APPLICATION OF OFFLINE-ONLINE TEACHING LEARNING METHODS IN MATHEMATICS

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ABSTRACT

The purpose of this study is to discuss the teaching methods and their application in different branches of mathematics taught at secondary level in India. Teaching methods of mathematics include inductive, deductive, lecture. Teachers may adopt any method according to the specific unit of syllabus, available resources and number of students in a class. Different merits and demerits of teaching methods along with the relevance of each method to the appropriate branches of mathematics in context are explained in this paper. And also learning mathematics can require a lot of patience. Unfortunately, the subject's reputation is hardly stellar-many students seem to automatically think that anything related to mathematics is boring, painful to learn and un-enjoyable. Fortunately, there are e-learning ways of making student more interested in the subject of mathematics. E-learning is becoming more and more popular, and it opens the door to a world of mathematics that is fun and exciting.

Key words: Applications, Offline-Online Learning, Teaching methods, Mathematics.

INTRODUCTION

The word mathematics came from a Greek word "máthēma" which means science or study. Mathematics is "the branch of human enquiry involving the study of numbers, quantities, data, shape and space and their relationships, especially their generalizations and abstractions and their application to situations in the real world" (Clapham & Nicholson, 2009, p. 505). Mathematicians generalize new formulas or methods based on similar patterns for different branches of mathematics (Devlin, 2004). Before teaching mathematics, every teacher should be informed well about the educational values of this subject. Proper teaching method should also be adopted according to the

situation, learning environment and educational background of the students. It is very important to keep the motivational level of students high otherwise they lose interest in mathematics (Butler & Wren, 1965). Students can be motivated by highlighting the importance of this subject, for example, mathematics is quite essential to learn other science related subjects. Moreover, students can avail good employment opportunities in their future life because of diverse applicability of mathematics in many fields (Rani, 2007). Teachers should be cleared about the following goals of teaching mathematics (Cornelius, 1982; Sidhu, 1995).

i. To develop reasoning ability in thinking process of the students.
ii. To enable students to do different kinds of calculations related to the daily life problems.
iii. To make them creative by developing analytical and discovering abilities in them.
iv. To enable them to learn other subjects of science or general science.
v. To prepare them for higher studies.
vi. To develop scientific approach in them to understand the realities of life on the base of logic

The teaching of mathematics also involves different methods. The mathematics is taught at different levels of school education. No one single method is fully suitable or appropriate for each level. Thus, different methods are used for the students of different level. There are different methods of teaching mathematics for primary, secondary and higher level education as the students of each level differ in age, maturity, mental abilities, mental development, mathematical understanding etc. therefore, one method cannot be applied to teach mathematics to all the classes. Besides this, with the use of one method, all the students of a class cannot be equipped with equal amount of knowledge because individual difference lies among them. Individual difference is an important psychological phenomenon which affects teaching and its outcome to a great extent. According to Thorndike, "There is a much difference between lower and higher categories of students of the same class. Higher category students learn six times more than the lower category students or lower category

students learn only one sixth in comparison of higher category students." Therefore, a teacher has to apply different methods to teach same topic to same class so that every student could understand and learn the given content. Researcher has delimited only inductive and deductive teaching methods which introduce as.

INDUCTIVE METHOD

It leads from concrete to abstract, particular to general and from example to formula.

Procedure: First do lots of example, and then generalize the formula.

Example: Ask students to draw a few sets of parallel lines and let them measure the alternate angle. Ask student to construct the few triangles. Let them measure the sum of the angles and draw conclusion.

MERITS OF INDUCTIVE METHOD

1. By making use of this method, following merits get accrue to the students as well as to teacher:
2. As this is a scientific method, thus it helps to considerable extent in developing scientific outlook among the students.
3. This method helps to develop scientific attitude among the students.
4. With the help of this method, teacher can develop qualities of critical thinking and habit of keen observation among the students properly and accurately.
5. This is a very logical and psychological kind of teaching science.
6. By this method, students get various opportunities to play an active role in learning process.

