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MATHEMATICS EDUCATION: A TOOL FOR RECREATION AND ECONOMIC DEVELOPMENT

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Abstract

This paper examined how mathematics education can raise business awareness by equipping the youths with creative skills acquisition, self-reliance, and employment generation and also by teaching and engaging them with mathematical modelling games for recreation with the aim of reducing, if not totally eradicating, youth restlessness that usually leads to vices like armed robbery, kidnapping, and political thuggery, with their attendant insecurities, disunity, and underdevelopment of the nation's economy . This paper recommends, among other things, the involvement of mathematicians in the training of youths in some practical mathematical concepts as a means of improving their (youth) acquisition of basic skills for both sustainability and recreational activities.
Keyword: Mathematics, Education, National Unity, Economic development

1 Introduction

Education is generally concerned with the transmission of worthwhile values such as skills, knowledge and activities that can develop the learner's potential for national development (John, 2016). The role of education as a potential tool for cultural, social, political, scientific and technological development cannot be overemphasised (Stone, 2017). It must also be noted that educational systems were said to produce the skilled manpower and the new knowledge required for technological advancement and economic growth. Iben (2020) said that the various governments and many stakeholders usually embark on many changes, but these are not usually implemented fully or not implemented at all. For instance, a lack of teacher commitment may produce only positive compliance with change, and thus the potential benefits of the change may not be fully realised.

Changes in education often come about when current practices are challenged and questions are raised about the way things are done. The search for more efficient ways of achieving education objectives may lead to proposals for either a new way of doing the same thing or instructing the current provision to enable the achievement of the same set of goals. Also, mathematics education in Nigeria has come a long way. In traditional society, before the introduction of formal education, mathematics was used mainly to take stock of daily farming and trading activities. Even in the system of education, mathematics occupies a central position in the school curriculum (Balbalosa, 2018). This important position is borne out of the role's mathematics play in scientific and technological development, a sine qua non in nation-building. Among many others, the main objectives of mathematics education in Nigeria are:

1. To develop precisely logical and abstract thinking
2. To encourage creativity
3. To develop the ability to recognise problems and solve them with mathematical knowledge (NPE, 2007)

The importance of mathematics to science education can be better explained by Andaya (2015), who observed that mathematics is widely regarded as the queen of all sciences. Aplaon (2015) observed earlier that there is hardly any area of science that does not make use of mathematical concepts to explain its own concepts, theories, or models. Mathematics is the science of the methods by which quantities sought are deducible to others, known or supposed. Thus, anyone who neglects mathematics may not be able to go far in the sciences and in fact, other things in the world. Practical work and observation of nature are the main sources of scientific discoveries, and mathematical methods play a very important role in this.

1.2 The Concept of Mathematics Education and its Challenges

Mathematics today is having an enormous impact on science and society. The influence may be silent and appear hidden, but it has shaped our world in many ways. Mathematical ideas have helped make possible the revolution in electronics, which has transformed the way we think and live today. The information and communication technology (ICT) of today has transformed the world into a global village. These advances in science and technology are

made possible by the numerous developments in mathematics; therefore, mathematical methods, structures, and concepts have become indispensable to the functioning of the technological society (Balbalosa, 2018). The role mathematics plays in the life of an individual and the development of a nation both scientifically and technologically is great, as its knowledge is used in fields of science like engineering, medicine, and aviation, just to mention a few; it even serves as a means of employment generation. Probability as a topic is useful for games like cards, drafts, and pool betting, while permutation and combination are useful in games like "ayoolopon.". However, the study and acquisition of mathematical knowledge are facing a lot of challenges, both superficial and cultural. These include, but are not limited to, the following:

Mathema-phobia: This is one of the greatest problems facing the study of mathematics. It is often called mathematics anxiety, an unfounded fear created by a group of people who are averse to the use of their cognitive abilities.

