



Mathematics Education as an Instrument For Development of Positive Values in Students' For National Cohesion

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ABSTRACT

In order to promote national cohesiveness, the research examines mathematics education as a means of fostering positive values in students. Values, developmental ideas, and the purpose and significance of mathematical education were emphasized. There was discussion of the positive values—utilitarian, disciplinary, moral, social, and aesthetic—that are attained through mathematical education. Lastly, a number of suggestions were made to enhance the teaching and learning of mathematics for the development of positive values in the modern era. These included hiring qualified math teachers to teach and using appropriate learning materials to create a calm and conducive atmosphere for students to see the relevance of mathematics, holding regular conferences, seminars, workshops, and refresher courses for math teachers to update their knowledge on modern approaches, and having the government and private sectors continuously review and update mathematics curricula to include new contemporary issues, positive values development, and national cohesion. In the end, the article came to the conclusion that it is not worth surviving in today's culture without mathematics.

INTRODUCTION

Man is constantly confronted with numerous challenges, and as a result, he is more often preoccupied with trying to offer solutions to such challenges at that particular point in time. There are many options available to him, but pragmatic solutions are typically sought after; in these situations, education as an instrument par excellence becomes the target for solution or solutions because the importance of education in the development of a total man cannot be understated. This could be the cause of the Federal Republic of Nigeria's (2013) declaration that education will remain the country's top priority in order to acquire the necessary skills and develop mental, physical, and social abilities and competencies as a tool for personal living and constructive contribution to national development. When faced with a significant obstacle, the initial course of action is typically to determine how suitable education could be implemented to lessen or completely resolve the issue (Uka, Iji & Ekwueme, 2012). This brings us to mathematics education, which is a component of education that is primarily focused on instilling in children the necessary abilities and attitudes for the development of positive values.

Mathematics education serves as a means to explore, interpret, and forecast experiences while also sharing discoveries with others. It fosters the growth of logical reasoning and beneficial values. This educational discipline acts as an essential resource across various fields such as business, industry, finance, and government. Consequently, it suggests that mathematics education can be utilized in all aspects of life, including promoting positive values among secondary school students. In this paper, we examine the definitions and goals of mathematics education, the concepts of development, and values, and analyze the impact of mathematics education in modern society as a means to enhance students' positive values in secondary schools, contributing to national unity.

The Meaning and Objectives of Mathematics Education

Idoko (2012) defines mathematics education as the process of instructing and learning mathematics. The instruction of mathematics should be related to the lives and experiences of learners, enabling them to engage



fully in society. The author observed that researchers focused on mathematics education primarily concentrate on the tools, methods, and approaches that aid this practice. Currently, mathematics education has evolved into a comprehensive field of study, complete with its own unique characteristics, concepts, theories, methods, as well as national and international organizations, conferences, and literature. In the past, basic mathematics formed a part of the education system in many ancient civilizations, including those of ancient Greece, the Roman Empire, Babylon, and ancient Egypt (Odiogo, 2009). In many instances, only boys from families of considerable standing had access to formal education.

However, in the eighteenth and nineteenth centuries, the Industrial Revolution led to an enormous increase in the urban population. Basic numeracy skills, such as the ability to tell time, count money, and carry out simple arithmetic, became essential in the new urban lifestyle. With the advent of public education, mathematics became a central part of the curriculum from an early age. By the twentieth century, mathematics was part of the core curriculum in all developed countries. This emphasis has also extended to developing countries, especially in Nigeria, where mathematics is a core subject in both primary and secondary schools.

