

Intended Curriculum For Secondary School Mathematics: A Comparison With International Standards And Implementation

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Abstract

The purpose of this study was to compare the current intended secondary school mathematics curriculum with international standards and implementation. A Mixed-Method approach was used in this study. The sample of the study was 100 secondary school students. A self-made questionnaire containing 15 items was distributed for quantitative data, while an interview was carried out with ten teachers. Statistically, the questionnaire was properly validated. Content analysis was applied which shows that teachers have there are a lot of problems while implementing the curriculum. The students' data was analyzed by the graph. There was a gap between the intentions with implementation. Only some private schools were good in responding to the intentions of the curriculum while the majority of them were not so good. It was recommended that in-service training should be provided for the teacher to promote their skills in sense of intentions and implementation.

Keywords: Mathematics, intended curriculum, curriculum standards, curriculum implementation

INTRODUCTION

According to Porter and Smithson (2001), there is a complication in defining the word “curriculum” and it has several meanings. Likewise, Goodlad (1979) stated that there is no single particular definition of the term curriculum. Curriculum authors contribute their preferable curriculum definitions. Each of them emphasizes different meanings or intentions of curriculum (Marsh, 2004). Likewise, according to Goodlad (1994), as a

subject field, it is not a very simple and straight but too elaborated term to interpret what the curriculum is. Even if, Van den Akker (1998) narrated that that curriculum is as a ‘program for acquiring’ coined by Taba (1962) as a short and general definition. Another good definition of curriculum about the nature of a plan for learning, proposed by Walker (2003) is ‘The curriculum is concerned to a detail ways of prescribing contents for teaching-learning process in

schools. Acknowledging that a lot of different definitions can be noticed in the literature, it is suitable to fix the meaning of intended, background, and context of use of term 'curriculum'. The set of all learning activities concerning, curriculum elements i.e aim, teaching methods, contents to achieve stated objectives.

All the nations as well as Pakistan are struggling to improve the quality of education by good curriculum development and its implementation. This betterment in education is only possible through pre-service and in-service teachers' professional courses of study and accessibility of the appropriate resources for students and teachers as well. In these compliments, instructors are boosted to use multiple teaching resources and schemes to bring forward-looking changes to make the teaching-learning environment conducive and attractive. Similarly, in our country, the Education Minister of the federal government with the coordination of the provincial government has attempted curriculum developing procedure. Presently, the newly developed curriculum is almost ready to be officially brought to schools for implementation. The present mathematics curriculum stresses learning mathematics for conceptual understanding and encourages problem solving and skills logical reasoning. Thus, teachers should modify their teaching process according to the current mathematics curriculum to promote knowledge accomplishments, exercises and practice. The student's involvement is required for achieving the goals and aim by practices and drills. The implementation will be best when a teacher instructs through an appropriate method and pay practice to the educatees (Amirali 2000; Rizvi & Rodrigues, 2007 & Halai 2008). In addition, need to bring change the National Curriculum for

Mathematics (NCM) 2006 has been highlighted the teacher must provide the opportunity to the students for practices and drill, not limited to give only information's, now teacher role is changed to give a positive learning environment to the learners' and to give the chance to the learners to know conceptions of mathematics". Hence, changes in teacher's attitudes, teacher knowledge of mathematics, teaching, and learning are the requirement of the curriculum (Susan, Swars, Smith, Smith, & Hart, 2009).

The curriculum is derived from the Latin word which indicates time and path respectively. Therefore, when a study is covered at a particular time, is the curriculum. For example, a specific time is given for 10th-grade mathematics which is one year it must be covered in one year. As a field of study, in 1890 a very first the curriculum was formulated and thus the name of the first book was titled 'The Curriculum' was published in 1918 by Franklin Bobbitt. (National Curriculum for Mathematicics grade 1-12, 2006, p. National)

The quality of a learning plan is curriculum, suggested by Walker (2003). Also defined the curriculum in the good sense 'The curriculum is a particular way of ordering table of contents and purposes for teaching and learning in schools'

Mathematics is used universally as a great utility for all so all the members need to realize the basic conceptions of mathematics. Mathematics increases the logical and reasoning skill of the learners. For thousands of years, every society made effort to use the subject to solve their day-to-day activities. (Anwar, 2004).

