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Comparative Study

Offline v/s Online Academic Therapy: A Comparative Study of Learning Outcomes

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ABSTRACT

In recent years, online education has gained widespread attention. However, it wasn't until the COVID-19 pandemic that it became the primary method of education globally. The sudden shift from traditional in-person teaching to online learning significantly changed teaching methods, content management, assessments, and learning outcomes. Research on the impact of these changes has yielded mixed results, with some studies reporting learning gaps, while others observed enhanced progress or no significant difference between online and offline learning. Students with special education needs required additional academic and emotional support, similar to what was provided in traditional classrooms. Therefore, specialized remedial instruction programs were employed to help these students bridge potential learning gaps. This research study sought to compare the learning outcomes of remedial instruction in offline versus online settings. Using a quantitative method, data was collected on the learning outcomes of academic therapy for twenty-five students with special education needs at Drishti, a therapy centre in Mumbai, Maharashtra, India. The study results indicated no significant difference in the comparative learning outcomes of academic therapy across the two modes – offline (before the pandemic) and online (during the pandemic lockdown), suggesting similar levels of effectiveness in both settings. Additionally, the study shed light on the roles of other specific variables in the learning process.

Keywords: *COVID-19 Pandemic, Remedial Instruction, Academic Therapy, Online, Offline, Individualized Education Program (IEP)*

Education is designed to facilitate the acquisition of knowledge, enhancement of competencies and skills, and overall personal development. The effectiveness of this learning and growth process depends on various factors, including the learner, instructor, pedagogy, educational framework, and teaching-learning environment. Over the past decade, there has been a significant shift in the educational system from traditional offline learning to online learning, as well as a combination of these two modes of teaching.

Online education is transforming classroom pedagogy. Research has shown mixed results for traditional versus virtual methods of education delivery. A comparative study by Hurlbut (2018) suggests that students in traditional classrooms achieved better grades and

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assignment scores than those in online classes. Whereas, a study by Hannay & Newvine (2006) found that students in part-time online courses preferred distance education for its flexibility in time management and balancing other commitments.

In a literature review by Chandrasekhar (2021), recent evidence on the impact of traditional remediation interventions indicates varying effects, as remedial courses seem to help or hinder students differently based on state, institution, background, and academic preparedness. Some recent studies evaluating mentoring approaches have found positive effects and noted that face-to-face services cannot be easily replaced by online teaching. A research study by Volery & Lord (2000) highlights three critical factors for success in online learning: technology, the instructor, and students' previous experiences with technology.

Pandemic of COVID-19 and virtual education

The global COVID-19 pandemic resulted in the closures of educational institutions worldwide, leading to a widespread shift towards online or virtual teaching and learning. This transition has been a significant and challenging experience for both educators and students, prompting the adoption of various pedagogical approaches to maintain the quality of education. E-learning tools played a pivotal role in facilitating student learning during this period of closure (Subedi et al., 2020). While educators, schools, institutes, and governments have faced substantial challenges, the pandemic has also presented opportunities for the implementation of e-learning systems that were previously distant plans.

Mishra et al. (2020) conducted a study during the COVID-19 outbreak and subsequent academic disruptions, highlighting how online teaching and learning can address essential educational needs and effectively transform formal education into an online format using existing institutional resources. However, the authors anticipated that students may encounter challenges such as limited peer tutoring and remedial teaching in promoting quality education through online platforms.

Notably, the pandemic has resulted in a closer connection between teachers and parents, with homeschooling requiring increased support from parents in both academic and financial aspects. Furthermore, parents of students with learning disabilities or other special needs have had to take on additional responsibilities, often acting as untrained specialists (Young & Donovan, 2020).

Impact of the COVID-19 pandemic on children & families:

In a comprehensive report published by UNICEF in 2021, the immediate effects of COVID-19 on children and adolescents were highlighted. The challenges posed by physical distancing and school closures have led to a myriad of conditions impacting the students. These include an increase in internalizing conditions such as depression, fear and anxiety as well as externalizing conditions including anger, irritability and impulsivity. Furthermore, evidence presented in the report indicates an increase in alcohol consumption and substance use during the pandemic (Sharma et al., 2021).

The impact of the COVID-19 pandemic on the education and well-being of children with special education needs and their caregivers has been significant. Caregivers were faced with the complex task of fulfilling multiple roles, from being a parent, and educator, to a researcher in their quest to establish suitable routines and solutions for their children. Many parents encountered challenges as they navigated through the trial and error process of facilitating their children's engagement in the virtual classroom (Nelson, 2020). Parents of

children with special needs have reported experiencing feelings of loss, worry, and changes in the mood and behaviour due to the rapid social changes that have taken place. Additionally, they have expressed being overwhelmed by the situation (Asbury et al., 2019). Families from economically disadvantaged backgrounds have struggled to afford the technology infrastructure and devices required for online education, resulting in significant learning setbacks for their children (Thirumoorthy, 2021).

On the academic front, while students have been engaging in virtual learning through online lessons and worksheets, many students with special needs have not received adequate feedback and educational support services (Yazcayir & Gurgur, 2021). The unanticipated shift from traditional face-to-face learning to virtual education has presented substantial challenges for students with special needs (Angode & Reesa, 2021). An analysis by UNESCO on empowering students with disabilities during the COVID-19 crisis revealed that students with disabilities have received inadequate educational support as a result of the pandemic. UNESCO has suggested various strategies, including accommodations, modified curricula, Universal Design for Learning (UDL), project-based learning, ensuring Individualized Education Programs (IEP), and fostering collaboration between parents and teachers (Chalasani, 2020).