Belief: This is a concrete human thought that eventually shapes human behaviour patterns; this controls the totality of experience, and the majority of society believes that mathematics is a difficult subject.

Culture: The culture of a society most often controls how individual members of the society conform to its dictates. The Yoruba culture does not see a girl-child education useful beyond the kitchen, and the northern part of the country does not even allow a girl-child to step out of their domain.

All these, coupled with a lack of infrastructure, a lack of necessary teaching and learning materials, inadequate of qualified teachers, and an unconducive learning environment, are factors militating against the study of mathematics (Ignatius, 2016).

2.1 Concept of Recreation

Nowadays, more than ever before, human activities have been on the rise, with attendant negative consequences such as psychological, emotional and mental stress. According to Park, (2018), recreation is an essential part of

human life and finds many different forms that are shaped naturally by individual interests but also by the surrounding social construction. Chemers (2018) wrote that recreational activities can be communal or solitary, active or passive, outdoors or indoors, healthy or harmful, and useful for society or detrimental. A significant section of recreational activities is designated as hobbies, which are activities done for pleasure on a regular basis. A list of typical activities could be almost endless, including most human activities. A few examples are reading, playing or listening to music, watching movies or TV, gardening, hunting, sports, studying, and travelling. It is of concern that the enjoyment and the good life brought about by technological advancement have eroded some aspects of our lives that we do enjoy. Even the high standard of living being experienced coupled with the economic meltdown is taking people to their early graves on a daily basis. According to the National Bureau of Statistics (2014), the life-expectancy of an average Nigerian is 42 years. hence the need to have a way of slowing things down. The Encyclopaedia Britannica has given the definition that "recreation means refreshment after toiling and sorrow, pleasurable occupation of leisure time and amusement, a new creation."

Recreation can be said to be the one that satisfied the following:

1. Leisure time: The activity must be engaged in during one's free time.
2. Enjoyable: The activity engaged in must be satisfying to the participant.
3. Freedom: Participation must be free and not forced (Mohammed et al., 2019).

2.1.1 Types of Recreation

According to Dalgard (2019), recreational activities can be grouped into two groups: indoor and outdoor activities.

2.1.2 Indoor Activities Recreation

Park (2013) sees indoor recreation activities as activities undertaken in the comfort of one's home, or more specifically, indoors, and they are to recreate the mind and soul. For such indoor recreation activities, there are well-established clubs or recreation centres that offer a varied programme of

activities throughout the year. Activities on offer include basketball, swimming, volleyball, chess, table tennis, bowling, singing, reading, listening to music, watching movies and more of the same.

Examples of indoor recreation

Smoker

Snooker is a game played on a billiards board with 15 red balls, six balls of other colours, and a white cue ball, in which we have to pot the other balls using the cue ball. Some play snooker as a recreational game, while others play it for money and prestige. It may seem ordinary, but there is so much to this game. It can be considered an example of applied physics and geometry. Some of its benefits include enhancing focus and coordination, and promoting self-confidence if you are good at this game (Alasa, 2018).

Table Tennis

Many people across the world play table tennis. It is an indoor variation of tennis, played on a table divided by a net with small paddles and a light-weight ball. Table tennis is a complex physical sport. It is good for the body, mind, and soul. It has many physical as well as mental benefits. It improves flexibility, helps with weight loss, develops motor skills and balance, and improves concentration and brain function. Even though table tennis can be played as a high intensity physical activity, there is a very low risk of injury as there is no contact between the players. Table tennis is often called ‘high speed chess’ due to the tactical challenges presented by the game. Table tennis is definitely a good investment (Wheler, 2018).

Badminton

Badminton is a game played with rackets in which a shuttlecock is volleyed across a narrow net. This game is packed with loads of entertainment and benefits. It is a versatile sport. Regularly playing badminton helps to reduce bad cholesterol and increase good cholesterol. It also helps to strengthen heart muscle, reduce blood pressure, and avoid hypertension. Playing badminton

keeps you motivated, strong, and healthy. Badminton is a very friendly game, and you can enjoy playing it with friends and relatives (2019).

