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COMPARATIVE ACHIEVEMENTS OF STUDENTS IN MATHS AND ENGLISH IN AN INCLUSIVE EDUCATION CLASSROOM SETTING

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KEYWORDS

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ABSTRACT

The research titled, the comparative achievements of students in Math & English in an inclusive education classroom setting, sought to evaluate the students' academic standing taught using total communication technique in inclusive education classroom and to examine the efficacy of teaching students with and without disabilities. An ABA single-subject experimental design was employed for current investigation. The population comprised students from special education institutions in Swat, including those with hearing, visual, and physical disabilities, as well as general education. Nine tests were created for study, the first three of which were administered to students before the treatment to gauge current level of knowledge as taught by their individual association. During experimental phase, three tests were carried out. Further assessments were administered as post-intervention tests following intervention 03. The academic performance of children with hearing impairments would be significantly impacted by the use of the total communication technique when teaching English and mathematics in an inclusive classroom. The results of the tests conducted before, during, and after the manipulation indicated that null hypotheses would be rejected. As a result, the total communication strategy was used to teach both English and mathematics in an inclusive educational setting, with the significant impact and more learning outcomes in English than in Mathematics.

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INTRODUCTION

Inclusive education, or the inclusion of people with disabilities, is based on acknowledgement that all human beings are fundamentally one. However, they developed their own strengths and weaknesses (Gordon, 2013; Faragher & Clarke, 2020; Gardesten & Hanna, 2025). Inclusive education basically is phrase that aims to address issue of including students with disabilities,

that creates discrimination amid people with disabilities and their non-disabled peers (Shaw, 2024). To make process of inclusion successful, it is crucial to foster a collaborative atmosphere in which individuals in public sector take on social responsibility while working for inclusion (Francisco, Hartman & Wang, 2020). Teachers in the general education setting can perform at their best to support students with disabilities, making the teaching and learning process very challenging (Croft, 2013). Placing the students with disabilities in general education classroom just because of the problems of their disabilities does not mean that they are component of the class.

The students must be enabled to use specific language for communication with their teachers and other members of the class to become efficient members of class, or otherwise, students with disabilities may face problems that are connected to the failure in their communication or achievements in the education, resulting in low grades in comparison to their fellow students (Hunter, Hunter & Anthony, 2020). This might create anxiety and lead the students to leave the education and drop out of the educational institute (Kart & Kart, 2021). As teaching moves towards a more child-centered approach, debate over ways to differentiate between teaching and curriculum to address needs of students with special educational needs would increase that can vary depending on context, support structures & instructional strategies. The process is more pronounced when the teaching methodologies of children with hearing impairments are considered in an inclusive educational setting (Efthymiou & Kington, 2017). Subjects like English & Mathematics have been predictably perceived as challenging, with assumption that sequential skills develop more than in other areas of teaching content (DeSimone & Parmar, 2006).

Currently, research projects are investigating effectiveness of school teachers, including those teaching Mathematics & English, using total communication technique in inclusive education classrooms (Krammer, Klicpera, Holzinger & Wohlhart, 2019). Thus, the connection between knowledge of Mathematics and English Literature with special or inclusive education is of great importance as the scope of the definitions overlaps (Direct Instruction). This extension and connection of fields bring prosperity through diversity of techniques and methodologies; however, they also challenge the improvement of typical amount of understanding (Szumski, Smogorzewska & Grygiel, 2022). Reviewing this, the methodological issues associated with conducting research in field of inclusive education and offering recommendations for better synergies between the educational fields (Nkoma, 2018). Numerous programs and agendas worldwide have produced abundant evidence and information about the effectiveness and use of inclusive education. In our country, the inclusive education has been adopted as an essential approach to ensure the equal and equitable education for all, regardless of ability or disability.

In our country, the perception of teachers also favors inclusive education and both children with and without impairments can gain significantly from inclusive education (Ullah, Ullah, & Iqbal, 2025). The majority of research on inclusive education has been conducted in special education. It is important to note that only few studies exist on how students with disabilities

can be educated alongside their peers in mainstream, especially in mathematics and English. Students with disabilities face communication and instructional challenges in these subjects. By comparison, this study aims to provide the valuable basis for the effectiveness of inclusive experiences in educational institutions of Pakistan. The present study sought to document the steps and procedures involved in successful incorporation of students with disabilities into inclusive educational settings, harnessing the total communication technique as a medium of instruction, and to assess the efficacy of this approach for the students with disabilities. The findings of study will equip educators and policymakers to develop more effective strategies to support all students' participation and academic performance within the national education system.