Given the uncertainty surrounding the reopening of schools, it was imperative to focus on foundational skills and rebuilding the necessary educational groundwork to address learning gaps and sustain a manageable pace of academic growth for children with special needs. Remedial education programs play a crucial role in bridging learning gaps, particularly for students with special needs, as they target the academic challenges faced by these students and aim to strengthen core learning processes. Hynes (2016) has critically evaluated and emphasized the importance of implementing remedial and pullout interventions to support students with learning difficulties in inclusive classrooms.

Remedial Education Programs:

The approach to learning as an interactive and collaborative activity emphasizes a student-centred approach, with the teacher assuming the role of a facilitator or coach (Giesbers et al., 2009; Jelfs & Colbourn, 2002; Maor, 2003; Van Gastel et al., 2009). For effective online remedial teaching, the educator's responsibilities in designing and organizing the learning experience, providing technical guidance and support, encouraging and facilitating discussions, promoting participation, employing various forms of instruction, and addressing communication issues are critical (Anderson, 2008; Brown & Bradley, 2005; Giesbers et al., 2009; Levin & Calcagno, 2008; Lim & Cheah, 2003; Maor, 2003; Rienties et al., 2006).

Online remedial education, defined as an instructional method utilizing information technology to assist students in acquiring the necessary knowledge and skills for academic success (Rienties et al., 2008b), draws from research on remedial education in traditional settings and emphasizes several key aspects for designing or implementing an online remedial or developmental course. These include ensuring 24/7 online availability and accessibility of course materials, enabling ubiquitous learning through internet-based study opportunities, and incorporating adaptiveness to tailor the program to individual student's prior knowledge, learning styles, and preferences (Giesbers et al., 2009; Rienties et al., 2006; Rienties et al., 2008b; Van Gastel et al., 2009).

Remedial instruction programs have demonstrated effectiveness in enhancing both general and domain-specific learning among students. Karibasappa et al. (2008) observed significant

improvements in pre-operational and operational domains of mathematical skills among children participating in such programs. Moreover, remedial instruction has shown long-term benefits in students' completion of post-secondary education and annual evaluations (Lavy et al., 2018). Bessho et al. (2019) found positive effects of remedial education programs on test scores for Japanese language arts, although no statistically significant effect was observed for mathematics test scores.

While online instruction presents challenges for special education students, particularly during the pandemic, parental involvement has become crucial in supporting these students. Young & Donovan (2020) noted that the shift to online learning has necessitated parents' involvement in guiding their children through educational activities, posing challenges related to understanding their role as educators and the level of engagement required.

Aims & Hypotheses

This research study underlines the potential impact of online teaching-learning, emphasizing the positive influence of in-person remedial instruction on student learning. There is a paucity of Indigenous research comparing online and offline teaching-learning during the COVID-19 pandemic, necessitating a contribution to the evolving data and knowledge on this subject.

This current research thus aims to examine and contrast the effects of offline versus online remedial instruction on the academic outcomes of students with special education needs, both before and during the COVID-19 pandemic.

This study also seeks to delve into other pertinent issues, including the response of specific learning domains to virtual instruction, the influence of virtual remedial instruction across age groups, and the differential impact across two diagnostic classifications of special education needs.

This research study posits a null hypothesis:

- H_0 - There will be no significant difference in learning outcomes between offline and online modes of remedial instruction for students with special education needs.

The study also proposes an alternative hypothesis:

- H_a - There will be a significant difference in learning outcomes between offline and online modes of remedial instruction for students with special education needs.

METHODOLOGY

Sample:

The research participants consisted of twenty-five students enrolled in a remedial education program at Drishti, a Diagnostics and Therapy Centre for Special Education Needs (SEN) in Mumbai, India. Some students had received formal diagnoses of primary learning disabilities, while others displayed indicators and were considered 'At Risk' of specific learning disorders. The participants' ages ranged from 6 to 17 years, spanning school grades 1-12.

The demographic details of each student participant are presented in Table 1, adhering to research guidelines and ethical standards by providing only basic demographic information.

Table 1: Demographic details of the participants

Participant	Gender	School Grade	Diagnosis	Category
Participant 1	Female	1	Significant deficits in the areas of Reading, Spellings, Handwriting and Written Language. Manifestations are seen in the area of inattention.	'At risk' for Specific Learning Disorder
Participant 2	Male	2	Deficits in the areas of Reading, Written Language and Mathematics. This is accompanied by deficits in the visual modality, delayed recall and visual-motor perceptual skills.	'At risk' for Specific Learning Disorder
Participant 3	Male	2	Developmental Delays (cognitive and pre-academic skills). Childhood Speech and Language disorder (as per concurrent speech assessment).	'At risk' for Specific Learning Disorder
Participant 4	Male	2	Deficits in Spoken English Language. Deficits in Mathematics. Curricular deficits in Reading and Written Language.	'At risk' for Specific Learning Disorder
Participant 5	Male	3	Specific Learning Disorder, With impairment in Reading (Dyslexia) 315.00 (F81.0), With impairment in Written Expression 315.2 (F81.81) and with impairment in Mathematics (Dyscalculia) 315.1 (F81.2); Severe range.	Specific Learning Disorder
Participant 6	Male	3	Significant deficits in the areas of Reading, Written Language and Mathematics.	'At risk' for Specific Learning Disorder
Participant 7	Male	4	Deficits in the areas of Reading, Written Language and Mathematics. This is accompanied by deficits in visual-motor perceptual skills.	'At risk' for Specific Learning Disorder
Participant 8	Male	4	Deficits in the areas of Reading, Written Language and Mathematics.	'At risk' for Specific Learning Disorder
Participant 9	Male	4	Deficits in the areas of Reading, Written Language and Mathematics. These difficulties are accompanied by deficits in visual-motor perceptual skills.	'At risk' for Specific Learning Disorder
Participant 10	Female	4	Deficits in the area of Written Language and Mathematics. This is accompanied by deficits in visual-motor perceptual skills.	'At risk' for Specific Learning Disorder

