

Mathematics in Society Development - A Study

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Abstract- *History of Mathematics reveals that whenever a society gave due weightage to the knowledge of Mathematics, it has made a tremendous progress. Mathematics makes its contribution in the advancement of science and technology. Mathematics is the common heritage of mankind and it is not the exclusive property of any particular nation, race or country. What we possess in the form of Mathematical knowledge today is the fruit of the combined efforts of all human beings. So it is no exaggeration to say that history of Mathematics is the history of civilization. Mathematics lies at the heart of commerce as all the processes of economics depend on an understanding of the ways numbers work, how they interact with reality and how certain equations which would normally have a simple solution, are never-ending. Mathematics has a number of very useful benefits to our mind if we go into its study. It develops our reasoning, helps us to have analytical thinking, quickens our mind, generates practicality and also its use can be applied in the day to day. The main purpose of this paper is to analyze the role of Mathematics in the development of the society. This study was done based on secondary data collected from multiple sources of evidence, in addition to books, journals, websites, and newspapers. "Mathematics as a language in which God has written the world – Galileo"*

Index Terms- *Mathematics, Society, Development, Knowledge, Science and Technology*

I. INTRODUCTION

Mathematics is a branch of science, which deals with numbers and their operations. It involves calculations, computations, solving of problems etc. Its dictionary meaning states that, 'Mathematics is the science of numbers and space' or 'Mathematics is the science of measurement, quantity and magnitude'. It is exact, precise, systematic and a logical subject.

Mathematics plays a significant role in the national development of India as well as other nations of the world. From ancient civilization (Egyptian, Greek, Roman etc.), mathematics has been found to be the

foundation for their educational thoughts and general development.

Mathematics is the foundation for nation building, since the level of mathematics skills and competences go a long way to determine the level of science and technological components of any nation, which is a basic requirement for its development. Mathematics today has an enormous impact on science and society, though the influence is silent and hidden, yet it is shaping our world in many ways.

Mathematics reveals hidden patterns that help us to understand the world around us. Now, much more than arithmetic and geometry, mathematics today is a diverse discipline that deals with data, measurements and observations from science, with inference, deduction, and proof; and with mathematical models of natural phenomena, of human behavior, and of social systems.

History of Mathematics reveals that whenever a society gave due weightage to the knowledge of Mathematics, it has made a tremendous progress. Mathematics makes its contribution in the advancement of science and technology. Mathematics is the common heritage of mankind and it is not the exclusive property of any particular nation, race or country. What we possess in the form of Mathematical knowledge today is the fruit of the combined efforts of all human beings. So it is no exaggeration to say that history of Mathematics is the history of civilization.

II. OBJECTIVE OF THE STUDY

The objective of the present study is to review the following:

1. Role of Mathematics in Society Development
2. Importance of Mathematics in Society Development
3. Benefits of Mathematics in Society Development

- **RESEARCH METHODOLOGY:**

The study has been done mainly on the basis of secondary data and information available from books and published works and reports.

1. **Role of Mathematics In Society Development:**

A society, or a human society, is a group of people related to each other through persistent relations and sharing the same geographical or virtual territory, subject to the same political authority and dominant cultural expectations. More broadly, a society may be described as an economic, social, or industrial infrastructure, made up of a varied collection of individuals.

Mathematics occupies a crucial and unique role in the human societies and represents a strategic key in the development of the whole mankind. The society consists of its members (human being), who make government and organize the natural resources to develop infrastructure. The human beings are the one who develop the society.

2. **Importance of Mathematics In Society Development:**

Mathematics is around us. It is present in many forms; right from getting up in early hours of the day to the ringing of an alarm, reading time on a watch, rounding a date on a calendar, picking up the phone, preparing a recipe in the kitchen, to wait for the counts of whistles of the cooker, manage the money, travel to some place, to exchange currency at a ticket outlet while availing a public conveyance or checking up the mileage of your car, halting at the filling station, attending to a roll call at school, getting scores in the class exams, almost every next moment we do the simple calculations at the back of our mind. Of course these are all done pretty unconsciously without a thought being spared for the use of mathematics on all such occasions.

Now we will discuss how mathematics is being dealt in Society Development. To understand it, we need to discuss the following;

- **Mathematics in Commerce:**

Mathematics lies at the heart of commerce as all the processes of economics depend on an understanding

of the ways numbers work, how they interact with reality and how certain equations which would normally have a simple solution, are never-ending.

Mathematics is an important part of managing business. Business and mathematics go hand in hand, this is because business deals with money and money encompasses everything in itself. At some point or other managing money is a need for everyone and to take decisions, which requires everyone to know mathematics. Business mathematics is used by commercial enterprises to record and manage business operations. Commercial organizations use mathematics in accounting, inventory management, marketing, sales forecasting, and financial analysis. It helps one to know the financial formulas, fractions; measurements involved in interest calculation, hire rates, salary calculation, tax calculation etc. which help complete business tasks efficiently. Business mathematics also includes statistics and provides solution to business problems.

