

**AARHAT MULTIDISCIPLINARY INTERNATIONAL EDUCATION  
RESEARCH JOURNAL (AMIERJ)**

*Volume-VII,*  
*UGC Approved Journal No 48178, 48818*

*Special Issue-XXII,*  
*ISSN 2278-5655,*

*26 May, 2018*  
*EduIndex Impact Factor 5.18*

**One Day International Conference**

**On**

**QUALITY CONCERNS IN EDUCATIONAL  
WORLD**

Organized by

**EXCELLENCE IN EDUCATION SOCIETY'S**

**K.B.COLLEGE OF ARTS & COMMERCE FOR  
WOMEN,THANE**

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# LEARNING OUTCOME IN MATHEMATICS - A PRACTICAL APPROACH: WITH SPECIAL REFERENCE TO UNDERGRADUATE COMMERCE TEACHING AT UNIVERSITY OF MUMBAI

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## **Abstract:**

A University designs & frames its programmes as well as the respective courses with a certain aim. Every course and programme that a student chooses has an objective to be attained. The course and programme is designed in a way so as to achieve the objectives. Knowledge, skill development and application of knowledge are some of the objectives. On enrolment for a course, a student undergoes the process of learning the contents of the course. The natural consequence on completion of the course is the 'learning outcome'. Learning Outcomes are statements that describe what a learner will learn at the end of a course or a programme. Hence we have course outcomes as well as programme outcomes. The subject of Mathematics has always been a challenge to majority of the students. For teachers teaching the subject, the task is no lesser as they have to break all the barriers and think of innovative methods in order to impart the subject knowledge to the students. The paper is an insight on the challenges that a mathematics teacher has to overcome while teaching undergraduate commerce students at University of Mumbai.

## **Introduction:**

Learning Outcomes can be defined as statements which elaborate on the desired knowledge as well as skills that the students acquire at the end of a course or a programme. They also help the students to understand the applications of knowledge acquired in real-life problems. Thus, we can say that Learning Outcomes are statements that can help students connect between knowledge, skills and their applications in the real world.

**Review:** Universities today are encouraging Outcome based Effective teaching that gives way to enhanced learning outcomes. The focus is more on student-centric learning with emphasis on research & industry interactions. Employability concerns on completion of programmes is the driving force behind imparting quality higher education with improved teaching-learning programmes that will help them to apply the knowledge acquired to real world problems. Framing appropriate curriculum & synchronizing programme learning outcomes with the requirement of job markets is also one of the major requirements of Higher Education Institutions. Connecting the academic knowledge with its practical application in real-life is the main goal. Adding service-learning to the teaching methodology is recommended by certain academicians. According to Robert Sigmon, Service learning is an experiential educational approach that is based on "reciprocal learning" (Sigmon, 1979). In service learning both the provider of the service and the receiver of the service must learn. Research states that service learning may lead to better understanding, better application of knowledge and encourage critical thinking. Service Learning can be in

the form of community service (voluntary) or in the form of field studies/internship programmes which provide hands on experience in the field of study.

### **Why learning outcome is important in Mathematics?**

Mathematics is a subject which teaches us computation techniques, problem solving and develops critical thinking, analytical skills and logical reasoning. Besides teaching us quantitative techniques, it enhances our numerical aptitude and logic which helps in decision making. This learning is not restricted to the four walls of classroom or examinations evaluation but has a far wider scope in day to day practical problems. But the subject is a big challenge to majority of students, more so for students with lesser aptitude for mathematics. The main objective of the course "Mathematical and Statistical Techniques" at first year commerce level at University of Mumbai is to "introduce Mathematics and Statistics to undergraduate students of commerce, so that they can use them in the field of commerce & industry to solve real life problems". Hence, the need of the day is to remove the abstractness of the topic and make it very interesting & relevant by demonstrating real life problems and simple applications of the concept being taught. Today teachers are emerging facilitators whose role is to connect the concept with its applications.

