



ON CHALLENGES OF LEARNING MATHEMATICS

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Abstract

Mathematics has a key role in education. A clear understanding of mathematical principles is essential in learning many subjects. This paper analyses the challenges of learning mathematics and the methods to overcome it. The use of innovative methods of teaching in education has the potential not only to improve the quality of education but also to empower the new generation with ideas and solutions to life.

Key words: Learning mathematics, Tools of education.

Introduction

Teaching is a Challenge. Learning is also a challenge. Evaluation is yet another challenge. Combining teaching, learning and evaluation effectively is a very big challenge. Advancement of teaching methods and tools is essential in the modern age. To adopt some useful teaching methods to impart knowledge to the students, we have to analyze the main aspects of the traditional methods of teaching as well as modern methods of teaching using multimedia. The two major components of education are sending information and receiving information. The concept of teaching includes providing knowledge to the students and motivating them by the piece of information contained in the lesson being taught to the student. Thus, any communication method that serve this purpose without destroying the objective could be considered as an innovative method of teaching. Advancement of teaching methods and tools is essential in the modern age.

Education is a light that shows the mankind the right direction to pursue. Ignorance and fear are always compared to darkness the development in any field requires a willingness to

change. Creativity can be developed and innovations in the field of teaching benefits both students and teachers in receiving and imparting knowledge. Any method of teaching should be capable of bringing out the quest for perfection within every man. The students who sit in the classrooms today are the nation-builders of tomorrow. The quality of education provided to the students determines the quality of the nation they build up. The real aim of education is to enrich the future generation with the right raw-materials for life.

Importance of mathematics in curriculum.

When a child start learning, a kind of self-discipline and commitment is generated within him. Learning of mathematics starts with counting and counting starts with one. It is symbolic, as every activity starts with the first step. Education is the sole tool for inculcating self-discipline and commitment in the students. Education should enlighten the value of life in the minds of students. Education should generate interest in the students and motivate them to know more about what is being taught. Education should be an integral part of the growth of the student and should help them to become very good citizens.

Education is actually an engine for the growth and progress of any society. It not only imports knowledge and skills but is also responsible for building human capital for setting technological innovation and economic growth. Thus education plays the key role in social reformations, cultural development of the society and advancement of technologies. Any ruler with right insight will not fail to realize the role of education in the building up of the nation and will definitely take steps towards imparting the right education to the coming generation.

Teaching methods of mathematics

Earlier, conventional methods were used to teach mathematics in schools, universities and colleges. But later many modern techniques and facilities were available for classroom teaching. Knowledge was imparted not only from books, but also from the experiences of the veteran teachers of each field. According to Nicolaides [1], acquiring life-skills and other information should be given due importance in the curriculum. The teacher is the source, the student is the receiver and the knowledge is the message or information being transmitted. In ancient days the role of the student was to listen to the words of the teacher. In Gurukulam system or in platonic dialogues we see that the teacher is the only one who talks and the students simply listen to it. But later as this conventional curriculum was subjected to a lot of restructuring or reformation and as a result, learning become an interactive process.

Mathematics is a subject which require more devotion and involvement from the part of learner. When learned in the right way, it is the easiest subject to learn and when learned in the wrong way, it is the most difficult subject. All subjects has its own relevance and impotence in the curriculam. But getting a strong foundation in mathematics benefits the student to understand things better. In a classroom the teacher solely decide and design the structure of the class. The ‘talk and chalk’method is more interactive. Itexperience more involvement from the part of both teacher and the student for the advancement of the class. When the teacher attempts to lecture simply about the topic, there is a chance that the class become passive.According to doctors and psychologist students cannot concentrate to something continuously more than 15-20 minutes. They may get distorted after that interval of time. If the teacher does not plan according to this concept, the students may fail to attend the class after the first 20 minutes. A one hour class should be planned in such a way that the students should not be exposed to simple lecture throughout the class. A class which is a one way flow of information has all the chances of getting bored. In order to avoid the boredom of students the class should be planned innovate and interactively.

