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Secondary Level Mathematics Education in the Present Context of Nepal

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Abstract

In this paper, we discuss about the education system of secondary level mathematics in Nepal. We also discuss the situation on the basis of teaching and learning process in Nepal. Not only referring to the existing situation, we also discuss about the problems faced which is hindering the students from proper mathematical knowledge. We also highlight on influence of curriculum on mathematical skill of students. We also focus on lack of application of theoretical education practically. At the end, we also discuss about the possible solutions of the problems.

Keywords: mathematics; education; practical; knowledge; status; problems

1. **Introduction**

21st century, when one think about this era, the first thing that pops out is global digitalization. The advancement in mathematics has led the world all the way to this point. It would be a sin to think this world

without mathematics. The analytical skills responsible for development are the products of conceptual mathematics(Nirakar Sapkota, Amresh Man Singh. Higher secondary mathematics education in the present context of Nepal. Indian journal of arts, 2017, 7(23), 185-189). Mathematics plays a vital role in our day to day life. Considering the importance of mathematics, Nepal government provides its education from the very beginning of school life.

Mathematics is vast subject. So, for the effective study, both teaching and mathematical practices should be carried out. Mathematical practices include use of symbols, representations, justification of mathematical ideas (RAND Mathematics study panel, 2003). Mathematical teaching approach is also very important for fruitful result. These practices are like two sides of a same coin. Each one should go parallel for better mathematical skill and knowledge of students.

Teaching process has been a topic to discuss all over the globe. The way of teaching affects a lot to the level of education that the students receive. Teaching process is mainly categorized into traditional and modern. This distinction between traditional and reform creates a dichotomy, which can be used to argue that many teachers "fail" to achieve reform practice (Lavi & Shriki, 2008; Nolan, 2008). The ones who try to reform their practices get stuck in the middle of traditional and modern way creating hybrid way (Brodie, 2010; Cuban, 1993). Students should be allowed to go beyond the bookish knowledge. Practical way of learning should be implemented. Moreover, interaction should be carried out in class to give rise to new ideas and way of solving. If one cannot stand outdated medicine then how can one sustain outdated way of teaching (Nico Molefe & Karin Brodie, 2010)? For most students of secondary level, mathematics simply means memorizing formulas and procedures to solve the problems.

Kilpatrick, Swafford and Findell (2001) identify five strands of mathematical proficiency: conceptual understanding, procedural fluency, strategic competence, adaptive reasoning and productive disposition (The literature review of algebra learning: Focusing on the contributions to students' difficulties Kilpatrick, J., Swafford, J., & Findell, B. (2001). The interaction between teacher and student is must for better understanding of the topic. Development of curriculum helps for the better interaction between teachers and students. It helps to improve the level of mathematical knowledge and skill of students. Internationally, curriculum developments, also called reforms, encourage teaching practices that present mathematics as a web of related concepts with different ways of representing and solving problems (National Council of Teachers of Mathematics, 2000; New Zealand Ministry of Education, 2007).

In this paper, we talk about Brief introduction of Evolution of Mathematics, Major problem in teaching and learning Mathematics in Nepal and General view on how curriculum has influenced mathematical skill of students. We also talk about the level up to which these two systems are used in Nepalese education system.

1. 2. Methodology

We practiced descriptive way of study. Particularly, researches related to education are descriptive (Knupfer and McLellan, 1996). As collection of data primarily is not possible, so we chose to study and analyze the ideas and data collected by government and other surveyors. We also provide international and historical contents for better study in the case of finding present state of secondary level mathematics education in Nepal(Nirakar Sapkota, Amresh Man Singh. Higher secondary mathematics education in the present context of Nepal. Indian journal of arts, 2017, 7(23), 185-189). It also helps readers for comparative study and evolvement of mathematics in Nepal. We mainly focus on problems existing typically in Nepal.

2. 3. Discussion

Ministry of Education (MOE) is responsible for all the educational activities in Nepal. This council is responsible to design curriculum for different standards, take board exams of different levels i.e. SEE, plus two, bachelors, masters. It is also responsible for proper planning to develop level of education in Nepal. This council gives orders to different branches and accordingly, different actions take place for betterment of mathematical study.

