JMETP
Journal for the Mathematics Education and Teaching Practices, 3(1), 23-29, June 2022
e-ISSN: 2717-8587
dergipark.org.tr/jmetp

Young Wise Publishing
youngwisepub.com
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Research Article

Role, need and benefits of mathematics in the development of society

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Article Info

Received: 06 March 2022
Accepted: 28 May 2022
Available online: 30 June 2022

Keywords:
Mathematic for life
Mathematic for society

Abstract

The history of mathematics indicates that whenever a civilization placed a high value on mathematical ability, it made remarkable progress. Mathematics contributes to technology and scientific advancement. Mathematics belongs to all of humanity and is not the unique domain of any country, tribe, or nation. What we have now in the set of mathematical understanding is the result of all humans' collective efforts. As a result, it is not hyperbole to claim that the history of mathematics was the history of civilization. Mathematics is at the heart of the business since all economic processes rely on knowledge: how mathematics functions, connects with realities, and how some equations should have a simple solution are never-ending. Learning mathematics supplies our thoughts with a multitude of incredibly beneficial effects. It helps us think more clearly, helps analytical thinking, quickens our thoughts, encourages practicality, and may be applied in everyday life. The primary goal of this paper is to examine the function of mathematics in societal evolution. This research was based on secondary material from various sources, including books, journals, blogs, and papers. The influence of human role, needs, and advantages on the use of mathematics is demonstrated in this article. It goes through the impacts of social demands and how they play a part in applying mathematics.

To cite this article

Abd Algani, Y.M. (2022). Role, need and benefits of mathematics in the development of society. *Journal for the Mathematics Education and Teaching Practices, 3*(1), 23-29.

Introduction

Mathematics reveals underlying knowledge that helps explain the world. Mathematics has become a varied subject that works with: information, surveys, observation from science, inference, reasoning, and evidence, and numerical simulations of natural events, human behavior, and social systems. Basic math skills include counting, adding, subtracting, multiplying, and dividing (Ashlock and Herman, 1970).

Mathematics is closely related to the details of daily human life and its activities. Man uses mathematics in its many applications and forms without being directly aware, whether in the kitchen, office, study place, or places of play and entertainment, where mathematics organizes human life. It rids him of chaos and randomness, develops a person's ability for logical reasoning, critical thinking, spatial and spatial thinking, and establishes in him the necessary and practical communication skills in his life.

Most people take mathematics as a given way to solve problems. Scientists can create mathematical formulas to describe subatomic events, and engineers can calculate spacecraft trajectories. We accept the view initially espoused by Galileo that mathematics is the language of science, and we expect its rules to explain empirical results and even predict

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new phenomena. So the power of mathematics is impressive. Thus, it is essential to see the impact of Mathematics on Human life, development, and evolution.

Mathematical Importance

The literal significance of mathematics is: "things which can be counted" You may now believe that numbering plays an essential role in our everyday lives; If there were no mathematics, how would we be able to rely on relatives, amount of kids in a class, rupees in our pockets, runs in a cricket game, days in a week, months, or years?. On a fundamental level, you have to be able to rely on add, subtraction, multiplication, and division.

On a psychological level, mathematical education aids in developing an analytical mind, as well as the more significant arrangement of ideas and precise communication of views. The value of mathematics for an ordinary person was maintained on a broader level, apart from engaging with higher mathematical concepts. The significance of mathematics has been reinterpreted as the ordinary man becomes highly dependent on science and technology in daily life activities: we are surrounded by mathematics. It can take many forms, such as managing money, Trying to verify the miles of your automobile when halting at the petrol pump, or transferring money at a ticketing agency. We perform quick arithmetic in the back of our minds virtually every second. Of course, all of this is done instinctively, with no consideration given to using mathematics in all situations (Abd Algani, 2019; National Curriculum Framework 2005).

