

## **MATHEMATICS CURRICULUM FOR SOCIAL TRANSFORMATION**

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### **ABSTRACT**

*Curriculum as concept is often applied though rarely used with understanding but the concept is synonymous to linkage between education and the society. As an action research the study narrowed down different views of curriculum experts into three in order to serve as useful guide though at variant. Curriculum was viewed variously as (1) document, (2) name of the system of schooling, and (3) title of field of study with broad conceptualization of experience (activity), social design and psychological factors (individual needs). It, however, narrowed mathematics curriculum to all planned mathematics courses in contents and pedagogy for the learners to acquire in stages in order to equip them for meaningful contribution to the social - political development of their immediate and outside environments. Combining the two concepts social and transformation, the study conceived social transformation as an apparatus for changing character of an individual in order to make living in communities worthwhile be it formal or informal. This social transformation was examined through contents and pedagogical practices of mathematics curriculum in the contemporary periods with diverse ramifications on how mathematics curriculum promote help, respect, understanding, tolerance, honesty, cooperation, ambition, confidence and peace that serve as indices of social transformation in the larger society.*

### **INTRODUCTION**

The existence of every society depends on a prescribed philosophy of living together as espoused in her philosophy of education to be executed by the school in order

to realize the goal. The school is saddled with the responsibility of developing human and natural resources towards meeting such stated goals under prevalent practices and so the school is constrained on how to actualise this goal. As a result the school is equipped with the document, which shows how the stated goals of the society could be achieved and this is referred to as 'curriculum'.

Curriculum as a concept is often applied though rarely used with understanding. Its understanding is synonymous to linkage between education and society. Sharing the views of curriculum experts like Inlow, Kimpston and Doll's definitions as blue-print and useful guide though at an agreed variant Olaoye (2004) perceived curriculum as (1) document, (2) name of a system of schooling, and (3) title of the field of study. It is a document, which spells out the need of a particular society, and how such needs could be achieved through various subjects' contents packed with different objectives. It refers to a system of schooling, which shows the pattern through which school system is run relatively to the nature of immediate society. It is the title of a field of study that internalize prospective readers on the meaning, scope and ramification of curriculum, its design, implementation and evaluation. Whatever meaning is associated with the curriculum, Olaoye (2004) noted three notions being often implied, which include experience, social design and psychological notions. This justifies the notion that curriculum exists to make living worthwhile for all and sundry in the society.

The interpretation of the above school of thoughts made it clear that curriculum exists to enhance character formation and ensure good living in society. As a result, mathematics curriculum refers to all planned mathematics courses in contents and pedagogies for the learners to acquire in stages in order to equip them for meaningful contribution to the socio-political development of their immediate and outside environments. On the other hand social transformation can be perceived, though complex concepts, from the human angle as it contains two concepts: social and transformation. Using Hornby (1984) as blue-print and guide, social means living in communities, relating to society while transformation refers to an apparatus that necessitates change and shape character. By the combination of the two it could be inferred as an apparatus for changing character in order to make living in communities worth living.

So, curriculum as social transformation is sine qua non to curriculum as apparatus for changing character of man in order to make living in the communities worthwhile. Social transformation in education could be at the formal or informal settings though the former practice takes cognizance of the needs of the society in a definite and specified environment under specific rules and regulations.

Today, the question is not only the contents of mathematics curriculum but how to teach these content areas in order to make the curriculum dynamic and ensure social transformation. For these reasons, the study examined contents and pedagogues of the mathematics curriculum as social transformation since the school is saddled with the diverse responsibility of teaching and making the curriculum an instrument of social transformation.

In Nigeria, the National Policy on Education (1998) stipulates the main goal of education as self-reliance while educational activities are expected to achieve the following: (1) *the inculcation of national consciousness and national unity.* (2) *The inculcation of the right type of values and attitudes for the survival of the individual and Nigerian society.* (3) *the training of the mind in the understanding of the world around.* And (4) *the acquisition of appropriate skills, abilities and competencies both mental and physical as equipment of the individual to live in and contribute to the development of the society.* In order to achieve these objectives, various measures were fashioned out in each school subject at different stages. In mathematics the following objectives were fashioned out in line with the contents of each stage of its teaching and learning.

At the pre-primary school level which accommodates children aged 3 - 5 years and serves as link between the home and the school, the National Policy on Education (1998) states the objectives as follows: (1) *Effecting a smooth transition from home to the school.* (2) *Preparing the child for the primary level of education.* (3) *Providing adequate care and supervision for the children while the parents are at work.* (4) *Inculcating social norms.* (5) *Inculcating in the child the spirit of inquiry and creativity.* (6) *Teaching cooperation and team spirit.* (7) *Teaching rudiments of numbers, letters, colours, shape and form and so on through play.* And (8) *teaching good habits especially good health habits.* The content of the curriculum in mathematics is basically flexible and channeled through play-way practices in order to achieve the objectives.

