

MATHEMATICS CURRICULUM: THE PHILOSOPHY BEHIND CONTENT ALTERATION

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Abstract

In education system regardless of the level, mathematics is central and is taught in virtually every level. Its curriculum as such, has to be given attention by the concerned authorities. It should be reviewed regularly as suggested by the paper and its contents should equally be altered. This, the paper argues is born out of the fact that human society is dynamic and as such its educational policies that has direct bearing to its inhabitants has to be dynamic as well. The paper as such goes further to opine how alteration could be made in the contents of mathematics curriculum and also offers recommendation on how such alteration could be beneficial to the society.

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Introduction

Mathematics is universally accepted to be the subject whose application cut across various spheres of education. Educational institutions whether Primary, Secondary or Tertiary have courses that are mathematics-based or mathematically-inclined. Therefore, the attention required to be given to the contents of mathematics at various levels is quite appealing; as a result of which stakeholders in the field of mathematics are very much concerned and interested in the contents of mathematics to be taught at different levels of learners' educational attainment. This interest shown by stakeholders about mathematics curriculum content may be because of the instrumentality of mathematics in virtually all spheres of learning and human endeavour. In this respect therefore, a special attention has to be given to the mathematics curriculum to be taught at various levels. This has to be in tandem with the current needs of the society since the mathematics knowledge acquired in these institutions has direct bearing to the happening in the community. This ranges from resource management, commercial enterprising, purchasing and supply, financial institutions' operations etc. This should be ensured through constant and regular alterations and review of its contents so as to be in tune with the current needs of the society. This was captured by Alade (2011) as

“Arising from the need for relevance in education for functional living, self sustenance and for self-reliance. In Nigeria, sporadic educational reviews which are indeed curriculum based have been witnessed at various times. These have re-shape educational thought and practices in Nigeria. The reason being that the opinions and solutions that key stakeholders' purpose for society's request and needs for productivity and progress often make some components of the existing curriculum obsolete or out of tune with currency. Whenever this happens, it sets pace for country's review initiatives in value-orientation, poverty eradication, and wealth and job creation among many other reasons.”

This is indicating the extent to which change in curriculum content of mathematics is inevitable and cannot be allowed to remain stagnant or static over the years.

Mathematics Curriculum in Nigeria

Curriculum is the pivot through which the purpose of the establishment of educational institutions could be achieved. Curriculum as such entails a conglomeration of whatever is to be taught to students and it plays a central role in helping students to best learn or otherwise of the contents of a particular course, subject or segment of instruction (Tsafe, 2012). Nigerian mathematics curriculum had undergone marked changes since its inception. The changes it had were in phases. For instance, prior to independence, the curriculum of mathematics used then was to satisfy the needs of missionaries and their activities in the country. As such, they (missionaries) dictated the content, objectives and methods of teaching the mathematics. This is aimed at producing people with knowledge in arithmetic so as to ease commercial activities between missionaries and local Nigerians. This is in addition to the production of catechists who would assist the missionaries in spreading the teaching of the gospel. According to Adetunji (2007) curriculum prior to independence had the mission of spreading the gospel which was feasible only through education as those missionaries were in need of the local men to help them interpret the content of the Bible to local people. The aim of teaching mathematics then was not centered on the need of an average Nigerian but to satisfy only the needs of the missionaries and as such books were developed which according to Badmus (1997) were centered on efficiency arithmetic, mostly dominated with shilling arithmetic and authored by Lacombe. Because mathematics is needed for sustainable development, these books were developed to undermine this possibility.

Subsequent to this were series of conferences held to improve the content of mathematics and to make the curriculum dynamic so as to embrace the universal trend of advancement in science and technology which is only achievable through rigorous mathematics content to be taught to prospective Engineers, Astronomers, Medical Experts, Accountants and so on. This is why the need to improve the content of mathematics then became a global phenomenon. Nigerian version of

these conferences took place by 1969 which heralded the development of yet another curriculum different from the one Nigerians were used to prior to independence. This curriculum conference was a turning point in the curriculum development history of Nigeria, mathematics inclusive. The outcome of this conference was what gave birth to modern mathematics curriculum which comprises some part of the pre-independence curriculum and some new aspects were introduced.

However, between 1970-1977 this new curriculum started to gain acceptance across the country and along the line it was marred by some problems which ranges from acute shortage of the manpower to teach the content effectively, lack of adequate and suitable text books and so on. This eventually led to Benin conference of 1977 under the custodianship of Col. A.A. Ali who then was the Federal Commissioner of Education. The aim of Benin conference was to deliberate on the way out of the problems identified with the modern mathematics. To make this achievable, the Federal Ministry of Education invited virtually every stakeholder who includes mathematicians, mathematics educators and the like. The stakeholders initially thought their opinion was going to be asked and instead Col. Ali went ahead to announce the complete abolition of using modern mathematics and said the country is going back to the traditional mathematics. This became a surprise to all the stakeholders that attended the conference.