Volleyball

Volleyball is a game played by two teams of six players each on a rectangular court divided by a high net, in which each team tries to ground the ball on the other team's court. This is a high-energy game in which a lot of physical movements like jumping, squatting, diving, and coordinated hand movements are necessary. Our body has many benefits from playing volleyball, a few of which are burning excess fat, improving hand-eye coordination, and providing physical fitness. As it is a team game, it has many social benefits, such as fostering friendship, constant interaction with teammates, and learning to cooperate with each other (Ema, 2016). It has been observed that volleyball players have the best figure compared to other people who exercise regularly.

2.1.3 Outdoor Recreation

The outdoors as a physical or social setting may meet the needs of physical health, self-sufficiency, risk-taking, the building of social ties, and the needs of achievement (such as practicing, enhancing, and challenging skills, testing stamina and endurance, and seeking adventure or excitement) (Choi and Kim, 2016). Outdoor sports like the ones mentioned also provide us with the means to exercise and, hence, happen to be one of the best forms of recreation. Outdoor recreation sport examples include nature walks, river rafting, cycling, camping, fishing, hiking, adventure parks, surfing, and sports. Outdoor recreational activities can range from nature walks to river rafting. Organised recreational activities are often planned by private clubs or government organizations. Sports, cultural activities, and social gatherings are some of the organised ones. Clubs and recreation centres offer a variety of recreational programmes for people of different ages and varied interests. Outdoor activities may also be pursued for the purposes of finding peace in nature, enjoying life, and relaxing (Choi and Kim, 2016). They are alternatives to expensive forms of tourism. Outdoor activities are also frequently used as a

medium for education and teambuilding. Outdoor recreation may also refer to a team sports game or practice held in an outdoor setting. When the recreation involves excitement, physical challenge, or risk, such as in rafting or climbing, it is sometimes referred to as adventure recreation. The two primary purposes for outdoor recreation are beneficial use and pleasurable appreciation (Dalgard, 2019).

Examples of outdoor recreation

Trekking

Trekking is about enjoying a great walking holiday. Treks can be day hikes, overnight hikes, or extended hikes. An example of a day trek is hiking during the day and returning at night to a lodge for a hot meal and a comfortable bed. Trekking can be more enjoyable when undertaken while being generally physically fit. Physical preparation for trekking includes cycling, swimming, jogging, and long walks. To ensure the safest experience possible, it is generally a good idea to have some experience with basic survival skills, first aid, and orienteering when going for extended hikes or staying out overnight. It's also expected that backpackers leave no trace while enjoying the outdoors (Dalgard 2019).

Mountain biking

The activity of mountain biking involves steering a mountain bike over rocky tracks and around boulder-strewn paths. To tackle the trails, the requirements are physical strength, stamina, and a strong mountain bike. Mountain bikes, or ATBs (all-terrain bikes), feature a rugged frame and fork. Their frames are often built of aluminium, so they are lightweight and stiff, making them efficient to ride. Many styles of mountain biking are practiced, including all-mountain, downhill, trials, dirt jumping, trail riding, and cross country. The latter two are the most common. Balance, core strength, and endurance are all physical traits that are required to go mountain biking. Riders also need bike handling skills and the ability to make basic repairs to their bikes. Advanced mountain bikers often attempt technical descents as well as some of the more intense styles of mountain biking, such as down hilling and

free riding (Keith, 2018).

Canyoning

Canyoning is an activity that involves climbing, descending, jumping, and trekking through canyons. The sport originates from caving and involves both caving and climbing techniques. When people mention canyoning, they are typically referring to descents that involve rope work, down-climbing, or jumps that are technical in nature. Canyoning is frequently done in remote and rugged settings and often requires navigational, route-finding, and other wilderness skills (Kafy, 2018).