Odiogo (2009) argues that studying mathematics sharpens the mind and enables individuals to act appropriately in times of need. The author also notes that the development of skills, knowledge, aptitudes, abilities, and attitudes can enable individuals to achieve overall achievement. No generation can take its place in modern times without sound mathematical knowledge and the ability to achieve developmental objectives in new situations (Usman & Iweka, 2013). Mathematics education is highly relevant in our societies; its importance includes enhancing students' thinking abilities by making them more creative, reasonable, rational, imaginative, and valuable to society. It is a serious problem that many mathematics educators, researchers, and stakeholders seem not to understand. The prosperity of any country depends on the volume and quality of mathematics taught in its school system. The relationship between mathematics education and the development of values and attitudes is best seen when considering the national objectives of primary and secondary mathematics education. These objectives, as spelled out in the National Policy on Education (2013 edition), include:

- Laying a solid foundation for the concepts of numeracy and scientific thinking in the child.
- Giving the child opportunities to develop manipulative skills that will enable him to function effectively in society within the limits of his capacity.
- Providing the child with basic tools for further advancement, as well as preparation for trades and crafts of the locality.
- To build on the foundation of the primary level so that the child can make a useful living, professionally, economically, politically, and socially, and imbibe the qualities of right attitudes and values.
- To have a general interest in mathematics and to provide a solid foundation for everyday life.
- To develop computational skills and the ability to recognize problems and to solve them with related mathematical knowledge

THEORETICAL FRAMEWORK

Schwartz theory of basic human values (1992) supports this study because it explains how individual behaviours and social interactions are influenced by the values they hold. The theory identifies universal human values to include benevolence, universalism, achievements, self-direction, conformity and security, which are essential for promoting harmonious relationships within society.

In the context of mathematics education these values can be cultivated through collaborative problem solving, equitable classroom practices, critical thinking activities, and ethical learning experiences. As students' develop values such as fairness, cooperation, honesty, discipline, and respect for diversity through mathematics instructions, they are more likely to exhibit behaviours that encourage peaceful co-existence, mutual trust, and responsible citizenship. Consequently the study assumes that mathematics education can serve as a vehicle for national cohesion in Nigeria.



The Concept of Development

Development comes from the French verb-veloper-meaning to wrap, that is, “to cause to grow gradually fuller, larger, stronger, and better (Njoku, 2009). The authors noted that development is conceived as a steady movement towards a better graduation that is seen as a progression towards maturity and better exemplification. A qualitative maturation in the exemplification from simplicity to complexity of the potentials of the personality for better functionality. It is the psychological study of how people change positively the values and attitudes to stay perfectly overtime.

A study in human development is interested in terms of attitudes and values that affect the growth and development of a person. Njoku (2009) opines that development is characterized at the level of the individual as increased skills and capacity, greater freedom, creativity, self-discipline, and responsibility. The success or failure of any individual in terms of affluence depends on how the individual develops himself. The refusal to trace human development beyond the twentieth century implicitly denies that development is a natural process. This implies a gradual growth towards a stronger and better status, a status that embodied a goal. Both at the levels of the individuals and societies, development is an unfolding of potentials for the better flourishing of the individual and society. Therefore, development is seen as the growth, changes, and improvement that occur in an individual or any society, which aims at enhancing the quality of life of the citizens.

Concept of National Cohesion

National cohesion in this context refers to the unity in diversity that Nigeria enjoys, peace and progress or development that Nigeria yearns for. It also include tolerance for one another, trust and being responsible citizens. Thus, when mathematics education promotes equality and inclusiveness, students learn to value fairness, respect individual differences, and work cooperatively with others. These experiences reduce prejudices and discrimination, strengthen social integration, and foster a shared sense of belonging. As a result mathematics education becomes a powerful instrument for promoting national cohesion by preparing citizens who appreciates diversity while working towards Nigeria’s common goals

The Concept of Values

Brown and Crystal (2007) describe values as one’s idea about what is right or wrong or what is important in life, or the quality of being useful in life. Rokeach (1973), as cited in Anameze (2002), noted that values are standards that guide one’s behavior towards the attainment of one’s desired objectives. He believes that values make us desire to have or to do something and thus influence our choice of what is worthwhile. Therefore, values are ideas in our minds that guide us to assess, accept, or reject an action or behavior. From these definitions, it can be deduced that values serve to ignite an individual’s actions as well as motivate him to act or behave in the right or positive directions. It is this possible effect on one’s behavior towards mathematics that this paper considers mathematics education as the most relevant tool for the development of students’ positive values for national cohesion in Nigeria. Drawing from the above discussion, one may ask, what are these positive attitudes and values that students can achieve from learning mathematics?