At the primary school level, the objectives include: (1) *the inculcation of permanent literacy and numeracy and the ability to communicate effectively.* (2) *The laying of a sound basis for scientific and reflective thinking.* (3) *citizenship education as a basis for effective participation and contribution to the life style of society.* (4) *Character and moral training and the development of sound attitude* (5) *Developing in the child the ability to his changing environment.* (6) *Giving the child opportunities for developing manipulative capabilities.* And (7) *providing basic tools for further educational advancement including preparation for trades and crafts of the locality.* In order to attain these objectives, several content areas of school's primary

mathematics curriculum were outlined as (1) *number and numeration*, (2) *basic operations*, (3) *measurement*, (4) *practical and descriptive geometry*, and (5) *everyday statistics* (NCPS, 1979; Kalejaye, 1985).

At secondary school level, the objectives were outlined as (1) *making student useful living within the society* and (2) *preparation for higher education with mathematics course content of both junior and senior secondary school*. The curriculum outlined (1) *Number and numeration* (2) *Algebraic processes*. (3) *Geometry and mensuration*. (4) *Trigonometry* and (5) *Probability and Statistics* (NCSS 1975; NC JSS, 1982).

At post - secondary school levels which comprises of colleges of education, polytechnics and universities the goal of higher education was outlined as (1) *the acquisition, development and inculcation of the proper value - orientation for the survival of the individuals and society*. (2) *The development of the intellectual capacities to understand and appreciate their environments*. (3) *The acquisition of both physical and intellectual skills which will enable individuals to develop into useful members of the community*. And (4) *the acquisition of an objective view of the local and external environments*. In order to attain these objectives various courses have been designed with varying degree of mathematics contents to make the objectives a reality. Indeed most of the national objectives of education are the same with the objectives of mathematics curriculum at different stages of Nigerian society. To actualize these objectives mathematics was made compulsory in the primary and secondary school levels for the students, and even a pre - requisite criterion for admission into the higher institution for greater number of courses. Thus, the curriculum is justifiable for making the subject a core and compulsory subject in the nation's educational strata for students to learn and pass due to varying degrees of objectives which it is purported to achieve. These have demonstrated the extent to which mathematics curriculum is significant to social transformation of an individual taking cognizance of the above objectives and contents enumerated.

### **Statement of the problem**

The study was designed to examine how mathematics curriculum is a social transformation. Specifically, the paper discussed the best practices through which mathematics curriculum is a social transformation via (1) contents and (2) pedagogical practices.

### **Mathematics curriculum as social transformation via content practices**

If there is any subject which has no deficient except that men entrusted with it do not appreciate the excellent use of its contents then mathematics readily comes

into limelight. This is because almost all the mathematics contents from the kindergarten to the tertiary levels are in one way or the other applied in solving society's problem. For instance at the kindergarten stage pupils are taught to count, separate shapes and colours in order to appreciate the beauty of nature and contribute meaningfully to the progress of the society and develop their intellects. Secondly, the concept of 'signs' used in the arithmetic operations is synonymous to real life situation in the society as  $(+) \times (+) = (+)$  equivalent to the friend of my friend is my friend.  $(+) \times (-) = (-) = (-) \times (+)$  equivalent to the friend of my enemy is my enemy or the enemy of my friend is my enemy.  $(-) \times (-) = (+)$  is equivalent to the enemy of my enemy is my friend. These preliminary contents in mathematics curriculum contributes in one way or the other to the tolerance and social adjustment of the child in the society.

At the primary level, many contents in mathematics make students socially transformed especially in reasoning and book - keeping. A child who is good in number and numeration find the use of the global system of telecommunication in vogue very stimulating due to adequate knowledge of numerals (0-9). A child will understand how much to purchase quantities of goods at any point in time if he has the knowledge of simple simultaneous equation of  $2r + 5b = 5$  and  $5r + 2b = 7$ . These equations transform to two cups of rice and five cups of beans costing N5 in market A and in market B with five cups of rice and two cups of beans costing N7.

Moreso, he is better informed on how to relate with the sellers on the mode of bargaining on getting to the market via the knowledge of the mathematics contents he has acquired.

Not only that various topics abound in mathematics especially at the senior secondary school level such as geometry and statistics just to mention a few, which contribute to the meaningful development of the society. A student who is good in geometry appreciates the use of land especially in agriculture, which serves as the main custody of the larger society. Knowledge of statistics cannot be overemphasized due to its role in the equitable planning of amenities of the available human and natural resources. These are provided in the content area of statistics, an aspect of mathematics curriculum.