2.2 The Role of Mathematics Education in Recreation

According to Chado (2014), recreation is a form of leisure time experience or activity in which an individual engages a form of choice because of the enjoyment or satisfaction that it brings directly to him. Mathematics education no doubt plays a very important role in recreation activities; among others are:

Games

Topics like logic, probability theory, and simple algebra help in forming a system of stability functions and critical thinking whereby, the outcome of an event can be easily predicted almost assuredly. This knowledge base works better with games like the draft, cards, puzzles, rubble skew, and some local games like “Ayoolopon”, a particular example is the draft game, which needs selection and combination theory. That is where chances are to be created in both upward, backward, and even diagonal movements to create more opportunities for the purpose of winning the games.

Video games

Video is a new innovation primarily invented both for adults and children for the purpose of relaxation, it is simpler and less graphically demanding. They are solely developed with a combination of knowledge of topics like

trigonometry and algebra. Major examples are Candle Crush, Mario and Dream League, to mention just a view. A game of video is played by pressing the knobs 0,1,2, and 3 where 0 means to shut the game down, 1 means to start the game, shoot and give a slide tackle, 2 means to pass and dribble through the opponent, and 3 means to cross the ball and shoot at goals. A continuation of any of the 2, 3 knobs mean a faster command for the basic operation, which can lead to determining the winner.

2.3 Concept of Economic Development

Economic development refers to the process by which a nation improves the economic, political, and social well-being of its people. Unlike economic growth, which is primarily measured by the increase in a country's gross domestic product (GDP), economic development encompasses broader aspects, including the distribution of wealth, the reduction of poverty, and the improvement of living standards. It is a comprehensive process that aims for sustainable and inclusive growth. Todaro & Smith (2015) defined economic development as the process by which a nation improves the economic, political, and social well-being of its people. Unlike economic growth, which is primarily measured by the increase in a country's gross domestic product (GDP), economic development encompasses broader aspects, including the distribution of wealth, the reduction of poverty, and the improvement of living standards. It is a comprehensive process that aims for sustainable and inclusive growth. Just like we humans, the nation as a constituent state also experiences an all-round physical increase in every area at every stage for any living organism. We consider such things as growth: It may be negative growth that is shrinking (Amos,1998). Economic development is a multifaceted process aimed at improving the economic well-being and quality of life of a nation, region, or community. It involves the transformation of economic structures, the enhancement of economic activities, and the creation of wealth and jobs. Understanding the concept of economic development requires examining its definitions, components, stages, and the factors influencing it (Sen, 2017).

2.3.1 Components of Economic Development

Economic development consists of several components that collectively contribute to the overall progress of an economy. According to Rostow (2018), the following factors contribute to economic development:

1. Economic Growth: This involves the increase in the production of goods and services in an economy over time. It is often measured by GDP growth, but it also includes improvements in productivity and innovation.
2. Social Development: Social development focuses on improving the quality of life for individuals within the economy. This includes better access to education, healthcare, housing, and social services, as well as reducing inequality and poverty.
3. Institutional Development: The development of effective institutions, including legal, political, and economic frameworks, is essential for sustainable economic development. Strong institutions ensure good governance, the rule of law, and a conducive environment for economic activities.
4. Human Capital Development: Investing in education and skills training to improve the workforce's capabilities is crucial. Human capital development enhances productivity and innovation, leading to higher economic growth and better job opportunities.
5. Infrastructure Development: Building and maintaining infrastructure such as transportation, communication, energy, and water supply systems is fundamental for supporting economic activities and improving living standards.

