Current Situations in Pre-primary and Primary Mathematics Education in Kathmandu, Nepal

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ネパール、カトマンズにおける幼児・初等教育段階の数学教育の現状

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Abstract

The paper discusses the current situations in pre-primary and primary mathematics education in Nepal, focusing on the activities by Ministry of Education and Sports (MOES), Triphvaan University (TU) and schools in Kathmandu. The author conducted the document analysis, interviews to stakeholders and mathematics lesson observations. The result shows that MOES and TU share almost the same direction for the improvement of mathematics education. The syllabus places an emphasis on everyday life with the enhancement of joy of learning mathematics. By contrast, at the school level, teachers taught students using the teacher-centred approach, which children's learning was by far different from its philosophy stated in the syllabus as well as by MOES and TU.

Keywords

Nepal, educational quality, mathematics, curriculum

Background

Nepal has made an effort to develop public education for the last 60 years since 1951. The world-wide stream of 'Education For All (EFA)', on which the international community made an agreement, also influenced the country's direction. A variety of educational programmes has been implemented in the education sector. The government substantially improved on *access and equity*, *quality and relevance*, and *capacity building in the educational system* (Bhatta, 2009). Some of the serious issues on access and equity are considered to be gender and the caste system. International agencies have been also paying attention to them. The undertaken programmes, more or less, have been contributing to improving its education compared to the last decades. In terms of quality and relevance, for instance, the number of teachers who participated in in-service teachers training programmes arranged by the government is 97% of all teachers in Nepal (Bhatta, 2009). In addition, continuous assessment and curriculum revisions have been put into practice. However,

the improvement can neither be observed nor discussed in different subject areas including mathematics (Bhatta, 2009; Khanya, 2004).

Mathematics is one of the core subjects in primary education in both Nepal and the international community. The subject is necessary for students to become a mature citizen the society at the individual level. At the same time, it is crucial to develop countries scientifically because the current society is shifting to knowledge-based. Thus, it would be pertinent to examine characteristics and challenges in the current mathematics education in Nepal.

The paper discusses mathematics education at pre-primary and primary levels in Kathmandu, Nepal. The ultimate purpose for the research is to shed light on students' learning process and performance in mathematics. Firstly, the article will focus on the objectives and contents of mathematics at the syllabus level. Secondly, it will reveal the comprehensive activities regarding mathematics education at different institutional levels in the fieldwork. The paper specifically focuses on the activities in Ministy of Education and Sports (MOES), Triphvaan University (TU), which is the national university in Kathmandu and schools. It examines the relations of their activities in order to highlight the current situations and challenges in Kathmandu.

Outlook of Mathematics Education in Nepal

Goals in primary and mathematics education in Nepal

The formal education system in Nepal is 2-year pre-primary level, 8-year primary level and 4-year secondary level (MOES, 2005, p.27). The syllabus for the preprimary level is implemented by Curriculum Development Centre (CDC). At the primary level, the curriculum has three stages: grade 1 to 3; grade 4 and 5; and grade 6 to 8. In total, there are eight grades in primary education. The pre-primary level is regarded as the preparatory stage for the primary level. The secondary level is from grade 9 to 12. At the end of grade 10, students must take School Leaving Certificate (SLC) examination, which is the national examination.

The learning areas are the languages: mother language, Nepali and English, mathematics, arts: creative and expressive art, science: general science, environmental education, health and physical education, social studies, local need based study (MOES, 2005, p.29). The goal of pre-primary education is to bring about holistic development of children and to facilitate children to have a smooth transition to primary education (MOES, 2005, p.27). The aim of primary education starts as

below.

The main aim of primary education is to develop the innate ability of each child through child-centered education. Its ultimate aim is to produce citizens who believe in the nation and in democracy and are aware of their responsibility towards the social and natural environment. Students are expected to be competent in communicating ideas, are independent and hard working, health conscious and ethical (MOES, 2005, p.27).

The education from grade 1 up to 5 intends the importance of learning the basic mathematical knowledge and skills required in their everyday life and study at school. The purpose of the first stage (grade 1 to 3) will be to introduce children to formal teaching and provide an opportunity to develop basic literacy, numeracy and life skills including personal health habits and sanitation (MOES, 2005, p.29). The purpose of the second stage (grade 4 to 5) will be to provide an opportunity for developing knowledge, skills, attitude and values through the experiences of different learning areas and life skills (MOES, 2005, p.29).

Mathematics curriculum is divided from grade 1 to 3, grade 4 to 5 and grade 6 to 8. This paper specifically deals with pre-primary education and grade 1 to 5 in depth. There are two strategies for the curriculum. The first one is *to develop minimum mathematical knowledge, skills and attitude to solve the problems that arise while carrying out the daily activities even for the students who leave the school after completing grade 5,* the seeond one is *to develop necessary mathematical knowledge and skill needed as the basis for the students joining grade 6 after completing grade 5.* (MOES, 2009, p.10) This indicates that mathematics in Nepal would be needed for students in/outside school.