Meanwhile, Nigerian mathematics curriculum over the years, suffered content alteration. Whenever curriculum content of a certain course or subject is altered, both teachers and learners would be affected and not only teachers and learners but the entire community. This is because before using or adopting certain curriculum, the community within which it will operate has to be taken into cognizance. The effect of the content alteration on teachers lies in the area of training. Teachers must embark on knowledge extension to the next level in order to assimilate and accommodate such changes and on students it involves mental adjustment; when they have to be more resolute in their quest to accommodate such changes.

Mathematics curriculum contents

At every level of educational endeavour, mathematics curriculum has to be developed so as to meet the need of learners at that particular level. What is to be taught at tertiary level should not be prepared for learners at formative level of learning and intermediate level i.e primary and secondary school levels. In any case however, the curriculum is supposed to be structured in such a way as to appeal to the mental capability and readiness of the learner.

Even though mathematics has a universal application by its nature, yet each country has a particular approach on how its mathematics curriculum is structured so as to help such countries perhaps to meet the need, yearning and aspiration of their people. This is made tenable because the needs of the societies are relative and one may not necessarily be applicable to another. To further buttress and portray the importance of mathematics, Anderson (cited in NCB, 2009: P 5) maintained that “a fundamental aim of mathematics curriculum is to educate students to be active, thinking citizens, interpreting the world mathematically and using mathematics to help form their predictions and decisions about personal and personal and financial priorities”. This is indicating the extent to which mathematics curriculum is of paramount importance as far as teaching and learning process in mathematics are concerned. To the teacher, it serves as a beacon and a guiding principle for teaching his/her students so that this will curtail the possibility of derailing and bringing-in irrelevant things in the process. To make this realizable, the selection of contents has to be done skillfully and with efficacy so that what the curriculum was developed for would be implementable eventually by the teachers. This is because teachers play a central role in the implementation of contents of the curriculum so developed by the experts in the field.

Another important aspect to be taken into cognizance as far mathematics curriculum contents are concerned is teachers’ orientation towards using the curriculum after it must have been developed. It is as a result of this that a study was conducted by Remillard and Bryans (n.d) who

found out that orientation helps teachers a great deal towards using curriculum resources that influence the way they use the curriculum as a result of which they concluded that different uses of the resources led to different opportunities for student and teacher learning. This will go a long way in enabling the teachers to peruse and digest the curriculum content very well so that no portion of the curriculum will be left uncovered as this most often have a grievous consequences on students part especially when they come to write their exams which is external to their school. Because mathematics teaching requires the usage of appropriate instructional materials, subjecting teachers to this form of orientation will help them harness their innate abilities and devote their time in teaching the students simply because they have been made to do so by exposing them to such concepts. In his words, Ernest (2000) outlined four main aims for school mathematics (curriculum) as:

- To produce mathematical skill and knowledge based capability
- To develop creative capabilities in mathematics
- To develop empowering mathematical capabilities and a critical appreciation of the social application and uses of mathematics
- To develop an inner appreciation of mathematics: its big ideas and nature

To this end, while developing mathematics curriculum content, it should have a reflection of this because they all-encompassing in terms of making both the teacher and the learner and how they will eventually apply the knowledge in the outside world i.e when they are outside the four walls of the school.

Contents alteration in mathematics

The dynamic nature of the world around us makes it compelling for the contents of mathematics curriculum to be subjected to alteration every now and then. Whenever there is a certain breakthrough in science, it has to be proven mathematically and a provision has to be made in the curriculum to that effect. Part of what Noyes (n.d) opined to be reflected in mathematics

curriculum which should be open up and enhance pedagogical thinking so that new changes can be accommodated include but not limited to the following:

- Mathematics education for the academy
- Mathematics education for employment
- Mathematics education for general education
- Mathematics education for citizenship
- Mathematics education for social justice
- Mathematics education for the information age

All these phenomena, as they unfold in the society requires at every stage the content of mathematics to be altered so that the content to be used as at the time they unfold would be beneficial to everybody in the society. If the contents were to remain unaltered, then incorporating new changes will not be possible and as a consequence, the problems in the society instead of tackling and addressing them, they will be more compounded and become complex beyond someone's imagination.

The philosophy behind content alteration

Borrowing a leaf from Newton's 3rd law of motion, that action and reaction are equal and opposite; meaning whenever there is an action, there must be a reaction to oppose it. Similarly, whenever the thought of altering the content of mathematics arise, there must be a philosophy behind it. Mathematics passes through various civilizations right from Babylonians, Egyptians, Greeks, Chinese and Indians and subsequently modern mathematics which is attributed to Europe. Each civilization has its own sophistication in mathematics but called for content alteration (change) eventually because of the increase in the need of every civilization.

Conclusion

Mathematics curriculum content shouldn't be left to be static. It should always be altered so that new changes and developments in the society will be well accommodated.

Recommendation

- Mathematics curriculum should be reviewed on regular basis
- Teachers should be assisted to harness their skills so as to be familiar with the likely changes in the curriculum
- Real life situation should form part of what should be altered and added in the curriculum

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