Problem Statement

Studies on inclusive education typically emphasize students with Special Educational Needs. However, numerous researchers have pointed out that the lack of practical research upon the educational achievement outcomes of students with and without special educational needs. In addition, some researchers have reported conflicting results regarding the consequences of the inclusion on the academic achievement of students without disabilities. A Literature review found no research on comparative achievement levels of disabled and non-disabled students in an inclusive education classroom. The main aim of this study was to expand research on comparative academic achievement in math and English amid learners in inclusive education classroom.

Research Objectives

1. To compare the academic achievement of students in learning math and English in an inclusive education classroom.
2. To analyze level of understanding and conceptualization of Math & English of students in inclusive education classroom.

Research Questions

1. What are the key elements that foster educational achievements of students with and without disabilities in an inclusive education classroom?
2. What are the strategies that might be used to enhance the learning of students with and without disabilities in an inclusive education classroom?

Research Hypotheses

H0: There is no significant difference in comparative achievement of students in math and English in an inclusive education classroom.

H1: There is a significant difference in comparative achievement of students in math and English in an inclusive education classroom.

Research Significance

This study can empower teachers in special and general education institutions, administrators in both settings, students themselves & especially parents of children with special educational needs to acquire a comprehensive body of the knowledge and information that could support

successful teaching and learning in an inclusive education program. It might help special and general education teachers show flexibility with students with and without disabilities in their collective educational environment, with extensive experience of the teachers teaching in an inclusive education program, many mathematics problems and English language proficiency skills can be solved, especially with the students with hearing impairments. Furthermore, this study might help the educationists, administrators, policymakers, organizations, and special educators inform the future policies and research and develop an appropriate methodology to improve the learning outcomes of students with the disabilities through an inclusive education program.

LITERATURE REVIEW

An inclusive education classroom has been observed as the most effective setting for students with disabilities, especially students with hearing impairments (Bamu, Schauwer, Verstraete & Hove, 2017). It is a fact that Education for All (EFA) follows principle of equal opportunities for all the learners to be educated together in the same educational classroom. The process of inclusion in education is one of best educational choices for students with disabilities without discrimination against the disabilities and their severity (Francisco, Hartman & Wang, 2020). It has been observed that the process of inclusion in an authentic educational environment that delivers services to all the students with disabilities in a general education classroom, and students with disabilities are related to their non-disabled peers (Roldán, Marauri, Aubert & Flecha, 2021). The studies on the use of total communication technique for teaching students with hearing impairments in inclusive education classrooms have primarily focused on the quality of the teaching and the students' learning achievements. A study was conducted to determine whether the teacher's use of the total communication technique could improve the educational achievement of the students with hearing impairments in an inclusive education classroom.

The study found that using the total communication technique while teaching in an inclusive education classroom did not yield the estimated significant improvement in students' learning (Ruijs, 2017). Research has shown that students with hearing impairments, who were taught using total communication technique, performed noticeably better than those taught through sign language. A study on using the total communication strategy as a universal remedy for hearing impairment in inclusive education classrooms found that teachers were trained to use total communication technique while teaching students with hearing impairment (Szumski, Smogorzewska & Karwowski, 2017). Thus, despite these studies, there is considerable lack of information on the perception of teachers with reference to the use of the total communication strategy while teaching students with hearing impairment in inclusive education classrooms, the difficulties they face, and strategies to overcome such difficulties. Consequently, current studies investigate perceptually difficulties teachers faced when using the total communication strategy in teaching the students with the active hearing impairment in an inclusive education classroom, and to search for ways to facilitate teachers in overcoming these difficulties (Walsh, 2018).

