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A comparison of the post-test scores on academic achievement as a whole of the experimental and control groups

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Abstract

To advance academically, children with learning disabilities require extra attention. Unfortunately, the most of them do not understand it. Some parents want to support their children who have learning disabilities, but the majority of them are unsure of how. Even the government is making an effort to assist them through inclusive education. The system is still unable to offer these kids much assistance. It is due to the rigidity of the curriculum, the scarcity of special educators in the classrooms, a lack of resources, etc. The lack of knowledge on the teaching techniques to use with these pupils is a major contributing factor to this. Despite the fact that numerous instructional strategies have been created globally, the majority of teachers are unaware of those that have an impact on students with learning disabilities. Teachers must take the target audience and the current conditions into account when choosing an instructional technique (students). For the benefit of kids with learning disabilities, these techniques should be adjusted and tested for effectiveness in Indian settings. The current study aims to achieve the same results with the Multi Sensory Strategy. It is designed to give educators, administrators, and decision-makers a teaching technique they may employ to give special attention to students with learning disabilities. The study's implications are listed below.

Keywords: Academic achievement, experimental and control groups

Introduction

Every person has a basic need for education. Through education, one can develop or mature in all spheres of life, including the social, economic, intellectual, physical, and psychic. Only an educated populace can spur a country's development. Every nation works arduously to educate all of its people. In order to educate all of its residents, Universalization of Elementary Education (1950) was established in India. In the last 60 years, this field has experienced significant expansion. Does this education empower all citizens in the same way, including those who are able and those who are disabled? It is in fact a contentious topic. Others object that particular groups, such as persons with disabilities, are overlooked when others claim that everyone should receive an education to enable them to stand on their own two feet, or to earn a job. The goal of "education for all" is still a long way off, and for people with learning disabilities, it is even further away.

With a population of over a billion, a nation like India frequently experiences issues like unemployment, illiteracy, and poverty. It is challenging to educate a normal child in such a large population and in such extreme poverty; hence, raising special needs children is incredibly challenging. Many kids exhibit typical behaviour yet perform poorly academically compared to their peers. They have learning disabilities (LD), a less well-known condition that encompasses a range of problems with speaking, listening, reading, writing, and math. Such kids frequently endure humiliating public displays. The reality is that LD exists and is a barrier to a country's growth. Why is this happening, and how does it impact development? Despite having average intelligence, a person with LD might not make a significant contribution to the advancement of civilization. Even if a person has average or above-average intelligence and no sensory impairments, such as eyesight or hearing loss, they may nevertheless find it difficult to keep up with peers their own age when it comes to learning and day-to-day activities.

The crucial fact that is overlooked is the fact that these individuals do in fact possess average intelligence. That implies that they can contribute to a country's advancement. Their poor academic performance, which often causes a lack of confidence, is the main thing holding them back. Most survivors were able to live up to their fullest potential. A few examples include George Washington, Winston Churchill, Tom Cruise, Thomas Edison, Albert Einstein, and

Thomas Edison. The biographies of these notable individuals show that, with the right assistance and scientific methods, people with learning disabilities may succeed in life to the fullest extent possible. This help should be given from an early age, starting at home and in school. The best people to aid these kids at this point are their teachers and parents. A learning challenged child's academic success will increase his or her self-esteem and confidence, which will lead to personal growth and contribute to the development of the country.

Learning disability

In India, awareness-raising efforts on problems like learning disabilities are still in their infancy. Rehabilitation services and special education programmes are woefully inadequate. Even if there exist facilities, they are not used because of a lack of knowledge. The burden on affected children, their families, and society as a whole could be significantly reduced if there was greater knowledge of learning problems and culturally acceptable ways to treat the affected children.