3.1. Brief Introduction on Evolution of Mathematics

There are many excellent reasons to study the history of mathematics. It helps students develop deeper understanding of mathematics; they have already studied by seeing how it was developed overtime and in various places. It encourages creative and flexible thinking by allowing students to see historical that mathematics is important in everyone's life and it is studied since ancient times. The advancement in mathematics from prehistoric mathematicians to modern mathematicians has helped a lot in modern concept of physics science and learning about space and astrophysics.

The history of teaching mathematics is as old as the human civilization. The history of mathematics is a powerful tool for proper understanding of mathematics. Origin of mathematics is started from counting of cattle and measurements using hand and finger. The history of mathematics teaching in Nepal started with starting of "Gurukula" in ancient period whereas the modern education system in Nepal seems to follow the world's education system. The establishment of Durbar High School and Trichandra College had started the formal way of learning mathematics. Mathematics now is studied to master level in various Universities and colleges all over country.

3. 3.2. Major Problem in Teaching and Learning Mathematics

In this paper, we discuss major issues of mathematics teaching and learning in Nepal. The issues coming from theories suggest that teachers having high qualification are not trained to use such approach in teaching

mathematics and there is lack of teaching aids and materials and technological tools. The issues related to social aspects are gender issues, languages issues, social issues and issues related to curriculum. The cultural issues are related to social diversity of language and ethnicity. The issues related to political aspects are equity and access, economic status and pedagogical choice. The issue related to technology includes the technological skills, use of technology and affordance. Finally, we suggest the curriculum, training teachers, resource the classroom with locally made and new technological tools.

The mathematical curriculum is designed by experts and implemented by the government to all grade levels do not fit our culture. Nepalese curriculum teaches foreign mathematics. It has been imposed to teachers and students. It is western mathematics that they are teaching and learning without considering the needs of students, diversity and values of our society and norm of eastern culture.

Nepalese are blindfolded to the imposed theories and practices without considering the richness of social and cultural diversity, geopolitical complexity and local knowledge system. The dominant monolingual and monoculture western education system are so pervasive that it has severely affected teaching and learning mathematics in Nepal.

The major social issues of teaching mathematics are issues of languages, issues of gender, ethnicity and social justice in the context of Nepal. According to MOE, low educational and social background is directly related to low results.

3.2.1. Language Issues

The language is merely a means of communication and also a vehicle of understanding. Students make sense or create meaning in their language. The most efficient way to make meaning or creating concept of mathematics is in one's mother language. But consideration of theories and acts of mathematics are only explained through the use of either English or Nepali and, mostly English. However providing education in mother language is challenge for the country; it is because to find a teacher efficient in both mathematics and that language is problem and publishing the books in 100s of language is also a problem.

3.2.2. Gender Issues

There is an issue of differential attainment between genders. The female students may have less interest in studying mathematics beyond schools in our context. There are so many causes behind girls not liking to continue mathematics at higher level.

Nepal being male dominated society the preference of son is given more priority than daughters so the daughters are given less priority to go to school and colleges. Girls are considered as the nurturer and caretaker and hence are taught household activities rather than giving educations. In Nepal, there is trend of sending Muslims girl to female schools while the number of female schools is less in number.

Only the few numbers of girls are getting opportunity to be at school and colleges even their performances is not good in mathematics and other subject as compared to boys. This might be due to their involvement in

household activity. The teenage endeavors and the physical and mental changes in them have also distracted their way of studying.

The issues of gender are more challenging in teaching and learning mathematics providing equal opportunity to both boys and girls in school. Nepalese society is the male dominated and similarly, mathematics classes are also male dominated. Due to which females have poor participation in mathematics classroom in general. According to MOE report 2015, shows those male students outperformed girls in mathematics in all geographical areas and all ethnic groups.

3.2.3. Ethnic Issues

Another issue in Nepalese context is ethnicity. There are the different ethnic background of the students and teachers. That also implies that they represent the various social classes in or mathematics classroom. But the mathematics curriculum is designed with preference to certain social groups over others. Hence mathematics education tends to favor one dominant social class over other.

3.2.4. Social Justice Issues

The next issue is the social justice. It is the necessary for the educating mathematics learners and teachers about social justice. When the teacher deliberates their knowledge to the students there is hierarchical position of the teachers and students. There is a power of relation between students and teachers.