It is significant to recognize the difficulties faced by teachers when teaching through the total communication technique in inclusive education and explore level of support required. Since responses from teacher's side and support specify, prediction being observed as challenging to identify the behavior of the children, what is level of their knowledge and understanding of English and Mathematics? Indeed, identifying way to avoid behaviors that are unfavorable to the learning process remains a challenge for the researchers (Weiss, Markowetz & Kiel, 2018). Slight research is available that takes into account the multiplicity of circumstances in which strategies and approaches need to be applied to teaching children with the special educational needs (Efthymiou & Kington, 2017). Therefore, inclusive classrooms that employ participatory teaching diverse methods tend to support the learners in reaching their academic potential by accommodating different learning styles and promoting deeper engagement with content. By contextual diversity, it is meant that schools functioning in very diverse contexts and facing many challenges associated with the limited socio-cultural settings, likewsie the schools facing difficult surroundings, schools with high numbers of children from various ethnic minority groups.

It is vital if the aim is to increase understanding of how to replicate measures of achievement in schools more effectively (Young, McNamara & Coughlan, 2017). Though, there is a growing acceptance of the need to detect the education of students with Special Educational Needs within inclusive education policy and exercise, with an emphasis over the improvement of the entire learning environment and integrating teaching and learning courses that apply to all children which might be a tactic that may avoid some children from developing the Special Educational Needs at priority level (Zagona, Kurth & MacFarland, 2017). This is particularly relevant for students with the special educational needs, for whom adaptations and targeted supports can improve numeracy gains over time. In all extents of need, research is conducted with young children. Insufficient evidence is found on the effects of different strategies at different stages of the education, although there has been durable evidence supporting early intervention in all areas of need. Research also suggests that without sufficient support, gains in mathematics can be limited for some students, especially those requiring individualized instructional adjustments. Therefore, with the exclusion of research on social and emotional development & self-determination, insufficient studies have focused on older learners (Sandhu, 2017).

RESEARCH METHODOLOGY

The study was carried out to investigate the comparative learning achievements in Math and English amid students with and without disabilities. The following research methodology.The study design was experimental. ABA single-subject experimental design was used to conduct study.

Population of Study

The population of the study was comprised of the students studying in class 7th selected from Government High School No.4 Mulla Baba Swat (General education), Government Institute for Children with Hearing and Speech Impairments, Swat (Special Education), Government Institute for Visually Impaired Children swat (Special Education) and Government Institute

for the Mentally Retarded and Physically Handicapped children Batkhela (Special Education). The total number of the students in class 7th at Government High School No.4 was 72; at the Government Institute for the Children with Hearing as well as Speech Impairments, Swat, 15, the Government Institute for the Visually Impaired Children, Swat was 05, and Government Institute for the Mentally Retarded and Physically Handicapped children, Batkhela was 07 in study.

Sampling of Study

Since the population of the study was comprised of students in class 7th, where the number of students selected from Government High School No.4 was 05, Government Institute for the Children with Hearing and Speech Impairments, Swat was 05, Government Institute for the Visually Impaired Children, Swat was 05. Government Institute for the Mentally Retarded and Physically Handicapped Children, Batkhela was 05 as evident in study. In this connection, these students were selected on the basis of equal sample size, and a simple random sampling technique was used to carry out this study. A total of 20 students were selected as the study sample.

Instrumentation of Study

Since the study was experimental in nature, an ABA single-subject design was used to carry out this study. The study used 9 tests developed from subject of math and 09 tests developed from subject of English. These tests were administered in 3 phases, i.e., before intervention, during intervention, and after intervention. Three tests in each subject were taken as the tests before intervention and were meant to check the current status of the students' knowledge, whereas three tests in each subject were taken during intervention to check the progress of the students' achievement, and three tests in each subject were taken after intervention to check the differences in the learning. The results obtained from the tests were considered for further analysis.

Intervention of Study

The students selected from four diverse categories of special education (Hearing Impairment, visual impairment, physical Handicapped), general education settings were set and instructed in a general education classroom. Before intervention, 03 tests were taken in the initial three chapters of class 6th mathematics and English to check current level of understanding. Then students were taught using total communication strategy, is a combination of sign language, facial expressions, gestures, and verbal communication. The next three chapters, i.e., chapter 04, 05, 06 in each subject, were taught through a total communication strategy. These students were again tested, and communication strategy was analyzed. The intervention process took almost 15 weeks. At the end of intervention period, students were again tested to compare the results of successes in mathematics, English before intervention, during intervention, and after intervention.