DEMERITS OF INDUCTIVE METHOD

1. This method has certain limitations, some of which are as follows:
2. The results or conclusions drawn from such method are not found to be final in case where the amount of data is very large in number.

3. All the topics of science cannot be dealt with this method properly.

4. This method can only be used when teacher have much time for teaching process.

DEDUCTIVE METHOD

Opposite of inductive method. Here, the learner proceeds from general to particular, abstract to concrete and from formula to examples.

Procedure: Immediately after announcing the topic for the day, the teacher gives the relevant formula and solves some problem related to formula. The student understands how the formula can be used or applies. Then few problems are given to the student to solve by themselves.

Example: Facts like sum of the angle is 180^0 and solve the problem related to given facts.

Formula like area of rectangle = Length x Breadth and solve problem related to given formula.

MERITS

1. This method is short and time-saving. The solution of the problems by pre-established formulas takes little time.

2. It encourages memory as the students have to memories a considerable number of formulas.

3. This method is advantageous at the "Practice and revision" stage.

4. It enhances speed and efficiency in solving problems.

5. This removes the incompleteness and inadequacy of Inductive method.

DEMERITS

1. The beginners find it very difficult to understand an abstract formula, if they are not acquainted with a number of concrete instances.

2. This method will demand blind memorization of a large number of formulas. And this will cause an unnecessary and heavy burden on the brain of children.

3. In this method, memory becomes more important than understanding and intelligence and that is educationally unsound.

4. Blind cramming leads very often to forgetting the formulas and the children are at a loss to recollect. This ultimately leads to no learning

5. This method is not suitable for development of thinking, reasoning and discovery.
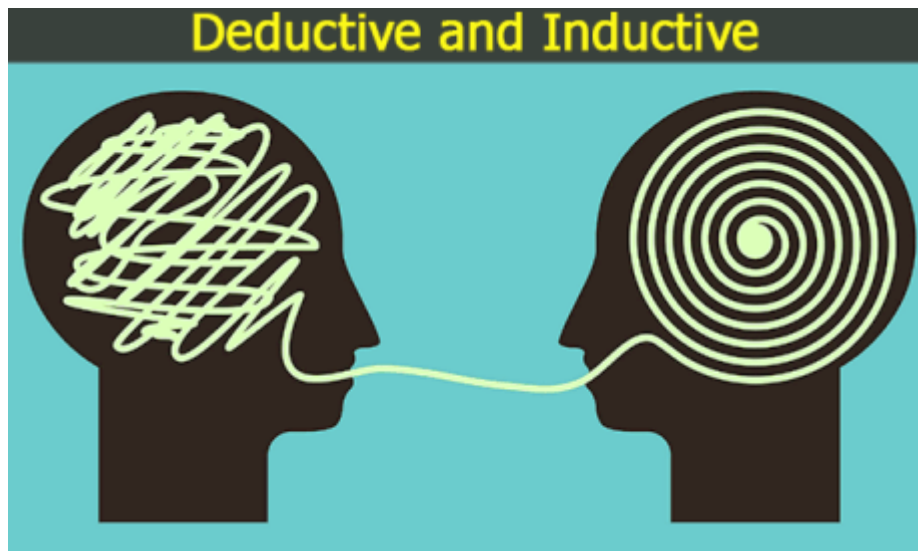
Inductive-Deductive method: It is a combination of two methods.

Lecture method: It is a method of imparting information through speech.

Procedure: The teacher prepares the talk and pours it out in the class.

Example: For the topic "profit or loss" the teacher goes on explaining profit and loss is calculate based on the cost price because the cost price is our investment. If the investment is less and we sell it at high price we get profit. There fore to find the profit we have to subtract CP from SP. And if we invest more and sell it at the price lower than the CP we are at loss. There fore to find the loss we have to subtract SP from CP.

MERITS

1. Effective lecturers can communicate the intrinsic interest of a subject through their enthusiasm.

2. Lectures can be specifically organized to meet the needs of particular audiences.

3. Lectures can present large amounts of information. Lectures can be presented to large audiences

4. Lecturers can model how professionals work through disciplinary questions or problems.

5. Lectures allow the instructor maximum control of the learning experience.

6. Lectures present little risk for students.

7. Lectures appeal to those who learn by listening.

DEMERITS

1. Lectures fail to provide instructors with feedback about the extent of student learning.

2. In lectures, students are often passive because there is no mechanism to ensure that they are intellectually engaged with the material.