3.2.5. Achievement Issues

There is a huge gap of student achievement in mathematics across the geographical region, ethnicity and gender. Recent study on National Assessment of Student Achievement (NASA) reported that in mathematics, the average achievement score is 57% and it is 26% in community schools. However, it is not clear whether it is due to effectiveness of institution schools. This achievement difference creates mental effects on students.

3.2.6. Technological Issues

The major issues of teaching and learning mathematics in rural areas with technology are lack of technology and affordance in teaching with technology. As there is lack of knowledge of using such technology and high price to such technology learning math through analysis and visualization is low.

Moreover, the psychology of taking mathematics as a difficult subject has added a pressure in students to gain proper knowledge.

4. 4. General View on How Curriculum Has Affected Mathematical Skills

Curriculum plays a vital role in the level of knowledge which a student possesses. Curriculum is designed at different level according to different grades. Moreover, curriculum should also meet the educational skill needed for current time. Students cannot afford to study the mathematics of 70’s today. So, the advancement

in syllabus is must for proper knowledge. As students seek to learn the contents provided by syllabus most of the time, curriculum should be designed considering the need of knowledge.

Talking about Nepalese curriculum of mathematics, till 2073 B.S., in class 9 and 10, old syllabus was followed which was unable to meet the requirement. The redesign of syllabus in 2074 has brought some aid but class 11 and 12's curriculum is yet to be improvised. The allocated hour is reasonable for higher secondary classes but it is not enough for secondary classes due to other subjects like social studies, EPH, account etc. Curriculum limits the knowledge of mathematics as students mainly study mathematics to pass the exam. To improvise this, curriculum should be made interesting and knowledgeable.

In recent time, the curriculum has been improvised and got some positive result in mathematical skill of students. The percentages of students who passed class 10 exam, previously called SLC and now SEE are:

1) 2070: 43.92 %

2) 2071: 47.43 %

3) 2072: 47.43 %

Also, 4,284 students in the regular category achieved results in the Grade Point Average (GPA) range of 3.65 to 4 in the year 2073 and 14, 234 passed the SEE with 3.6 – 4 GPA in the year 2074. This also shows that there is improvement in education level of students. The improvement in mathematical education is also shown by this result.

5. 5. Suggestion for Improvement

Some of the measures for solving these mathematics learning problems are: If possible math should be taught in mother language and the entire ethnic group should be given equal priority. Curriculum should be designed in such a way that every individual would love the way they learn mathematics. Technology should be widely used and all the stakeholders should be participated in uplifting mathematical standard. The scope of mathematical education should be enriched and the people should be incorporated with the feelings that mathematics even has future values and good standard for living. All the peoples should be provided of mathematics education with no cost at all. Girls should be provided of equal opportunities and learning math should be social constructivism.

Mathematics should be taught in an interactive way; the relation between teacher and students should be good. Practices like beating, scolding should be banned. Students should be encouraged and teaching attempts should be made in friendly manner. All the social issues should be mitigated through social awareness. Teachers should not only focus on the grades of SEE rather should focus on knowledge and skill of students. Students should be counseled to remove the fear of failure and mathematics should be introduced as an interesting subject rather than a difficult one. Students should feel forced to study mathematics rather they

should be enthusiastic to learn new techniques and ideas of mathematics. Students should be exposed to fun parts of mathematics by organizing mathematical competitions like Math Fair, Math hunt and so on.

6. 6. Conclusion

Mathematics is a key for development of a person and nation. Each and every activity in our day to day life is related to mathematics one way or the other. So, the concern for mathematical study should be increased. The hindrances for proper mathematical educational are psychological problem of taking mathematics as difficult subject, lack of appropriate curriculum, traditional way of teaching, social issues, lack of trained teachers and lack of interactions. So, to mitigate these problem appropriate curriculum should be designed, teachers should be provided trainings, proper interactions should be conducted in classroom and proper awareness should be brought in people. More importantly, ready-made ideas and methods should be stopped and creative ways should be encouraged. Students should learn how to develop ideas rather than solving problems. Mathematics should not be taught as only a subject. Its wide scope and applicability should be introduced to the students. Teachers should introduce students to different research programs. New ideas and questions should be welcomed by teachers. Today's weak condition should not affect the future ones. So, effective steps should be taken to bring the necessary changes in the education of Nepalese students.

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