

## **THE VALUE OF MATHEMATICS, CULTURE AND SECURITY ISSUE TO HUMAN DEVELOPMENT**

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### **Abstract**

Humankind has been able to explore from within him most of his potentials through his creative prowess. The benefits of such exploratory potentials are found in various artistic and scientific innovations and development. The work is an attempt at evaluating the value of mathematics and culture to human development. Mathematics is a rational outgrowth of cultural knowledge. There are views that put mathematics in human perspective as a cultural phenomenon. Mathematics as a department of culture is a product of human intellectualism, while culture abides as social requirement for mathematics. The relation between culture and mathematics is enabled by man as the instrumental constructor. Thus, mathematics becomes a cultural discipline that gives an intelligible picture about reality to mankind. To that extent, the mathematician cannot be isolated from the particular society in which he locates his operation. Moreover, the way of organizing information is a mathematical precedent of presenting nature's reality in a calculative format. Culture therefore is that civilization that brought about the mathematization of the world for the enhancement of human and environmental security. Mathematics as a cultural concept remains the basic postulate of the descriptive order of the world.

**Keywords:** Culture, Development, Human, Mathematics, Security, Value

### **I. Introduction**

A critical study of the history of mankind reveals that several factors have propelled the development of humanity. Some of such factors are latent and intrinsic while others are extraneous and not manifest. But mathematics and culture are factors that are not latent in human history, and are not yet extraneous through experience of man following man's impact on his environment.

Humanity has been able to explore from within him most of his potentials by his creative prowess. The benefits, some of which we have seen through many artistic and scientific innovations and development. Hence the value of mathematics and culture towards such innovations and development cannot be overemphasized.

In the context of this work, we employed the analytic method of philosophy to consider what the concepts of culture, mathematics and security issue are, the growth of mathematics as a science of culture, culture, mathematics and security issue in human development and the value of them to humanity. Mathematics would be seen as a science of numbers that developed from human creativity which further synthesized the whole of reality for a proper understanding of the human environment. Thus, it is the attempt by man to understand nature within and without him that makes him to cherish whatever he finds useful as valuable. Culture becomes a useful tool for him to explore such human values; one of which is mathematics. No field of human endeavour and achievement does not feel the impact of mathematics as a value on its culture. Indeed, “the value of culture and mathematics to human development cannot be exaggerated”. It is therefore an attempt at evaluating the value of human achievement through mathematics and culture granted the security of human environment that this piece of work projects.

## **2. The concepts Culture and Mathematics**

The very first question a mediocre would ask if presented with a topic as this will be what is culture and what is mathematics? What is the beginning of culture and mathematics as concepts? Are there any relations holding between culture and mathematics that are either hostile or harmonious? How are the relations between man, culture and mathematics developing? These are some problems that are being discussed in philosophy of mathematics as a dimension in philosophical literature with ardour.

In the first instance, culture will reflect itself as a phenomenon. Yet specialists assert that there are over two hundred definitions on this concept. Beginning with the ancient times, culture was known merely as cultivation of the soil. For people at that era, it was an act of “improving nature by revealing and augmenting its primeval beauty and might”. Man advanced towards self knowledge by the cognition of nature. So for Pavel Gurevich, (1989: 8) culture is “cultivation, development, improvement.”

In Europe or the Western world, culture is identified with spiritual standards such as values, traditions and separate characteristics of social relations. In Africa and Asia, it is both spiritual and material. In the middle ages, culture was identified with the urban way of life. In the Renaissance period, it was identified with the humanistic ideal of man.

However, in modern civilization, it became the level of advancement of the spiritual and practical knowledge of individual peoples of the world. So, culture is naturalistic and social; the material and intellectual products of man, one of which is mathematics. Mathematics as a department of culture becomes a product of human intellectualism, and because culture is a man’s ability to create symbolic concepts in that social sphere. Hence, it is also by mathematics that man is able to have contact with reality through symbolization of objects in the universe.

Thus, the ability to symbolize the universe by man is a cultural attitude, and that cultural attitude to logically enumerate the world in size and numbers is a mathematical one. The relation between culture and mathematics is enhanced by man as the instrumental constructor. In this regard, mathematics becomes a cultural discipline that seeks to find out an intelligible picture of reality to mankind (Ijiomah 1999: 102). Any mathematical culture would imply pure and applied mathematics for a proper cognition of man's environment. As a consequence, Rosenthal and Yudin opined that culture in relation with mathematics is: all the material and spiritual values and the means of creating, utilizing and passing them on, created by society in the course of history ... Machinery, experience and the field of production, material wealth, achievement in the realm of science, art, literature, philosophy, ethics, education (1967:10).