Films like Taare Zameen Par have educated audiences about learning disabilities. In the film, an eight-year-old boy named Ishaan Awasthi experiences severe suffering before being diagnosed as dyslexia by his teacher. Both economically and critically successful, this film helped parents and teachers understand why certain kids don't perform to their potential. India continues to lack a good understanding of the incidence and prevalence of LD despite this increased interest. According to experts at Learn 2012, a worldwide conference on inclusive education and career possibilities, at least 10% of youngsters in the nation have learning disabilities. Unfortunately, most schools don't take learning disabilities in children's difficulties seriously. These kids are labelled as failures as a result. A learning challenged person can lead a happy and productive life with the help of accurate diagnosis, early detection, appropriate education, and hard effort, as well as acceptance and support from family, friends, teachers, and others.

Research Methodology

The study sample was for primary school students in the Kerala. For gathering pertinent information for the current investigation, survey and experimental methods were employed. For the purpose of identifying primary-aged children with learning disabilities, the survey approach was used. The most effective way for determining the efficacy of the created Multi Sensory Strategy was discovered to be the experimental method (MSS). The before test-post test non-equivalent design was the experimental strategy adopted in the current study. Primary school kids in the Kottayam District served as the study's sample population. By giving the Diagnostic Test for Learning Disability (DTLD), Intelligence Test, Achievement Motivation Scale, and Learning Problem Checklist to the entire sample, 66 kids with learning disabilities were found for the experiment. The pupils who were found to have learning disabilities were split into an experimental group and a control group. The control group received instruction using the conventional activity-oriented method, while the experimental group received instruction utilising the developed Multi Sensory strategy (MSS) (CAOM). The students in both groups took the standardised academic achievement assessments as pre-tests before the experimental therapy began, and the same tests were taken again as post-tests.

Data analysis is the methodical application of logical and/or statistical approaches to describe and demonstrate, summarise and assess, and assess data. The appropriate and accurate analysis of study findings is a crucial part of preserving data integrity. Inadequate statistical analyses distort scientific results, confuse casual readers, and may have a detrimental impact on how the general public views research. The data are described by the descriptive statistics. They do not make inferences about the data, but they can provide the researcher with information about the variable's central tendency, or the typical participant performance on a particular study measure. The researcher can also determine the range in which scores appear or the distribution of scores on a particular study measure. Descriptive statistics can also be used to inform the researcher about how frequently particular replies or scores appear on a particular study measure.

By using inferential statistics, the researcher was able to start drawing conclusions about the hypothesis from the gathered data. This indicates that the researcher is drawing inferences about the entire population while using inferential statistics to analyse the data. Inferential analysis seeks to infer characteristics of populations from observations of samples. Inferential statistics look for patterns that might exist in the target population by extrapolating beyond the study's data.

The main goal of this study is to determine whether the established Multisensory method has a positive impact on the academic performance of primary school students with learning disabilities. A pre-post non-equivalent group design with one experimental and one control group was used in the study. The conventional activity-oriented method (CAOM) and the multisensory strategy (MSS) were used, respectively, to teach the experimental group and the control group. 60 pupils were selected from the identified learning impaired students as samples for the experimental therapy, 30 for the experimental group and 30 for the control group.

In order to compare student achievement before and after the experiment, the researcher created standardised academic achievement exams, which were utilised as pre-tests and post-tests. The efficiency of the Multi Sensory Strategy was determined by comparing the difference between the pre-test and post-test scores using the appropriate statistical methodologies (MSS). The next sections include the results of the analysis done in this regard.

Variables used in the study

Variables of science are scientific variables that can assume various values and impact the outcomes of experimental study. The independent variables are the conditions or features manipulated or regulated by the experimenter in his or her attempt to determine their relationship to observed phenomena. The dependent variables are the circumstances or features that, as introduced by the experimenter, appear, vanish or change. The independent variables in the present analysis are the teaching strategies, Multi Sensory Strategy (MSS), Traditional Activity Based Approach (CAOM), and

Academic Achievement is the dependent variable.

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Basic level

In Kerala, the term "primary level" refers to the first through eighth standards of education. Students in standard VI were chosen by the researcher as the representative group for the current investigation.

Results and Discussion

Distribution of pre-test and post-test scores on academic achievement of experimental and control group

Frequency tables were created from the pre- and post-test results that were acquired by learning disabled pupils in the experimental and control groups. The following steps involved computing the arithmetic means, medians, modes, standard deviations, skewness, and kurtosis.