2.4 The Role of Mathematics Education in Economic Development

The economy of a nation is not much different from that of an individual or a family. A family that provides her needs in the areas of goods and services will undoubtedly spend less, and if such services are extended to others, there will be surplus to save, So a nation that has a low propensity to consume, will have a high propensity to save, and if all leakage and injections are avoided, there will be a favourable balance of trade, and such a country would be rich and developed. The country is poor. because it renders fewer goods and

services to others, and its balance of trade is, for most of the time, always negative. It is therefore very important to highlight the role mathematics education can play in developing the economy of a nation so that the stakeholders can harness the opportunity provided to improve the gross domestic product. According to Zuka (2015), these opportunities include, among others:

Coding

Coding is considered the activity of writing computer programmes and software packages. It is also a system of signals for communication whereby, problem-solving skills, creativity, and critical thinking are developed (Azuka 2015). It is used to form robotic machines, and it is actually an invention based on the knowledge of abstract algebra, numbers, and numeration. So, for the vast unemployed youth, coding is a way to go. This is knowledge-based; the country can even export to other countries in order to get the needed foreign currencies (Adeleke, 2015).

Mathematics and Agriculture

The role of mathematics education in agriculture, both crops and animal husbandry cannot be over emphasis but the employers of labours in this critical an important area of food production hardly considered a mathematician as being useful when it comes to pre-planting, planting and post-planting activites that is harvest time but everything about cropping and animal rearing needs a lot of mathematical approaches like spacing the ridges, number of seed to plant, and application of fertilizers and manures, that is the quantity and the quality to apply, the gestation period, all these activities without a methodical mathematical approach will only lead to poor harvest as we are witnessing now in the country.

Law

It would surprise many to know that mathematics education also plays a very important role in legal matters. One of the greatest legal practitioners ever was

Lord Dennings of the United Kingdom, who read mathematics as his first degree before becoming a lawyer. Also, the feared and fiery Nigerian legal luminary, the Late Gani Fawehinmi, had a stint as a mathematical student. Gani wrote almost all the law books on Nigerian law reforms, and the books are still very useful and cited in Nigerian major courts, even the Supreme Court. Topics like logic and critical thinking always give a broader and wider consideration to arguments; they consider facts such that the premises of an argument must be able to support its conclusion. It has been established that mathematics could be used to resolve legal disputes. A celebrated case was that of Obafemi Awolowo versus Chief Alhaji Shehu Shagari, where the 1983 presidential election was decided in favour of Shagari due to a mathematical conundrum by his legal counsel (Barrister Akinjide) of the famous 122/3. The issue then was to determine 2/3 of Nineteen States at the Supreme Court. Of course, the reasonable answer is 122/3, but the question then and even now is: can 2/3 be appropriated to a whole number? Where human beings are concerned

Banking and Finance

Mathematical knowledge is useful in banking and finance institutions as a means of calculating compound interest and determining loan repayment and some fiscal issues that may be considered difficult to people who have little knowledge of mathematics (Jansen, 2016), Topics like everyday arithmetic, numbers and numeration, and especially number base, are useful in forest trading. It must be noted that in a population of more than 200,000,000 people, just about 20,000,000 people have bank accounts. This means that the country can put more graduates, especially mathematicians, to work by reviving the Moribund Alajo and Esusu (the daily mobile bankers that traverse the local community on a daily basis). This simply means more money for the government as these people will register and pay their taxes to the government.

Engineering

It is often said that mathematicians are not engineers, but engineers are mathematicians. The fields of engineering make use of it as a major plan for

almost every aspect of mathematics, especially some courses like Ordinary Diffractal Equation and Partial Differential Equation, where they make use of a part of the course known as strength of materials for all engineering students. The knowledge of mathematics in engineering aims at providing the learner with the cognitive, affective, and psychomotor domains of learning in order to make sound judgements with accuracy and precision, without which the work of an engineer will be adequate. The government and stakeholders should make use of these graduates in road construction and other areas that require their services instead of patronising foreigners. If implemented, our economy will develop faster than ever imagined (Ignacious, 2016).