The following are the positive values that students can acquire through effective learning of mathematics:

Utilitarian Values

A common man can get on very well in life without learning how to read and write, but not without learning how to count and calculate (Sidhu 2002). The author stresses that any person who is ignorant of mathematics will be at the mercy of others and will be easily cheated. An engineer, a businessman, an industrialist, or a banker, and even a laborer, has to calculate his wages, make purchases from the market, and adjust the expenditure to his income. A person with proper knowledge of calculation can anticipate all the possible handicaps to be faced, and he can adopt precautionary measures. Mathematical knowledge inculcates in an individual the ability to identify, define, and delimit problems, proposing hypotheses, collecting data and other evidence, and finally, trying out the hypothesis (Obodo, 2004). In many occupations, such as tailoring, carpentry, postal jobs, shop-keeping, and those that help in the fulfillment of human needs, mathematics is used. Students are sometimes



misled about the utilitarian value of mathematics on account of the feeling that whatever is taught in higher classes is of little use in life in society

The Federal Republic of Nigeria (2013) rightly put the philosophy of secondary school mathematics education as a preparation for life and making rational decisions. Mathematics prepares students for useful living, simple and fundamental positive values. Processes of mathematics, such as counting, addition, subtraction, weighing, measuring, and others, help to check economic waste in everyday living. It helps in the development of positive values of the power of originality in the individual. The establishment of a new formula, which is an individual original work, keeps him going. It generates the power of thinking, reasoning, discovery, and judgment. All these are necessary positive values in solving problems of daily living. The study of mathematics cures the vices of mental distraction and cultivates the positive habit of continuous attention. This habit is a great asset in everyday living. All these need an individual to be mathematically literate in the present-day communication technology (Obodo, 2004).

Disciplinary Values

Strengthening of mental power as well as acquisition of knowledge is considered an important disciplinary value of mathematics (Agwagah, 2001). In secondary schools, it is primarily taught for mental training. The mental power students get from learning mathematics is the acquisition of the art of proper thinking and effective reasoning. (Agwagah, 2001) noted that mathematics education inculcates in students the values like honesty, truthfulness, open-mindedness, objectivity, self-confidence, self-reliance, patience, will power, and orderly habits like concentration, punctuality, neatness, and hard work. Students can live a well-disciplined life through abstract mathematical concepts that are taught to students, which in turn helps them to become assets to society for national cohesion.

There are some good and positive values that politicians need. For instance, if students want to become good political leaders, they should have some of these values, such as foresight, a sense of judgment, and be tactful. Mathematics is therefore adequately positioned to equip a would-be politician. As mathematics deals with facts which are accurate and precise, there is no scope for uncertainty or vagueness. This makes the minds of the learners broader and more open. Learning mathematics helps students to organize their ideas more logically and express their thoughts or views more accurately and explicitly (Kurumeh, 2006).

Cultural Values

Culture reflects how people live, behave, dress, eat, drink, rear children, and maintain their social relationships. The mode of living of the members of a society is greatly determined by the scientific and technological advancement, which in turn depends upon the progress and development of mathematics. Therefore, the changes in modes of living of members of a society are continuously influenced by the progress in mathematics. Oluwanyi (2004) observes that mathematics also helps students in the preservation and transmission of our cultural traditions from one society to the other. The sculptures and designs of the ethnic groups in Nigeria have mathematics imbedded in them. Cultural arts such as music, sculpture, poetry and paintings have mathematics as its pivot in students