Distribution of pre-test scores

Distribution of pre-test and post-test scores on achievement in mathematics of experimental and control group

The children in the experimental and control groups' pre- and post-test math achievement scores were compiled into frequency tables, and the mean and standard deviation were computed. Table-1 lists the combined results of the pre-test and post-test math achievement scores in the experimental and control groups.

Table 1: Shows the average and standard deviation of the experimental and control groups' pre- and post-test math achievement scores

	Group	Mean	Median	Mode	Standard Deviation	Skewness	Kurtosis
Pre	Experimental	11.63	12.00	16	3.953	-0.818	1.072
test	Control	11.47	12.00	14	3.204	-0.891	0.117
Post	Experimental	21.32	22.00	14	2.997	-1.397	1.855
test	Control	12.26	13.00	16	3.634	-0.670	-0.328

Variation can be seen in the median and mean numbers. The experimental and control groups' respective arithmetic mean scores are 21.32 and 12.26. This result demonstrates that the Multi Sensory Strategy (MSS) improved math performance on the post-test. The experimental and control groups' standard deviation figures demonstrate that the scores do not deviate significantly from the mean. The sample has narrow skewness and kurtosis, which indicate that it is roughly normal.

Comparison of the post-test scores on academic achievement as a whole of the experimental and control groups using ANCOVA

There is a substantial difference in the academic accomplishment of the students in these groups, according to an analysis of the post-test scores and gain scores of the students in the two groups (experimental and control groups).

Genuineness of the mean difference in academic achievement as a whole of experimental and control groups

By merely comparing the post-test scores, it cannot be said that the students of the two groups significantly differed on their achievement in the post-test because the two groups chosen for the study were non-equivalent groups and differed slightly in the means of their achievement in the pre-test scores.

Furthermore, the use of the Multi Sensory Strategy (MSS) by itself cannot account for the experimental group's students' higher post-test scores than those of the control group's pupils. In this situation, it was necessary to analyse the data using the statistical method known as Analysis of Covariance (ANCOVA), which allows for comparison of the two groups' baseline status differences.

The ideas of partial correlation are applied to analysis of covariance (ANCOVA). It is especially suitable when it is discovered that the subjects in two or more groups differ on pre-test or other starting variables. The results of the adjusted means of the post-test scores were compared after the effects of the pre-test and other pertinent variables were partially eliminated in this instance. Thus, the analysis of the current study justifies the use of the statistical approach ANCOVA. The sub-heads provide the ANCOVA statistical technique.

- Variance Analysis
- Covariance Analysis
- Comparison of Adjusted Mean Scores

Analysis of variance

Total sum of squares, mean square variances, and F-ratios for the Experimental and Control groups' pre- and post-test academic achievement scores were calculated in this section of the analysis. The analysis of variance table for the learning-disabled kids who were members of the experimental and control groups is shown in table-2 below for the pre-test scores (x) and the post-test scores (y).

Table 2: Students in the experimental and control groups with learning disabilities' pre-test and post-test scores on their overall academic achievement

Source of Variation	df	SSx	SSy	MSx(vx)	MSy(vy)
Among Means	1	1.835	7109.470	1.835	7109.470
Within Groups	59	1862.123	2448.061	29.098	38.251

Fx = 0.063\sFy = 185.864

For df 1/59, the table value of F is 3.99 at the 0.05 level and 7.05 at the 0.01 level.

The calculated result, Fx = 0.063, is lower than the number in the table and, even at the 0.05 level, is not significant. It demonstrates that there is no discernible difference between the academic achievement pre-test scores. The calculated result, Fy=185.864, exceeds the value in the table and is significant at the 0.01 level. Therefore, it may be said that there are significant post-test score differences between the Experimental and Control groups.

Comparison of adjusted mean scores

The significant F ratio requires that the difference be tested individually using the "t" test. Students in the experimental and control groups had their post-test scores adjusted means (y means) calculated. The significance of the variations between the corrected y means was evaluated. Table-3 presents the information and findings.