Participant	Gender	School Grade	Diagnosis	Category
Participant 11	Male	4	Deficits in the areas of Reading, Written Language and Mathematics.	'At risk' for Specific Learning Disorder
Participant 12	Male	4	Deficits in the areas of Reading, Written Language and Mathematics. This is accompanied by deficits in the auditory modality.	'At risk' for Specific Learning Disorder
Participant 13	Male	5	Specific Learning Disorder, 315.00 (F81.0) With impairment in Reading (Dyslexia), of moderate severity, 315.2 (F81.81) With impairment in Written Expression, of moderate severity and 315.1 (F81.2) With impairment in Mathematics (Dyscalculia), Severe range.	Specific Learning Disorder
Participant 14	Male	6	Deficits in the areas of Reading, Written Language and Mathematics. These difficulties are accompanied by deficits in visual motor perceptual skills.	'At risk' for Specific Learning Disorder
Participant 15	Male	6	Deficits in the areas of Reading and Written Language. Curricular deficits in Mathematics. This is accompanied by deficits in visual motor perceptual skills.	'At risk' for Specific Learning Disorder
Participant 16	Male	7	Specific Learning Disorder, With impairment in Reading (Dyslexia) 315.00 (F81.0), With impairment in Written Expression 315.2 (F81.81) and with impairment in Mathematics (Dyscalculia) 315.1 (F81.2); Severe range.	Specific Learning Disorder
Participant 17	Female	8	Significant deficits in the areas of Reading, Written Language and Mathematics. This is accompanied by deficits in visual motor- perceptual skills.	'At risk' for Specific Learning Disorder
Participant 18	Male	8	Deficits in the areas of Reading, Written Language and Mathematics. This is accompanied by deficits in word fluency and visual motor perceptual skills.	'At risk' for Specific Learning Disorder
Participant 19	Male	8	Deficits in Spoken English Language. Deficits in the areas of Reading, Written Language and Mathematics. This is accompanied by deficits in auditory modality, delayed recall, word fluency and visual motor perceptual skills.	'At risk' for Specific Learning Disorder

Participant	Gender	School Grade	Diagnosis	Category
Participant 20	Male	8	Deficits in the areas of Reading, Written Language and Mathematics. This is accompanied by deficits in auditory and visual perceptual skills, and information processing skills (memory).	'At risk' for Specific Learning Disorder
Participant 21	Female	8	Deficits in the areas of Reading, Written Language and Mathematics. This is accompanied by deficits in the area of auditory modality.	'At risk' for Specific Learning Disorder
Participant 22	Male	8	Specific Learning Disorder, With impairment in Reading (Dyslexia) 315.00 (F81.0) and with impairment in Written Expression 315.2 (F81.81); Moderate severity. Deficits in Mathematics.	Specific Learning Disorder
Participant 23	Female	8	Specific Learning Disorder, With impairment in Reading (Dyslexia) 315.00 (F81.0) and with impairment in Written Expression 315.2 (F81.81); Moderate severity. Deficits in Mathematics.	Specific Learning Disorder
Participant 24	Male	8	Specific Learning Disorder, With impairment in Reading (Dyslexia) 315.00 (F81.0), With impairment in Written Expression 315.2 (F81.81) and with impairment in Mathematics (Dyscalculia) 315.1 (F81.2); Severe range.	Specific Learning Disorder
Participant 25	Male	11	Specific Learning Disorder, With impairment in Reading (Dyslexia) 315.00 (F81.0), With impairment in Written Expression 315.2 (F81.81) and with impairment in Mathematics (Dyscalculia) 315.1 (F81.2); Severe range.	Specific Learning Disorder

Research Variables:

The research study has two Independent Variables (IV):

- Remedial instruction delivered in Offline mode.
- Remedial instruction delivered in Online mode.

The main Dependent Variable (DV) in the study:

- Learning outcomes of the remedial instruction program.

Operational Definition:

Independent Variables:

1. Offline Mode of imparting Remedial instruction: The remedial instruction was imparted across in-person sessions with a remedial educator.

2. Online mode of imparting Remedial instruction: The remedial instruction was imparted over a virtual mode/ digital platform by a remedial educator.

Dependent Variable: Learning outcomes. This refers to the targeted goal achievement, as per a statement of goals in an Individualized Education Program (IEP), by the end of the IEP term/plan.

Research Design:
The variables of this study i.e. learning outcomes as a function of online and offline modes of imparting remedial instruction were studied using a descriptive research design.

Sampling Procedure:
The study utilized a representative sampling method.

