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A study on the significance of mathematics in our daily life

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Abstract
Mathematics is a branch of science, which deals with numbers and their operations. It involves calculation, computation, 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. It may also be defined as, 'Mathematics is the study of quantity, structure, space and change; it has historically developed, through the use of abstraction and logical reasoning, from counting, calculation, measurement, and the study of the shapes and motions of physical objects.
Contemporary life demands the requirement to have good mathematical knowledge. Mathematics is important for life and supports all-round personal development. Mathematics significantly influences pupils' and students' education both in a special branch (mathematical knowledge) and in terms of moral education.
We can find mathematical application in the nature, technology, architecture, machinery, building industry, in the banking sector, in research, cartography etc. There are very interesting applications in genetics and in using mathematics in the nature. Statistical methods are used in hypothesis testing in genetics.

Keywords: Science, life, knowledge, technology, research

1. Introduction
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 behaviour, and of social systems. The literal meaning of mathematics is "things which can be counted" now you can think that counting has vital role in our daily life; just imagine that there were no mathematics at all, how would it be possible for us to count members of the family, number of students in the class, rupees in the pocket, runs in a cricket match, days in a week or in a months or years? On a basic level you need to be able to count, add, subtract, multiply, and divide.
Even nature also embraces mathematics completely. We see so much of symmetry-around us and have a deep sense of awareness and appreciation of patterns. Observe any natural thing and find out symmetry or pattern in it. Change of day into night, summer into winter etc. In plants there are innumerable examples of symmetry, shapes, patterns, etc. Such examples exist in animals, in objects, in pictures and other things. The sun rises and sets at specified moment. The stars appear at fixed time. Mathematics runs in the veins of natural sciences like Physics and Astronomy. This subject is inextricably incorporated with world and the natural phenomena.

2. Theoretical framework
The aim of performing this activity is to explore the daily life applications of mathematics. Observation is the method used for data collection. The researcher has carried out the activity of daily life mathematics. Mathematics is often perceived as a difficult subject utilized solely for calculations. However, in reality, mathematics is utilized incessantly in every simple aspect of life. It is the only subject that is applicable in both scholarly and personal realms.

Mentioning specific numerical examples, mathematics is applied while shopping for vegetable quantities, cake grams, and more. Other manipulations of calculation include calculating monthly salaries, splitting bills for transports, and distributing share and profit amounts among 3-4 members. This investigation focuses on the aspects of life where mathematics is utilized. Symbolical examples related to addressing bill amounts in shopping are included within this activity.

This research is expected to be informative for several individuals as mathematics interfacing is common among people. As science is releasable in different mathematics usages, mathematics research will be useful for the science domain. After conducting this activity, all the different aspects of daily life where mathematics is used have been noted. Various persons including home-makers and literate workers exhibit differences in threshold daily life mathematics quantities. While the analysing results section includes a brief introduction in reflecting activities, the points of highlight significance should be readable by anyone.

These points can also be a basis for further research about science interfacing with day-to-day mathematics aspects. On exploring the impact of mathematics in everyday life activities, it is noted that art as a domain receives the least scientific interfacing. Other interfacing can be classified in different standards irrespective of the number of aspects. As science methodology is applied in analysing aspects, mathematic domain interfacing is the only simple analysis. Mathematics must be a compulsory item for every domain to conduct commencing with schooling to higher studies.

3. Methodology

The study of the importance of mathematics in everyday life activities has been approached through the theoretical framework of science, with a focus on the scientific methodology. This science-oriented methodology integrates the concepts of mathematics, its evolutionary phases, time, space, theory, experiment, model, and paradigm in a holistic manner. To study the importance of mathematics in daily life activities in particular, and to study any scientific knowledge and its importance in general, the in-depth notions of the evolutionary phases of knowledge (Phase I, Phase II, and Phase III) and of the higher and lower dimensions of knowledge in harmony with time and space have been proposed, developed, and practiced.

4. Scientific approach to studying mathematics in daily life

Mathematics involves abstract concepts such as quantity, structure, space, equations, and changes, which can be represented through numbers, symbols, vectors, diagrams, and equations. Everyday life is defined as the typical activities of persons in personal, educational, or social contexts, including anything that occurs in routine life or standard situations. The research objective focuses on identifying mathematical activities in daily life, particularly relating to planned and executed local activities. A geographical perspective emphasizes the significance of place and space. Hence, the intent is to discover the quantity of mathematics embedded in daily activities and the perception of importance and difficulty in the local treatment of it. The concerned population comprises students of Classes IV and V of SDN Sipak, Citeureup, Bogor, West Java. The method utilizes the scientific approach comprising systematic steps: Observations, Questions, Exploration, Association/Reasons, Conclusion, and Re-Observation. The research is fieldwork-based or fieldwork as a research basis, depicting the setting, interactions, and problems in natural patterns as they occur in daily life. The local theme ensures closeness and relevance and facilitates understanding by focusing on the local and common so that they are more familiar (Mainali, 2021) [2].