According to Gall and Hicks (1964), mathematics has brought a very first role in several areas of studies. Cognition of mat (National Curriculum for Mathematicics

grade 1-12, 2006, p. National) Mathematics is used in science, agriculture, industry, business, and technology. Skills like, thinking, intellect independence, aesthetical gratitude, and originative construction have been linked with mathematics. These objectives and chances become slow till the adaptation of present times challenges as far away from the satisfaction of accomplishments. Now here the Mathematics is being used in different fields like science, technology, industry, education, economics, etc. If the intention is to develop a cadre of individuals able to meet these higher-level disciplines, then at all levels the day requires to build up a proper groundwork of mathematics (Farooq, et al 2005).

In Pakistan, the subject Mathematics is compulsory in secondary school. According to Tahir (2005), mathematics is learned from grade 1st to 10th, Curriculum Document (2000) suggested that the numbers of mathematics period must be 12 in a week, which is 26 percent of the total school workload. The school timing is not quite enough. This is roundabout one hundred and eighty days and six hours per day as working. If it is compared with other nations like U.S.A, Germany, and Japan. This time ranges from 175 to 220 days with five to eight hours per day (ISESCO, 1989).

The secondary school mathematics curriculum has been revised many times since independence. The first step was taken in 1968 to modify the curriculum of mathematics. The aim of this attempt was the modernization of the curriculum. Fields of the curriculum adopted were content, textbooks, and pieces of training of the teacher. At the secondary level, the concept of sets was first time brought out in Pakistan. The practical and scientific application program of mathematics was the major

modification views of the curriculum (Government of Pakistan, 1968).

In curriculum revision, contents were five times reviewed for conceptual point of view in 1972-73 (Government of Pakistan, 1972). Inductive and deductive teaching approaches were suggested for mathematics at the secondary level. Then the implementation of textbooks was brought from the year 1977. Minor changes were formed in the former secondary school mathematics curriculum in 1986 (Government of Pakistan, 1986). This curriculum is implemented in 1988.

For all learners, those preferring general as well as an elective group were proposed a uniform curriculum in 1994 that was a better development of mathematics curriculum for secondary level in Pakistan (Government of Pakistan, 1994). In this development mathematics curriculum was separated into four main parts i.e Sets and numbers, Algebra, Geometry, Trigonometry, and information handling, Implementation of this curriculum from 1995. The implementation was without any preparation for bringing and high shortfall of teachers which has always existed. The alerting point was brought out from determinations of an evaluation study (Tahir, 1997) that the majority of the part of this curriculum developed for elective group students. Incompetent teachers were appointed in the schools to teach the subject mathematics. Most were female appointed as mathematics teachers were ineligible. The 1994 and 1986 curriculum was closely related however the addition of information handling was a significant change.

The comprehension of information dealing adversely affects the learner's accomplishments in the examen. The Board of intermediate and secondary education (BISE) Islamabad gazette in the year 2002 declared that students' failure was seventy-

five percent in the subject of mathematics (BISE Islamabad, 2002).

The attempt made by the Punjab education department (PED) to get the better of this position of the current national curriculum for grades 1-12 (Government of Pakistan, 2000).

To change the curriculum and textbook development of and teacher supports for classes 1-12, The government of Punjab decided to an organized task force for below four groups

The curriculum of Physics, Curriculum of Chemistry, Curriculum of Biology, Curriculum of Mathematics

Goals, Aims, and Objective of Mathematics curriculum

According to Johnson and Johnson (1991), to develop learners for the 21st century, a curriculum may be developed that emphasizes mathematical thinking, mathematical communication' problem solving, understanding, and application of mathematics. Five main goals were placed by the national council of teachers of mathematics (NCTM) to assemble Learners' mathematical demands for the 21st century. These goals are further explained in detail.

A teacher should promote the importance of mathematics while teaching to the students, so they will boost their capacity to extend the learning of mathematics as long as they are in school out of school. Students should appreciate the ethnical, historic, and

scientific evaluation and grandness of mathematics.

