

Obstacles Faced around Mathematics Education in Nepal in Terms of Promoting Meaningful, Authentic and Inclusive Education

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ABSTRACT

In this paper, we discussed some major obstacles that are existing in promoting meaningful, authentic and inclusive education in Nepal in case of mathematics education based on the experiences and reflections gained from the study of various creations of different authors. However, many Nepalese teachers are still using the traditional method of teaching in which a teacher is regarded as the only source of information and the learners as the vessels that need to be filled with knowledge; the modern concept of mathematics learning does not treat the students as the passive listeners as mentioned in the traditional approach. Creative learning in mathematics is the best learning approach as the demand of modern education fosters the engagement of the learners. Moreover, to make fruitful learning in mathematics with active involvement of the learners, there may arise some obstacles in our context. Therefore, this work is intended to explore the major obstacles faced around mathematics education in Nepal in terms of promoting meaningful, authentic and inclusive education. Indeed, from our in-depth study, we highlighted curriculum, pedagogical approaches, teachers' role, evaluation process, political issues, social exclusion and location of schools as the emerging obstacles in developing meaningful, authentic and inclusive education in our context.

Key words: Meaningful, creative, obstacles, modern education, traditional approach.

INTRODUCTION

The education system of each country is more often associated with the development of problem solving and critical thinking skills such that each individual can solve real world problems. Moreover, each country aims to develop the responsible citizens and lifelong learners (Spector,

Johnson, & Young, 2014) through the education process. It is well known that education is the process of facilitating learning, supporting learners in acquisition of knowledge, skills, values, beliefs, and habits in multiple disciplines to make them able in practical life. From the modern perspective, it is said that education is no longer based primarily on fact acquisition

because such a concept of education is assumed as an outdated concept to solve real world problems. Therefore, policymakers seem to be debating the basis for transforming their education systems to meet goals of the 21st century. Yet, these transformations in education require more than a vision of what is possible: they require evidence that will justify such changes (Cooper, Levin & Campbell, 2009). Thus, only the core bookish knowledge of individual discipline seems workless in practical life. In addition, it is necessary to connect existing learner knowledge of local context to the process of learning abstract concepts (Lotz-Sisitka, 2013) in any discipline including mathematics.

However, the modern view towards mathematics learning is in the way of transformation highlighting learners' active involvement, interaction and collaboration; in our context, the contemporary learning procedure seems exam-oriented तजबत foster rote memorization and mechanical drills. In other words, the way of learning mathematics in our context seems de-contextualize. There is no sense of local and cultural context in learning mathematics. Moreover, in educational institutions, mathematics is taught through textbooks to pass the written examination of certain hours for the purpose of getting certificates of different classes/levels rather than making the subject of real life. We cannot find interdisciplinary and multidisciplinary relationships between the concepts of mathematics at the time of learning on one hand. On the other hand, the way of learning does not promote critical thinking or intellectual inquiry (Wilhite, 2019) from an overall perspective. Such a learning process seems beyond the concept of modern education because the goal of modern

education is based on the holistic development of the students, rather than a fixation with academic performance (Tan, Koh, & Choy, 2016). There are many obstacles in organizing the meaning education process in any discipline as the recent demand of day to day human life in our context. Therefore, we have chosen the topic æObstacles Faced around Mathematics Education in Nepal in Terms of Promoting Meaningful, Authentic and Inclusive EducationÆ for the study. The main purpose of this study is to explore the major obstacles faced around mathematics education in Nepal in terms of promoting meaningful, authentic and inclusive education.

MODERN VIEW ON MATHEMATICS LEARNING

It is said that a good education gives students the freedom to recognize their capabilities and individual potentials (Tan, Koh & Choy, 2016). From the recent view on mathematics learning, the concept of mathematics is also important in work environments after the learning journey of formal education. Moreover, the knowledge of mathematics is needed in the development of entrepreneurial skills (Machaba, 2013) such as builders need to calculate the number of bricks, they would need to build a wall and business administration learners use mathematics knowledge to calculate stock in the business (Coffey, 2011). Thus, it seems compulsory for each country to organize the education process in practical perspectives linking with day to day life. Empowerment of engaged learning is the most essential factor of the education system of this 21st century. Indeed, empowering students to involve actively in their learning shifts the role of the teacher from instructor to learning partner. In addition, in the modern education

system learners are given greater choice by providing different ways of navigating through curriculum content (Beldarrain, 2006). According to this modern concept, giving students ownership of their learning promotes a deeper understanding of concepts (McCarroll & Curran, 2013) in many disciplines.

