Effectiveness of Implement Mathematics Curriculum in Classroom of Secondary Level

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Abstract

This research study evaluates the effectiveness of mathematics curriculum implementation in the classrooms of secondary schools in Rajpur Rural Municipality, Dang. The research design is qualitative and follows the interpretivist paradigm. Data were collected through focus group discussions with nine students and in-depth interviews with mathematics teachers from three secondary schools. Student academic achievement is a crucial indicator of the overall quality of school education in Nepal; however, the achievement level in community schools remains low, particularly in grade ten mathematics. This issue poses a significant challenge for teachers, students, parents, and the local government of Rajpur Rural Municipality. Findings indicate that teachers rely heavily on textbooks and do not adequately use the curriculum in classroom practice. Large class sizes, poor foundational knowledge of students, limited understanding of learners' interests and abilities, and insufficient familiarity with the new curriculum were identified as major barriers. Additionally, teachers lack updated training and adequate knowledge of information and communication technologies (ICT) for classroom use. To enhance students' academic achievement and strengthen Nepal's overall educational system, improved and effective use of the new curriculum across its various components is essential.

Keywords : interpretivist paradigm, curriculum, focus group discussion (FGD), academic achievement.

Introduction

Curriculum is a plan or roadmap of any educational program. The word curriculum comes from the Latin word "currere" which meaning is 'to run' or 'runway'. In a limited sense it is also known as syllabus. Content, teaching materials, teaching methods, teaching learning strategies and evaluation are the key components of curriculum. Nowadays in Nepal mainly two types of curriculum are used in school level. These are national curriculum and local curriculum. The local curriculum was developed in local level on the basis of local need, interest of local society, including local occupation, local culture, religious matters, agriculture, important places, important natural resources, social and familiar personalities and characters which introduce this local place in national level etc. This curriculum includes one subject of one hundred full marks from class one to class eight. This curriculum may be developed by school or society but nowadays in Nepal local curriculum was developed by

local government. This local curriculum was developed by discussion and interaction with all groups of this local society in different steps. This curriculum was implemented in class one to class eight (Adhikari, 2024).

The national curriculum was developed by Curriculum Development Centre (CDC). There are subject committee of all subjects used in Nepal. This national curriculum was developed or revised by collection of needs or new technologies to be included to change or revised curriculum. For this interactions and suggestions are collected from teachers and students. Nowadays four or five subjects are developed by curriculum development center. These subjects are implemented in class one to class twelve. The curriculum of mathematics is a part of national curriculum and read as compulsory subjects in class one to twelve and optional subjects in class nine to twelve (CDC, 2007).

Improve the quality of education is the main factor to achieve the success of nation building. The quality of education is achieved if it is supported by qualified human resources. Thus, for qualified human resource curriculum must be improved and changed as the period of time including the new innovations and new technologies discovered in the world. In a Nepal curriculum was revised in every five years and changed in every ten years (Larasati and Rindaningsih, 2024).

Teachers are responsible for understanding the needs of all stakeholders in teacher education. They must be able to interpret learners' psychology and be well informed about appropriate teaching methods and instructional strategies. In addition, teachers play a crucial role as evaluators in assessing students' learning outcomes. Therefore, they are expected to possess multiple professional qualities, including those of planner, designer, manager, evaluator, researcher, decision maker, and administrator (Su T., 2018, p. 6).

Implementation of the curriculum involves instructional scheme of each subject to be completed in the semester, planning the lesions as per the time table, using the transactional strategies, using the appropriate media, providing the learning resources, promoting classroom learning experiences, progressive testing curriculum evaluation involves, intra-curricular evaluation, Teacher evaluation of student, Students evaluation of teacher, Materials evaluation, Verification of method, Evaluation of test and examinations, Checking the learning outcome while on the field, Curriculum review, improvement, change, modification, System revision. After evaluating the prepared curriculum, it is observed that the curriculum is not satisfactory then developer turns for revising and improving phase (Su T, 2018, p7).

Daraghmeh and David (2017) observed that support of technology integration is supportive for effective curriculum and instruction. David and Abukari (2019) suggest leaders must ensure the contextualize curriculum and instruction. Education is a systematic, thoughtful, and continuous effort to develop and diffuse information, ideas, skills, and attitudes. There must be a plan to guide that process, and the term 'curriculum' refers to that plan (Saylor et al. 1981).

Over the past century the challenges facing the education system and teachers continue to escalate. Society has required the school to educate learners for a complex set of social and knowledge- based economic realities where the demand for high level skills will substantially continue to be intensified. It is undeniable that providing a conductive curriculum will yield the generation of pioneering and skilled citizens. To that end, the curriculum must be conceptualized historically where significance is not given only to what is to be taught but also how it should be taught and assessed. Without a comprehensive approach, the curriculum will be understood slowlyas a written document or textbook content. Education aims to provide learners with knowledge and skills, and curriculum is a backbone of education as it acts as a road map to achieve targeted objectives, therefore, appropriate curriculum design is paramount for delivering knowledge and skills (Bounds, 2009).