Effective use of diagrams and tables

Using proper diagrams and tables to convey an idea helps the teacher to present his ideas in a very effective manner. For example, a pie-chart or a bar diagram can convey a comparative study beyond words. To teach $(a+b)^2 = a^2 + 2ab + b^2$, we can identify a square with side a, a square with side b and two rectangles with sides a and b inside a square with side (a+b). Computing the composition table for an algebraic system [5] makes the student to understand the binary operation more effectively. When a composition table is complete, no more methods other than inspection is required to check closure property, existence of identity element, existence of inverse element or commutativity. A correlation between variables is best explained by a rough scatter diagram. We can quote numerous examples where the proper use of diagrams and tables increase the effectiveness of the ideas being presented in the class. It is also a fact that a diagram is remembered much easily than a raw data.

The fact that visuals catch more attention is a proven fact. Thus a visual presentation catches more attention than any oral presentation.The conventional class room teaching has got many limitations. The main limitation is regarding the effectiveness of the class. The lecture is based on lecture notes or text books prescribed by the university. There are high chances that the information being conveyed to become outdated or old. Learners has little role

in the learning process. They are supposed to simply listen to the words of teacher throughout the class, but such one-way flow of information has always proved to be less effective than interactive sessions. When discussions happen in the classrooms, it provides freedom for the learners to ask questions on the topic they learn. Generally, the traditional or conventional classroom teaching does not provide a chance or freedom for the students to analyze, compare and investigate on the topic they learn in the classroom. They may understand what is being learned, but perhaps may not believe it. In such cases the information or knowledge acquired through education does not become an integral part of the student, but it remains as a passive data their mind.

Effective use of mathematical formulae and identities.

In mathematics, students learn different formulae and identities. They have their own applications and importance. It would be more useful if the teacher explains the application of a particular concept first and then describe the theory behind it. Knowing about the uses and applications of a concept, students would normally be eager to know much about its theory. From the viewpoint of students learning a theory without knowing where it has got applications is definitely not interesting. The concepts of group theory in a mathematics has got many applications in chemistry. So if we first explain the applications of group theory in chemistry and then teach the concepts of group theory, it would create a much better environment for the students to learn about the ideas of group theory. According to Saxena[3], Grabbing a useful tool will be much more interesting for a student than acquiring something without knowing its use. Making awareness about the use of the information is the best method to create eagerness in the students to study. Humor is always considered as a very effective medium for the conveyance of ideas. Being sensibly humorous is a very big achievement. If a teacher has this quality, then he can perform wonders in the classrooms. Humor strengthens the relationship between the teacher and the student, Humor has the ability to relax the minds of people reduce tensions and thereby create an environment which is more apt for learning.

Math games can be linked to classes

It would be very useful if the teacher link the topic of study with some math games, events or examples familiar to the students. Many real life examples can be linked directly to mathematics classes. This type of linking strikes the minds of the students and help them understand, analyses and memorize the topic much better. Even difficult theory and formulae can be learned and remembered by linking them to interesting examples or events. The process

of teaching, Learning and Evaluation are always been a challenge. When we face challenges we need innovative ideas and plans to overcome it. The students may forget what they hear, but they believe what they see. They understand what they do. The challenge of a teacher is to plan the classes in such a way that the knowledge he imparts to the students does not nearly becomes a passive data in the minds of students, but they actively accept the information and the knowledge become an integral part of their life. A society requires experts in all fields. So, education should aim to create experts in all fields. The way and the quality of education provided to a generation should not fail to fulfill this aim.