Even though we consider the importance of mathematics in our leisure activities, the list is astonishingly long: computer games, video games, kabaddi, riddles, cricket, puzzles, hockey, kho-kho, soccer, and volleyball, to name a few. A cricket captain once stated that when he gets his outfield position right, he would have done half to get the opposing team out. What are the requirements for field placement? An acute feeling of the game and space; all the games listed above necessitate an instinctual knowledge of and use of space. When doing crossword puzzles, we must depend on the distance of the phrases we fill in and the pairing of similar letters. What about chess and other board games? It would be best if you devised a successful strategy while playing. You must create the probable movement at every given time, specifying the circumstances under which the lots of pieces were permitted to move. Players in games like Ludo, Trade, and Chaupad, are now using much math. It is frightening to consider a life without any understanding of calculating or computation, or in other terms, mathematics. Mathematics aids in the precise understanding of a person's ideas and findings. The aspect of man's life and understanding deals with numbers and calculations. It has become a vital aspect of the advancement of our modern world because it plays such a prominent role in our daily lives (Roy Hollands, 1990). Nature, too, is entirely enamored with mathematics. We are surrounded by symmetry and clearly understand pattern appreciation and recognition. Examine any natural object and look for symmetry or a pattern. There are countless cases of symmetry, forms, patterns, and other characteristics in plants. The sun begins to set at the same time every day. The stars look at predetermined intermissions. Mathematics pervades natural sciences, including astrophysics. This topic was intrinsically linked to the planet and natural events (Abd Algani, 2019; Thomas, 1993).

The significance of mathematics could be appreciated through Galileo's definition. "Mathematics as a language in which God has written the world – Galileo."

Objective of the Study

This research explores the conceptual and everyday meanings of mathematics; Literature review on Needs of Mathematics, Role of Mathematics, Benefits of Mathematics aims to create a scientific discussion.

Method

Among the important topics of the philosophy of mathematics are the daily life aspect of mathematics and the subject of mathematics as a field of study for an elite group. Recently, one of the qualitative research methods, document analysis method has been used to make the discussions on the aspect of mathematics regarding human life from a scientific point of view. Identification of relevant documents was searched with keywords.

The Need for Mathematics in Society Development

The demand to comprehend and apply mathematics in daily life and at work was never stronger, and it would keep growing (Figure 1) (Barnes, 1977). For sample:

Mathematics for Life

Knowing mathematics could give you a sense of accomplishment and power. Everyday life's foundations are becoming progressively quantitative and technical. Making purchase decisions, selecting health or health plans, and casting informed votes, for example, necessitate mathematical understanding.

Mathematics as a Part of Cultural Heritage

People should gain gratitude and consider mathematics, such as its aesthetic and sometimes even pleasurable components, as one of humanity's greatest intellectual and cultural accomplishments.

Mathematics for the Workplace

The amount of mathematical thinking and problem solving required in the job, from medical care to web design, has risen considerably in tandem with the level of mathematics required for intelligent citizenship.

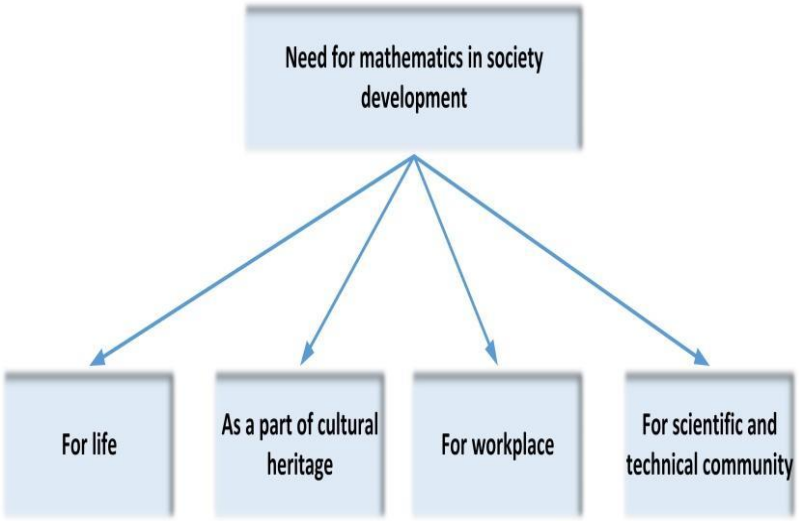

Figure 1. Schematic representation of Need for Mathematics in Society Development

Mathematics for the Scientific and Technical Community

Even though all jobs necessitate a basic understanding of mathematics, a few are mathematics-intensive. Many children need to choose an academic plan that will qualify them for a career as a mathematician, statistics, architect, or scientist for the rest of their lives. Those who know and can do mathematics will have much more possibilities and options for defining their careers in this dynamic world. The mathematical ability offers the way to a prosperous future. Those doors remain shut due to a lack of mathematical ability.