Contents in mathematics curriculum

At the pre-primary level, the four learning areas are determined: number and counting, measurement, time and geometrical shape. Students at the level are expected to grow mathematical sense and positive attitude toward mathematics through learning basics and playing. At the level, children learn mathematics as a subject, unlikely Japanese pre-primary education. At the primary level, nine areas are determined: *geometry, concept of numbers, basic operations in mathematics, time, currency, measurement, fraction, decimal percentage, unitary method and interest, invoice and budget, statistics, sets and algebra* (MOES, 2009, p.10), as mentioned in detail in Table 1.

Table 1: Learning areas in different stages

S/N Stages	Pre-primary	Grade 1 to 3	Grade 4 and 5
1	Number and counting	Geometry	Geometry
2	Measurement	Concept of numbers	Concept of numbers
3	Time	Basic operations of mathematics	Basic operations of mathematics
4	Geometrical shapes	Time, Currency and Measurement	Time, Currency, Measurement and weight
5	Explain the charts	Fraction, decimal percentage, unitary method and interest	Fraction, Decimal, Percentage, Unitary and simple interest
6	Relationships	Bill and Budget (Only for G3)	Bill and Budget
7		Statistics	Statistics
8		Sets	Sets
9		Algebra (Only for G1, 2)	Algebra

Table 1 shows that the syllabus includes the learning areas related to numbers and geometry. It also deals with daily life situations and practical aspect of mathematics because it contains time, money, bills and so on.

Data collections in Kathmandu, Nepal

Semi-formal interviews are also carried out to stakeholders such as schools, university and MOES. The research questions were: what different stakeholders want to improve in mathematics education, what sort of activities are undertaken, and how teaching and learning mathematics are put into practice in classroom.

Fieldwork was conducted in Kathmandu in September and December, 2011. The country has a variety of geographical features such as a mountainous area; therefore, different regions within the country would have remarkably different cultures and environment. There also would be a big gop in regions. Therefore, it should be noted that the discussion in this article only will cover the situation in Kathmandu.

Kathmandu is the capital city of Nepal with the biggest population in the country. The city was selected for data collection. This is because it would be a reasonable starting point to see the

comprehensive situations in education. It is also considered to be directly influenced by the governmental policies.

The purpose of the fieldwork was to collect information on mathematics education at three different stakeholders; the ministry (MOES), university (TU) and two schools. Semi-formal interviews were conducted to four professors and lecturers, a retired professor and teacher, an educational researcher in NGO, and officers at National Centre for Educational Development (NCED) and Curriculum Development Centre (CDC) under MOES. The questions were regarding current situations of general and mathematics education, students' learning performance, challenges and current practices. The each interview lasted for thirty minutes to an hour. At the school level, ten mathematics lessons were recorded and observed. The author also conducted informal interviews toward teachers and students on mathematics education in a public school and private school. The public school is located in a rural area, and the private is in an urban area. Both of them were reputable schools in terms of students' academic performance in SLC.

Result and discussions

Findings at the policy level

Stakeholders at related organizations to MOES pointed out that students do not master basics due to rote learning in class. They say that it is necessary to introduce more practical contents, daily life situations and mathematical beauty. They also have a challenge of how they can convey the drastic change of society to teachers. The sense of emergency leads them to consider the curriculum contents for grade 6. to grade 8. They were in the process of the revision. They also refer to Finish mathematics textbooks for further improvement of their textbooks and teachers guidebook. In the curriculum and textbook revisions, they form a task force and make continuous discussions under the collaboration with the subject committee and pilot schools. They mentioned that mathematics curriculum has been influenced by U.S. As a matter of fact, it has been influenced by India historically, the neighboring country. It indicates that Nepalese mathematics education is moving forward with the influence of the international trend and other countries' changes.

Findings in the university

In the Faculty of Education in TU, mathematics professors and lecturers are familiar with the international trend of mathematics education. They offer investigative activities to university students, for example, giving them a book list of different issues in recent mathematics education.

Masters' dissertations were on a variety of issues in mathematics education, for instance, experimental approach, practical approach dealing with lessons, teachers' values and so on. They reflect the international movement of research.

The students in TU mostly will become mathematics teachers in secondary level; therefore, university professors and lecturers pointed out that it is questioned if prospective teachers for primary level would learn the same contents in the same way as university.

The feelings about challenges on mathematics education that professors and lecturers had were almost the same as the governmental officers in the ministry. They were concerned that children were not interested in abstract mathematics with abstract letters and mathematical sentences, that teachers repeat boring chorus in class and that the national examination system negatively influenced children's learning. Their concern was how children can enjoy learning mathematics. They believed that teachers should teach interactively in class.

More specifically, in curriculum development, the retired professor suggested that the unit of *sets*, introduced at the beginning of the primary mathematics, was replaced into *shapes*, which deals with more concrete materials than abstract signs in sets. This change is reflected in the current syllabus and mathematics textbooks. The result of interviews showed that mathematics department in university had the same direction that MOES emphasized.

Lesson observations in two schools

The private school and the public school accommodate about 400 primary students from grade 1 to 10. In total, the author observed 10 lessons in both schools, stated in Table 2.