### **3. Culture and the growth of Mathematics**

Mathematics is a rational outgrowth of cultural knowledge. This view put mathematics in the human perspective as a cultural phenomenon. To that extent, the mathematician cannot be isolated from the particular society in which he locates his operation. Thus, his work reflected the culture around him and also influences the direction of that culture. At this instance, we refer to the cultural-knowledge-base that influenced the growth of mathematics. In this regard, it is important to note that culture provides the lenses of perception and a way of looking at reality (Magrui 1980: 47).

A cultural knowledge system may therefore mean any set of ideas prevailing in a given culture or sub-culture which provides a way of organizing information about the world. It is also argued that in evaluating the growth of any scientific and technological and artistic knowledge one has to recognize the

That way of organizing information is a mathematical precedent of presenting nature's reality in a calculative format. Culture and mathematics complement each other while culture remains the foundation. Again, when we conceive culture as a civilization that brought about the mathematization of the world, we will see how mathematics through culture constrains human life and transform his perception of the world. Culture is an indubitable forerunner of mathematics while mathematics remains the basic stabilizer of any culture.

### **4. Mathematics and Culture in human development**

Mathematics as a cultural concept is the basic postulate of the descriptive order of the world. In this sense, we mean that the world is ordered and uniform in its operation. So for us to understand the law that governs nature, mathematics is involved. The world consists of statements that are empirical and subject to scientific proof. Yet there are other statements that are not empirical which are also scientific. How do we get at them and know them as true? For example, that  $1 + 1 + 1 + 1 = 4$ ? Or, that given a possible world that exists somewhere which we may not have idea of its kind of life, yet we know that if three things and another three things are placed we have six things in number. So the ability to figure out these things is mathematical ability which applies human reason from a pure or apriori perspective Hospers (1997: 132). Since natural laws are descriptive and are

discovered, the human being reaches those uniformities by formulation. So formulation is a human category which involves mathematics.

Scripturally, our history of creation has a mathematical origin. From the origin of letters in the book of beginnings (Genesis), all that ever existed was the uncreated Creator. The period of this existence is recorded with the hindsight of the knowledge of numbers within some period. Millions of years before the beginning of figures was known by man would have been. However, figures are man's creation from the knowledge of things with man being created based on creation history, not Darwin's evolution narration. Creation history produced the story about the uncreated Creator who first had the art of division when He, divided the earth which was formless, void and dark. There was an empty space which had no form or shape yet, characterized by darkness. The uncreated Creator's knowledge of understanding was to cause light which involves inventive calculation. Here was the knowledge of calculation. Again was the knowledge of separation of caused light from formless space. The next mathematical task of knowledge was addition. The caused waters under the firmament (space called heaven) were gathered together to pave the way for a space within the void space termed 'dry ground.' In other words, from an overwhelmingly void space other spaces were formed. That is, what was formless took form or became enmorphied or formed. Note the word firmament to mean a thing or something made strong, tight and armoured. Something made firm and armoured. In this regard, armoured properties which absolutely do not, and cannot wear out or off. This leads to the foundation of solidity, form and shape etcetera, which are mathematical entities from a creative mind in the beginning. Inclusive in the mathematical basis of creation knowledge was multiplication by the uncreated Creator.

In all of these arts of creation evinced the mathematical genre in the understanding of nature. Our knowledge of the world is culturally caused. Thus causation is an art, and any art is caused. Therefore culture is an art. No art can therefore be without the mathematical elements which involved the calling and putting of concepts or ideas together and letting them to practical understanding. Indeed, to give to understanding what caused the hitherto void dark mass or space include the application of mathematical dynamics of appreciation to fathom out an element of space called light or day from darkness or night. The use of figure or object was involved when the word division of light from darkness is mentioned, producing two things now caused to be from an initially existing oneness of a thing.

Mathematically, we can understand how the aptitude for knowing what light from darkness, day from night, evening from morning, firmament from waters, waters from waters, dry-land-earth from waters, grass, herb or seed that produced herb, fruit that produced tree whose seed is in-itself, by setting them descriptively in their measures and amounts, informs mathematical basis of creative culture.

Mathematics helps man to grasp the abstract patterns on the mind correlating the facts with the physical structure of the universe. Through it man gets deeper understanding about the sciences and technologies. It leads mankind to deeper and wider way of thinking or reasoning granted its prophetic insight and predictive precision with the aid of a master. Hence mathematics is arts and creativity. Indeed, our imaginations are full of mathematical currents with voltages associated with

either the Logical Positivists' concern for performance in operation or the Pythagoreans' belief in numbers as superhuman as the ultimate alphabet of nature (Bell 1951: 320).