Data Collection Tools & Procedure:
An Individualized Education Plan (IEP), with multiple goals across learning domains as per the student's assessed needs, had been developed previously for each participant using the e-IEP, Drishti's indigenous web-based therapy creation and management system. An IEP outlines the goals, support and services a child with special education needs (SEN) might require for therapy and continued progress in school.

The data for this study was collected retrospectively. Research data was quantitative and consisted of evaluation scores extracted from the progress reports of each student's IEP. The progress reports highlighted the percentage of overall and domain specific IEP goal achievement of each of the participants.

Data Analysis:
Research data was analysed using the deductive approach. This approach aims towards developing a hypothesis, testing it and examining the outcomes. Quantitative data was collected from the progress reports of the e-IEP of each participant.

Statistical Analysis:
A paired sample t-test was conducted to determine if the difference between the mean scores of the two groups was statistically significant.

RESULTS

The current research study was conducted to explore and compare the impact and efficacy of remedial instruction delivered via two different modes: offline mode and online mode. For this purpose, the mean scores of remedial therapy term-end evaluation were gathered for each participant. These scores were extracted from the progress reports of both offline and online modes of learning.

A paired sample t-test was performed to determine whether there is a statistically significant difference between the mean scores of the learning outcomes of remedial instruction using two different modes of teaching- offline vs. online.

Table 2: Comparative analysis of the mean scores across modes of remedial instruction

	Mean	N	Std. Deviation	Std. Error Mean
Offline Mode	75.5728	25	8.85441	1.77088
Online Mode	73.1584	25	10.49230	2.09846

As can be seen in the above table, the mean score of students in the offline learning mode was found to be 75.5728 and that of students in the online mode of learning was found to be 73.1584. The Standard Deviations for the same were found to be 8.85441 and 10.49230 respectively.

Table 3: Difference in the Mean scores across modes of remedial instruction

					Significance	
	Mean	**Std. Deviation**	**t**	**Df**	**One-sided p**	**Two-sided p***
Offline-Online	2.41440	13.50058	.894	25	0.190	0.380

As can be seen in the above table, the mean difference between the two modes of remedial instruction was found to be 2.41440. The obtained corresponding two-tailed p-value was calculated to be 0.380 at df (25) which is greater than 0.05. t- value is found to be insignificant. Therefore, a significant difference does not exist between the two groups in their achievement of IEP goals.

Furthermore, the study also explored ancillary data,

- The data collected for treatment for all participants spanned from 2019 to 2020 (before and during COVID-19). To understand the effectiveness of the therapy, the duration of remedial therapy was also factored into consideration. The data was bifurcated into long-duration (greater than 12 months) and short-duration (12 months or less).
- This data aimed to compare the effectiveness of online vs. offline remedial instruction to students with special education needs across school grades, clustered into Primary and Secondary sections.
- The effectiveness of therapy delivered in different modes on the learning outcomes in various domains (Reading, Writing, Math) was studied.
- The learning outcomes of students who are diagnosed with a Specific Learning Disorder (SLD) were compared with students who currently only have indicators or are 'at-risk' for SLD (no diagnosis). Findings are represented with the help of a bar graph.

Table 4: Mean scores of students across modes of remedial instruction- Short duration

Duration - Short	**Mean Scores**	**N**	**Std. Deviation**
Offline	75.4140	15	9.97627
Online	68.8767	15	8.94168

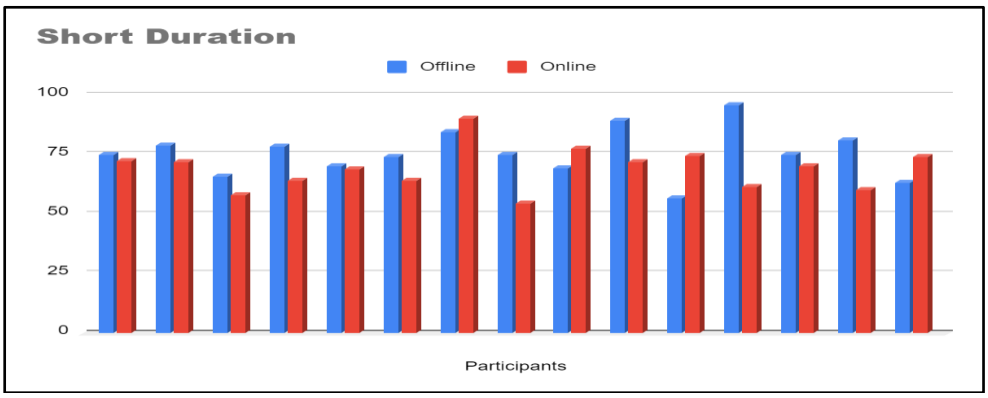

Figure 1: Short duration Remedial Instruction

Figure 1 indicates the short duration of the remedial therapy i.e. 11 months of therapy; long duration (Figure 2) indicates the duration of remedial education therapy of 18 months.