It is commonly assumed that mathematics is just for a chosen few. Everyone, on the other hand, requires a basic understanding of maths. All children should be incentivized to understand essential mathematics in detail and with the help they need. Equity and excellence are not mutually exclusive. According to the Guidelines and Norms, all children must study a basic framework of mathematics. However, this method does not imply that all pupils are the same. In mathematics, students demonstrate various talents, abilities, accomplishments, demands, and passions. All kids, however, must have access to the top mathematical instruction. To do so, students who are passionate about pursuing a profession in mathematics or science must use their hobbies and skills. Meanwhile, students with unique educational needs must be provided with the chances and assistance to be thoroughly aware of essential mathematics. A community where only a few humans exhibit the maths skills needed to perform critical economic, social, and technological duties is incompatible with the objectives of a just representative democracy and the requisite number.

Effects of Social Needs in the Uses of Mathematics

Sponsorship

There must be finances available to support the implementation of mathematics into practice. Massive institutions, such as the governments, large money organizations, enterprises, and large producing sectors, such as puma, have bailed out cash. For this corporation to support the use of the region, it must first analyze the benefits it will derive from it. As a result, they will sponsor in their region of need. The government will fund projects that would promote economic growth and the smooth operation of its parastatals and citizens and will thus focus on this area. Manufacturers and companies will primarily focus on maximizing earnings and lowering costs. As a result, they employ formulas such as industrial engineering. Money lending institutions and others will also support mathematical applications in the development of their businesses and encourage their interest (Bos and Mehrtens, 1977).

Agreement by Members of the Society

Individuals are what makeup society. This group has a significant impact on how mathematics is used and applied. They significantly impact the types of goods and services produced in a given location, as well as the types of enterprises that exist in that area. They also determine for their children what field to specialize in, which significantly impacts mathematical applications. If they allow for efficient banking, investors will be interested in the economic side of mathematics. If they allow for data collecting, they will be allowing for the use of statistical data collection and data analysis tools.

Professionalization

Individuals who can intervene decisively in mathematical subjects will always be decisive. They will always pick regions that provide a pleasant working atmosphere. These circumstances are based on elements including income and salary, job hierarchy, and a strong reputation in the field of work. This can be shown in the decision to become an aeronautical engineer rather than a math teacher (Collins and Restivo, 1983).

Male Gender Domination

The idea and perception that males could only solve most mathematical difficulties have persisted in culture. This is founded on the concept that arithmetic necessitates a manly, hardworking individual who can persevere in various situations. These include spacecraft and other engineering disciplines, technology fields, and others.

This view is amplified by the fact that males control vast implications in significant areas of life such as government, big corporations, and all other connected areas of dominance. This allows them to dominate in the most important aspects of math, influencing how mathematics is used.

Specialization

Specialization occurs as a result of education and other sorts of training. This significantly impacts an individual's field of study because diverse persons use various methods of study. For example, a few people would then study financial mathematics. In contrast, others investigate physical mathematics, while others study technical mathematics, and many others will investigate biological mathematics (MacKenzie, 1978). Banks hire only people who are experts in financial mathematics. However, research organizations hire people who are experts in specific fields (Bos and Mehrtens, 1977).

Role of Mathematics

Role of Mathematics in Social Development

Human life is essential to the effectiveness of others because man is a social animal. Working in a group improves social abilities. The ability to collaborate on activities with others could help develop various social abilities. Due to the apparent start-giving procedure, mathematical knowledge is required to live in a social circle. Industry and business also rely on mathematical understanding. This is only due to mathematics that the structure of society has changed with modern amenities such as modes of transportation, means of communication, and advancements in science and technology. As a result, mathematics has played a critical part in studying and developing society.

Role of Mathematics in Intellectual Development

Maths instruction is critical for intellectual development; no other discipline in the syllabus engages children's minds as much as mathematics. The growth of cognitive capabilities is aided by problem-solving. Solving math problems necessitates mental effort. When a youngster is faced with a mathematical challenge, his or her brain gets active in attempting to solve the difficulty. Each mathematical issue has a sequence required for the constructive and creative process. Math is used to develop all of a child's mental talents in this way.

Furthermore, mathematics allows a leader to be highly calculative, allowing them to save time, money, speech, and thinking. It strengthens one's willpower, tolerance, and self-confidence. It also helps to improve the opportunity to know and create.