Problem solving method

Mathematics is always treated as a solution provider. The deductive method and deductive logic is used in algebra, geometry and trigonometry. The synthesis method joins separate parts while Heuristic method is a pure discovery method of learning independent of teacher. In any of these methods, mathematics develops logical thinking, power of decision making, reasoning power and analytical and critical analysis. Reading through Mehar [2], we learn that e-learning is an effective method relevant in the present Scenario. The information and communications technology is rapidly advancing and the education field also should be subjected to a lot of changes in order to be in tune with the present trends. Today, the learner needs to learn better and faster and the teacher should teach more vast and accurate. The Indian National Policy on Education (1986) has laid special emphasis on the special use of computer for improving quality of education.

Electronic content or digital content is defined by those involved in creating providing and distributing information as the digitalized content which is viewed on screen and not on paper. The quality and relevance of e-content should be carefully verified and updated so that the students shall receive totally apt and latest information. Audios, videos, animations, slides and appropriate images or graphics shall be included to improve the quality of e-content. In short a good e-content should be authentic modular, highly interactive structural multimedia enriched and easily navigated. Creating good e-content requires more attention and efforts from experts in the field of education. In the coming days there are chances that the traditional classrooms may disappear and students will acquire knowledge of their own interest through e-learning.

The use of multimedia in teaching and learning is a new-generation innovations which has got a lot of benefits and advantages over traditional methods. The use of multimedia makes the

presentation of facts to appear in a different way. The same information orated by the teacher in the classroom has got more power when presented through slides in form of the students. The use of relevant audio clips video clips and slides can be make the class more colourful, attractive and memorable. It almost evacuates the boredom from the attention of students for more time span in an effective manner that is memorized more than a traditional lecture class. Thus the use of multimedia in teaching and learning process can compensate for many inadequacies of traditional learnings. It can not only make the classes colourful, but also increase the interest of the students in attending the classes and increases their duration of effectively attending the classes. The use of PowerPoint slide presentations definitely make the classes more structured and logical. It also help the teacher to present all the ideas without losing any minute facts with a clear logical flow.

Development of mathematical skills

Learning mathematics helps in developing skills like speed, accuracy, logic, reasoning power. Like any other field, the field of education is also being subjected to tremendous changes. In the coming days there are chances that the traditional classrooms may disappear and e-learning is popularized. Students can choose what to study, when to study and from where to study. The present scenario requires the teachers to be more and more competent in their relevant field. If a teacher is an expert and he has created good e-content the he will be sought after. Creating good e-content requires more attention and efforts. The online courses and virtual classrooms are increasing in a rapid rate so that the traditional classrooms may disappear in future.

Mathematics provides power of decision making

The major advantage of learning mathematics is the ability of decision making acquired by the students. It develops confidence in the mind of students and they begin to believe that every problem has a solution. According to Kothari [4], research is the fountain of knowledge for the sake of knowledge and an important source of providing guidelines for solving different business, governmental and social problems. It is a sort of formal training which enables one to understand the new developments in one's field in a better way. Research inculcates scientific and inductive thinking and it promotes the development of logical habits of thinking and organization. The role of research in several fields of applied economics, whether related to business or to the economy as a whole, has greatly increased in modern times. The increasingly complex nature of business and government has focused attention on the use of

research in solving operational problems. Research, as an aid to economic policy, has gained added importance, both for government and business. Education should focus on developing a research oriented generation for the future times.

Importance of Revision, Assignments and tests

Apart from the factors discussed here, Revision, Assignments, homework and timely tests play a very big role in the mathematics education. Teacher is not the only source of knowledge today, but one of many sources. So a teacher should be competent enough in all aspect. This is most relevant in the case of a mathematics teacher. Imparting the right sense of mathematical aspects is very important in education. E-learning and its platforms are being more and more popular day by day. So teachers should adopt more innovative ideas and techniques in order to attract the interest of the students towards learning.

Conclusion

Learning mathematics provides the student the essential skills like speed, accuracy, logical thinking, reasoning ability, power of comparison, analytic and deductive capabilities. These skills definitely make a strong foundation so that the student can understand anything better. That may be the reason of treating mathematics with prime importance among other sciences.

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