Table 5: Mean scores of students across modes of remedial instruction- Long-duration

Duration - Long	Mean Scores	N	Std. Deviation
Offline	75.1360	10	8.21082
Online	80.0650	10	9.16200

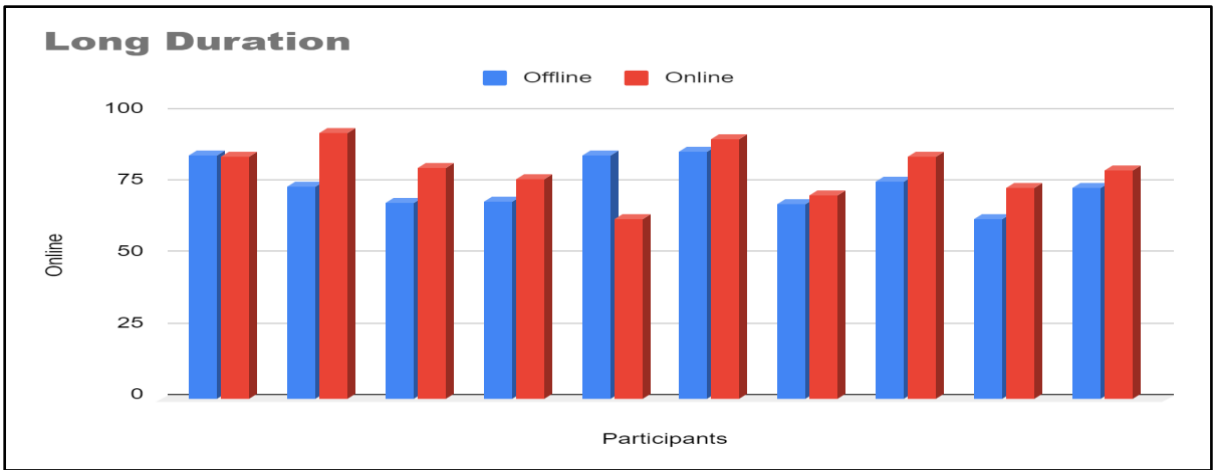

Figure 2: Long Duration Remedial Instruction

Thus, as can be seen, higher mean scores in terms of learning outcomes were seen for students who had participated in Remedial instruction therapy for a longer duration (i.e. 18 months).

A paired sample t-test was performed to determine whether there is a statistically significant difference between the means of the learning outcomes of remedial instruction for both online and offline modes for students in the Primary and Secondary school sections. The data was analysed and compared within each section.

Table 6: Comparative analysis of mean scores for the Primary section.

Primary section	Mean	N	Std. Deviation	Std.Error Mean
Offline Mode	74.5508	13	5.96835	1.65532
Online Mode	73.0415	13	11.86911	3.29190

As can be seen in the above table, the mean score of primary section students in the offline learning mode was found to be 74.5508 and the mean score of students in the online mode of learning was found to be 72.0415. The Standard Deviations for the same were found to be 5.96835 and 11.86911 respectively.

Table 7: Difference in the Mean scores across modes of remedial instruction- Primary section

					Significance	
	Mean	**Std. Deviation**	**t**	**Df**	**One-sided p**	**Two-sided p**
Offline-Online	1.50923	10.88264	.500	12	0.313	0.626

As can be seen in the above table, the mean difference between the two modes of remedial instruction for primary section students was found to be 1.50923. The obtained corresponding two-tailed p-value was calculated to be 0.626 at df (12) which is greater than 0.05. This indicates that the t-value is not significant (NS). Thus, a significant difference does not exist between the learning outcomes of primary section students across the two modes-online and offline.

Table 8: Comparative analysis of the mean scores for the Secondary section

Secondary section	Mean	N	Std. Deviation	Std.Error Mean
Offline Mode	76.6800	12	11.38527	3.28664
Online Mode	73.2850	12	9.29928	2.68447

As can be seen in the above table, the mean score of the secondary section students in the offline learning mode was found to be 76.6800 and the mean score of students in the online mode of learning was found to be 73.2850. The Standard Deviations for the same were found to be 11.38527 and 9.29928 respectively.

Table 9: Difference in the Mean scores across modes- Secondary section.

					Significance	
	Mean	**Std. Deviation**	**t**	**Df**	**One-sided p**	**Two-sided p**
Offline-Online	3.39500	16.32345	.720	11	0.243	0.486

As can be seen in the above table, the mean difference between the two modes of remedial instruction for secondary section students was found to be 3.39500. The obtained corresponding two-tailed p-value was calculated to be 0.486 at df (11) which is greater than 0.05. t-value is found to be non-significant (NS). Thus, a significant difference does not exist between the learning outcomes of secondary section students across both the modes-online and offline.

The study also explored the differential impact of online vs. offline modes of remedial instruction on the learning outcomes of specific domains outlined in the IEP of the participants. Each student's IEP included domains as per the needs of the students. However, reading comprehension and Written composition were seen to be the two common domains across all the students' IEPs in 2019 offline mode and 2020 online mode.

A two-paired sample t-test was performed to determine whether there is a statistically significant difference between the learning outcomes across the two modes- online & offline- for the two common domains of Reading comprehension and Written composition.

Table 10: Comparative analysis of the Reading Comprehension outcomes across two modes

Reading Comprehension	Mean	N	Std. Deviation	Std.Error Mean
Offline Mode	80.1600	25	9.92337	1.98467
Online Mode	79.6000	25	11.44916	2.28983

As can be seen in the above table, the mean score of students for Reading comprehension in the offline learning mode was found to be 80.1600 and the mean score of students in the

online mode of learning was found to be 79.6000. The Standard Deviations for the same were found to be 9.92337 and 2.2898 respectively.