To clarify complex positions, students must improve their gather facts, make inferences, develop models, create counterexamples, and build profound argumentations .insistently doing, the students will promote acute insight features of mathematical potential. Well-grounded reasoning should be appreciated as much as the learner's ability to find correct answers.

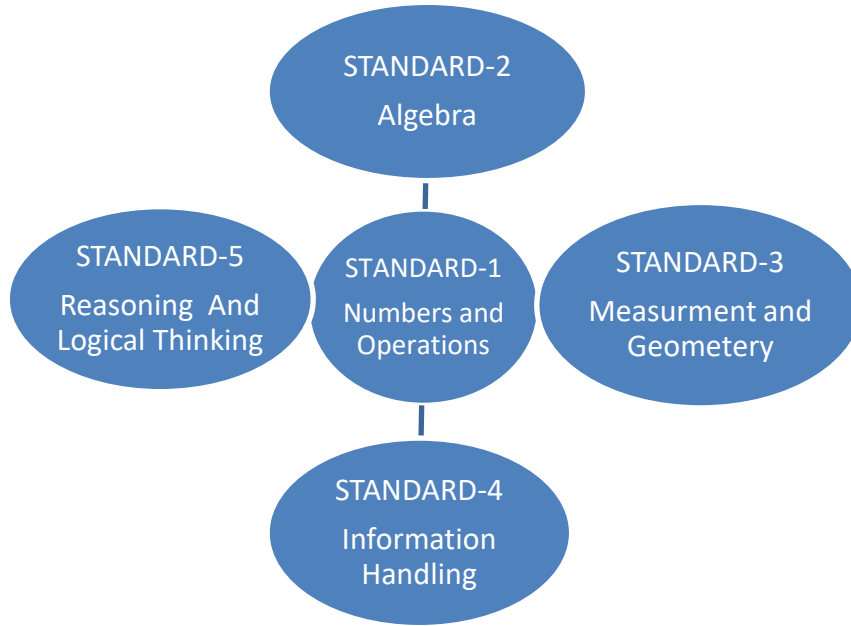
Learners need to develop their reading, writing, and speaking in mathematics. In communicating their ideas a lot of struggle is needed, they learn to clarify, refine and strengthen their thinking. Also, they convey their skills in a better way.

For dealing with the mathematical requirement in every situation students must proficient in mathematics. When they learn and use mathematics, they must have self-confidence and the power to reason mathematically. Students must know that it is a worldwide and well-known activity, and used in daily life.

Standards and Benchmarks

National Curriculum for Mathematics is split up into five standards. The competencies are intentionally maintained wide to allow for flexibility to the teachers following their learners. Every standard has their cognitive content.