**Challenges:** The Metropolitan City of Mumbai & Thane has strata of undergraduate students coming from a diversified cultural as well as academic background. Typically a classroom of a suburban undergraduate college has a mixture of students coming from English and Vernacular mediums, the majority being from latter. Hence, language poses as the biggest barrier for learning. Lack of reading habits & writing skills also add to the woes. Students are more prone to using SMS and Whatsapp language. Changing education policies at school & junior college level has also not helped. The no-detention policy in class V, VIII has given rise to deteriorating learning outcomes. The National Achievement Survey (NAS) released in 2018 has revealed that the Class X students are performing worst than the students of lower classes due to being promoted to higher classes without any detention. The subjects badly affected are Mathematics, Social Science, Science and English. Added to this, majority of students coming to the commerce stream are students who have not opted for Mathematics at XI and XII level. Irrespective of this, Mathematical and Statistical Techniques is a compulsory course at first year commerce level. As a result, the students have a major difficulty in dealing with the subject of Mathematics & Statistical Techniques. As compared to Statistics, students find Mathematics harder to comprehend. Lack of numerical ability, less language skills and fear for the subject has given rise to more weak learners in a classroom. Moreover a class-strength of 120 plus students makes the job of a mathematics teacher all the more harder.

### **Suggestions for enhancing learning outcomes:**

Teachers today are exploring innovative teaching methods for outcome based effective teaching. Capturing the students' attention and then presenting concepts in interesting ways for easy understanding needs creativity on the teacher's part. Connecting the concept at hand with its real life day to day applications is one way of making the learning process effective. To make the topics more practical oriented the researcher has tried a number of things to

enhance classroom learning, which has yielded improved outcomes for the undergraduate commerce students of first year at University of Mumbai. Few of the suggestions proposed for improving students' learning outcomes in mathematics are -

- Encouraging Activity based learning- For the topic of Mutual Funds, students can be asked to collect information regarding bank Recurring Deposit (RD) and Fixed Deposit (FD) interests and the maturity amount offered. These concepts can be used as the students are more familiar with these schemes. RD can be compared with Systematic Investment Plan (SIP) where as FDs can be compared with normal Mutual Funds. The teacher can then exemplify how Mutual Funds and SIPs are more beneficial than FDs and RDs. This way we can also encourage the students to save some amount from their pocket money and invest.
- Field visits to Stock Exchange or bolts can help give a better understanding of trading in shares.
- Newspaper cuttings of Initial Public Offers (IPO) and New Fund Offers (NFO) can also help in demonstrating practically the process of launch of new shares and mutual funds by companies.
- The concept of probability can be introduced by giving an example of number of perishable food item packets sold daily by a grocer in a month (30 or 31 days) and then using this data to find the corresponding probabilities. The example can also lead to the concept of decision making.
- As the main objective of the course is to use Mathematical & Statistical Techniques in real life problems, we can use live examples for explaining the concepts. A dummy amortization sheet can be circulated among the students. After this EMI calculations for the loan can be demonstrated. This will convert the lecture into a real-life problem solving session & students can relate the concept with its application in day-to-day life. In a way this technique will discourage rote learning and encourage application based learning. Even the topic of Interest can be explained using discussions on more practical problems.
- Giving hand-outs/notes/PPTs in advance to students and asking them to go through it, and declaring a date for discussion on the topic can help in a better learning process. The lecture on the particular topic can then be a discussion session where the students also can participate.
- Appointment of student-mentor (good learner/advance learner) to a group of 5-7 weak learners in a class may be considered as a service-learning technique as the provider of service as well as the recipient is benefitted by the learning process. For weak learners, it is a second revision of a topic after the teacher teaches and for the student mentor who is teaching, the concept gets more clearer which will enhance the mentor's problem solving skills and critical thinking skills. 'Each-one-Teach-one' type of Peer teaching can also be encouraged in the classroom.
- Bridge courses can help the students to deal with the course, especially those students who will be studying Mathematics after a gap of 2 years.
- Students can be made aware of objective of the course and expected learning outcome of the course at the beginning of the academic year.

**Conclusion:**

Universities today are focusing on various strategies for achieving the desired learning outcomes. In achieving these goals, teacher as a facilitator plays a major role. More self-involvement, out of box thinking to capture the students attention and increase their involvement in the class, activity based teaching, practical approach to the subject to make it more relevant, flip classrooms are some of the techniques which will aid a teacher to achieve enriched course learning outcomes. Mathematics teachers can get together to form a forum and give platform to the teachers to voice their thoughts, concerns and suggestions. Collectively, they can explore and adopt steps to give a rich learning experience to the students and attain the desired course learning outcomes.

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