Data Collection & Analysis

The data collection process took 16 months. Three tests before intervention were taken to check the current knowledge and understanding of the students, in which they were taught in

their relevant settings, three during intervention, in which these students were taught through the total communication technique, and three tests after the intervention period were taken. In order to analyze student's comparative learning outcomes in Math and English in an inclusive education classroom, the results of all nine assessments were gathered. In order to examine educational performance of students with and without impairments in an inclusive education classroom, data were analyzed using a repeated-measures ANOVA. The test's mean values before, during, and after intervention were compared, the mean scores were analyzed using descriptive statistics, & Mauchly's Assumption of Sphericity was used to verify the sphericity assumption.

The p-value was 0.592, which was greater than the standard value of 0.05, and the assumption that the assumptions of sphericity were met meant that the p-value was significant, leading to the conclusion that the use of the total communication strategy in the inclusive education classroom would have an impact on student's academic outcomes. Mauchly's Assumption of Sphericity, tests of within-subject effects, and thus another comparison statistic displaying the descriptive statistics were also obtained. When taught using total communication technique, students' learning achievement in English was more notable than in mathematics, according to these comparative statistics. Consequently, the repeated-measures ANOVA results were used to draw conclusions, summarize the study's findings, and offer suggestions for the additional research.

RESULTS OF STUDY

The results of current study are produced in this section to systematically present the leading outcoms.

Table 1

Mauchly's Test of Sphericitya

Measure: MEASURE_1							
Within Subjects Effect	Mauchly,s W	Approx. chi-square	df	Sig	Epsilonb		
					Greenhouse-Geisser	Huynh-feldt	Lower-bound
Test	811	1.049	2	.592	.841	1.000	.500

The sphericity assumption was either met or broken, as seen in Table 1 above. The column with significance value in Mauchly's Test of Sphericity is most crucial. Since the significance value of 0.592 is greater than critical value of 0.05, it may be concluded that the assumption of sphericity had been satisfied and that substantial differences could be seen in the variances of score differences. The assumption of sphericity was not violated, according to Mauchly's Test of Sphericity, $\chi 2$ (2) = 1.049, p = .592. One could conclude that there is no substantial change in the variance. When assumed, Mauchly's Test of Sphericity indicates that the null hypotheses have been disproved. The alternative hypotheses were validated, leading to conclusion that student comprehension & performance in English were significant higher than in mathematics when total communication technique was used to teach both subjects in inclusive education classroom.

Table 2

Tests of Within-Subjects Effects

Measure: MEASURE_1									
	Source	Type III SS	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent Parameter	Observed Power[a]
TEST	Sphericity Assumed	352.381	2	176.190	65.487	.000	.916	130.973	1.000
	Greenhouse-Geisser	352.381	1.682	209.527	65.487	.000	.916	110.135	1.000
	Huynh-Feldt	352.381	2.000	176.190	65.487	.000	.916	130.973	1.000
	Lower-bound	352.381	1.000	352.381	65.487	.000	.916	65.87	1.000
Error (Tests)	Sphericity Assumed	32.286	12	2.690					
	Greenhouse-Geisser	32.286	10.091	3.200					
	Huynh-Feldt	32.286	12.000	2.690					
	Lower-bound	32.286	6.000	5.381					

The ANOVA findings are shown in Table 2 above, which highlights most important outputs. Since it is related to the significance level and effect size (Partial Eta Squared), the F value for the "Tests" factor would be presented. Thus, the numbers would show up in the "Sphericity Assumed" row since the data satisfied the sphericity assumption. Students' achievement levels in Math and English differ significantly, as indicated by the Sphericity Assumed line's p-value of.000.

DISCUSSION

The main purpose of the study was to examine students' achievements in Math and English in an Inclusive Education Classroom Setting. The study was experimental and followed an ABA single-subject design. Tests were used before, during, and after treatment session. The data obtained were analyzed using descriptive and inferential statistics. In Table 1, column with the significance value in Mauchly's Test of Sphericity is the most crucial. Since the significance value of 0.592 is greater than critical value of 0.05, it may be concluded that the assumption of sphericity had been satisfied and that substantial differences could be seen in the variances of score differences. The assumption of sphericity was not violated, according to Mauchly's Test of Sphericity, $\chi 2$ (2) = 1.049, p = .592. It could be concluded that there is no substantial change in the variance. When the assumption is violated, Mauchly's Test of Sphericity indicates that the null hypothesis is rejected. he key lies in tailoring the inclusive approaches to the specific cognitive demands of each subject & ensuring that all learners receive the support they need to succeed.