Fig 1 Standard for mathematics currcium

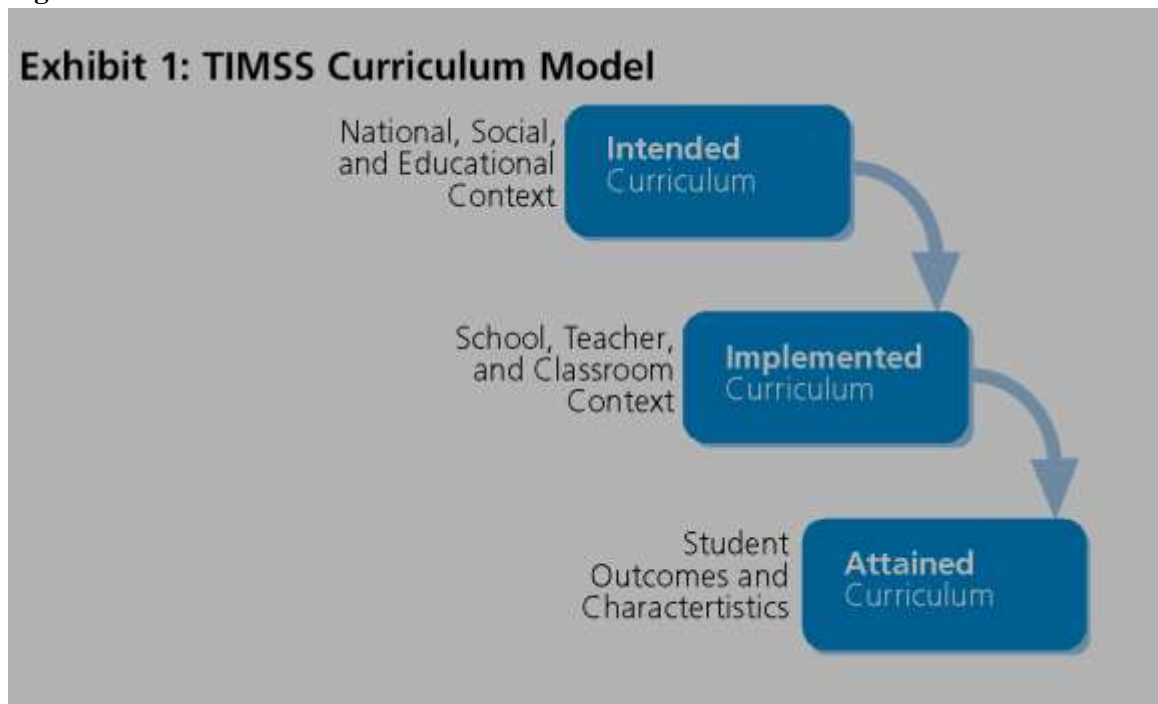


TIMSS Curriculum Model

In the TIMSS Curriculum Model, the different levels are labeled as the intended, implemented, and attained curriculum. First of all the curriculum is formulated (intended

curriculum) then it is taught by the teachers (implemented curriculum) then it comes to the students as knowledge this is attained curriculums (Robitaille., et al, 1993).

Fig. 2 Curriculum Model for TIMSS



This model presents the curriculum procedure completely, society suggests the curriculum for students to learn and how should be organized the system of an educational activity to ease this learning; identification of teaching materials which may be learned in a classroom, who teaches it, and what method teaching may be used in mathematics; and, what the learners have learned and think about the mathematics (TIMSS, 2006). The intended curriculum is the educational circumstance. The reflection of national policies and official documents is mainly the intentions, Official or political approval for educational objectives (Robitaille et al., 1993). In the TIMSS curriculum study, the intended curriculum is the textbooks, curriculum guides, examinations cognitive content, policies, and other prescribed arguments generated to conduct educational system`` (Robitaille et al., 1993). It is defined as “intended courses of study and series of learning chances in proper educating” (Chen. J.C, Reys, & Reys, 2009). It relates with the students what to know and what to do in the particular point of training. The intended curriculum has described meaning from the textbook (Tarr et al, 2008).

Objective of the Study

Objective of this study was to compare the intended curriculum at secondary level with the international standard

RESEARCH METHODOLOGY

Ten secondary school teachers were taken for the collection of qualitative data while two hundred students were taken from the 10th class for quantitative data collection. According to Hodder (2000), qualitative research documents are significant because “approach can be easy and low cost, the data provided may take issue and may not

available in spoken form, and textual matter endure and thus give historical insight”.

Interview

The key to receiving beneficial data from an interview is the question asked. There are three general classifications of interview designs: unstructured, structured interviewing, semi-structured interviewing (Merriam, 1998).

For the collection of qualitative data, a structured interview was used for the teachers. The interview was made with the assistance of teachers and in the light of curriculum 2006. The interview was containing ten questions.

DATA ANALYSIS

Qualitative data was analyzed through the thematics approach. Analysis in qualitative demands that the researcher is well-to-do with formulating them. It also demands that the researchers' possibilities and check different explanations for the findings. They then able to apply the desirable themes (Creswell, 2005)

The data was firstly collected in raw form the researcher compose it then the themes pointed out from the raw data with his judgment and then interpretation was made from the data.

DATA ANALYSIS AND INTERPRETATIONS

For the current mathematics curriculum, the teacher’s interview was taken and content analysis was carried out. The table shows the summary of teachers' interviews where major themes have been distracted while the graph presents the summary of different contents coverage in percentage in each chapter.