To know about a business, it requires skill more than developing a product or providing a service. If a business has to survive and succeed, one needs to look after the finances and make necessary arrangements for it to prosper as well. Understanding business mathematics is important to maintain profitable operations and accurate keeping of records. It is required right from the start for pricing products/services and till the end to check if the budget was met.

- **Mathematics in Economics:**

Economics for the first time, one will probably never come across any equations or calculations other than simple mathematics. There is much to read around the basic concepts and understanding the various aspects of market, economy, business and understanding simple definitions of price, supply, demand, costs etc.

Education in Economics for students, it rather helps them to know about their mathematics.

The most basic concepts in Economics are the study of Demand & Supply. Hence one should understand the meaning of Demand and Supply.

Individual Demand is defined as the quantity that consumers are willing to buy a particular good at various prices.

Similarly, Supply is defined as the willingness of the supplier to provide the quantity of a particular good at various prices.

Now quantity and prices are denoted by numbers which is mathematics.

Analysis and study in economics help explain the interdependent relation between different variables. They try to explain what causes rise in prices or unemployment or inflation. Mathematical functions are modes through which real life phenomena are made more understandable and logical.

Indeed, there has been long standing argument on how important is mathematical that works relevant for economics and the uses of economics. It is interesting to know that a number of economists have been awarded the Nobel Prize for their application of mathematics to economics including the first one awarded in 1969 to Ragnar Frisch and Jan Tinbergen. Leonid Kantorovich won a Nobel Prize in 1975 in economics and he was a mathematician!

Many students who pursue their career in economics are advised to take a course in Mathematics since graduate level studies that involve a lot more complex mathematics which is important to carry out their research.

- **Mathematics in Art:**

The connection between mathematics and art goes back thousands of years. Mathematics has been used in the Design of Gothic Cathedrals, Rose Windows, Oriental Rugs, Mosaics and Tiling's. Geometric forms were fundamental to the cubists and many abstract expressionists, and award-winning sculptors have used topology as the basis for their pieces. Dutch artist M.C. Escher represented infinity, Mobius bands, tessellations, deformations, reflections, Platonic solids, spirals, symmetry, and the hyperbolic plane in his works.

Mathematicians and artists continue to create stunning works in all media and to explore the

visualization of mathematics – origami, computer-generated landscapes, tessellations, fractals, anamorphic art, and more.

There is also mathematics in art. Since Pythagoras, the most famous mathematician, discovered numerical reasons in musical harmony, the relationship between mathematics and art has been permanent. These aspects of mathematics make them a bridge between the humanities and the natural sciences, between the two cultures.

- **Mathematics in One's Career:**

In addition to mathematical knowledge, a person who wants to make his/her career in mathematics needs to also have knowledge of subjects like economics, finance and business management in order to open up many doors in this challenging field. As far the skills goes one has to have good oral and written communication skills as Mathematicians need to work on teams, collate research and be in contact with clients.

Since all corporations require managing their money and business many mathematicians find employment in these fields. Mathematicians follow a logical thinking; follow a problem-solving approach to business.

Companies/ Organizations hire mathematicians to work as the following:

- Actuaries
- Financial analysts
- Insurance underwriters
- Budget Analysts
- Market Research Analyst
- Securities Analyst

- **Mathematics in everyday life:**

Mathematics is a methodical application of matter because it makes a man methodical or systematic. Mathematics makes our life orderly and prevents chaos. Certain qualities that are nurtured by mathematics are power of reasoning, creativity, abstract or spatial thinking, critical thinking, problem-solving ability and even effective communication skills. Mathematics is the cradle of all creations, without which the world cannot move an inch. Be it a

cook or a farmer, a carpenter or a mechanic, a shopkeeper or a doctor, an engineer or a scientist, a musician or a magician, everyone needs mathematics in their day-to-day life. Even insects use mathematics in their everyday life for existence.

Snails make their shells, spiders design their webs and bees build hexagonal combs. There are countless examples of mathematical patterns in nature's fabric. Anyone can be a mathematician if one is given proper guidance and training in the formative period of one's life. A good curriculum of mathematics is helpful in effective teaching and learning of the subject. Experience says learning mathematics can be made easier and enjoyable if our curriculum includes mathematical activities and games. Mathematics puzzles and riddles encourage and attract an alert and open-minded attitude among youngsters and help them develop clarity in their thinking. Emphasis should be laid on development of clear concept in mathematics in a child, right from the primary classes.

Another very effective means of spreading the knowledge of mathematics among children is through peer-teaching. Once a child has learned a concept from his teacher, the latter should ask him to explain the same to fellow students. Moreover, in the process all the children will be able to express their doubts on the topic and clear them through discussions in a group.

The present age is one of skill-development and innovations. The more mathematical we are in our approach, the more successful we will be. Mathematics offers rationality to our thoughts. It is a tool in our hands to make our life simpler and easier. We should realize and appreciate the beauty of Mathematics and embrace it with all our heart. Mathematics is a talent that should be compulsorily honed by all in every talk and walk of life.

The mathematics is present in our daily lives. For many students, math is boring, abstract, lacking in creativity, complex and very difficult to understand, hence the typical expressions of "I am of letters" or "Numbers are not mine." However, it is a subject that is part of the study of our children and as such should

be an effort for compression, which usually involves constant practice.