The alternative hypotheses were validated, and same findings were also explored by Ullah, Rana, and Habib (2022); MED et al. (2017), that total communication has a significant effect on student performance that leading to conclusion that student comprehension and performance in English were significantly higher than in mathematics when total communication technique was used to teach both subjects in an inclusive education classroom. In Table 2, the ANOVA findings highlight that the most important outputs, Teaching Math and English to children with and without impairments in an inclusive school setting with a complete communication strategy, had a significant impact (F (2, 12) = 65.487, p = .000, $\eta p2$ = 1.000). When applying the total communication strategy in an inclusive education class, there is a significant difference in

learning accomplishment between students in the English and Mathematics, with student's achievement in English being relatively greater than in Mathematics, according to the primary ANOVA. The same findings fall in line with those explored by Hasan and Khan (2015); Awan, Noureen, and Naz, (2011) that students perform better in the English subject compared to the Mathematics.

Findings of Study

1. Since the critical value is lower than significance value, or 0.05, it may be determined that the assumption of sphericity had been satisfied and that significant differences could be seen in the variances of score differences.
2. Since the sphericity assumption has not been violated, it is possible to conclude that the differences are not substantially different.
3. The alternative hypotheses were approved and null hypotheses were denied, leading to the conclusion that when the total communication technique was used to teach both English and Mathematics in inclusive education classroom, student achievement levels were greater than those of Mathematics.
4. The Sphericity given that assumed line yields a p-value of.000, it is possible to conclude that there is significant difference in outcomes between Math and English examinations administered at three distinct stages: before, during, and after the intervention in the particular contest.
5. The findings and values are significant, which indicates that academic performance of both students with and without impairments is significantly impacted by the use of the total communication technique when teaching English and Mathematics to students in an inclusive education classroom.

CONCLUSION

The purpose of the study, "Comparative Achievement of students in Math and English in an inclusive education Classroom in Swat, Pakistan," was to compare the academic performance of students taught using the total communication technique in inclusive education classroom and to find out how effective it is to teach students with and without disabilities. The study's goal was to compare academic achievement & instructional efficacy using inclusive education program and the total communication technique. An ABA single-subject experimental design was used for the investigation. Students from Swat's General Education and Special Education Institutions (Visually Impaired, Hearing Impaired & Physically Handicapped) made up study population. Six of the 24 students in the study population were chosen at randomly to make up study sample. Nine tests were created for study, first three of which were given to students before treatment in order to gauge present level of knowledge as taught by their individual association. Then, during manipulation phase, three tests were carried out. Tests were used to assess the pupil's development after they were instructed utilizing the total communication technique.

Further examinations were conducted as post-treatment tests subsequent to intervention 03. Tutoring English and mathematics to students with and without impairments using the total

communication technique had significant impact on student's learning, according to results of repeated-measures ANOVA analysis of data gathered from these tests, which revealed that the null hypotheses were denied. The study concluded that English mean scores were higher than Math mean scores. Academic performance of children with hearing impairments would be greatly impacted by the use of total communication technique when tutoring English and Mathematics in an inclusive classroom. The results of the tests conducted prior to, during, and following the intervention indicated that null hypotheses would not be accepted. As a result, the total communication strategy was used to instruct English and Mathematics in inclusive educational setting, with a significant impact and more educational targets in English than in mathematics.

Recommendation

1. As it was evident from the findings of study that total communication has significantly improved academic performances, total communication strategies may be implemented in an inclusive classroom.
2. As students' performance was low in mathematics as compared to English, additional support is needed in the form of the use of A.V Ads, a step-by-step solving method that may help the students.
3. Success of IE depends on teacher skills; teachers be trained professionally to strengthen professional skills in using collaborative learning, peer tutoring & one-to-one teaching strategy in inclusive setups.
4. As the current study manifested many gaps, future research studies are recommended in the area to explore why total communication is not as more effective as in English in the paritucalr context.

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