Observations are initial activities to collect information on mathematical activities regarding the selection of plants, fruits, and flowers to be planted and maintained in the yard. The selection concerns the number/quantity of plants, flowers, and fruit trees based on the area/size of the land. This area is calculated in square meters using a calculation method and mathematical calculations. Simple calculations consist of gathering the available plants and comparing the number of plants observed. Questions arise from the observation process concerning mathematical aspects of everyday life activities. It focuses on planned and executed activities, indicating technology and mathematics components and involving mathematics in local activities. The mathematical design consists of exploring plant species options comprising fruits and flowers planted in the garden. Tracing local treatment mathematically allows for the local quantitative activity of distance, area, and capacity as part of room design, which can be a design theme of the learning process (Wang, 2021) [3].

5. Applications of mathematics in various daily life activities

Mathematics is commonly regarded as a complex subject that revolves around numbers, formulas, graphs, and charts and entails the application of different operations and techniques. However, the significance of mathematics in daily life is usually unnoticed. The fact is that mathematics has immense relevance in real life, especially in shaping a person's lifestyle and molding their character. Mathematics plays a pivotal role in diverse facets of life such as banking, finance, shopping, cooking, travel, sports, education, measurements, time, clothes, business, health, and many more. The applications of mathematics in everyday life should not only be studied conventionally but should also be understood as it relentlessly functions and acts in various daily life activities. With the advancement of modern education, mathematics has now emerged as a significant subject and is a part of the essential educational curriculum in schools and colleges. Due to the growth of some professions like research, intelligence, finance, and equipment development, mathematics has attained prime significance in the field of education (Andersson & Barwell, 2021; Ernest, 2021) [4, 5].

Finance and budgeting are two essential elements of life that require mathematics in daily activities. People usually live on a budget where they make a calculation on the cash in hand and the cash remaining after spending and depositing. The balance of this will reveal the budget of a person. Houses are bought with the help of loans, and the EMI is repaid monthly, depending on the tenure, rate of interest, and principal amount. A simple interest loan is the cheapest one, while compound interest is a more expensive loan on which high interest is paid off. In a similar vein, fixed deposit schemes are opted where every month a fixed

amount is deposited to the bank, and at the span of a certain period, maturity is received back with interest. Therefore, finance and budgeting almost always require the calculations of simple interest, compound interest, percentage, division, addition, and so on.

Mathematics is also used in cooking and baking in daily life activities. Cooking often requires measuring the weight of the items or counting the number of ingredients, which are mathematical problems. Even the cooking times are based on mathematics and depend on the weight of the component, i.e. if further time is necessary for more weight, the time again needs to be calculated. In baking, the precise amount of flour, cake bread weight in grams, etc. is used based on pan size and ingredient density. Here weight and density play a vital role, which is again a mathematical concept. Apart from this, to bake a cake, the infra-red radiation of the oven here is placed in terms of Fahrenheit and time duration which needs to be explored. Therefore, cooking and baking are also surrounded by mathematics problems.

Home DIY projects are another everyday activity that revolves around various types of mathematical concepts. Flat pack furniture is generally bought from IKEA, and the DIY projects often require simple steps where calculating the sizes, areas, and surface areas are to be discovered. Building a birdhouse from wood involves problems of calculating the area and cutting the right dimension. Similarly, growing plants on a vertical garden wall requires calculations on the height and width of the pot, number of plants per square meter, etc. Designing clothes, making photo frames or craft projects involve geometry or symmetry, so that the shapes look pleasing and nice. Painting whiteboard surfaces in rectangles or picking up area carpets always includes calculating the area of the surface to be covered. Therefore, there are lots of day-to-day DIY home projects that come up with mathematical problems that require a systematic approach toward solving.

5.1 Finance & budgeting

Many people believe that mathematics is no longer required after school. However, mathematics plays an important role in various everyday life activities that are taken for granted. Finance and budget is an area of everyday life that frequently uses mathematics without most individuals even realizing it. Whether it is about personal loan, transfer of funds, interest on fixed deposit, or tracking of the monthly expenditure, mathematics is intricately involved in such financial transactions. This article examines the use of mathematics in everyday life focusing on finance and budget (Ferreira & Bisognin, 2020) [6].

