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Effect of remedial teaching on mathematics achievement among secondary school students

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Abstract
The main objectives of this study are to find the effect of remedial teaching on mathematics achievement among secondary school students. This study was conducted on 30 secondary school students studying in Govt. High School, Badanuagan, Kuliana block of Mayurbhanj, Odisha. An instructional intervention programme was administered to improve mathematical knowledge of secondary school students. The finding of the study emphasized that remedial teaching in mathematics improves the academic achievement of secondary school students. The academic achievement of the child depends upon his or her conceptual learning and understanding of mathematics in the teaching-learning process. Further, recommendations were given on the basis of obtained finding of the study.

Keywords: Remedial teaching, mathematics achievement, secondary school students

1. Introduction
Mathematics is the rudimentary subject for the development of scientific knowledge and intellectual growth of students. Mathematics knowledge is necessary for secondary school students; as it is very useful for higher education. Academic achievement or academic performance is the extent to which a student, teacher or institution has attained their short or long-term educational goals. Academic achievement is important for the successful development of young people in the society. Remedial teaching is assigned to assist students in order to achieve expected competencies in core academic skill such as literacy and numeracy. Remedial education can be designed for any student with or without special needs. Remedial teaching and its effect on student's leaning of mathematics continue to attract the attention of researches because of their association with students learning and achievement in mathematics.

2. Review of related literature
Brown (1968) conducted an experiment study to investigate the effeteness of the programme in remedial mathematics for elementary school students to measure the improvement of students, after a period of remediation the findings showed that construction of revitalized programme for remedial students in mathematics yielding highly satisfactory results. Further, a study on the remedial strategies for the slow learning mathematics at elementary level revealed that by using suitable teaching learning material and strategies fosters the academic achievement of mathematics at elementary level (Theis, 1980). The usefulness of remedial teaching programme brings out significant improvements at elementary level students (Karibasappa, 2008). A research was conducted to determine the usefulness of remedial teaching on the academic achievement of elementary school student with respect to their mathematics learning outcomes in inquiry learning model by Kartono (2016) [3]. The findings showed that remedial teaching in the many models effectively enhances the teaching-learning outcomes of elementary school students. An experimental study on the effect of elementary mathematics remediation on student achievements revealed that there exists a significance difference between non-remediation student and remediation students and indicated improving the performance after remedial teaching (Marshall, 2014).

3. Research problem
Remedial teaching is a fundamental approach to gain better understanding as well as to solve the problem arises among secondary school students in mathematics.

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Remedial teaching is a detailed and organized effort in finding the delimitation of student in mathematics. Remedial teaching is an effective and assistive programme to overcome mathematics anxiety among secondary school students and to enhance the academic achievement in mathematics. Secondary school students needed a good understanding of mathematics to reduce mathematics anxiety and develop positive attitudes towards teaching learning of mathematics. The main objective of this investigation is creating suitable circumstance for the production of knowledge in mathematics in order to solve problem there by improving the knowledge in mathematics and ability to solve problems. The relevance of the study is to gain a greater understanding in mathematical knowledge and the usefulness of remedial teaching at secondary level. The purpose of this study is to find out the effect of remedial teaching among secondary learners with respect to their academic achievements in mathematics. Hence, the investigator has undertaken to study this topic. It is hoped that the findings would be utilized by scholars, teachers, students, researchers and educationists in future.

4. Objectives of the study
O1. To study the effect of remedial teaching on mathematics achievement among secondary school students.
O2. To study the difference between pre-test and post-test mathematics achievement scores among secondary school students.

5. Hypotheses of the study
H1. There exists a significant effect of remedial teaching on mathematics achievement among secondary school students.
H2. There exists a significant difference between pre-test and post-test mathematics achievement scores among secondary school students.

6. Delimitation of the study
The population of the study delimited to secondary school students only. The study delimited to 30 students as sample. The present study has been confined to the secondary school students of Govt. High School, Badanuagan, Kuliana block of Mayurbhanj, Odisha.

7. Methodology
Taking into consideration the nature of study the investigator adopted the experimental research design to explore the facts related to the study regarding teaching on the academic achievement in mathematics of secondary school students. In the present study, the population constituted out of secondary school students in Kuliana block of Mayurbhanj, Odisha. For the collection of sample for this study purposive sampling technique was used. For the present study a total number of 30 students selected as sample by aforesaid sampling technique.

7.1 Experimental research design
The present study is a pre-test and post-test experimental design. Remedial teaching is a 12-days designed intervention program for secondary school students which are provided before applying the pre-test on mathematics achievement. After the intervention program is provided, the achievement test on mathematics is administered again on a post-test survey.