Social values:

To become a civil society, the country should encourage its members to participate in the political process and contribute to community services consistent with good citizenship; interpersonal co-operation and social responsibility, which are encouraged through effective learning of mathematics. Mathematical knowledge helps in the proper organization and maintenance of a fruitful social structure and plays an important role in the proper setting up of social institutions such as banks, co-operative societies, post offices, insurance companies, industries, and transport navigation. Effective business transactions, exports and imports, trade and commerce cannot take place without mathematics education. Even the issue of representative governance, which has given rise to the senate, governors, and the like, is purely a mathematical issue as seen in some topics like group axioms, especially subgroups and statistics. The success of an individual in any society depends on how well he is able to become and what contributions he can make towards the progress of the society.



Our social existence is totally governed by scientific and technological knowledge, which solidly depends on mathematics. Mathematics education helps students to adjust themselves and live a harmonious life with their colleagues. It is on record that societies that gave due attention to the learning of mathematics derived huge benefits, as it always leads to advancement in science and technology (Odili, 2006). Therefore, with proper plan and care, mathematics can be used to achieve world peace, hence its relevance to students and society.

Moral Values

Character formation, in many ways, is affected by the learning of mathematics. The learning of mathematics helps in the development of positive values and attitudes. Mathematics education does not give room for prejudiced feelings, biased outlook, discrimination, and irrational thinking. It develops in an individual objective analysis, correct reasoning, valid conclusions, and impartial judgment. Okafor (2001), cited in Kurumeh (2006), noted that students of mathematics clubs are expected to be neat, friendly, respectful, abide by rules and regulations, punctual, curious and creative, able to work as a team, obedient, and ready to listen to seniors and teachers. When these qualities are developed in our youth, society will be a better place to live and will be devoid of crimes, which ultimately pave the way for National cohesion.

Aesthetic Values

There are indications that mathematics education influences individuals concerning the beauty of art and the understanding of beautiful things. Mathematics itself is aesthetically appealing and enriching. It moves beyond the amusement found in games, the elegance and gracefulness touch students' emotions the same way music and arts reach inside the psyche and make us feel alive (Clawson, 2004). The realization of the beauty of mathematics attracted the great mathematicians of old, as can be seen through their biographies. The fineness, the harmony, and the symmetry of mathematics all add to her beauty.

The round houses with the conical roofing among the Ngas people of Plateau State in Nigeria show the beauty of mathematics. Decoration and tessellation for beautiful and appealing environments are the direct application of mathematics (Kurumeh, 2006).

CONCLUSION

To meet the basic learning needs for people to survive and develop their full capacities, the development of positive values such as utilitarian, disciplinary, cultural, moral, social, and aesthetic values is done through effective teaching and learning of mathematics. The paper considered mathematics education as the most appropriate learning that sharpens the minds and gives individuals the ability to behave in the right direction in terms of needs and personal character development. The only key to change of career in life is mathematics education, and life without mathematics is not worth living.

RECOMMENDATIONS

The following recommendations are made for the development of positive values through mathematics education for national cohesion.

1. Qualified mathematics teachers should be recruited to teach and use appropriate learning materials to create a peaceful and conducive atmosphere for students to see the relevance of mathematics in different fields.
2. Refresher courses, seminars, workshops, and conferences should be organized on a regular basis for mathematics teachers to update their knowledge on modern approaches to teaching mathematics in order to facilitate the development of positive values in students.
3. Students should regularly attend mathematics lessons and participate in class work and assignments to equip them with the practical values.



4. The Government and private sectors should constantly check and update the mathematics syllabus for the inclusion of contemporary issues for positive values development and national cohesion.
5. Parents can have a tremendous influence over the attitudes of their children towards mathematics. Therefore, they should provide their children with relevant mathematics textbooks, calculators, mathematical sets, and other materials; they should also monitor their progress and assist them where they are not capable.

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