When Leucippus and Democritus propounded the term "atom" to mean "uncuttable", it involves mathematical knowledge for them to have been able to formulate its indivisibility. It took a geometrical approach for them to show that atoms are characterized by size, shape and position without weight. The ancient Egyptian culture of writing using conventional symbols is a historical evidence of mathematical underpinnings. Herodotus' assertion about Sesotris, the King of Egypt who made division of the soil of Egypt among his subjects by calculating and assigning square lots of land of equal size to all is a mathematical advancement. When Galileo (1564 – 1642) expounded that all bodies fall at the same rate in a vacuum, it was a mathematical conception. Even so was Sir Isaac Newton's (1642 – 1727) law of gravitation that "every particle of matter in the universe attracts every other particle with a force varying inversely as the square of the distance between them and the product as the product of the masses" (Hospers 1997: 103).

In early astronomy Anaximander's (610 – 547BC) 'the earth is round and revolves around the sun, Pythagoras' "the earth is a globe", King Chandragupta's story to Greek Ambassador Megasthenes in 302BC; that 'the earth is spherical' are all mathematically conceived. The questions one may readily ask are what is at the back of man's mind? What is the true importance behind many of our deep subconscious images, or the sensation which we experience in dreams, and the many strange happenings in people's mind? (Mooney 1975: 9). Schofield would answer that it is just a 'general impression' which implies 'doing the done thing'. For him, it is culture which involves the performance of worthwhile activities (1972: 107).

Bertrand Russel, (1978: 10) asserts that philosophers are the outcome of their milieu. If this is correct then culture is at the background of every philosophical work. So common sense is the bedrock of all fields of knowledge and provides the raw materials for all other fields of study. Thus, most domestic behaviours we exhibit are determined by common sense mathematical knowledge. For example, how one knows what quantity of measure of oil or pepper is required at a time to make a sweet savour does not need a formal education. Mathematics permeates every facet of human endeavour. In religion, monumental designs show how calculative humanity could harness nature for his benefit. In politics, such maneuvering prowess of politicians indicates that there is mathematical ingenuity. In law, the dexterity of a judge in determining a case of tort reveals how influential mathematics is. The row is endless, etcetera.

In normal human organization, mathematics offers a formalized field for logical thinking. Culture and mathematics have a relationship of interest by which culture enriches mathematics and mathematics spontaneously enhances the development of culture. So, both phenomena provide intellectual innovations in human development. Our daily social engagements portray challenging experiences which ordinarily our intellect would not have reached any point of actualization, but for a creative prowess which mathematics and culture supply. Mathematics provides the sophistication that is needed in technological culture. This is to say that without mathematics most of the technologies in our society would not have improved.

Without mathematics, the curriculum of education for teacher-student relation will be incomplete. That is to say that a teacher's conceptual focus will remain truncated as he/she becomes impotent

about the ideas that will further enhance his student's psychology and intelligent quotient. His method of teaching will not be calculative enough. Thus, with proper mathematical culture, the teacher will be able to harness three features namely: subject matter competence, practice teaching and psychology and the methodology of teaching (Ijiomah 1999: 129).

Consequently, mathematics relates with so many factors in human engineering which have culminated into high skill social and man-power development in all fields of specialization especially global security of human and animal environment. In this regard, proficiency is reached by constant knowledge acquisition while professional inefficiency is curtailed. Mathematics and culture make for the philosophic value of our universe so much that reality is brought to focus. This is established when both the quality and quantity of research in critical thinking is affected by mathematical reasoning. That is, when we make selection of content in any vital area of experiment in critical thinking, a culture of mathematics is necessary (Selakovich 1970: 157).

### **5. Mathematical and Cultural relevance in security issue**

The issue of security is very topical among states, countries, nations, societies, tribes. Generally, one of the major problems of humanity is the problem of insecurity which simply could mean the absence of security or freedom to act freely and without fear. It is imperative for humans to use everything positive within their knowledge to ensure the safety of lives and property. To this end, aspects of the life of any society, such as culture, traditions, the norms and values, could go a long way in bringing about security and a secured environment. This is possible if a proper and progress oriented culture is embedded in the habits of individual members of the society. This implies that all the negative and anachronistic aspects of any culture should be expunged, and the positive aspects with emphasis on the safety of lives and property and the preservation of the environment should be inculcated in the minds of the people, such that any actions or activities must reflect this culture of safety. The culture of the people must be the culture of live and let's live. This is why in existentialism the 'other' forms an essential theme of existentialism. It stresses the fact that one exists because the other also does so, without which existence would be a pseudo one and deceptive.

Basically, a culture of safety and security inclined, is enhanced with a science of mathematics as its substratum. This is so because security is easily achievable with mathematical knowledge, understanding and meaning derivable from mathematical objects. From the knowledge of mathematics, that is, the existence of mathematical object we come to terms with the fact that whatever exists, exists only in relation to another or others. This means that having a mathematical understanding of relation of objects and applying this to human relations, where the sanctity of the other human is maintained, could really enhance our security consciousness.