At the tertiary level, adequate content area of mathematics is most visible across all disciplines and that is why it is often made pre-requisite condition for the admission into different programmes in sciences and technologies. Mathematics is tool that serves as panacea to the society's development, for no meaningful development could be attained outside the framework of advanced science.

According to Awodeyi (2004), mathematics knowledge of some contents areas like relationship between pairs of alternate angles, corresponding angles,..... and substitution of an equivalent variables into equation develops the students to articulate and apply ideas, reason and argue logically,.... predict events, ensure tolerance and hardwork among others. This is to say some of these contents if not all, make the students to appreciate the work of others, the nature, and spur them to contribute more to its standard. As a result, content practices in mathematics curriculum assist students to be helpful, respectful, understanding, tolerating, honest, cooperative, ambitious, confident and peaceful which are the indices of social transformation.

### **Mathematics curriculum as social transformation via pedagogical practices**

There is an adage that good teachers are made and not born because the nature of knowledge facilitator determines the extent of understanding of any concept. Mathematics curriculum as a social transformation through pedagogical practices could be demonstrated through the letter purported to have been written to the teacher of Abraham Lincoln's son as quoted by Abolade (2004). Lincoln opined that much transformation of his son depended on the teacher who could make him understand the content areas of the subject and submitted as follows:

*He will have to learn, I know that all men are not just, all men are not true. But teach him also that for every scoundrel there is a hero; that for every selfish politician, there is a dedicated leader. Teach him that for every enemy there is a friend. Teach him that a dollar earned is of far more value than five found. Teach him to learn to loose and also to enjoy winning. Steer him away from envy, if you can. Teach him the secret of quiet laughter. Teach him the wonder of books; but also give him quiet time to ponder the external mystery of birds in the sky, bees in the sun and flowers on the green hill side. In school teach him it is far more honourable to fail than to cheat. Teach him to have faith in his own ideas, even if anyone tells him they are wrong. Teach him to be gentle with gentle people, and tough with tough. Try to give him the strength not to follow the crowd when everyone is getting on the bandwagon. Teach him to listen to all men, but teach him also to filter all he hears on a screen of truths and take only the good that comes through. Teach him how to laugh when he is sad. Teach him there is no shame in tears. Teach him to close his ears to a howling mob; and to stand and fight if he thinks he is right. Treat him gently but do not cuddle him, because only the test of fire makes fine steel. Let*

*him have the courage to be impatient, let him have patience to be brave. Teach him always to have sublime faith in his creator and faith in himself too, because then he will always have faith in mankind. This is a big order, but please see what you can do.*

*He is such a fine little fellow, My son!*

From here it is obvious to see that pedagogical practices which is synonymous to social values, plays a vital role in the individual social transformation, and this is why teachers of mathematics should harness these content areas of mathematics in their pedagogical practices at all levels of educational strata. Mathematics curriculum, if properly handled, will bring about the above stated objectives into reality especially when the pedagogical practices of mathematics curriculum are skewed away from rote learning. For instance, there is no gain in teaching pupil concept of perimeter without relating it to his father's sitting room in order to enrich his understanding; circle without relating to the plates being used at home or some other concepts readily available to him at home.

The same thing goes to those teaching at the tertiary levels whereby students are, in most cases, made to learn mathematics without close interpretation of its use in their immediate environment. For instance concepts like cauchy integral was often taught without meaningful relationship to the fact that not all the shapes could be regular so as to calculate their areas, and in an attempt to adjust these irregular shape of objects makes the topic irrelevant. Through these pedagogical practices meaningful social transformation could be achieved. The practices that embrace diverse mode of instruction, and ensure that close relationship of content and students' environment are juxtaposed in order to bring about social transformation. There is no gain in separating students from the society where they are expected to contribute quotas of development through imparting irrational knowledge due to faulty pedagogical practices. Mathematics knowledge was made to assist in solving society's problem and not vice versa. The improvement in the pedagogical practices of mathematics curriculum is a social transformation.

## **Conclusion**

This paper has discussed extensively different interpretations of curriculum as well as its contextual meaning in relation to the National Policy on Education with emphasis on mathematics. It narrowed down mathematics curriculum to social transformation via content and pedagogical practices with some content areas identified to buttress the assertion; and how pedagogical practices could be applied as a form of a social transformation. These social transformations include being

helpful to others having appreciated their work, respectfulness which emanates from having considerations and agreeing with others, tolerance which minimizes complaining among others and peaceful coexistence in the society just to mention a few. Logically, curriculum is a social transformation and mathematics curriculum permeates virtually all the facets of curriculum, hence mathematics curriculum is a social transformation. With these and some other salient points implied mathematics curriculum at different levels of our educational strata has demonstrated beyond reasonable doubt to be an instrument of social transformation for all, and it is not surprising why it is made compulsory for the students.

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