In all over the world mathematics subject is taken as a hardest subject. Most of the mathematics teacher are the topper and talent student of their school and college life but the result of SEE, basic level examination of class eight, and all pattern of exam of each class is very poor in Nepal. But some talented students of each class achieve highest mark in mathematics than other subjects. (Langoban, 2020).

In Rajpur Rural Municipality there are eight secondary schools but the result of mathematics subject is very low in all school in all examinations. This rural municipality is a largest rural municipality in area of Dang district and consist of three geographical regions which are Naka region (very remote beyond Chure hill on the boarder side of India), Khola region (remote region in Chure hill), and Terai region (plane region both side of Hulaki Lokmarg and needy basic facilities are available). In Naka region and Khola region number of students are very low and the problems of road, telephone, electricity, drinking water, internet, etc. and availability of qualified teacher is very low and in terai region facilities of road, telephone, electricity, drinking water, internet, etc. and availability of qualified teacher are available than Naka and Khola region but the academic achievement of students in mathematics is very low in all region of Rajpur Rural Municipality of Dang district.

The main cause of low result or low achievement of students is lack of effective teaching learning process. Effective teaching is related to teachers' qualification, ability, teachers' training, policy of government for teachers' facility and teachers' satisfaction. Learning is related to students' interest, students' level, economic condition of parent, education level of parent, and family environment of student. But teacher, parent, and school management committee are most responsible for the low achievement of students in mathematics subjects. It is must necessary to improve the achievement level of students in mathematics in systematic way. There may be various factors of low achievement in mathematics but effective implication of mathematics curriculum in classroom is also be a factor of low achievement in mathematics. (Rijal, et al. 2017). In this study, I want to find the condition of implementation of curriculum in class ten in Rajpur Rural Municipality of Dang

district. This study fulfils(a) to explore the effectiveness of mathematics curriculum and (b) to find the ways to make mathematics class effective.

Curriculum plays a vital role in guiding instructional content, pacing, and assessment strategies in the mathematics classroom. Research emphasizes that well aligned curricula support teachers in meeting educational standards, providing a roadmap to cover necessary content in structured sequences. For example, studies on the alignment between Common Core State Standards and curricula in the U. S. reveal that standards aligned curricula improve students' conceptual understanding and skills in mathematics (Polikoff, 2012). Research consistently shows that curriculum choice has a direct effect on student outcomes. Studies comparing traditional and reform-oriented curricula find that reform curricula, which emphasize problem-solving and critical thinking, can positively impact students' achievement and engagement (Cai et al.,2017). Another study by Tarr et al. (2008) indicates that students using standards-based curricula perform better in areas requiring higher-order thinking skills compared to those in traditional curricula.

Teachers often need to modify or adapt curricular materials to meet diverse student needs, which can affect curriculum fidelity and effectiveness. Adaptations may involve tailoring the pacing, scaffolding concepts or incorporating additional resources. Choppin (2011) hightlights how teachers adapt curricula to fit the unique dynamics of their classrooms, influencing both student engagement and understanding. This adaptation process, however, can lead to variability in student experiences and outcomes. The integration of digital resources within the curriculum has introduced new possibilities in mathematics education. Technology-enhanced curricula can improve accessibility, personalize learning, and offer interactive experiences that are difficult to achieve through traditional resources alone. Studies on technology-rich curriculum interventions in mathematics indicate that they can improve engagement and understanding, especially for complex topics (Li and Ma, 2010). Equity remains a significant concern in mathematics education, as curricular access and quality can vary widely. Research shows that low-income and minority students often receive less access to rigorous, standards-aligned curricula, which can perpetuate achievement gaps. Studies like those by Lubienski (2006) explore how curricula, when designed inclusively and implemented equitably, can serve as tools for bridging these gaps. Curriculum also shapes instructional practices by setting expectations for teaching methodologies, such as inquiry-based or procedural approaches. Boaler and Staples (2008) examined how curricula supporting inquiry-based learning fostered deeper understanding and motivation among student's compared to procedural- only approaches. This research supports the notion that a well-designed curriculum can encourage pedagogical practices that enhance students' mathematical thinking.

Research Methodology

This research paper was based on effectiveness implementation of mathematics curriculum in classroom of community school of Nepal. This research is a qualitative

research design. This research is mainly based on interpretivism paradigm. Focus Group Discussion (FGD) was used for data collection from students and in-depth interview method was used for data collection from teachers.