- **Mathematics in Moral Development:**
Morality is the important phase of life, which is most affected by time, person, situation and place. As a subject, mathematics can add to everyone's moral development, since mathematical knowledge is helpful in character and personality development. It develops all those qualities which a person of strong character must possess.

- **Mathematics in Cultural Development:**
Mathematics helps us to understand the contribution of mathematics in the development of civilization and culture. Mathematics has enabled us to understand the role of mathematics in fine arts and in beautifying human life.

- **Mathematics in Science and Technology:**
Mathematics may be considered as the language of Science, Technology and Engineering. And it said that, without mathematics, there can be neither Science nor Engineering.

In modern times, adoption of mathematical methods in the social, medical and physical sciences has expanded rapidly, confirming mathematics as an indispensable part of all school curriculum and creating great demand for university-level mathematical training. Much of the demand stems directly from the need for mathematical and statistical modeling of phenomena.

Mathematics has been successfully used in the development of science and technology in 20th and 21st Century. The areas like Advanced Semiconductor Devices, Biotechnology, Digital Image Technology, Nano Technology, Artificial Satellites and Rockets all are based on Mathematical Concepts.

The recent success of NASA's Mars Rover is also based on mathematics.

- Mathematics in Medical Science and Agriculture:

Mathematics is applied to Agriculture, Ecology, Epidemiology, Tumor and Cardiac Modeling, DNA Sequencing and Gene Technology. Mathematics is used to manufacture Medical Devices and Diagnostics, Optoelectronics and Sensor Technology. Mathematical and Statistical Modeling of phenomena plays a vital role in all Physical Sciences and contributes significantly to the Biological Sciences, Medical Sciences and Agricultural Fields.

There are positive senses in which mathematics is special. Firstly, by virtue of its fundamental nature as a universal abstract language and its underpinning of the Sciences, Technology and Engineering. Secondly, Mathematics is fundamentally important in an all-pervasive way, both for the workplace and for the individual citizen.

3. Benefits of Mathematics In Society Development:

Mathematics has a number of very useful benefits to our Society Development and mind if we go into its study. It develops our reasoning, helps us to have analytical thinking, quickens our mind, generates practicality and also its use can be applied in the day to day. Some of the benefits of mathematics are listed below. They are

- Math helps us to have analytical thinking.
- Analytical thinking develops the ability to investigate and know the truth about the world around us.
- Mathematics develops the ability to think.
- Mathematics can explain how things work.
- Mathematics promotes wisdom.
- Mathematics quickens our minds.
- Mathematics makes a child smarter.
- Mathematics can make money.
- Mathematics is essential in order not to lose money.
- Mathematics can provide a child with a ticket to the world.
- Mathematics is essential in a world of constant change.
- Mathematics will be more represented in the future.

- Mathematics makes up a large part of our everyday life.

III. CONCLUSION

- History of Mathematics reveals that whenever a society gave due weightage to the knowledge of Mathematics, it has made a tremendous progress. Mathematics makes its contribution in the advancement of science and technology.
- Mathematics occupies a crucial and unique role in the human societies and represents a strategic key in the development of the whole mankind.
- Mathematics is around us. It is present in many forms.
- The connection between mathematics and art goes back thousands of years.
- Mathematics is a methodical application of matter because it makes a man methodical or systematic.
- Mathematical knowledge is helpful in character and personality development.
- Mathematics has a number of very useful benefits to our Society Development and mind if we go into its study.

“Mathematics as a language in which God has written the world – Galileo”

REFERENCES

- [1] The interactions of mathematics and society in history some exploratory remark by H. J. M. Bos Utrecht and H. Mehrtens Hamburg, *Historia Mathematica* 4 (1977), 7-30.
- [2] Pedagogy of Mathematics for Two Year B. Ed Course by B. S. P Raju, B. S. Upadhyaya and C. P. S Chauhan, First Edition, (2011).
- [3] Development of Mathematical Skills: A Resource Book for Teachers, November, 1983 by Roy Derrick Hollands, Blackwell Publishers.
- [4] The Psychology of Learning Mathematics by Richard R. Skemp, Routledge Publisher, 1st Edition, (1987).

- [5] Teaching of Mathematics by Dr. Anice James, Neelkamal Publication Pvt. Ltd., First edition, (2014).
- [6] www.google.com
- [7] [www.investopedia.com\(Mathematics\)](http://www.investopedia.com(Mathematics))
- [8] [www.wikipedia.com \(Mathematics\)](http://www.wikipedia.com (Mathematics))
- [9] Reasons Why Math is important, <https://lifehacks.io/reasons-why-math-is-important/>[Accessed on 28/08/2019].
- [10] The importance of math's in everyday life, <https://timesofindia.indiatimes.com/city/guwahati/The-importance-of-maths-in-everyday-life/>[Accessed on 28/08/2019].
- [11] Use of Mathematics in Economics, <https://owlcation.com/social-sciences/Use-of-Mathematics-in-Economics> [Accessed on 28/08/2019].