According to Ozumba, and Chimakonam (2014), the relationship between mathematics and philosophy does not stop at the level of epistemology, logic, and metaphysics, it continues into aesthetics. Aesthetics is the science of the study of beauty in objects, especially Art objects or forms. The implication is that the relationship is basically an environmental one, because aesthetic is concerned with the objects of environment, and aesthetics can only function in a secured environment, and philosophy means everything a human being can think of.

The question that comes to mind is what sorts of impressions that mathematics actually and possibly make on humans? That is from mathematical objects to the actual practice, what impressions does mathematics leave on the minds of man? We could understand better the importance of mathematics in security issues when we accept the positions of Ozumba and Chimakonam on the usefulness of mathematical impressions.

They see mathematics as a meaningful interplay of discrete objects and propositions, and that the impressions which mathematics makes on the mind of man is that its objects are real and its propositions make meaningful expressions about facts in the world. It is a very useful exercise in all aspects of life. Therefore, mathematics as a discipline, has a veritable structure, real in existence and important in practice. This is where it can be useful when it comes to security, because issues about security are factual issues as they affect man factually. From the perspectives of the integrativists and the complementarists, mathematics is seen as an arbiter in the relationship between man and his external environment by which man uses his intellect to employ mathematical categories in ordering the realities around him. According to them, the integrativists make the point that mathematics makes impression on the mind of men as a go-between or point of integration. It is in mathematical practice that men and their environment come to a concrete and meaningful relationship. Without mathematics, they observed, men would barely know, much less understand their environment. Thus, they see mathematics as the necessary link in the chain of realities.

Security is a phenomenon and a product of many causes-such as the lack of basic necessities of life, lack of understanding, unemployment and injustice etc. These constitute chains of relationship and mathematics provides the necessary understanding as a necessary link, where there seems to be no connection and understanding. From the complementarists perspective, mathematics is seen as the missing link that complements men and their environment, thus making mathematics actually existent in the network of realities and joins the rest in mutual complementation.

For instance, when we have a mass of objects, we need mathematics to number, measure, group or classify them without which our relationship with such objects may not be fully meaningful. In this way, according to Ozumba and Chimakonam, mathematics makes a veritable and integrative impression on the mind of men. It is in this way that mathematics plays a relevant role in curbing terrorism and insecurity in any society.

From another perspective, mathematics could be therapeutic in preventing insecurity and disorder through a proper use of its knowledge and applying it in various aspects of our national life. So, mathematics has positive effects on our cultural, religious, economic, political and educational areas of our society. Basically security or insecurity is mostly tied to the existential condition of man. As we know the existential condition is related to the economic condition, and according to Karl Max, the economic condition-force is a determinant of other things within the scheme of things. In recent times, especially in African nations like Nigeria, where poverty increases geometrically occasioned by crass greed, it is seen as stomach infrastructure. Given that most security issues arise from the economic condition, a knowledge of mathematics could be used to curb insecurity arising from this angle of life. Note that a calculative mind is a mathematical mind, and a mathematical mind a pragmatic mind, and a pragmatic mind is a realist mind. Mathematical calculations could be used to improve the agricultural sector of the economy which will in turn improve the economic condition

and subsequently the existential condition of life. Therefore, from food security, we can have national security which will arrest unemployment and this could prevent idleness that could generate insecurity in the society. The use of mathematical knowledge to improve agriculture and other sectors of the economy is not new. Thales of Miletus who is often called the father of Western Philosophy, used his mathematical knowledge to study the stars and deduced at what seasons or times people could cultivate to have a bumper harvest. Through this knowledge, he made a lot of money, the result of mathematical calculations (Edet, 1995).

Through mathematical insight and knowledge one could know what seasons and times that may provoke insecurity and peace, granted the foresight to act proactively to arrest the situation. For these and other reasons, the importance of mathematics in providing useful security cannot be overemphasized.

## **6. Conclusion**

It is our view to conclude that culture and mathematics are of great relevance to human society especially when we consider the roles both phenomena have played in human endeavours and achievements. Mathematics and culture are valuable to humanity. Mathematics is a science of numbers and calculations with logic as its basis whose foundation is rooted in the culture that forms it. Mathematics is a culture that helps humanity to decode and symbolize the universe for his optimum benefit. Culture oriented humanity has achieved great heights in science and technology with the help of mathematics. In our every day domestic engagements the role of mathematics is so obvious, so relevant that our logical comprehension of statements we make involves quantum of calculations. In conclusion, it will not be an overstatement to say that all human philosophic, scientific and technological breakthroughs require mathematics and culture for every success made.

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