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A Review Of The Studies On The Effects Of Assistive Technology For Students Reading And Writing Disabilities On The Academic Performance Of Students With Visual Impairments.

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ABSTRACT
According to UNICEF studies, up to 10% of children globally have SLD, and the great majority of these children are included in mainstream education settings. Students with disabilities have a far better chance of succeeding in school if they are given the opportunity to use assistive technology. Teachers must provide students with the skills they need to make the most of classroom assistive technology. Teachers' perspectives on using AAC for their pupils with SLD were collected in this in-depth research project. Six scholarly articles were used to compile this review. These articles demonstrated that teachers are receptive to the idea of using assistive technology into their lessons. They saw it as a resource that would improve their ability to take in and remember knowledge presented in written and read forms. But, in their opinion, more training and guidance was needed for instructors before they could feel comfortable using assistive technology into their lessons. So, to assist students with SLD in reaching their full potential, teachers must get specific training and include appropriate technology tools. Future research should focus on how best to prepare which was before instructors to include AT into their educational practices.

KEYWORD: Assistive Technology, Reading Disabilities, Writing Disabilities, Visual Impairments.

1. INTRODUCTION:

To put it simply, a specific learning disability (SLD) is a problem with one or more of the rudimentary mental processes necessary for acquiring and employing language. As a result of this impairment, the individual may have trouble reading, writing, or doing math at grade level. It is common for children with Specific Learning Disabilities to have more challenges than their typically developing peers while attending a regular classroom setting. Adopting novel educational approaches in the classroom is one way to combat these issues, as they have been shown to improve the academic outcomes of students with learning disabilities and help them overcome obstacles that stand in the way of their success in life **(F€alth, 2013)**.

There has been a recent uptick in researchers interested in investigating how technology might help kids with learning difficulties succeed in mainstream classrooms. Integrating technology into the method of instruction and learning is vital for enhancing the achievement of learners who are struggling with learning, as shown by this research. Yet very little was learned from teachers about how these technology aids may benefit pupils with learning impairments. To successfully use technological tools in the classroom, teachers must be comfortable with them and optimistic about their possibilities. So, it is essential to comprehend how teachers feel about the achievement of children with learning difficulties using assistive technology. **(Berkeley, 2011).**

1. BACKGROUND:

2:1 Specific Learning Disability:

Understanding and competence are examples of what may be gained via learning. Children of a certain age and mental aptitude are introduced to the basics of reading, writing, and arithmetic throughout the early stages of their education. Some kids, although having average intelligence and normal vision, hearing, and physical ability, just can't seem to pick up the basics of language and numeracy, no matter how many chances they're permitted to do so. Although children with learning disabilities typically develop cognitive skills at a slower pace, they do not suffer from intellectual disability. The umbrella term "learning disabilities" encompasses a wide variety of conditions. Students with learning disabilities may struggle in a wide range of subject areas and in their social and emotional development because of the impairments to their cognitive processes; however, the most significant difficulties are typically observed in the most fundamental aspects of education such as trying to read, writing, and arithmetic **(Torgesen, 2009)**.

2.2 Inclusive Education:

An equal opportunity is one that welcomes and supports all learners, independent of their socioeconomic status or cognitive capacity. Instructors can guarantee that every student get an outstanding schooling by establishing learning environments that can accommodate pupils who have a broad spectrum of learning approaches and skills. Children with special needs are taught in regular classrooms with their usually developing classmates because it is what mainstream schools, which serve the requirements of every kid, do. The United Nations Convention regarding the Rights of the Child ensures that all children, regardless of their physical or mental condition, are entitled to a free and appropriate public education. To this end, it is essential that children with special needs have a high-quality education in either special or regular schools so that they may grow into responsible, productive individuals. According to the Salamanca Manifesto, a

fully inclusive classroom allows students of varying mental, emotional, and physical capacities to succeed. Organizations that enhance employee should consider the many ways in which their students are unique. So, instruction and study must be modified for each individual student. To receive special education services, a child in the United States must have an individualized education program (IEP) created in accordance with the Individuals with Disabilities Education Act (IDEA). Teacher, parent, student, and special education expert all work together to create individualized education programs (IEPs) for each student. Individualized education programs (IEPs) are tailored for students with special needs attending a regular school **(Siegel, 2013)**.

