completed in time and learning became effective. Teachers provided enough sources as self-learning materials. Assignments, quizzes, term paper writing, project works, group works were regular activities of the classes. Students gained a good knowledge of subject matter creatively as they were self-learners and more engaged in learning and allocated tasks. But lack of regular electricity supply and low bandwidth of internet facility hampered classroom teaching and learning. As per the discussion, to make effective and successful teaching and learning in the semester system, every teacher must follow ICT based digital mode of teaching and learning. Traditional teachers must be trained with ICT knowledge, and every class must be connected with appropriate resources, network, and devices. Moreover, teachers and students should be provided access to online libraries, resources, and textbooks. Similarly, we came to realize that learning mathematics through mathematical apps, and digital tutor makes it joyful. In this regard, UNICEF (2009) argues that children need the freedom to use their inner resources to solve problems just as much as they need guidance in making the best use of their natural talents as learners. We believe that to create a child-friendly environment, the teacher should take responsibility and should be committed to meeting the diverse needs of students. A child-friendly learning environment encourages the use of different teaching methods and techniques for the learners and the subject matter as well. Similarly, in this line Shakya et al. (2017) explained that Nepal, in recent years, has made remarkable achievement in developing ICT infrastructure and human resources, however, the achievements are still not adequate to fulfill the nation's demand and lack of use of e-learning, lack of human resource (skilled manpower) in rural areas of Nepal are the major problems of ICT in Nepalese context. Dhakal et al. (2016) claimed that the face to face learning improves study habits and provides an opportunity to learn and relearn with more interactions. In this regard, face-to-face learning is the preferable mode of learning in mathematics as it allows multiple options of promoting creativity for sustained learning.

Multi- Methods is the Keys for Teaching-Learning Mathematics

In the semester system, we can use different teaching methods in the teaching-learning subject matter in general and mathematics in particular. The choice of teaching method is based on the objective and the nature of the subject matter. We asked one of my teacher participants T1 about the use of teaching method in his classroom teaching. He replied,

In my classroom, teaching-learning activities can engage students in the semester system application of think-pair-repair, brainstorming, concept mapping, discussion, reflective writing, role play, interactive demonstrations, case studies, and problem-based learning used.

In this concern, I asked one of our student participants S2 who shared his view, as follows:

A semester system is a type of system, which divides the academic year into two terms of equal length. So, in the semester system, one year's of academic course is divided into two equal terms of 6 months in each. It is the new system in the field of the education system of Nepal. I think this system was applied regularly on University Campus since last eight years. So this system is new for the teachers and students. Let's talk about the existing teaching-learning practices in the semester system. In this system, the student-centered teaching method is used, which focused on the interaction between student-student and student-teacher. In our own experience, there is less use of lecture method and with more preferences on student-centered method like problem-solving, guided discovery method, inductive method, discussion method, etc. Also, there is a space for the use ICT by teachers while teaching and presenting his/her lesson in order to make the class more attractive. So, in our experiences, pedagogically the semester system is modern and suitable, and it is also applicable for the teaching-learning process in our campuses.

From the above information of our participants, we concluded that we applied multi-methods in the semester system for delivering the subject matter to the students. Teachers use student-centered pedagogies in the classroom to engage students in

the semester system through the application of think-pair-share, brainstorming, concept mapping, discussion, reflective writing, role play, interactive demonstrations, case studies, and problem-based learning and use of ICT-added pedagogy.

With the hope of verifying the responses of the teachers and students as well as observing the actual classroom practices from the methodological perspectives, we planned and managed for observing a class of our key respondents.

It was the day of 19 November 2021. The day was cold enough. I reached the college in the evening time. I called my key informant and knew that he had already moved into his class. Then, I directly went to his classroom.

Me: Excuse me, sir. Could you please allow me to get an entry?

He (respondent): Please sir.

Me: Thank you so much.

And I went to the last desk of the class and sat there. At the same time, students were looking at me curiously.

Then immediately their teacher introduced me and moved with his regular class.

I knew he was just creating an environment for that day's class.

He invited one of the students for his presentation on a regular schedule.

(It was great to know that students took part in content presentation, in front of the class, at the scheduled time.)

The student presented his presentation with some well-decorated slides through a projector.

Just at the end of his presentation, the teacher summarized about the key concepts of the content. And, then he (the teacher) requested all the students to share their understanding and confusion to continue the discussion.

At last, it was really impressive to know that he requested students to reflect on the classroom discussion and suggested to prepare a short note.

With these practices, I came to a decision that the semester mode of the teaching-learning system in some ways is the turning point for the shift in methodological perspective from only lecture method to student-centric discussion mode.

Likewise, to deal with the research question: existing practices of semester system in the mathematics classroom, we conducted another FGD comprising six participants. It was conducted in M.R. campus, Tahachal. The principal investigator raised the issues in FGD. The co-investigators recorded the participants' voices and took photos of FGD. FGD continued about one hour.

From FGD, we concluded that in the semester system, the main teaching-learning strategies in the mathematics classroom were slide presentation of the teachers in the classroom, demonstration, interaction method, project work, class-work, group-work, participatory work. Moreover, there was collaboration with the students, participating. However, all students were not equally active in classroom discussions. In a classroom, we should emphasize scaffolding, reinforcement and motivation. In this line, constructivism theory of Vygotsky (1978), focuses on scaffolding, which makes learning fruitful.