Data shows that teacher’s responses about the overall aim and intention of mathematics curriculum are that it is the base for higher

studies, preparing students for future challenges, the students can use the mathematics in daily life and prepare the students for professional education. The most frequent occurred response was preparing the students for higher studies and students can use mathematics in daily life.

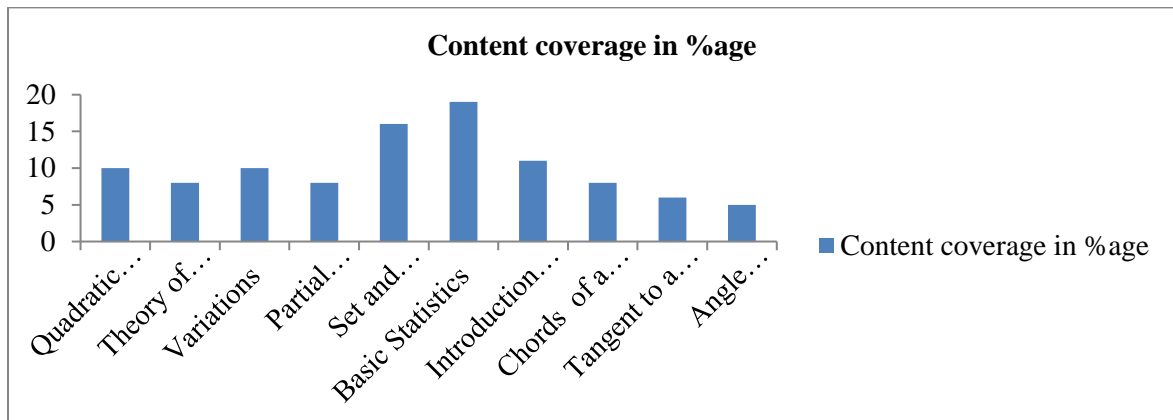
Teachers about the development of skills responded that various portion of mathematics develop the thinking skills of the students some teacher's response that the current mathematics curriculum does not develop the thinking skills of the students

which are incorrect response. While some of the response that it improve the creativity of the students.

The responses of the teachers about the Skill focused in mathematic were that mathematics focus on logical and reasoning skills and focuses on creativity.

The responses of teachers toward logical and reasoning questions in mathematics were, that theorem, geometry, Trigonometry, equations, and graph develop the logical and reasoning skills of the students

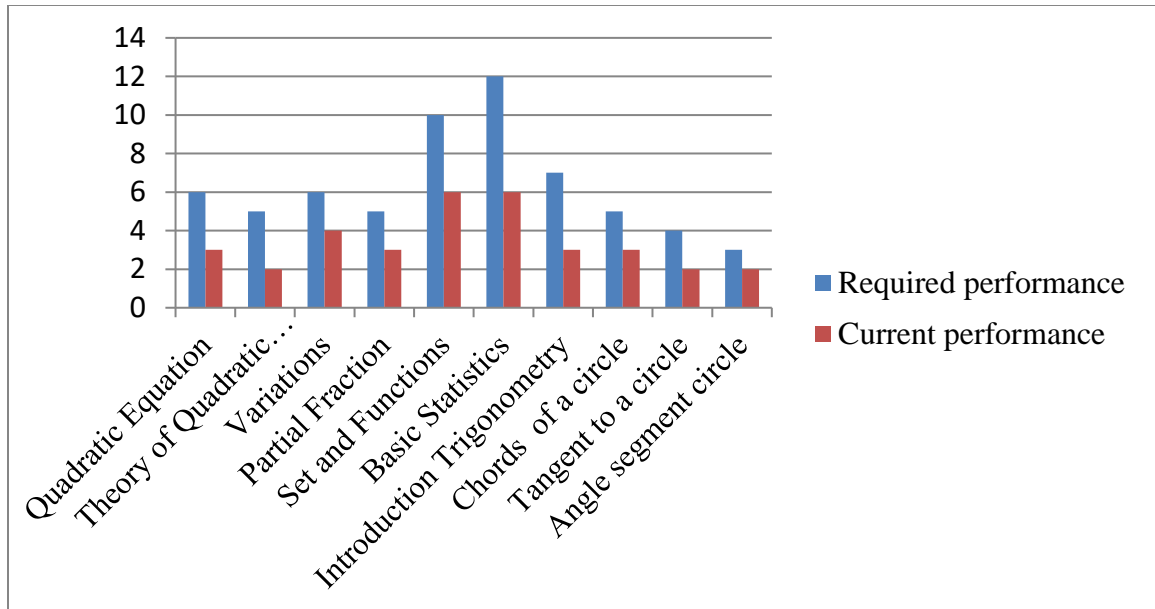
Graph Content coverage of mathematics curriculum