2.3 Teacher Perspectives:

Teachers of students with SLD should employ instructional strategies and instructional materials designed to mitigate or eliminate students' individual learning deficits. A teacher's primary duty is to help students achieve their full potential in the classroom so that they can go on to have rewarding and fruitful lives. Therefore, teachers should equip their classrooms with the appropriate technological tools for these students and figure out when, where, and with whom these tools will be most useful. The key elements of a child's educational excellence are effective teaching strategies and a curriculum tailored to each individual student's needs, both of which they may understand. Teachers are still worried about how to incorporate assistive technology into the regular curriculum due to a lack of information and pedagogical strategies. This is illustrated by the fact that the study's findings corroborated teachers' worries that their training programs lack the necessary theoretical grounding and practical experience to prepare them to work with students who have special education requirements **(Edyburn, 2015)**.

Students' preferences, interests, and levels of preparedness all play a role in how much teachers rely on technology in the classroom, regardless of their own training and education. The IEP can help figure out what the kid likes and doesn't like, how to best interact with them, and what their strengths and weaknesses are. By giving students more control over their own education, teachers can boost their motivation and interest in learning through personalized instruction **(Gasparini, 2012)**.

2. PROBLEM STATEMENT:

*"*Students with disabilities need a unique teaching method. Programs for kids with disabilities need greater attention from specialised organisations since they are the sole means of improving students' academic achievement."

However, there is a lack of dedicated support networks and educational opportunities for these individuals, and their progress is not often adequately measured. As a means of making the most of their time, educators in both the public and commercial sectors address systemic issues in education and impart practical knowledge and methods used by most people. There have to be more options for pupils who are impaired and have both mental and physical delays in development. These days, education takes many shapes, and these new models and information technologies are applied in many ways. "Visual and auditory supports" are necessary for those with vision and hearing impairments. Those with and without learning difficulties may both benefit from the efforts of the various specialised organisations that have been formed to make life's challenges more manageable. It's a positive development towards ironing out the problem. When it comes to learning and development, it's crucial that persons with disabilities have the same opportunities as everyone else. Positive outcomes and evidence of enhanced performance are clear outcomes of specialised programs and institutions for persons with disabilities. Without a doubt, a person's incorporation into the system of social connection influences personality changes rather than the violation of a certain role. This is analogous to the prevalence of and potential causes for physical disability. Thankfully, there are a wide range of options for those pursuing specialised education, each of which takes a somewhat different selective approach to the students enrolled **(Beate, 2011).**

3. LITERATURE REVIEW:

In the present study, a comprehensive literature analysis was carried out with the purpose of locating studies on the perceptions of the usefulness of assistive technology among teachers working with students who have specific learning difficulties. The purpose of a comprehensive and repeatable research process known as a systematic review is to determine the degree to which previously conducted research has advanced towards clarifying a certain issue. The objective of a systematic literature review is to answer the research question by combining the material from a variety of sources. In the present study, a comprehensive literature analysis was carried out with the purpose of locating studies on the perceptions of the usefulness of assistive technology among teachers working with students who have specific learning difficulties. The purpose of a comprehensive and repeatable research process known as a systematic review is to determine the degree to which previously conducted research has advanced towards clarifying a certain issue. The objective of a systematic literature review is to answer the research question by combining the material from a variety of sources **(White, 2014).**

Laws pertaining to special education have gone through various iterations, beginning with measures to avoid the division of pupils who are handicapped and progressing to those that require their full and equal inclusion in regular classrooms. Because of the importance of their position, special educators must be well-versed in the rules regulating the use of assistive technology to effectively collaborate with parents and kids to create individual learning plans (IEPs). The most

important laws that have been enacted governing the rights and usage of assistive technology and the reasons they were placed in effect will be discussed below **(Lindeblad, 2012)**.