Furthermore, according to the modern view on education learning is generally explained as a process that involves the emotional, cognitive and environmental influences and experiences for gaining, enhancing, or making changes in a person's values, skills, knowledge and world views (Ormrod, 1995). The learning environment in which children share ideas and results, compare and evaluate strategies, challenge results, determine the validity of answers, and negotiate ideas on which all can agree (Machaba, 2013) is needed in mathematics learning. Vygotsky (1978) argued that social interaction is the key component in knowledge development, since children learn more easily when they learn from their peers and when they are engaged to ask questions in the learning process. Likewise, Van de Walle (2007) focuses on the theory of constructivism suggesting that teaching does not imply transferring information to children from books or teachers. According to him, children construct the knowledge themselves when the teaching and learning process is based on an interactive classroom situation in which children are actively engaged in learning (Van de Walle, 2007, p. 39). According to the modern view of education, the traditional teachers' function of transmitters of information has transformed into that of organizers and partners in students' learning (Clapper 2009). In addition, teachers and students play an equally active role in the learning process (Gelislisli, 2009). As a result, students

construct the knowledge to solve their real-world problems.

Moreover, the mathematics learning process should encourage the learners in self-reflection and critical thinking because critical thinking leads to deeper thinking, deeper inquiry and imagination, and ultimately deeper discovery (Ibarra & Sommerstad, 2019). Also, to create connections between mathematics and real life of the learners, use of art in mathematics seems essential. On one hand, our education system seems unable to address the problems of all groups of people. On the other hand, the components (curriculum, pedagogy, evaluation techniques etc.) of the education system seem unfit according to this era. However, some attempts have been made to uplift the educational standard by providing quality education to the citizens.

MAJOR OBSTACLES IN EDUCATION PROCESS

According to UNESCO (2004), the assurance of relevance in education implies local design of curriculum content, pedagogies and assessment. It further states, the convention of the "Rights of the child" stresses a child-centered approach to teaching and learning. This emphasizes the importance of curricula responding to the needs and priorities of the learners, their families, and communities (UNESCO, 2004, p.31). However, in our context, the curriculum is mostly de-contextualized since policy makers and curriculum planners are detached from the local reality, which involves the teachers, parents, learners, and local cultures. Besides, the teachers are bound to follow the ways prescribed by curriculum and textbooks. Also, the teachings are memorized, practiced and then tested in formal examination; credit being given for the correct answers (Amirali &

Halai, 2010). Regarding these all, we cannot believe that the education system is oriented to invigorate all-encompassing social and emotional development of a child as a human being such that the mathematics learning is enhanced. Indeed, there are some mentionable obstacles and hurdles that are emerging in promoting meaningful, authentic and inclusive education in mathematics. Out of these, the major obstacles that we felt are listed below:

Curriculum: It is necessary to update the curriculum to promote customized and interdisciplinary study, which is different from the curriculum that is common, rigid and classified under different subject-matter disciplines (Tan, Koh & Choy, 2016). However, in our context, curriculum is highly structured in content, and beyond the social context, cultural issues and real-life. There are a number of issues in the curriculum structure. Some of these issues can be identified as separations of school mathematics from important aspects of mathematical learning and use (Coffland & Xie, 2015). According to Coffland & Xie (2015), the first separation is that school mathematics remains disconnected from real life, the second separation is that each course in school mathematics is often disconnected from other courses in the mathematics curriculum and the third separation is that school mathematics is divorced from other subjects' curriculum. Same types of separations exist in Nepalese mathematics curriculum. Thus, education does not seem practical at any level and none of the levels of education prepares learners for the real world. In most of the cases, students suppose learning mathematics means just to recite whatever is written in a textbook without understanding the practical aspect of it. In addition, teachers are teaching textbooks to meet the

goal of curriculum, where such mathematics textbooks are written mainly for the purpose of the business rather than child psychology (Sharma, 2016). From such a curriculum neither students' personal creativeness is encouraged, nor they are challenged to think critically and originally (Markovic & Markovic, 2012). As a result; meaningful, authentic and inclusive sides of learning mathematics education are still latent.