3. Students' attention wanes quickly after fifteen to twenty-five minutes.

4. Information tends to be forgotten quickly when students are passive.

5. Lectures presume that all students learn at the same pace and are at the same level of understanding.

6. Lectures are not suited for teaching higher orders of thinking such as application, analysis, synthesis, or evaluation; for teaching motor skills, or for influencing attitudes or values.

7. Lectures are not well suited for teaching complex, abstract material.

8. Lectures requires effective speakers.

9. Lectures emphasize learning by listening, which is a disadvantage for students who have other learning styles.

E-Learning is learning utilizing electronic technologies to access educational curriculum outside of a traditional classroom. In most cases, it refers to a course, program or degree delivered completely online. There are many terms used to describe learning that is delivered online, via the internet, ranging from Distance Education, to computerized electronic learning, online learning, internet learning and many others. We define e-learning as courses that are specifically delivered via the internet to somewhere other than the classroom where the professor is teaching. It is not a course

delivered via a DVD or CD-ROM, video tape or over a television channel. It is interactive in that you can also communicate with your teachers, professors or other students in your class. Sometimes it is delivered live, where you can "electronically" raise your hand and interact in real time and sometimes it is a lecture that has been prerecorded. There is always a teacher or professor interacting/communicating with you and grading your participation, your assignments and your tests. E-learning has been proven to be a successful method of training and education is becoming a way of life.

E-LEARNING CREATES INNOVATIVE LEARNING ENVIRONMENTS

A learning environment includes the physical, social, and pedagogical context in which learning occurs. An innovative environment supports strengths-based teaching and learning. It offers students and teachers flexibility, agency, ubiquity, and connectedness. Working in an innovative e-learning environment where teaching and learning is collaborative, reflections and inquiries are shared, and communities engaged leads to a more robust, continuously improving community of practice.

For Students: E-learning resources for students include one-on-one instruction that supplements current schoolwork and offers advanced concepts in mathematics. Students are able to use future school's text and video courses to better understand their class work, improve their marks, and explore additional topics that might be of interest to them.

For Parents: Online learning resources to help their students get a better grasp of key concepts, understand homework more thoroughly, and online test prep for standardized exams. Future school has successfully combined technology with the best instructional approaches to provide parents and students the support needed to get through the undergraduate educational journey.

For Teachers: Teachers love invaluable collection of mathematics courses that serve as a supplement for class instruction and offer alternative learning for students who need a challenge. Teachers are affordable and can be customized to fit a variety of needs. All e-learning courses remove the stress of trying to learn in a contrived setting

and improve a student's chance of academic success. Whether our students are just starting out learning mathematics, or are looking for help in advanced concepts, we are able to provide a method of instruction that best reaches where students are on their academic paths.

LEARN MATHEMATICS ONLINE

Online math courses provide interactive videos, making mathematics easier and more enjoyable to understand. Math problems are displayed through visual and audio formats on a stimulating web-based interface. These effective visuals and instructions are produced by qualified and experienced teachers. Parents also have the ability to monitor each student's progress through baseline reports and charts. Now it is even easier for parents to fully understand their child's progress, needs, and success for each lesson and course. Online mathematics learning involves using a wide range of different methods to master basic and advanced mathematics. Online mathematics covers a range of different mathematical fields, from arithmetic to algebra, calculus, geometry and more. Online mathematics lessons can be presented in a variety of formats, from written guides to interactive tools that help students absorb important mathematical rules and formulas at their own pace. Learning mathematics online has a range of advantages. Students can spend more time on specific subjects than they could in the traditional classroom, allowing them to learn mathematics at the perfect pace for information retention.

