

Grade Transition and Mathematics Curriculum

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Abstract: Transition from elementary to middle school is not facile. Students go through various emotional as well as cognitive changes along with the change in grades and the physical environment of the school. This brings a significant change in the curriculum and thus in the performance of learners and their interest towards academics. Mathematics curriculum at primary level is focused to develop students' interest towards Mathematics and its concepts through activities and fun learning. However, at upper primary level or in middle school, it is more focused towards developing abstract mathematical concepts rather than using concrete ideas and activities.

This study reveals the gaps in the mathematics curriculum at grade 5 and grade 6, which is definitely being acknowledged by the teachers and the concerned parties but not being properly catered to at times. Based on changes in Mathematics textbooks, content, and pedagogical practices at these grades, this study highlights how all these factors contribute to the process of transition and raise gaps in Mathematics curriculum for students moving from grade 5 to grade 6.

Keywords: Mathematics curriculum, Middle school, Primary school, Transition.

1. Introduction

Transition is about change. It is a natural process of learning and growth. Students in schools and in various educational settings experience several changes during any learning process. Whether it's a transition from primary to upper primary, upper primary to middle school, middle school to high school or high school to college, the transition brings change in curriculum and teaching-learning process. They have to adapt to the physical changes in their environment and in curriculum as well along with new teachers. Many researches on transition have been conducted and have suggested that it's always difficult for the students and the teachers (Akos, Shoffner and Ellis, 2007; Schielack & Seeley, 2010; Polikoff, 2012). As students move from primary school to middle school, they make a significant shift in their cognitive level and undergo various emotional changes. Moreover, the expectations of parents and teachers build up and create pressure on students during this transitional period.

Mathematics is a way of thinking that allows a child to think logically to make conclusions. In mathematics, children learn calculation, computation, estimation, logical reasoning, problem solving, etc. In grade 6, children learn abstract mathematical concepts, cover vast syllabus, engage in less activity-based teaching-learning process in the classroom.

They have to work upon their pace of learning and responding, their relationship with peers and teachers and come at par with parental expectations, etc. In many schools there is a change in evaluation process. The transition to middle school has a direct impact on students' educational trajectory in mathematics (Akos, Shoffner and Ellis, 2007). According to NCTM, during this transition, a decline in their academic achievements, motivation and changed attitude towards learning mathematics have been observed. NCF 2005 suggests that at the elementary level the purpose of mathematics is to develop students' interest in mathematics along with the concept development. Mathematics at this level should be fun and should involve activity-based learning to achieve universal mathematical literacy. On the other hand, in middle school, students experience a real sense of mathematics and develop abstract mathematical functions through rigorous problem-solving techniques and less concrete activity learning. It addresses the transition from elementary to middle school as challenging as well as rewarding, thus suggested the progression of concepts in an integrated manner. This highlights the nature of the mathematics curriculum and the standards to be maintained within each grade.

2. Objectives

1. To study the change in Mathematics curriculum of grade 5 and grade 6 through mathematics textbooks and classroom teaching learning process.
2. To identify gaps in the content and pedagogy of both the grades and the factors promoting those gaps.
3. To understand the perspective of teachers and experts about the challenges faced by the students during this transition.

3. Methodology

This is a qualitative study, conducted to build deeper understanding of Mathematics curriculum and its implementation in schools. This is conducted in two phases- one is through textbooks' analysis and second is through interviews.

NCERT mathematics textbooks and private publisher mathematics textbooks (Britannica) of grades 5 and 6 were analyzed. Interviews of 6 students of 6th grade, 6 Mathematics teachers and 2 curriculum experts were conducted to fulfill the objectives.

4. Findings

Textbooks at both the grades are similar in thickness or bulkiness but there are lot more pictures, stories, puzzles, games and worksheets in grade 5, especially in NCERT textbooks. In grade 6 textbooks, there are lot more questions and worksheets to practice in the form of exercises. The private publisher textbook has fewer pictures, stories, and worksheets and no puzzles and games in grade 5 and similarly more questions and worksheets to practice in grade 6, as compared to NCERT textbooks.

The responses of students and teachers indicate that teachers conduct a lot of games and activities to teach mathematical concepts like fractions, money, area-perimeter in grade 5 and they easily managed all those things during school teaching hours. However, in grade 6, students are asked to solve lots of questions along with worksheets and home assignments. The completely new concepts like algebra and integers were introduced through examples or contextual situations rather than some interesting activity that their teachers would conduct in grade 5.

They also indicate that teachers conduct various assessment tasks and worksheets throughout the term in grade 5 but in grade 6 students are assessed more on tests and exam scores and they hardly received any worksheets for assessment purpose.

To accustom students to the changes, teachers spend more time on new concepts in the classroom, prepare shorter worksheets, conduct revisions and short tests before final evaluation and become lenient with students, in grade 6.

5. Conclusion

Change in content representation in the textbooks makes the syllabus intense, loaded and more abstract for the learners. If a child has to change the school, it might create more challenges in the transitional environment.

Teaching-learning process at grade 5 and 6 is different. Learning mathematics in grade 5 is comparatively fun, interesting and easy for students. However, it is hectic and a little burdened for those in grade 6. Exams, tests, evaluations are more rigid and structured. Introduction of summative assessments in grade 6 creates pressure on learners to perform better in tests and achieve good results. It also develops a fear among students to learn and score best.

Teachers, curriculum experts and parents all recognize all the changes students go through this transition and take steps to deal with it, at their levels. But no considerable efforts are being made in a systematic manner to make the process simpler for the learners.

6. Implications

This study is quite meaningful and helpful for mathematics teachers to acknowledge the gaps during transition but no conclusion or generalization can be made on the basis of this small set of study. However needful steps can be taken to make the process smoother for the learners. To help students to navigate through this transition easily, following steps can be taken:

A. Communication and interaction

Teachers can build a strong communication system with the students so they can easily share their experiences. They can also provide opportunities of interaction between grade 5 and 6 students. Classroom visits can be conducted for the same.

B. Content alignment

Mathematics content at both the grades can be organized according to the learners' needs and age. Content can be aligned in a vertical manner. For instance, concepts of algebra can be build upon arithmetic thinking by introducing it in grade 5 and then building upon it further in grade 6.

C. Sensitization

Teachers can build their classroom curriculum by interacting with the students and taking their experiences into account. They can also conduct few instructional sessions to help students absorb changes in the routine.

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