Role of Mathematics in Vocational Development

The primary goal of education was to aid students in earning a living and becoming self-sufficient. Mathematics is the most critical subject for achieving this goal: It assists students in preparing for professional and other vocations where mathematics is used, such as engineering, construction, accounting, finance, business, and even agriculture, sewing, woodwork, surveys, and desk jobs.

Role of Mathematics in Moral Development

Morality is a vital aspect of life that is influenced by time, people, situations, and places. Mathematics, as a discipline, could contribute to a student's moral growth because mathematical knowledge aids in forming personality and character. It cultivates all qualities a person of pleasing personality must-have. Cleanliness and realism are attributes that a child acquires (D'Ambrosio, 2003).

Role of Mathematics in Spiritual Development

The most excellent chance of mathematics appears to be in the development of reflection abilities and, for the more receptive, a feeling of the beauty of a solution. Solving math problems is enjoyable, mainly when one obtains the correct answers to one's difficulty. Every child feels fulfilled, secure, and self-reliant at that moment. A determined "mathematics hater" may be oblivious to the aesthetic appeal of an effective solution. As a result, the child receives support, contentment, and joy from his or her outstanding accomplishments. As a result, mathematics aids in developing their aesthetic sense caters to their diverse interests, and assists students in making the most of their free time.

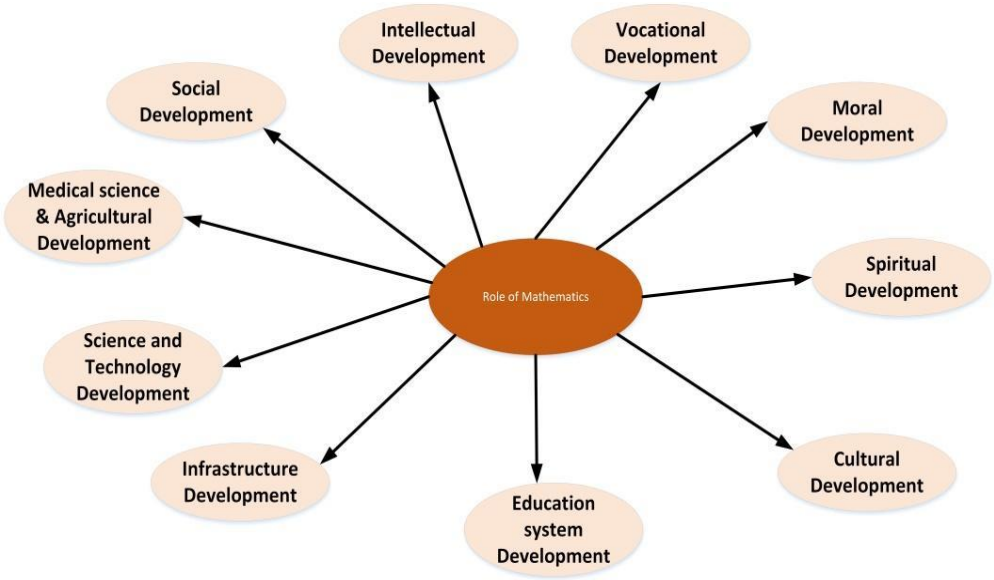

Figure 2. Schematic Representation of Role of Mathematics in Various Societal Developments

Role of Mathematics in Cultural Development

This aids the student in comprehending math's role in advancing cultivation and culture. It has helped her or him see the importance of mathematics in the visual arts and the sanctification of human existence (Roy Derrick Hollands and Blackwell 1983).

Role of Mathematics in the Development of Education System

Mathematics has a significant part in molding young people's prospects in the educational system. Education is designed to promote a person, start making her or his identity bright and a socio-economic contributor, and in our educational system, we are required to continue studying for almost every topic we research in college and uni, such as physics, chemistry, life sciences, economics, business and accounting, geographic location, heritage, psychology, architecture, design, computations, statistics, and commerce. Mathematical expertise is also required in tailoring, carpet, culinary, cosmetologists, sportspersons, and farming occupations. Simple mathematical ideas are used in various occupations, including conductors, shopkeepers, drivers, composers, magicians, and bank tellers (D'Ambrosio and Ubiratan, 2007).