SOME E-LEARNING RESOURCES FOR TEACHING LEARNING MATHEMATICS EDUCATION

Future school Online Mathematics: Elementary school introduces children to the basics of mathematics. It may be the first time many of them are learning in a large group setting. For some, being in this kind of setting can be rather distracting. Distracted students tend not to pay close attention to their teacher, which leads to their lagging behind the rest of the class. Online elementary math classes give our child the opportunity to learn and practice all the necessary concepts taught in school, at home, in the comfort of their own home.

High school math introduces students to a whole new world of concepts and ideas designed to prepare students for college level courses as well as jobs where understanding and using complex mathematical equations is required. Many of these concepts build on what was previously learned in elementary and middle school. Some of them, however, may be completely foreign and difficult to grasp. If our child is having trouble understanding the concepts introduced and you are unable to receive the assistance needed, e-learning can give you the extra help you need in order to help you succeed in high school math.

Purple math's: Purple math's algebra lessons are written with the student in mind. These lessons emphasize the practicalities rather than the technicalities, demonstrating dependable techniques, warning of likely "trick" questions, and pointing out common mistakes. The lessons are cross-referenced to help we find related material, and a "Search free lessons" link is provided above the article title on every page to aid in finding the math help we are looking for. Helping students gain understanding and self-confidence in algebra. These forums exist in the hope of helping learners grow in mathematical knowledge and inner strength. The forums are free-access and are "staffed" by volunteers. For best success, don't wait to start looking for math help until the last minute or until we are "totally lost"; start asking questions as soon as we find yourself feeling "stuck".

E-Book and E-Television: In order to enable the students to access the books and TV programs on the Internet, the contents of the course books and TV programs could be presented on the Internet as e-books and e-television. Therefore, a student of the system could easily access the course books, TV programs, study through the multimedia research software and assess him/herself through the proof tests in an Internet-café or at his/her own PC at the office.

E-Sound Book: The E-sound book application, which enables especially the visually retarded students to listen to the course book contents, could be provided on the Internet. Therefore, visually retarded students and the students with screen reading difficulties could access their course books form their offices or from an Internet-café.

They could listen to the contents of the course book by downloading the sound files on their computers.

S.O.S. Mathematics: S.O.S. Mathematics is free resource for math review material from Algebra to Differential Equations. It is perfect for study site for high school, college students and adult learners. It is to help to do homework, refresh your memory, prepare for a test, etc. Browse more than 2,500 Math pages filled with short and easy-to-understand explanations. It is contained the following subject areas: Algebra, Trigonometry, Calculus, Differential Equations, Complex Variables, Matrix Algebra, and Mathematical Tables. We can find topics ranging from simplifying fractions to the cubic formula, from the quadratic equation to Fourier series, from the sine function to systems of differential equations - this is the one stop site for your mathematic needs.

CONCLUSION

This study described different teaching methods of mathematics. These teaching methods include lecture, inductive, deductive methods. Lecture method can be used to explain basic concepts of all branches of mathematics. Inductive method is helpful to establish laws and formulas related to algebra, matrices and geometry. Already established laws and formulas can be applied through deductive method to solve problems related to all branches of mathematics. A teacher should be familiar with all of these teaching methods because he or she can get better results by applying appropriate method according to the nature of a problem, available resources and number of students in a class. We can conclude that inductive method is the forerunner of deductive method. The deductive method will give a good follow up, if the topic is understand through induction. Thus the teaching must begin with induction and end in deduction.

Technological tools include those that are both content specific and content neutral. In mathematics education, content-specific technologies include computer algebra systems; dynamic geometry environments; interactive applets; handheld computation, data collection, and analysis devices; and computer-based applications. These e-learning approaches support students in exploring and identifying

mathematical concepts and relationships. Content-neutral e-learning include communication and collaboration tools and Web-based digital media, and these technologies increase students' access to information, ideas, and interactions that can support and enhance sense making, which is central to the process of taking ownership of knowledge. The flexibility offered by online courses and the convenience they provide enhance the popularity of distance learning courses. While the diverse functionality of emerging technologies and the rapid infusion of various computer technologies into classrooms renders online courses and programs enticing to teachers and students to improve their mathematical knowledge.

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