The author detailed forty IDEA-protected rights related to assistive technology (IDEA). All government universities and other government organisations held to account for the learning of pupils who have disabilities must comply with Section B of the Disability Education Act by providing suitable assistive equipment and services to kids and teens between three years old and twenty-one. It is the responsibility of public schools to offer the free, comprehensive public education to which those who have disabilities are entitled under the People with Disabilities Education Act (IDEA). It has been shown via research that handicapped people now have a constitutionally guaranteed right to be provided with good facilities in both public and private settings thanks to the passage of the Americans Disabilities Act (ADA).According to the authors, those with unique requirements can be best accommodated using technology in the classroom, such as devices or alterations to the current environment **(Nordstr€om, 2018)**.

4. RESEARCH OBJECTIVE:

- To determine how the use of assistive technology influences the academic success of blind pupils.
- To find out how the right assistive technology may help with the learning process.
- To learn why it's so important for kids with visual impairments to have access to assistive technology.
- To suggest mitigating strategies to overcome the encountered difficulties.

5. RESEARCH METHODOLOGY:

Define the research methodology as the whole set of procedures followed by a researcher while conducting a study. Therefore, a quantitative research approach involves counting and analyzing data to draw conclusions. Questions like "who," "how much," "what," "where," "when," "how many," and "how" may be answered via the use of numerical data and the use of certain statistical procedures. To elaborate on this concept, researchers might say that quantitative research methods will use to describe a problem or phenomena using mathematical or statistical techniques. As the second aspect of the description, quantitative research is characterized by the collection and analysis of numerical data using statistical procedures. But, on the other side. To support or disprove alternative knowledge claims, quantitative research necessitates the gathering of data that can then be quantified and statistically treated." Researchers also note that quantitative research begins with a declaration of a problem, the generation of a hypothesis or research question, a study of relevant literature, and a quantitative analysis of data.

Statistical Software: SPSS Version 25.0

Sampling: A pilot study was conducted with the questionnaire using a group of 20 customers from China and final study was conducted with the questionnaire on sample of 700 customers. A total of questionnaires was distributed among customers selected in a systematic random sampling. All the completed questionnaires were considered for the study and any incomplete questionnaire will be rejected by the researcher.

A rating system based on the Likert scale is often used in surveys and questionnaires to gauge respondents' ideas and viewpoints. Participants often have the option of selecting a response from a set of five options, including "strongly agree," "agree," "did not respond," "disagree," and "strongly disagree," to a given question or statement. If the research uses numeric coding, such as 5 for "strongly agree," 4 for "agree," and so on, then the values for each category of answer must be established. By asking on a Likert scale from 1-20, as shown above, researchers may learn about shoppers' preferences for both online and traditional retail. The survey began with a series of "control" questions on the respondent's demographics and their level of familiarity with online vs. offline buying.

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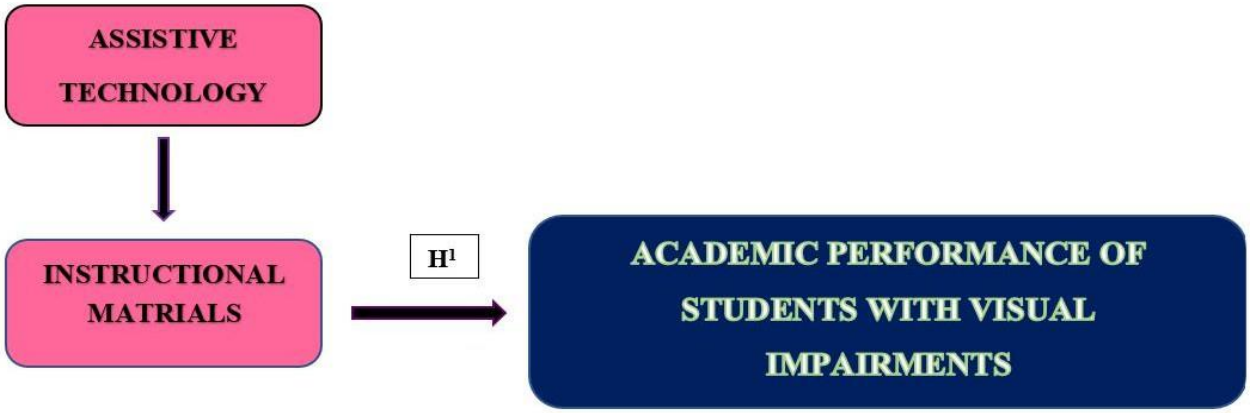
6. CONSEPTUAL FRAMEWORK:



7. RESULTS:

Rao-soft software was used to estimate the sample size of 813. A total of 950 questionnaires were distributed to the respondents. Out of this number 775 sets of the questionnaire were returned, and 700 questionnaires were analysed using the Statistical Package for social science (SPSS version 25.0) software.

8.1 Factor Analysis:

Factor Analysis often used to validate the latent component structure of observable data (FA). As visible or diagnostic markers cannot be directly measured, regression coefficients are commonly used to provide scores. FA success need models. Modeling targets observable connections, intrusion detection, and error. Multiple regression data sets may be assessed using the Kaiser-Meyer-Olkin (KMO) Test. The sample and model variables are assessed for representativeness. The statistic indicates data overlap. Lower proportions indicate data that is easier to interpret. KMO returns 0–1. The sample size is enough if the KMO values are between 0.8 and 1. Kaiser's cutoffs for acceptability are as follows:
Kaiser's cutoffs for acceptability are as follows:
A dismal 0.050 to 0.059.
0.60 - 0.69 below-average
Typical range for a middle grade: 0.70–0.79.
Having a quality point value between 0.80 and 0.89.
The range from 0.90 to 1.00 is really stunning.

Table 1: KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.959
Bartlett's Test of Sphericity	**Approx. Chi-Square**	6524.517
	df	190
	Sig.	.000

This demonstrates the validity of assertions for sampling purposes. To further verify the relevance of a correlation matrices, Bartlett's Test of Sphericity was performed. Kaiser-Meyer-Olkin Sampling Adequacy Value is 0.959. The p-value for Bartlett's sphericity test was determined to be 0.00. Bartlett's test of sphericity showed that the correlation matrix isn't an identity matrix, with a significant test result.

7.2 Test for hypothesis:

7.2.1 Dependent Variable:

- **Academic performance of students with visual impairments:**

Blindness and visual impairment are physical disorders that, when compounded with additional obstacles, make it difficult, if not impossible, for a person to participate in society fully and effectively on an equal footing with everyone else. So, the umbrella term "those with disabilities" includes those who are visually impaired or blind. As this is the most common kind of functional impairment, it affects over 2.2 billion individuals worldwide. The loss of sight or the inability to see well may have devastating effects on an individual's standard of living. Many people believe that providing handicapped people with financial or in-kind aid is a way to help them rise above their circumstances. Nevertheless, this approach may not last and is not a long-term solution. Education, however, is a proven and long-lasting tool for enhancing the independence of persons who are blind or have other visual impairments. Perhaps, it would turn them from a tax

recipient into a contributor. This claim is backed by both anecdotal evidence and empirical studies showing that a lack of sight is not an insurmountable obstacle to education. A person's inability to see presents obstacles when it comes to accessing and sharing data, but with the correct resources, that person may learn to rely on his or her other senses to fill in the gaps. Consequently, a person with vision impairment and blindness would be able to compete on an equal footing with their sighted peers given the correct academic atmosphere and assistive technology.