The infrastructure in the private school was better than the one in the public schools. The private school has enough textbooks and teaching materials with better quality compared to the public school. However, the social status of teachers and the wages were higher in the public school. Teachers in the private schools had the desire to work in the public school because they relatively work harder in less payment. One of the other disadvantages of private school teachers would be much less number of in-service teachers training programmes compared to the public schools.

Table 2: Record of mathematics lesson observations in two schools in Kathmandu

Date	Classifications of Schools	Grade and time	Contents	Medium of instruction used in class
1st September 2011	Private	G4, 3rd period	LCM (Least Common Multiple)	English
1st September 2011		G4, 4th period	Numerator and denominator in fraction	English
1st September 2011		UKG(Upper Kindegarden)	Multiplication table for 1 digit numbers	English
1st September 2011		G3, 5th period	Roman numeral from 1 to 60	English
5th December 2011		UKG(Upper Kindergarden), 3rd period	Reading and writing numbers from 201 to 300	English
5th December 2011		UKG(Upper Kindergarden), 4th period	Reading and writing numbers from 201 to 300 (2)	English
2nd September 2011	Public	G4, 1st period	Comparison of fraction size(1)	Nepalese
4th September 2011		G5, 1st period	Four operations with brackets	English
5th September 2011		G4, 1st period	Comparison of fraction size (2)	Nepalese
5th September 2011		G5, 6th period	Conversion of units using multiplication in time, month, date	Nepalese

In both schools, teaching approaches were found to be the lecture type. Students answered a word or number when teacher asked a question for mathematical knowledge. For instance, teacher asks 'What is the answer?' and a student answers '15'. In mathematics class at the pre-primary level, verbal repetitions of multiplication table were frequently observed. It seemed that the majority of children did not understand its meaning, but just repeated what teacher said. The style of teaching and learning was recognized and actually a serious concern in MOES and TU. Teachers' approaches seem to be, to some extent, related to the contents in textbooks. For example, reading and writing of Roman numerals and too many mechanical unit conversions seemed to make mathematics meaningless to students as they are not related to their daily life which the syllabus emphasises ideally.

A tremendous difference between two schools was the medium of instruction. In the private school, English was the medium of instruction throughout the pre-primary level; on the other hand, in the public school, Nepalese was widely used compared with English in class. As mentioned; however, teachers' instructions were with no difference no matter which language was spoken in class.

In terms of the SLC result in 2009, the passing rate was 100% in the private school, whereas it was 97% in the public school. The result shows that the two schools were better schools than average. Despite this, in class for primary level, the quality of lessons, students' English competence and students' learning performance in the private school seemed better than the one in the public school. Details on students' learning and its assessment would be discussed in the different paper.

Conclusion

The paper concludes that MOES and TU philosophically move to the very close direction in terms of further development in mathematics education, which keeps up with the international trend. There was also accumulation of mathematics educational research in the university. It indicates that the country's education has rich resources for improvement, which is a positive finding for better mathematics education. At the same time, networking among the government officers and university professors positively exists. On the other hand, the ultimate goal is not achieved at the classroom level. Almost all the lessons were teacher-centred and far from child-friendly or child-centred approach. This does not blame schools and teachers. The school observations found that teacher-centred approach was accepted, because teachers in both private and public schools were obliged to have students pass SLC. Also contents of textbook would be questioned if they were correspond with the philosophy or preparations of SLC. These are the issues for further research and discussions.

Consequently, the author concludes no matter how the syllabus and its objective are genuine and child-centred, it would be a tough challenge for teachers to change their teaching under the current examination system. Many countries as well as Nepal are faced to the dilemma of how to balance between national examinations and objectives and contents in curriculum. It could be one of the solutions that teachers should keep struggling in their mathematics practices. Mathematics educators also should keep supporting them for improvement and picking up the issues on the ground level of educational delivery. It will be also essential to observe different regions for more

generalisability, as this paper only took two schools in Kathmandu for observations. In the next paper, the author intends to discuss students' mathematics performance in detail.

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References

Bhatta, P.(eds.) (2009). *Education in Nepal –Problems, Reforms and Social Change-,* Martin Chautari, Kathmandu, Nepal.

Curriculum Development Centre. (2009). *Primary Education Curriculum Class 4-5,* Ministry of Education, Bhaktapur, Nepal.

Curriculum Development Centre. (2011). *Primary Education Curriculum Class 6-8,* Ministry of Education, Bhaktapur, Nepal.

Kaniya, T., and Williams, H. J. (2004). Necessary but not Sufficient: Challenges to Implicit Thories of Educational Change: Reforms in Nepal's Primary Education System, *International Journal of Educational Development,* 23(3), 315-328.

Ministry of Education in Nepal. (2010). *Flash 1 Report 2067*, Government of Nepal, Bhaktapur, Nepal.

Ministry of Education and Sports. (2005). *National Curriculum Framework for School Education (Pre-primary-12) in Nepal*, Curriculum Development Centre, Sanothimi, Bhaktapur.