On November 23, 2021, in order to carry out our research, we conducted the other FGD. We formed a group of seven members. After forming the group, we decided to take me as the principal investigator and other co-investigators would take the responsibility. I as the principal investigator, raised the issues. The other two co-investigators took the responsibility of recording the responses the students provided and took the photos during the discussion period.

After distribution of the role of the members in a group, we decided to go to the field. We were assigned the topic entitled 'Existing practices of semester system at TU' for our task. Our aim was to find out views of the learners towards the pedagogical practice of the semester system on TU.

As the classes of M.Ed were running in the morning at Sano-Thimi Campus, we went to the campus in the morning, at 9 o'clock. It was not new for me. We went directly to the class of M.Ed fourth semester. We chose seven students to conduct the discussion. We asked them to sit making a circle for easy discussion. After clarifying our purpose, the issues viz existing teaching-learning practices carried out the semester system in mathematics classes by principal investigator; the responses of all seven participants were recorded, and a co-investigator took photos. After taking the students' responses, we thanked them for actively participating in FGD. It took about one and a half hours' to complete our task with the students. After that, we went to the campus canteen to have some snacks. We had tea and samosas for our snacks. Then, we sat in a circle on the campus ground and discussed the responses that we had with us. Students responded that the semester system was better than the annual system and that the assessment system was also more scientific, whereas only two students responded that it was not flexible like the annual because of regular attendance and term-wise assessment.

Likewise, regarding the activities of the semester system, students responded that they were involved in group work, self-study, report writing, discussion, pre-reading activities, and internal and external examinations to complete their semester. After discussing the responses, we found that the semester system was more effective than the annual system. There was the use of student-centered techniques and activities in the classroom. Each semester run for six months; there was regular evaluation and feedback, the assessment system was also more practical and activity-oriented, and learners tried to become independent. We also found that group work, self-study, report writing, discussion, and class presentation activities were practiced in the semester system. Although the semester was not bad in itself, it is not free from demerits like everything. Some of the demerits were lack of proper treatment to all the units and contents from the teachers' side and work-burden to complete the assignment on time. In this line, Ogugu et al. (2020) also found that assessments of teacher's utilized of innovative teaching strategies in enhancing achievement in mathematics among secondary school students have highlighted the selection of teaching strategies,

mathematics teacher choice for innovative strategies, and the mathematics teachers' response to the computer-assisted instruction. The study also found that the teachers used four innovative strategies: discussion web, manipulative, problem-solving, and project-based learning (Ogugu et al., 2020).

CONCLUSIONS

The semester system at TU, Central Department of Education, particularly in mathematics, has a radical shift in pedagogical practices. Teacher educators have adopted learning practices developing closer relationships and interaction with the students (Hatisaru, 2020). They have lessened the hierarchies among them as that of the annual system. The use of ICT in teaching-learning practices further enhanced collaborative learning. The multiple methods and approaches used by teachers were meaningful in conceptualizing abstract ideas and concepts of mathematics (Maharjan et al., 2022; Simelane-Mnisi & Mji, 2019). They were able to develop critical thinking on the issues they discussed in classroom situations.

The alternative assessment practices were likely to enhance the learning of students. The assessments were not just for grading the students' abilities but rather promoting learning. On the one hand, the focus given to assessing students' higher-order thinking was instrumental in constructing newer knowledge. On the other hand, the diversified assessment practices promoted social justice for all learners. The provision of internal and external evaluation systems helped develop multiple competencies of the learners or the holistic development of learners. The assessments were able to encourage and motivate the students to learn.

Implications of the Study

The study assists in improving the weakness of teaching-learning activities in the semester system. It is the supporting document for effective teaching-learning in the semester system. This study helps use the appropriate learning resources important to the semester system. This study will relentlessly train teachers in the semester system's best practices. The findings will help the concerned authorities about the ways to improve the existing system and make it more appropriate and reliable as per the 21st century's global trend of pedagogy, which will also be beneficial for all university stakeholders and particular teachers.

There is a concern about some weaknesses in the process of implementing the curriculum, but it is still more applicable and useful for all stakeholders. So, it helps the policymakers and political leaders make educational policies, curriculum expert to address the raising issues about content, related university or department for correction and proper implementation, researchers, readers, and writers who are involved in this area. In addition, the findings of this research will help policymakers formulate proper policies for making teaching-learning activities and assessment systems more effective, reliable, valid, and standard. This research can be applied to restructuring the semester system to eliminate weaknesses and limitations. It also has implications for the development of resource allocation policies develop a good policy to eradicate the weaknesses and challenges faced by teachers and students and make the semester system policy student friendly. This research is aimed for researchers, teachers, students, and planners, i.e., anyone interested in acquiring knowledge about the semester system.

Author contributions: All authors have sufficiently contributed to the study and agreed with the results and conclusions.

Funding: This study was supported by the University Grants Commission of Nepal as faculty research.

Acknowledgements: The authors would like to thank the University Grants Commission of Nepal for providing support to the first three authors to initiate this study. The authors also would like to thank the research participants for their participation in this study.

Ethical statement: The authors stated that the study did not require ethics committee approval since no personal data were analyzed, and pseudonyms are used in this paper.

Declaration of interest: No conflict of interest is declared by authors.

Data sharing statement: Data supporting the findings and conclusions are available upon request from the corresponding author.

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