Table 11: Difference in the Mean scores across two modes in the domain of Reading Comprehension

Reading Comprehension					**Significance**	
Offline-Online	**Mean**	**Std. Deviation**	**t**	**Df**	**One-sided p**	**Two-sided p**
	0.56000	15.85896	.177	24	0.431	0.861

As can be seen in the above table, the mean difference between the two modes of remedial instruction was found to be 0.56000. The obtained corresponding two-tailed p-value was calculated to be 0.861 at df (24) which is greater than 0.05. t-value is not significant (NS). Thus, a significant difference does not exist in the learning outcomes for the domain of Reading Comprehension across the two modes.

Table 12: Comparative analysis of the Written Comprehension outcomes across two modes

Written Composition	**Mean**	**N**	**Std. Deviation**	**Std. Error Mean**
Offline Mode	76.1200	25	12.23492	2.44698
Online Mode	72.6400	25	12.33180	2.46636

As can be seen in the above table, the mean score of students for Written Composition in the offline learning mode was found to be 76.1200 and the mean score of students in the online mode of learning was found to be 72.6400. The Standard Deviations for the same were found to be 12.23492 and 12.33180 respectively.

Table 13: Difference in the Mean scores across two modes in the domain of Written Composition

Written Composition					**Significance**	
Offline-Online	**Mean**	**Std. Deviation**	**t**	**Df**	**One-sided p**	**Two-sided p**
	3.48000	17.31117	1.005	24	0.162	0.325

As can be seen in the above table, the mean difference between the two modes of remedial instruction was found to be 3.48000. The obtained corresponding two-tailed p-value was calculated to be 0.325 at df (24), which is greater than 0.05. This indicates that the t-value is not significant (NS). Thus, a significant difference does not exist in the learning outcomes for the domain of Written composition across the two modes.

Lastly, two paired sample t-tests were performed to determine whether there is a statistically significant difference in the learning outcomes of students who are diagnosed with Specific Learning Disorder (SLD) from those students who are ‘At Risk’ for Specific Learning Disorder.

Table 14: Comparative analysis of the participants 'At Risk' of Specific Learning Disorder across two modes of remedial instruction

'At Risk' of SLD	Mean	N	Std. Deviation	Std. Error Mean
Offline Mode	76.3239	18	9.16578	2.16040
Online Mode	72.2294	18	9.85463	2.32276

As can be seen in the above table, the mean score of 'at risk' students in the offline learning mode was found to be 76.3239 and the mean score in the online mode of learning was found to be 72.2294. The Standard Deviations for the same were found to be 9.16578 and 9.85463 respectively.

Table 15: Mean difference of the participants 'At Risk' for Specific Learning Disorder across two modes of remedial instruction

'At Risk' of SLD					Significance	
Offline-Online	**Mean**	**Std. Deviation**	**t**	**Df**	**One-sided p**	**Two-sided p**
	4.09444	13.96688	1.244	17	0.115	0.230

As can be seen in the above table, the mean difference in the scores across the two modes of remedial instruction was found to be 4.09444. The obtained corresponding two-tailed p-value was calculated to be 0.230 at df (17) which is greater than 0.05. This indicates that the t value is non-significant (NS). Therefore, a significant difference does not exist in the learning outcomes of the 'At Risk' group across the two modes of Remedial instruction.

Table 16: Comparative analysis of the same participants who are diagnosed with Specific Learning Disorder across two modes of remedial instruction

Diagnosis of Specific Learning Disorder	Mean	N	Std. Deviation	Std. Error Mean
Offline Mode	73.6414	7	8.33816	3.15153
Online Mode	75.5471	7	12.48808	4.72005

As can be seen in the above table, the mean score of students who are diagnosed with SLD in offline learning mode was found to be 73.6414 and the mean score in the online mode of learning was found to be 75.5471. The Standard Deviations for the same were found to be 8.33816 and 12.48808 respectively.

Table 17: Mean difference of the same participants who are diagnosed with Specific Learning Disorder across two modes of remedial instruction

Diagnosis of Specific Learning Disorder					Significance	
Offline-Online	**Mean**	**Std. Deviation**	**t**	**Df**	**One-sided p**	**Two-sided p**
	-1.90571	12.08771	-.417	6	0.346	0.691

As can be seen in the above table, the mean difference between the two modes of remedial instruction was found to be -1.90571. The obtained corresponding two-tailed p-value was calculated to be 0.691 at df (6) which is greater than 0.05. This indicates that the t value is

non-significant (NS). Therefore, a significant difference does not exist in the learning outcomes for the students diagnosed with SLD across the two modes of delivery of Remedial Instruction.

DISCUSSION & FUTURE IMPLICATIONS

In this study, the aim was to investigate the impact of Offline v/s Online academic therapy on the learning outcomes of students with special education needs: Before and during the COVID-19 Pandemic.

A paired samples t-test was used to analyse whether there is a significant difference in the performance of the students receiving Remedial instruction therapy delivered across two modes- Offline and Online. The acquired results, which support the Null hypothesis, revealed that there was no significant difference in the efficacy of learning outcomes of Remedial Instruction Therapy delivered across two conditions- Offline and Online. This can further be interpreted to understand that the online mode of academic therapy is as effective as the offline mode of academic therapy.

A research study conducted by Büchele et al. (2021) across a span of 3 years aimed at examining the difference in students' level of participation as a result of a switch from offline to digital instruction. The results revealed that the digital courses were as effective for learning outcomes as the courses conducted in person on campus. However, it additionally reported that students had participated with lucid signs of dishonesty in the self-monitored evaluations. Another study explored the success of remedial mathematics in online and traditional classrooms. The findings of that study reported that there was no observed difference in student achievement in remedial mathematics online in comparison to traditional classrooms (Reed, 2017). A similar study conducted in 2016, suggested that instructional delivery method and the student demographics i.e. gender, race and age had no predictive effect on student's perceptions of the online and offline classrooms (Lucas, 2016).