Fine, Applied and Creative Arts

Very few members of society actually know that mathematics education plays important roles in music, Kraft, graphic design, and dye (Adire) to mention but a few. But Sir Victor Iwa for the multitalented Professor of Musicology, and international renowned sculpturist did not get that stage of greatness overnight according to the interview he granted a new paper correspondence he said he was good in Mathematics as a student and that help him in some aspects of the arts like rate and proportion where the needed items for molding are measured in accurate proportion in order to have an enduring, durable and beautiful scripture or model even in drawing both life and sill objects the knowledge of mathematics always brings the best, another area of Mathematics needed is reduction and enlargement in order to make portraits which could be exported as means of foreign exchange earner. Mathematics teaching pedagogy aims at providing men who will utilise the materials for the provision of goods and services for the effective development of a country through the engagement of well-trained youth instead of depending on foreigners who are not better qualified (Adeleke, 2015)

3 Conclusion and Recommendations

The paper highlights several ways in which the knowledge and acquisition of mathematics education can serve as a solution to the

unemployment problem facing the nation, while also increasing the country's gross domestic product (GDP) and thereby improving the nation's economy. By focusing on the usefulness of mathematics education as a job provider, it explores its significance in various fields of human endeavour such as accounting, banking and finance, medicine, oil and gas, law, engineering, and griculture. Additionally, mathematics education plays a critical role in numerous activities. It is, therefore, very important and urgent for various stakeholders to utilise every available opportunity, and even create more, to improve the teaching and learning of mathematics for effective outcomes.

Based on the findings of this study, the following recommendations are proposed to enhance the role of mathematics education in recreation and economic development:

1. Training and Re-training of Mathematics Teachers: Continuous professional development for mathematics teachers should be prioritised to ensure they are equipped with the latest pedagogical skills and knowledge. Regular workshops, seminars, and advanced degree programmes should be organised to keep teachers updated with new teaching methodologies and technological advancements in mathematics education.

2. **Scholarships and Motivation for Mathematics Students:** To foster a greater interest in mathematics among students, scholarships and financial incentives should be provided. Merit-based scholarships can help attract and retain talented students in the field of mathematics. Additionally, motivational programmes such as math competitions, recognition awards, and mentorship opportunities should be established to inspire students to excel in mathematics.

3. **Provision of Necessary Infrastructure:** All stakeholders, including government bodies, educational institutions, and private organisations, should collaborate to provide the necessary infrastructure for a conducive learning environment. This includes modern classrooms, well-equipped laboratories, and access to digital resources. Ensuring that schools have the required facilities will enhance the teaching and learning experience in mathematics.

4. **Integration of Technology in Mathematics Education:** The integration of technology into mathematics education should be emphasized. Utilising tools such as interactive software, online platforms, and virtual labs can make learning more engaging and accessible. Teachers should be trained to effectively use these technologies to enhance their instructional methods.

5. **Community and Industry Partnerships:** Establish partnerships between educational institutions and industries to provide students with practical experiences and real-world applications of mathematics. Internships, industrial visits, and collaborative projects with companies can help students understand the relevance of mathematics in various sectors and prepare them for future careers.

6. **Curriculum Enhancement:** The mathematics curriculum should be regularly reviewed and updated to include contemporary topics and real-life applications. Incorporating problem-solving and critical-thinking exercises that reflect current economic and technological trends can make the subject more relevant and interesting to students.

7. **Public Awareness Campaigns:** Launch public awareness campaigns to highlight the importance of mathematics education in economic development and recreational activities. These campaigns can help change societal attitudes towards mathematics, encouraging more students to pursue studies and careers in this field.

8. **Support for Extracurricular Activities:** Promote and support extracurricular activities related to mathematics, such as math clubs, camps, and competitions. These activities provide students with opportunities to explore mathematics outside the classroom and develop a deeper interest in and proficiency in the subject.

By implementing these recommendations, stakeholders can ensure that mathematics education becomes a powerful tool for both recreation and economic development, ultimately contributing to the nation's growth and prosperity.

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