The graph shows the content coverage in secondary school mathematics of 10th grad. It shows 10 % coverage of quadratic equation and variation while 8% in the theory of quadratic equation, partial fraction, and chords of a circle in the overall text. 16% and 19% coverage is given to sets and functions and basic statistics respectively. Introduction

to trigonometry has 11% coverage while tangent to a circle and angle segment circle have low coverage which is 6% and 5% respectively.

The gap between intended and implemented curriculum



It shows the gap between the intended and implemented curriculum. Required performance was shown by blue bars which means the intention of secondary schools mathematics while the implementation was shown by red bars. In quadratic equations, set and functions, chords of a circle and tangent to a circle the implementation is half and the gap is 50% while in the variations, set and functions and angle segment to a circle the gap below than 50% which is 33%, 40%, 33% respectively so there is a small gap. In the theory of quadratic equation, partial fractions, and introduction to trigonometry the implantation is below half and the gap is above 50%. Possible factors for gape are there are fewer resources, teachers did not know about the mathematics curriculum, insufficient previous knowledge about mathematics, the needless topic is there in mathematics, time, teachers competency, students teachers ratio. These factors are narrated by the teachers' interviews.

Findings

The findings of this thesis are the following

1. Overall aim and intention of mathematics curriculum are that it is the base for higher studies, preparing students for future challenges; the students can use the mathematics in daily life and prepare the students for professional education.
2. The variable portion of mathematics develops the thinking skills of the students.
3. Some teacher's response that the current mathematics curriculum does not develop the thinking skills of the students is incorrect.
4. The mathematics curriculum improves the creativity of the students.
5. Logical and reasoning questions in mathematics are theorem, geometry, Trigonometry, equations, and graph develop the logical and reasoning skills of the students.
6. The coverage of quadratic equation and variation is 10% in the mathematics curriculum.

7. The theory of quadratic equation, partial fraction, and chords of a circle is 8%.
8. The sets and functions and basic statistics have more coverage which is 16% and 19% respectively.
9. Introduction to trigonometry has 11% coverage while tangent to a circle and angle segment circle have low coverage which is 6% and 5% respectively.
10. In quadratic equations, set and functions, chords of a circle and tangent to a circle the implementation is half and the gap is 50% while in the variations, set and functions and angle segment to a circle the gap below than 50% which is 33%, 40%, 33% respectively so there is a small gap. In the theory of quadratic equation, partial fractions, and introduction to trigonometry the implementation is below half and the gap is above 50%. Possible factors for gap are there are fewer resources, teachers did not know about the mathematics curriculum, insufficient previous knowledge about mathematics, the needless topic is there in mathematics, time, teachers competency, students teachers ratio. These factors are narrated by the teachers' interviews.

Conclusion

Most of the teachers answered that this is based on higher studies, educating students for the future; the learners can apply the mathematical terms in everyday life and develop their skills for professional education.

Some of them replied that several portions of mathematics promote the thinking skills of

the learners. While some of them answered that the current curriculum of mathematics does not promote the thinking skills of the learners which is a faulty response.

The least themes were that the Mathematics curriculum promotes the creativity of the students.

About the Logical reasoning question, the teachers were replied that they are theorem, geometry, Trigonometry, equations, and graph develop the logical and reasoning skills of the learners.

Average coverage is given to quadratic equation, Introduction to trigonometry, and variation.

There is a lot of difference between the intended and implemented curriculum.

Coverage is given to the Theory of quadratic equation, partial fraction, chords of a circle tangent to a circle and angle segment circle is very low as compare to other content.

The sets and functions and basic statistics have more coverage.

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