Financial transactions involve digits from 0-9. Thus, every financial transaction is a numerical value in the number line. Based on place value system, mathematical operations such as addition, subtraction, multiplication, or division can be applied for any financial transaction. Number sense is an essential skill needed to comprehend and carry out calculations for such financial transactions. Generally, school-going children are expected to learn and develop number sense. To be proficient in number sense, learners should develop an understanding of numerical values and their relationships. For example, grasping the concept of tens and units in a number 81. Each digit in the number has a specific place value. In this case, 8 denotes 80 and 1 denotes 1. Understanding place value can help to do different computations in multiple ways such as expansion, rounding number, or performing operations on numbers.

Generally, a homemaker, retired person, or students who are not a professional accountant would deal with household budget and monetary transactions. In such instances, finance and budget is tracked using pencil and paper. Accounting is a systematic formal record-keeping process of financial transactions.

Finance and budget based on addition, subtraction, multiplication, or division is simple and straightforward. Still, it can lead to calculation errors affecting daily life. Errors in number-based computation frequently occur due to various reasons such as human error, transposition error, and outside disturbance. It could lead to severe consequences such as imprisonment, being sent behind bars, or bankruptcy.

5.2 Cooking & baking

Mathematics is essential in cooking and baking tasks. Whether for personal enjoyment or as a vocation in restaurants or bakeries, various measurements are required, from dry and wet ingredients to the amounts of flavouring and spices used. Many cooking measurements are based on American and British standards. Common measurements are on spoons and cups, with cup measurements considered large because they can measure liquid ingredients. Spoon measurements are small and precise. In cooking, several conversions are necessary for different recipes, especially where the conversions involve centimetres and inches for dry ingredients and millilitres, litres, and gallons for liquid measurements.

On the other hand, baking requires accurate measurements, so converting recipes is a little tedious, although it is essential to know. Many kitchens scales measure and convert weight measurements and different kinds of liquid measurements. Though considered a strong subject as part of the school curriculum, a little struggle in cooking and baking mathematics is not a shame. Consider knowing only the basics in cooking and baking measurements. Several common cooking and baking measurements.

5.3 Home DIY projects

The importance of mathematics in home DIY (do-it-yourself) projects cannot be understated. Drawing on subjects such as geometry, algebra, measurement, and arithmetic, these projects have the potential to bring hours of fun, creativity, satisfaction, pride, and joy. A mathematical understanding of space and shape helps with planning and projects. Measurement is vital for ensuring that parts fit together as designed, such as the size of joints or tiles. Designs rely on ratios, including the ratio of a vehicle to the width of a door and the best ratio for an arch to avoid collapsing. Ellipses are used in churches for sound projection. The visual arts rely on geometry and numeracy, such as artists needing to know how to mix paints or maintain perspective. Even a simple drawing involves calculations of ratio, measurement, angles, and estimation.

There are two aspects to home DIY projects. Planning is crucial for everything, including repairing a water leak. Most problems involve producing ideas and repeatedly modelling them mathematically, modifying them until an adequate design is made. It is possible to be able to visualize most designs and projects without drawing them on paper. The double sickness of perfectionism makes some designs

too complicated for hope to build. Listening to good advice and modifying some plans is suggested, such as the design is simpler and cheaper than the original. Speculating on feasible shapes of objects is commonplace, including speculation on the shape of planets. One project of interest is involving raising the roof of an old building to create more space.

6. Conclusion

Mathematics occupies a crucial and unique role in the human societies and represents a strategic key in the development of the whole mankind. The ability to compute, related to the power of technology and to the ability of social organization, and the geometrical understanding of space time, that is the physical world and its natural patterns, show the role of Mathematics in the development of a Society. 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.

With education and employment, the use of mathematics becomes more advanced and sophisticated; nevertheless, individuals remained ignorant of mathematics topics learned in higher education. Almost everybody believes mathematics is difficult, and there are many who go to the extent of saying that they hate this subject. At the same time, it is shown that mathematics in everyday life, although not a topic of general awareness, is quite complex and deals with Euclidean geometry and calculus as well. Attention and future research directions are now focused on filling gaps in the present study and addressing the issues raised from its results.

7. Future research directions

Future research could analyse how daily life activities would be performed in the absence of mathematics or further investigate and summarize these activities by age and/or occupation. The bridge between formal and less formal mathematical practices could be examined as well as its consequences in terms of educational policies. Lastly, methodology addressing and focusing upon mathematics topics learned in higher education could be developed. To sum up, this study reinforces the importance of mathematics in daily life activities and quality of life and provides an impetus for further investigation in this field.

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