The ancillary data reveals no significant difference in the efficacy of offline versus online delivery of remedial instruction across various grade levels and domains. Both primary and secondary students showed no significant variance in learning outcomes in the core domains of Reading Comprehension and Written Composition when exposed to offline or online remedial instruction. Moreover, the study indicates that longer durations of therapy result in better learning outcomes in remedial instruction.

Furthermore, the research findings demonstrate no notable distinction in learning outcomes between the two modes of remedial instruction delivery for students considered 'at risk' of Specific Learning Disorder and those diagnosed with Specific Learning Disorder. This study significantly contributes to understanding the impact of offline versus online academic therapy (Remedial instruction) on the learning outcomes of students with special education needs, particularly before and during the COVID-19 pandemic.

However, it is important to note that the study has limitations. The sample size of 25 may not adequately represent the population of children with special education needs. Additionally, the gender distribution in the sample was skewed, with fewer female students compared to male students. Gender differences concerning learning outcomes are a variable that was not explored in the current study.

The diversity of participants in this study encompasses various socio-economic backgrounds and educational institutions, which has undoubtedly influenced the level of financial, emotional, and social support received by each student from their families, as well as the academic, social, and emotional support provided by their respective schools. The scarcity of research on the variables considered in this study underscores the significance of these findings and emphasises the need for further comprehensive exploration.

The implications of this study extend to various stakeholders, including teachers, special educators, school management, and parents. The insights gained from this research can be particularly beneficial for remedial educators in devising intervention strategies tailored to the individual needs of students. Furthermore, for teachers, this study offers valuable insights into specific domains of learning that necessitate and respond to particular forms of instructional input.

In the context of India, where many children are deemed ‘at-risk' of Specific Learning Disabilities (SLD), yet lack access to adequate support services due to limited infrastructure in remote areas, this research on the effectiveness of online academic therapy delivery can serve as a catalyst for special educators and other therapists to bridge the learning gaps and extend their support to students with limited or no access to infrastructure. The positive outcomes demonstrated by this research suggest that students in urban-rural and rural areas without access to offline therapy could potentially benefit from online support.

Moreover, this research holds significance for teachers and school authorities by raising awareness about the special education needs of students. The findings can aid school authorities in recognizing the potential for favourable learning outcomes if consistent and uninterrupted therapy, transitioning seamlessly from offline to online modes as required, is ensured for students without interruptions.

Lastly, the pivotal role played by technology in the educational sector during the COVID-19 pandemic cannot be understated. The innovative use of interactive devices, various platforms, and applications has not only maintained but also enhanced learning outcomes for all students. These experiences underscore the positive outcomes arising from a global catastrophe and illuminate the potential for further exploration of these technological options beyond the current scenario.

REFERENCES

Anderson, T. (2008). Teaching in an Online Learning Context. In T. Anderson (Ed.), The Theory and Practice of Online Learning (2nd ed.) (pp. 343-365). Edmonton: Athabasca University Press.

Angode, C. & Reesa, W. (2021). The Impact of COVID-19 Pandemic on Students with Special Needs: A Case Study of Kakamega County, Kenya. Insights into Learning Disabilities, 18(2), 121–141.

Asbury, K., Fox, L., Deniz, E., Code, A., & Toseeb, U. (2020). How is COVID-19 Affecting the Mental Health of Children with Special Educational Needs and Disabilities and Their Families? Journal of Autism and Developmental Disorders, 51(5), 1772–1780. Retrieved from https://doi.org/10.1007/s10803-020-04577-2.

Bessho, S. I., Noguchi, H., Kawamura, A., Tanaka, R., & Ushijima, K. (2019). Evaluating remedial education in elementary schools: Administrative data from a municipality in Japan. Japan and the World Economy, 50, 36–46. Retrieved from https://doi.org/10.1016/j.japwor.2019.04.003.

Borup, J., Stevens, M., & Hasler Waters, L. (2015). Student and Parent perceptions of parental engagement at an online charter high school. Online Learning, 19(5).

Brown, A. R., & Bradley, D. V. (2005). Elements of Effective e-Learning Design. The International Review of Research in Open and Distance Learning, 6(1). January 22, 2008. Retrieved from http://www.irrodl.org/index.php/irrodl/article/viewArticle/217/300

Büchele, S., Liebendörfer, M., & Lankeit, E. (2021). Increasing the effect of a remedial mathematics course by switching to an online format during the COVID-19 crisis: evidence from a German university. Teaching Mathematics and Its Applications: An International Journal of the IMA, 40(4), 478–496. Retrieved from https://doi.org/10.1093/teamat/hrab013

Chalasani, P. (2020). Supporting Students with Learning Difficulties During Covid-19 Online Learning. Retrieved from https://www.researchgate.net/profile/Pushpa-Chalasani/publication/350572269

Chandrasekhar, K. (2021). Remedial or Developmental Teaching: A Review, CESS-RSEPPG Background Paper Series (BPS) #5, Research Cell on Education (RSEPPG), Centre for Economic and Social Studies, Hyderabad.