Pedagogical Practices: A new education strategy which encourages interaction between teachers and learners needs different learning styles (Markovic & Markovic, 2012) than our conventional practice. Probably, most of our mathematics classes are guided by a behaviorist approach. The behaviorist teachers present lessons objectively in a 'one-way traffic' approach and provide hints or clues to impress the learners for a desired behavior, and then use reinforcement to the desired behavior. The role of students is to absorb instructional presentations and materials. Also, the assignments are directly linked to the learning objectives. Perhaps, a behaviorist approach is some sort of disengaged and de-contextualized teaching learning pedagogy. In this pedagogy, learners will not get the chance of *discussion, collaboration, dialogical environment* and a *design-led approach* to real-life problem solving. The notion of teaching in behaviorist pedagogy is as *depositing* the teacher's ideas into students' heads assuming them as bank accounts (Luitel & Taylor, 2005) through stimulus-response learning approach. The way of teaching mathematics is to memorize the facts and practice the same routine problems recurrently. The sense of creativity seems rare in the existing pedagogical practices because creative teaching may be defined in two ways: firstly, teaching creatively and

secondly, teaching for creativity (Markovic & Markovic, 2012). In particular, learner-centered pedagogy which focuses on individual learners, their experiences, perspectives, backgrounds, talents, interests, capacities and needs with a focus on learning priorities on creativity.

Contrary to the student-centered approach of teaching mathematics, Nepalese formal education system seems to be more lectures dominated in large classrooms making students as passive listeners (Dhakal & Sharma, 2016). As a result, students are heavily devoted to memorizing the facts rather than meaningful understanding; focusing on doing tedious and boring calculations instead of creating context for meaningful learning (Dhakal & Sharma, 2016). Moreover, most of our teachers do pay less attention in higher order thinking skills; instead they simply work with *pie-in-the-sky* motivation (Dhakal & Sharma, 2016). This kind of teachers centered practices of *one-way traffic* instruction is not working well for students to be engaged and interactive in their learning (Freire, 1970). As a result, creativity has zero value and gaining a high score is laudable. Indeed, the development and implementation of student-centric methodologies will highlight a need to shift to student-centered pedagogy and the ownership of learning by learners, a quality that is indispensable for fostering creativity (Markovic & Markovic, 2012). Thus, our pedagogical practices do not address and motivate students towards creative mathematics learning.

Evaluation Practices: The aim of modern education seems to teach better by engaging the students and preparing them for life, rather than merely teaching more for tests and examinations (Tharman, 2004). In terms of assessment and evaluation, it is essential to move beyond the focus on rote

memorization of content knowledge and low-level thinking skills (Tan, Koh & Choy, 2016). Moreover, in the modern education; it is valued students' holistic development of competencies such as critical thinking, innovation and creativity, communication, collaboration, independent learning, lifelong learning, information and communication technology, and active citizenship (Tan, Koh & Choy, 2016). Therefore, the alternative forms of assessment such as project work, design based assessment and evaluation based on it is used. Indeed, sharing reflective experiences of assessment and delivery with others becomes an important part of enhancing student learning experiences and developing strong communities of practice within higher educational contexts (Swan, 2017). Moreover, learning and assessment become connected and students' level of gained knowledge is measured through both formal and informal assessments including written and oral questions, performance ratings, project reviews, portfolios and self-reporting (Stiggins & Chappuis, 2011). However, in our context the evaluation and assessment do not seem properly used in appropriate form.

To certify students as they move from one level of the education system to the next (or into the workforce), the evaluation is made through examination of certain hours in our context. For the examination, teachers select and create the examination questions paper by covering major subject areas and scoring guides, administer and score the examination, and supervise the examination procedures. Such examination culture makes mathematical knowledge absolute by avoiding lived, felt and experienced pedagogical beliefs (Panta, 2017). Also, the absolute knowledge of mathematics is being given by teachers to students by the process

of knowledge transmission (Panta, 2017). As a result, our evaluation system seems unable to address our students' voice. It is beneficial to only a selected set of students, not to all. Thus, the evaluation technique may work as an obstacle in our education system to shift from traditional to modern.

Teachers' Role: For fostering creativity, primarily it requires an active mode of learning, and consequently a new teaching format, where the teacher is a coach (Markovic & Markovic, 2012). In addition, creative teachers are willing to change and welcome new experiences; they are not afraid to go off the main track or step into the unknown because the teachers are key figures to implement change, but they need support to understand and accept creativity in their practices (Markovic & Markovic, 2012). In the modern education system, teachers are no longer just experts and dispensers of content knowledge; they are expected to be resource persons to facilitate the students' learning through creative and student-centered activities (Tan, Koh & Choy, 2016). The role of teachers in modern education is needed to be devoted to teaching better by engaging the students and preparing them for life, rather than merely teaching more for tests and examinations (Tharman, 2004). In the modern education system, the teacher's role is changed from being transmitters of knowledge to becoming multi-role educators who are able to involve students in the process of gaining knowledge and independent development of skills (Kudryashova et al., 2016). Furthermore, the major task of a modern teacher is to create an educational environment that facilitates the students to obtain first-hand knowledge with appropriate teacher's support and guidance at each cognitive level in their active involvement.

