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THE EFFECTIVENESS OF MATHEMATICAL SOFTWARE IN ENCOURAGING MATHEMATICAL REASONING IN STUDENTS WHO STRUGGLE WITH MATHS

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ABSTRACT

This study looks into how using mathematical software affects students who struggle with maths in developing their mathematical reasoning abilities. This study intends to assess the efficacy of specialised software in cultivating mathematical reasoning abilities, given the growing emphasis on technology in education, especially in the context of mathematics education.Using a mixed-methods approach, the study combines qualitative findings from student observations and interviews with quantitative analysis of pre- and post-intervention assessments. A certain set of kids who have been judged to be having difficulty with mathematics on standardised tests and in teacher evaluations are among the participants.

This study's mathematics software combines real-world problem-solving scenarios, adaptive learning algorithms, and interactive visualisations. Pre- and post-intervention assessments are the main focus of quantitative data analysis, which quantifies improvements in mathematical reasoning scores. To obtain a more profound comprehension of students' experiences, attitudes, and the influence of software interaction on their learning, qualitative methodologies are also utilised.

INTRODUCTION

Students usually don't have much time in a regular classroom to interact with the teacher, the materials, or each other. However, technology-assisted learning can also promote quick communication and feedback, encourage students to work on their learning tasks for longer periods of time, and in certain cases, analyse each student's performance and give more timely and focused feedback than students receive in a typical classroom. Hear technology includes devices including computers, tablets, educational software, the internet, and teleconferencing systems that facilitate teaching and learning.

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Over the past few years, technological use in the educational system as a whole has grown in popularity. For the past 26 years, the researcher has been an undergraduate mathematics teacher at several colleges in both rural and urban locations. The language of all sciences is mathematics. It is referred to as the scientific queen. It could be considered the most fundamental field of science as a result. Nonetheless, it is noted that college-level students show little interest in mathematics. They only think about the exam.

So the researcher thought about the following problems

i) Why don't the students seem interested in learning mathematics?

ii) Why do they not consider mathematics to be a necessary tool for other subjects?

In the current technological era, scientific and technological advancements are occurring at a very quick pace. The globe has become a global village thanks to the globe Wide Web. The world's largest library and a fantastic source of information is now the internet. It serves as the younger generation's knowledge repository. For math-related learning, teaching, and research activities, there are a plethora of electronic resources available online.

Mathematics contains highly sophisticated and specialised software, such CAS (Computer Algebra Systems), Mathematical Laboratory, Maple, Sage, Science Laboratory, and Maxima. Also, there is software specifically made for a wide range of specialised subjects. In addition to these programmes, the internet is home to a large number of freeware programmes, applets, and utilities.

Software for mathematics has been seen as a possible instrument for improving problem-solving abilities, motivation, and conceptual comprehension in students. Over the past 20 years, there has been a significant increase in the usage of mathematical software in the classroom.

Objectives

1. To identify undergraduate maths learners who struggle.
2. To compile data from the internet regarding openly available mathematical software.
3. Using mathematical software to help undergraduate students who struggle with the subject.
4. To confirm this mathematical software's effectiveness.

Hypotheses

1. There is no discernible difference between girls from rural and urban locations in terms of their mean scores in mathematical reasoning.
2. Males from rural and urban areas do not significantly differ in their mean scores on the mathematical thinking test.

3. There is no discernible difference in the mean scores of mathematical reasoning between the male and female experimental and control groups.

4. There is no discernible difference between female slow learners from rural and urban locations in terms of their mean scores in mathematical reasoning.

5. There is no discernible difference between male slow learners from rural and urban locations in terms of their mean scores in mathematical reasoning.

6. Between the control and experimental groups of male and female total slow learners, there is no discernible difference in the mean scores of mathematical thinking.

Research Design

Experimental design is the blueprint of the procedure that enables the researcher to test hypotheses by reaching valid conclusion about relationship between independent and dependent variables. The selection of particular design depends upon such factors as the nature and purpose of the experiments, the type of the variables to be manipulated, the nature of the data, the facilities, or the condition for carrying out the experiment, and the competence of the experiment. Experimental design classified in to three categories.

1) Design of the pre-experiment.

2) A real-world experiment setup.

3) The design of a quasi-experiment.

Since real experimental design is the more robust of the three design types mentioned above, it is suggested for the current investigation. In a genuine experiment, volunteers are randomly assigned to experimental and control treatments to ensure the equivalency of the experimental and control groups.

Three types exist for true experimental design.

1) The equivalent-group, posttest-only design.

2) The equivalent-groups pretest-posttest design.

3) The four-group Solomon design.

Variables

The circumstances or traits that the experiment modifies, regulates, or records are known as variables. Independent and dependent variables are the two categories of variables.

1) Independent Variables: Utilising mathematical software for instruction.

2) Test results (Achievement) are dependent variables.

Population

Population refers to a collection of items or people that are taken into consideration for a particular goal. The demographic of Pune University's undergraduate slow learners in mathematics will need to be defined here.

Sample: A grouping of a few representative individuals from the entire population that aids in the examination of the entire population. Here, a total of 80 second-year mathematics slow learners from the Nashik District—30 men and 50 women—are divided into two groups at random from the sample. The groups are then assigned to the experimental or control group by flipping a coin.

Tools

The researcher employed the following instruments to gather data for the current investigation.

1) Software for maths

2) An accomplishment exam created by the teacher

Statistical instruments:

The researcher used the following statistical instruments to analyse the data in the current study.

1) Central tendency measurements: Mean

2) Dispersion metrics: Standard Deviation

3) The relationship

4) The T-test

Range and Restrictions

1. The current body of research only relates to undergraduate students who struggle with mathematics.

2. The current study solely looks at Pune University undergraduate students.

3. The sample consisted exclusively of second-year maths students.

4. The sole mathematical software used in the research is freely accessible on the Internet.

5. The sample used in this study came exclusively from the Nashik District.

6. Only students from scientific faculty were included in the sample.

7. The accomplishment exam will be created by the teacher rather than being a standardised test.

Relevance of the research

It is anticipated that the results of this investigation will have several applications. The results of this study should be especially beneficial to undergraduates who struggle with mathematics, as they will help them to get motivated to think mathematically and comprehend logical concepts. It is anticipated that the findings will also benefit college-level instructors in fostering their students' interest in mathematics. The study's findings are anticipated to be beneficial to society as a whole since they touch on the educational system. Government-run educational institutions in rural and tribal areas also benefit from it. The study's findings might be useful to various local, state, federal, or international organisations in making decisions on teacher preparation

programmes at various levels. The results are anticipated to be helpful for implementing new concepts in mathematics curricula at all levels across the entire educational process.

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