7.2 Tools used
The investigator used remedial teaching as intervention programme for mathematics achievement of secondary school students. Further, one achievement test developed by the investigator was used to collect necessary data. Investigator prepared an achievement test in mathematics for secondary school students. The test includes different types of questions like multiple choice questions, fill up the blanks, match the following, true or false statement, and one-word answers. The test contains 40 questions representing 40 marks. Reliability of the test was calculated by Product Moment correlation method. The co-efficient of reliability calculated and come out to be **0.70**. Hence the tools are highly reliable. The tools are checked by the language and subject expert to find out the content validity of the tools. According to the expert, the tools are valid and appropriate to measure the achievement level of students in mathematics. Every correct answer and wrong answer should be given one (1) mark and a zero (0) mark respectively. The minimum and maximum scores are 14 to 35.

8. Analysis and interpretation

Table 1: Significant of difference between pre-test and post-test scores of mathematics achievement of secondary school students

Sl. No	Test	No of Samples (N)	Mean (M)	SD	SED	*t*-ratio	Level of Significance
1.	Pre-test	30	23.54	6.72	1.47	3.02	Significant at both level i.e. 0.05 and 0.01
2.	Post-test	30	27.98	4.53			

(Degree of freedom =29, at 0.05 level = 2.04, at 0.01 level = 2.76)

It is revealed from Table No.1 that means score of pre-test and post-test are 23.54 and 27.98 respectively with standard deviation 6.72 and 4.53. The calculated t-value is 3.02 which is more than standard table value at both levels of significance. This indicates there is a significant difference between pre-test and post-test scores of mathematics achievement of secondary school students. Further, the mean score of post-test on mathematics is higher than the pre-test. So it implies that remedial teaching has significant impact on mathematics achievement of secondary school students.

The mean and standard deviation of pre-test and post-test scores of mathematics achievement of secondary school students are depicted in the above table is represented by the bar graph.
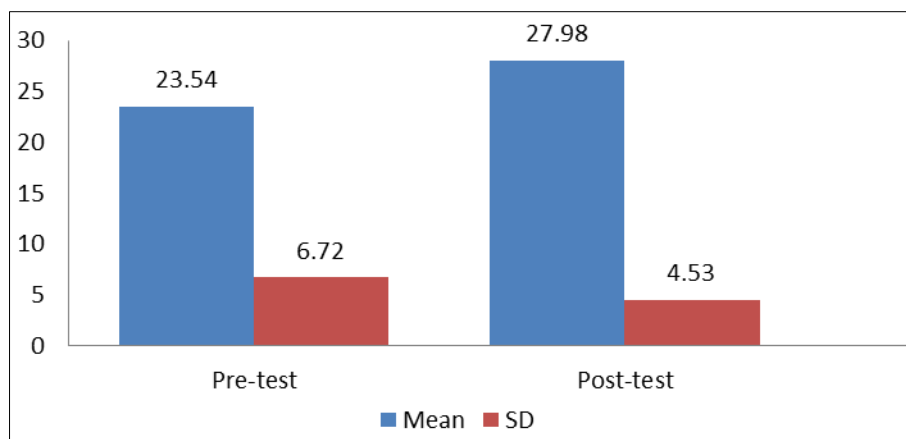
Fig 1: pre-test and post-test scores of mathematics achievement of secondary school students

9. Findings and discussion of the result
Every study provides some meaningful information and knowledge to the related field and this study also has some systematic and meaningful information. There is a significant difference between the pre-test and post-test scores of mathematics achievement of secondary school students. Further, the mean score of post-test on mathematics is higher than the pre-test. So it indicates that remedial teaching has significant impact on mathematics achievements among secondary school students. There are several educational implications of remedial teaching on mathematics and its effect academic performance related to this study which is as follows: Elementary learners are more confident towards their study in mathematics; Leaner should engaged in strategies focused on real life experiences aimed at enhancing the natural and meaningful process of learning; Teacher should present content which focused on whole ideas and events which are purposeful and applicable situation among secondary learners; Learner should provided with the knowledge of mathematics to apply the relevant skill to facilitate their optimum learning in real life situations and focus should be given on problem solving ability of learners.

10. Recommendations
In this study, the investigator conducted an experimental research on effect of remedial teaching on mathematics achievement among secondary school students; it is advised to conduct on other areas like science and social science for better generalization. In this study, the sample was delimited Mayurbhanj district only; it is advised to explore the sample in other districts of Odisha. The study can be administered for elementary and higher secondary school students instead of secondary school students. The study can be administered on various types of schools *i.e.* private school, tribal school, girl's school and co-education school.

11. Conclusion
Based on the result of research and discussion it was concluded that the effect of remedial teaching on mathematics among secondary school learners improve learners mathematics outcomes. Remedial teaching produces result based on diagnostic assessment of mathematics is better than without diagnostic assessment of mathematics in terms of academic achievement. Remedial teaching in mathematics not only helpful to fosters mathematics problem solving ability but also enhances the academic achievement in mathematics among secondary school students.

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