In our context, teachers are the main agent for maintaining the quality of education in educational institutions. Timsina (2008) argues that the effectiveness of teachers is a basic component in the effectiveness of the education system. Moreover, the team of teachers plays a vital role in the success of any educational institution. But unluckily, most of the community institutions' teachers are affiliated with the unions which are nearer to political parties' manifesto which politicize the institutions further and affect the teaching learning activities. As, Timsina (2008) argues, "Highly politicized teaching forces and influences of political parties through teacher's union, teacher's absenteeism, and inefficiency are the main factors hindering the quality of the public schools" (p.33). There is no effective monitoring policy, due to which many community institutions' teachers they appoint other people in their position temporarily *Khetala Shikshak* by giving a tiny amount of money then they involve in other sectors for earning large amounts of money. Obviously, it affects the teaching learning activities. Moreover, most of the teachers who are involved in teaching mathematics for a long time, are not upgraded by their qualification and are not updated (Parajuli & Das, 2013) with recent technology, and pedagogies. The frequent organization of the workshops, teachers training, and refreshment programs to teachers are not managed. As a result, the students are distracted from the learning mathematics and the intended goal cannot be achieved.

Political Issues: A common assumption is that the education system of any country cannot be affected by the politics of the country. However, educational policies seem to have been made by the government of the country guided by related political

parties in accordance with the policy and political system, as it was clearly noted by Cohen et al. (1974) by stating "What you want in the country, you put it in the school." Their idea seems to be the basis of political influence on the overall affairs of education and not just on decision making. Similarly, Massialas (1969) mentioned that the political influence that affects higher education decision-making can easily be seen when the institution is governed by local authorities. As a result, the interests and necessities of others (i.e. opponents) may not be addressed in the education system of the country.

Social Exclusion: In most of the remote areas of our country; women, lower caste, and indigenous people are excluded from education till the date. However, the state had implemented the policy to eliminate the discrimination of the citizens based on caste and gender (Chitrakar, 2007). Still, there is a problem of equitable access to education for all people. Indeed, exclusion in education means not responding to the educational needs, and values of all children with gender, ethnic groups, children with different abilities and disabilities and so forth (Parajuli & Das, 2013). In addition, due to the case of lower caste and indigenous children in school as well, they have been dominated on the ground of caste status since long which is the cultural hindrance in our context. As a result, it has been reproducing the educational exclusion through the social structures (Bourdieu, 1977). In such a situation, the fulfillment of the educational goal seems virtually impossible.

Location of Schools: As we know that Nepal is a mountainous country with diverse terrain (Parajuli & Das, 2013), due to which people in the mountains and hills are facing various problems to run their daily life.

Also, communities are widely scattered and there is variation in distribution of schools. In some communities, there are no schools at all. As a result, distance to school usually matters for all children, especially for girls (Parajuli & Das, 2013). Thus, the location of school determines the enrollment of students. Short distanced schools would make parents feel more comfortable to send their children from the view of security. Therefore, the location of schools in public access also impacts the achievement of the educational goals.

CONCLUSION

Finally, our study supported us in reflecting our ideas that the modern view on education which facilitates creative education based on engaged learning helps to foster creativity and original thinking. Therefore, in our context the existing education system and educational programs need to be redefined, re-planned and revised with the modern view of education by addressing the multi-dimensional relationships between course concepts and day to day life. For this, the major obstacles that we highlighted in our study, need to be kept in consideration. Moreover, we found that creative and interactive education provide a completely new dimension of gaining knowledge because such a mode of learning provides innovative personality development in the individual who creates something unique. In addition, in creativity-based mathematics learning, there is always some new, critical and useful idea, understanding, information, approach or solution to a challenge that emerges at different levels, which could lead to better innovative performance of learners in mathematics. Likewise, to learn on their own students need unlimited time to play, explore, become bored, overcome boredom, discover their own interests, and pursue

those interests. It helps students to develop their analytical and critical reasoning skills. Therefore, to make it possible for our students to solve real world problems, the existing education system needs to be revised with the new and modern concepts of education that encourage creative learning.

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