Purposive sampling method was applied for selecting population sample. Rajpur Rural Municipality was divided into three regions on the basis of geographical structure. Naka region which is very remote and far from Hulak iLok Marg, lie on the border side of Uttar Pradesh of India. There are three secondary schools, Bal Kalyan Secondary School Khangra Naka was selected from these three schools. In Khola region lie inside of Chure hill there are not any secondary schools. In terai region there are five secondary schools out of them Jana Jyoti Secondary School and Shadharan Model Secondary School was selected as sample. Among them three mathematics subject teacher of secondary level were selected for in-depth interview and nine students in which three students from every three school were selected for Focus Group discussion and data were collected. The mathematics teachers of secondary level and total students of class ten of Rajpur Rural Municipality of Dang district was taken as population of the study.

Three students were selected from each school as sample for focus group discussion. Out of these nine students five girls and four boys were selected for focus group discussion and three mathematics subject teacher of Jana Jyoti Secondary School, Shadharan Model Secondary School and Bal Kalyan Secondary School were participated in in-depth interview. Thus, nine students and three teachers were taken as a sample of the study. For the selection of sample researcher visit each secondary school. Then the students of class ten are divide in different groups on the basis of their geographical residence then students are selected from each stratum. For the collection of the opinions or data of students' questionnaire guidelines were constructed then the opinions or views of the students' from focus group discussion was recorded in mobile and noted in dairy. The questionnaire was prepared for collection data or opinion of mathematics subject teachers from in-depth interview. The opinions or answer of mathematics teacher was also recorded in mobile and noted in dairy.

In the focus group discuss with the selected students of these three secondary school of Rajpur Rural Municipality students were actively participated in discussion and they give their opinion on asked questions. Some questions they cannot be clear at first then they asked cross question to researcher to make clear the meaning of the asked question. These students gave some positive activities and some activities must be improving for best implementation of curriculum of mathematics in classroom by teachers. The theme of the opinion of the students about the conditions of implementation of mathematics curriculum made by Curriculum Development Center of Nepal in the classroom of community school of Nepal can be mention in following words. Teacher give the short descriptions about uses of the chapter in our life, teacher give the meaning and information about new terminologies used in the chapter, teacher write all the formulas used in this chapter, teacher give the classwork and check the classwork, teacher give the homework and checked it, teacher will solve the

different questions on board and discuss with students if any problem, teachers are active in teaching learning activities, they use some teaching materials, teachers ask questions to the students for formative evaluation, they evaluate the achievement level of the students by terminal, half yearly and annual examinations, they mostly use text book instead of curriculum of mathematics, and they play role in extracurricular activities. But for improve the learning achievement of the students' teacher must be fully implement mathematics curriculum in classroom of community school of Nepal. For fully implement the mathematics curriculum in classroom; teacher must be describe the advantages and disadvantages of the chapter and uses and important of this chapter in our daily life, teacher should be focus on project work given in text book, teacher should be focus on classwork and homework, teacher must be connect mathematics with our daily life, teacher should be use all teaching materials mentioned in curriculum as much as possible and teacher must be use information communication and technology in mathematics teaching in classroom.

From the depth-interview with three mathematics teachers of Rajpur Rural Municipality of Dang district they accept some weakness of mathematics teachers for implementing mathematics curriculum in classroom. For implementing mathematics curriculum teachers suggest some problems which can be mention as follows; teacher says that students are very weak so teacher cannot implement curriculum in their classroom properly, project work mentioned in text book are not implemented properly, teacher cannot able to motivate students in participating classroom activities, doing classwork and homework, due to large number of students in mathematics class teacher cannot take tests regularly, most of teacher teach mathematics as old curriculum and they must not be want to change their teaching pattern, they are not interested in preparing teaching materials and use in class room, most of the mathematics teacher are weak in skills of using information communication technology in teaching mathematics in class room, mathematics teachers are not using concept of STEAM (Science, Technology, Engineering, Arts, and Mathematics) education in teaching mathematics in class room of community schools of Rajpur Rural Municipality, there is no mathematics lab and mathematics materials in school, there is no orientation of mathematics teachers about new mathematics curriculum, and teachers are also not interested in implementing curriculum in mathematics classroom. Mathematics teachers suggest that for improve the implementation of mathematics curriculum; mathematics teacher must develop mathematics lab in each secondary school, teacher will must relate mathematics with daily behavioral problems of students, teacher must familiar with information communication and technology and use in classroom, teacher must be use mathematics curriculum rather than text book of mathematics, parents of students must be create suitable environment for study and motivate for doing homework, mathematics teacher focus on class work and checking regularly, related governmental organizations must participate every mathematics teachers in orientation of new curriculum, teacher must be use the concept of STEAM education in teaching learning process, and mathematics teacher must be energetic and active in implementation of mathematics curriculum in class room of community school.