Giesbers, B., Rienties, B., Gijselaers, W.H., Segers, M., & Tempelaar, D. T. (2009). Social Presence, Web-videoconferencing and Learning in Virtual Teams. Industry and Higher Education.

Hannay, M., & Newvine T. (2006). Perceptions of Distance Learning: A comparison of online and traditional learning. MERLOT Journal of Online Learning and Teaching, Vol. 2 (1).

Hurlburt, A. (2018). Online vs. traditional learning in teacher education: a comparison of student progress, American Journal of Distance Education. Volume 32, Issue 4. Retrieved from https://doi.org/10.1080/08923647.2018.1509265

Hynes, J. W. (2016). The efficacy of pullout programs in elementary schools: Making it work. The Journal of Multidisciplinary Graduate Research, pp. 32- 47.

Jelfs, A., & Colbourn, C. (2002). Virtual seminars and their impact on the role of the teaching staff. Computers & Education, 28, pp. 127-136.

Karibasappa C., Nishanimut P., Padakannaya, P. (2008). A remedial teaching programme to help children with mathematical disability. Asia Pacific Disability Rehabilitation Journal, Vol 19.

Kozeracki, C. (2002). Issues in Developmental Education. Community College Review, 29(4), 83-100

Lavy, V., Kott, A., & Rachkovski, G. (2018). Does Remedial Education at Late Childhood Pay Off After All? Long-Run Consequences for University Schooling, Labour Market Outcomes and Intergenerational Mobility. NBER WORKING PAPER SERIES, Working Paper 25332. Retrieved from https://doi.org/10.3386/w25332

Levin, H. M., & Calcagno, J. C. (2008). Remediation in the Community College. Community CollegeReview, 53(3), 181-207.

Lim, C.P., & Cheah, P.T. (2003). The Role of the Tutor in Asynchronous Discussion Boards: A Case Study of a Pre-Service Teacher Course. Education, 40(1), pp. 33-48.

Lucas, B. J. (2016). Perceptions of classroom dynamics and identification with academics in online and face-to-face remedial classrooms in two-year colleges. University of Georgia.

Maor, D. (2003). The Teacher's Role in Developing Interaction and Reflection in an Online Learning Community. Education Media International, 40(1), pp. 127-138.

McCabe, R. H., & Day, P. R. (1998). Developmental education: A twenty-first century social and economic imperative. Mission Viejo, CA: League for Innovation in the Community College.

Mishra, L., Gupta, T., & Shree, A. (2020). Online teaching-learning in higher education during the lockdown period of COVID-19. International Journal of Educational Research. Vol 1, 100012. https://www.sciencedirect.com/science/article/pii/S2666374020300121

Nelson, A. (2020). How COVID-19 Has Affected Special Education Students. Retrieved from https://now.tufts.edu/articles/how-covid-19-has-affected-special-education-students

Reed, K. D. (2017). A Comparative Study of Student Achievement in Remedial Math Courses through Online and Traditional Delivery Modes at Northwest Mississippi Community College.

Rienties, B., Tempelaar, D. T., Waterval, D., Rehm, M., & Gijselaers, W. H. (2006). Remedial online teaching on a summer course. Industry and Higher Education, 20(5), pp. 327-336.

Rienties, B., Tempelaar, D. T., Dijkstra, J., Rehm, M., & Gijselaers, W. (2008b). Longitudinal study of online remedial education effect. In N. P. Barsky, M. Clements, J. Ravn & K. Smith (Eds.), Advances in Business Education and Training 1: The Power of Technology for Learning (pp. 43-59). Dordrecht: Springer.

Roueche, J., & Roueche, S. (1999). High stakes, high performance: making remedial education work.Washington DC: Community College Press.

Sharma, M., Idele, P., Manzini, A., Aladro, CP., Ipince, A., Olsson, G., Banati, P., Anthony, D. (2021). Life in Lockdown: Child and adolescent mental health and well-being in the time of COVID-19, UNICEF Office of Research – Innocenti, Florence; pp. 43-46. Retrieved from https://www.unicef-irc.org/publications/pdf/Life-in-Lockdown.pdf

Subedi, S., Nayaju, S., Subedi, S., Shah, S. K., Shah, J. M. (2020). Impact of e-learning during COVID-19 pandemic among nursing students and teachers of Nepal. International Journal of Science and Healthcare Research, 5(3), 9.

Thirumoorthy, G. (2021). Remedial Teaching is Need of the Hour During Post-COVID-19 Classroom. SELP Journal of Social Science - A Blind Review & Refereed Quarterly Journal, 12 (49).

Van Gastel, L., Brouwer-Zupancic, N., & Ekimova, L. (2009). Facing the Mathematics Problem, Two Cases Considered. Industry and Higher Education.

Volery, T., Lord, D. (2000), "Critical success factors in online education", International Journal of Educational Management, Vol. 14 No. 5, pp. 216-223. Retrieved from https://doi.org /10.1108/09513540010344731

Yazcayir, G., & Gurgur, H. (2021). Students with Special Needs in Digital Classrooms during the COVID-19 Pandemic in Turkey. Pedagogical Research, 6(1), em0088. Retrieved from https://doi.org/10.29333/pr/9356

Young, J. & Donovan, W. (2020, June). Shifting Special Needs Students to Online Learning in the COVID-19 Spring. Retrieved from https://files.eric.ed.gov/fulltext/ED605503.pdf

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Conflict of Interest

The author stated that there are no conflicts of interest.

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