Role of Mathematics in Development of Infrastructure

Mathematics has significantly helped the development of science and technology for thousands of years and will continue to do so now. It has uses in commerce, business, culture, government, athletics, medicine, farming, architecture, and the natural and social sciences, among other things. In a society, facial attractiveness and the growth of infrastructure are critical. Thus, in mechanical engineering, civil engineering, electrical, and other fields, for building highways, houses, stadiums, flyovers, airports, dams, tunnels, automobiles, airplanes, and so on.

Role of Mathematics in Development of Science and Technology

The significance of the nature of Technology, Science, and Engineering, as well as their function in their development, gives it a "functional" element. This engagement is as old as mathematics, and it might be claimed that science and technology cannot exist without mathematics. Mathematical techniques have been quickly adopted throughout the social, medicinal, and physical sciences in recent years. It reaffirms mathematicians as essential to all teaching and learning and creates a high need for university-level mathematical education. The requirement for mathematical and statistical modeling of phenomena accounts for a large portion of the requirement. Modeling is fundamental to all engineering disciplines, plays a critical part in all physical sciences, and considerably impacts biology, medicine, psychology, finance, and commerce. In the twentieth and twenty-first centuries, mathematics was already successfully applied to the advancement of science and technology (Fatima and Roohi, 2012).

Role of Mathematics in Development of Medical Science and Agricultural Field

Farming, ecology, tumor, epidemiology and cardiac models, DNA sequence, and gene technologies all use mathematics. It is employed in the production of medical equipment and diagnostics, as well as sensor technologies. There are some ways in which mathematics is unique. First, mathematics must have an essentially different status from most other subjects due to its core character as a universal informal language and its foundation in the disciplines, science, and architecture. Second, as previously said, mathematics is crucial in every aspect of life, both in the job and for individual citizens (Ball et al., 2005).

Benefits of Mathematics in Society Development

If we learn mathematics, we can gain several very beneficial uses for our economic growth and thinking. It improves our critical thinking, aids logical thinking, improves our minds, encourages practicality, and could be used in daily situations. The following are some of the advantages of mathematics (Bos Utrecht and Mehrtens, 1977). They are

- Math enables us to think analytically
- Analytical thinking improves one's opportunity to travel and discover the reality of the world around them.
- The capacity to think is developed through mathematics
- Mathematics could help you understand how things work

- Mathematics encourages introspection
- Our thoughts are stimulated by mathematics
- Mathematics improves a child's intelligence
- Money could be made with mathematics
- If you don't want to lose money, you'll need to know how to do math
- Mathematics could provide a child a passport to the rest of the world
- In a world that is constantly changing, mathematics is crucial.
- In the future, mathematics would be better portrayed. Mathematics is an important component of our daily lives.

Conclusion

The history of mathematics indicates that whenever a civilization placed a high value on mathematical knowledge, it made remarkable progress. Mathematics offers a commitment to technology and science development. Mathematics has an essential and distinctive effect on human communities and a strategic part in the growth of humanity as a whole. The geometrical understanding of time and space, which was the physical reality and its variety of forms, and the ability to compute is linked to the strength of technologies and the ability of social organization, validating the implication of Mathematics in the development of a society. The members of society form the government and arrange natural resources to generate technology. Humans are the ones that propel society forward. As a result, we will analyze mathematics's importance in individual and societal growth. Mathematics aids in the precise understanding of a person's ideas and findings. The aspect of man's life and understanding deals with numbers and calculations. It has become a vital aspect of advancing our modern world because it plays a prominent role in our daily lives.

Biodata of Authors

Yousef Methkal Abd Algani was born in Nahif, Israel, on June 2, 1981. He graduated from the Department of Software Engineering, Technion in 2002, and another degree in Mathematics and Computer Science in 2008, Haifa University, Israel. In addition, he graduated with an M.Sc. in Mathematics and Computer Science with a thesis in Algebraic Topology, Haifa University, Israel, in 2012. Abd Alghani completed his Ph.D. in Mathematics education in 2021. Now he is a student of Post-Doctoral in Bar-Ilan Uni'. He has also completed his teaching certificate and a certificate in Measurement and Evaluation in Education from Oranim College. Abd Algani has worked as a lecturer in Sakhnin College for Teacher Education, in the Department of Mathematics, and a lecturer in The Arab Academic College for Education in Israel, in the Department of Mathematics. He participated in several international conferences and published articles in mathematics and mathematical education.

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