Result

In this research study from the focus group discussion on the condition of using mathematics curriculum in classroom of community school with the students of class ten of Rajpur Rural Municipality of Dang district. Students participate actively and give their views some positive and some to be improve in using curriculum in class room by mathematics teacher. Students say that some teachers give the short descriptions about uses of the chapter in our life, teacher give the meaning and information about new terminologies used in the chapter, teacher write all the formulas used in this chapter, teacher give the classwork and check the classwork, teacher give the homework and checked it, teacher will solve the different questions on board and discuss with students if any problem, teachers are active in teaching learning activities, they use some teaching materials, teachers ask questions to the students for formative evaluation, they evaluate the achievement level of the students by terminal, half yearly and annual examinations, and they play vital role in extracurricular activities. They mostly use text book instead of curriculum of mathematics. Some teachers are partially following curriculum. But the condition of using curriculum in mathematics classroom of community school of Nepal is poor, so to improve the learning achievement of the students' teacher must be fully implement mathematics curriculum in classroom of community school of Nepal. For fully implement the mathematics curriculum in classroom; teacher must be describe the advantages and disadvantages of the chapter and uses and important of this chapter in our daily life, teacher should be focus on project work given in text book, teacher should be focus on classwork and homework, teacher must be connect mathematics with our daily life, teacher should be use all teaching materials mentioned in curriculum as much as possible, every teacher must be acknowledge about the aim of new mathematics secondary curriculum, teacher must be competence and regular use information communication and technology in mathematics teaching in classroom, and every teacher must be active and energetic in teaching mathematics in class room of community school.

In in-depth interview with mathematics subject teachers about using mathematics curriculum in classroom of community school of Rajpur Rural Municipality of Dang district by mathematics subject teacher. Teachers accept some their weakness and suggest some ways to improve the condition of using mathematics curriculum in class room. Teachers say that students are very weak so teacher cannot implement curriculum in their classroom properly, project work mentioned in text book are not do properly, teacher are not able to motivate students in participating classroom activities, doing classwork and homework, due to large number of students in mathematics class teacher cannot take tests regularly, most of teacher teach mathematics as old curriculum and they must not be want to change their teaching pattern, there is no mathematics lab and mathematics materials in school, there is no orientation of mathematics teachers about new mathematics curriculum, and teachers are also not interested in implementing curriculum in mathematics classroom. Mathematics teachers suggest that to improve the implementation of mathematics curriculum; mathematics teacher must develop mathematics lab in each secondary school, teacher will must relate mathematics

with daily behavioral problems of students, teacher must familiar with information communication and technology and use in classroom, teacher must be use mathematics curriculum rather than text book of mathematics, parents of students must be create suitable environment for study and motivate for doing homework, the head teacher of school must be helpful for providing educational teaching materials, and mathematics teachers must use the concept of STEAM education by every teacher.

Discussion

The low achievement of students in mathematics subject is may be the one important factor is weak implementation of mathematics curriculum in class room. In this study students and teachers are participate openly and give response what the researcher asked. Focus group discussion was taken place with nine students of three secondary schools and three mathematics teachers are participated in in-depth interview and give the actual condition of implementation of curriculum in class room at the time of teaching learning process. The students and mathematics teachers are actively participated and give responses. From this study researcher find that teachers are mainly dependent on text book for teaching learning process. Researcher feel that teachers are unable to know the importance of curriculum. There is large size of class, weak base of students, lack of ICT knowledge, lack of willingness to update according to new curriculum, lack of mathematics lab and mathematics teaching materials in secondary level, poor studying environment in home of students, lack of relating mathematics teaching learning with STEAM education.

This study was limited in three mathematics teachers and nine students of three secondary schools of Rajpur Rural Municipality. Although, there may be some weakness in the research but I think this is fruitful for teachers, students, educational scholars, educational policy makers. In my view this research is more useful and applicable for improving teaching learning process in class room. Thus it also helps to improve the academic achievement of students of mathematics subject of community school of Nepal.

Conclusion

The condition of implementation of mathematics curriculum in class room of community school of Nepal is very poor. In fact, mathematics subject teachers are more responsible for implementation of curriculum in class room. The educational level of students, environment of home of students for study, awareness of parents toward study of their children, help of head teacher in providing teaching materials and other facilities, role of related educational organizations or institutions to provide orientation or training about new curriculum and its method of implementation in class room are the factors which play a vital role on poor implementation of mathematics curriculum in class room of community school of Nepal. Thus, to improve the academic achievement of students and use of mathematics curriculum in class room of community school in Nepal, mathematics teacher must be active, energetic, update about new knowledge, self-motivated, interested in teaching, knowledge about

information communication and technology (ICT), knowledge about connection of mathematics with STEAM education and teaching mathematics in class room connecting with use of our daily life. Other related persons and organizations (like as head teacher, students, parents, educational institutions and organizations) help mathematics teacher in implementing mathematics curriculum in class room of community school in Nepal.

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