Table 3: Data and results of test of significance for adjusted means of post test scores with respect to academic achievement as a whole of students in the experimental and control groups with learning disability

Group	N	Mx	My	My.x	't'
Experimental	30	37.87	61.762	61.636	17.312
Control	30	37.26	41.000	41.121	

At the 0.01 level, the calculated t value of 17.312 is significant. It demonstrates that for kids with learning disabilities, the Multi Sensory Strategy (MSS) outperforms the Conventional Activity Oriented Method (CAOM) in terms of academic achievement. Additionally, the MSS Group's adjusted mean academic achievement score is 61.636, which is significantly higher than the adjusted mean academic achievement score of 41.121 for the Conventional Activity Oriented Method (CAOM) Group. This indicates a substantial difference between the academic achievement of the Multi Sensory Strategy (MSS) Group and the Conventional Activity Oriented Method (CAOM) Group as measured by the adjusted mean scores. The key finding from the research above is that, in terms of academic achievement, learning through the Multi Sensory Strategy (MSS) is superior to the Conventional Activity Oriented Method (CAOM).

Conclusion

The children with learning disabilities can either attend a special school or a normal school with additional help to suit their "special educational needs." Parents of children with learning disabilities are hesitant to enrol their normally clever children in special schools since society would not treat a child in a special school as normal. The mainstream school with additional support is the only choice still available. But the majority of the institutions professing to offer inclusive education lack this additional assistance. According to the study's conclusions, Multi Sensory Strategy outperforms Conventional Activity Oriented Method in terms of raising academic achievement among kids with learning disabilities. Therefore, schools might use this technique to give these kids extra support. The Multi Sensory Strategy also helps pupils pay attention for longer periods of time. By making use of the right senses, it will assist these kids in avoiding and compensating for their weaker areas.

A significant contribution of the current work is the design that uses a multisensory strategy. Even while there are predictable expectations for children's development, not all kids grow and change at the same rate. In the current study, the RTI technique is used to address this difficulty. Even in a sizable varied class, each individual receives special attention thanks to the RTI approach used in the design. Therefore, teachers should embrace this design and successfully execute it in their lessons to enhance the academic performance of students with learning disabilities.

The Diagnostic Test for Learning Disability for children at the primary level is another significant contribution of the study. The primary schools can utilise the tool to recognise these kids and to conduct additional research in this area.

Academic frustration and failure are frequent experiences for kids with learning disabilities. As they experience regular success, the Multi Sensory Strategy greatly reduces their academic anxiety. When learning is done through games and activities, it also becomes enjoyable. Their self-assurance and independence will therefore grow as a result of this.

The effect of the established Multi Sensory Strategy design on academic achievement of children with Learning Disabilities does not differ based on gender. This suggests that, regardless of a student's gender, the design can be used to provide special care to those with learning disabilities.

The study found that children with learning disabilities who were taught using a multisensory strategy fared better in English, Malayalam, and mathematics than those who were taught using a traditional activity-oriented approach. In order to meet the unique academic demands of their children in these topics, elementary schools should adopt the design and offer the facilities needed to implement it.

The Multi Sensory Strategy's supremacy is impressive in the completion of several components in English, Malayalam, and Mathematics. This demonstrates that the Multi Sensory Strategy may be successfully applied to enhance achievement in all of these areas where students with learning disabilities have learning difficulties.

A significant barrier to the development of a student with a learning disability is the teachers' ignorance. For children with learning disabilities to succeed, teachers must continually get training in multisensory methods, structure, environment adjustment, curriculum changes, and support. Therefore, in-service training should be given to instructors to inform them of the situation.

To assist students with learning disabilities, teachers must be encouraged to employ instructional tactics like the multisensory strategy. They should be taught the techniques and given time to practise them. Although it initially appears to be a lot of work, it ultimately saves time and energy for both teachers and students.

In their efforts to provide inclusive education for all students, administrators, policy makers, authorities, and instructors will find the current study to be a helpful guide. Only when extra attention is given to children with disabilities can inclusive education be effective in its real sense. According to the study, the Multi Sensory Strategy will guarantee that the less fortunate receive extra attention.

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