7.2.2 Independent Variable:

- **Assistive Technology:**

People with disabilities may now go to school, hold down jobs, and take part in civic life because to advancements in assistive technology. This uses assistive technology has the potential to reduce the need for medical and emotional support assistance, the duration of care required, and the stress placed on carers. The negative effects of illness and disability on an individual, their loved ones, and society are exacerbated when individuals do not have access to assistive technology. Due to barriers like high prices, limited supply, insufficiently educated workers, inadequate policy, and insufficient funding, just one in ten individuals in need now have access to assistive technology.

- **Instructional Materials:**

Every tool or resource a teacher uses to maximize their students' learning is considered pedagogical material. Presentations, studies, publications, digital features, and other materials are examples of both human and non-human resources. These cutting-edge strategies for instructing may be used in both traditional and online classrooms by both students and teachers. Depending on the circumstances, some of them may need to be adjusted somewhat. The most effective teaching resources allow for an open classroom with respect for all students and lecturers. They are just as useful in an online setting as they are in a classroom one. These resources provide students a solid grounding in the subject covered in class. Lesson plans and resources that have been carefully compiled may pique a student's curiosity and spark their interest in the subject. By gauging students' interest, teachers may choose where to take their lessons next. The instructor benefits from the students' increased motivation and focus on their own learning consequently.

8.2.3 Relationship Between Academic performance of students with visual impairments and Instructional Materials:

Much research has been conducted on the topic of instructional materials and the academic success of students with visual impairment. In the state of Kwara, West Africa, for instance, researchers analyzed the impact of educational materials on students' test scores. He found that material resources were connected to better student achievement across all topic areas. They asked instructors in each topic for information on the materials they use in the classroom. Student performance on the West African School Certificate Exam during the previous five years has been correlated with the amount of funding allocated to the respective subject area's classroom instruction. As a result, he concluded that material resources significantly affect student performance across the board.

In a similar vein, they investigated the Kwara state municipality of Ilorin. She collected data on the material resources available for the teaching of certain chosen subjects in ten secondary schools using questionnaires and then made connections between the quantity of resource available for teaching the topic and the accomplishment of students in that subject. The results indicated that material resources had a substantial impact on students' academic achievement in these areas.

On basis of the above discussion, the research formulated the following hypothesis, which will analyse the relationship between Instructional material and Academic Performance of the Students with visual impairments.

"**$H0_1$: There is no significant relationship between Instructional material and Academic Performance of the Students with visual impairments.**"
"**H_1: There is a significant relationship between Instructional material and Academic Performance of the Students with visual impairments.**"

Table 2: ANOVA test H^1

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	**301.375**	**218**	**5784.062**	**105.587**	**.000**
Within Groups	**103.375**	**481**	**26.848**		
Total	**404.750**	**699**			

In this study, the result is significant. The value of F is 105.587, which reaches significance with a *p*-value of .000 (which is less than the .05 alpha level). This means the ***"H_1: There is a significant relationship between Instructional material and Academic Performance of the Students with visual impairments.***" is accepted and the null hypothesis is rejected.

8. SIGNIFICANT OF THE STUDY:

Studies on the effectiveness of AT for children with learning difficulties reveal that practitioners need to have the knowledge and abilities to apply AT effectively and successfully. The Individuals with Disabilities Education Act (IDEA) mandates that educators have the expertise to choose, deploy, and evaluate assistive technology (AT). Yet, obstacles such as a lack of expertise, training, and support have made instructors wary about implementing technology into their classrooms. The potential benefits of technology for students with SLD have been the subject of many studies, although many of these investigations have omitted teacher perspectives and data. Thus, this study presents a meta-analysis of prior studies' results about the effect of assistive technology on the educational achievement of pupils with different types of learning impairment.

9. CONCLUSION:

The goals of this research were to determine (1) implications of accessible technology on traditional reading skills, (2) how it improves students' capacity to take in and convey text in a broader perspective, and (3) how it affects students' encouragement for coursework and reading. Numerous studies have indicated that students who use TTS or another kind of technology in the classroom are able to improve their phonemic awareness without engaging in decoding exercise. Similar results were obtained in this investigation. Students showed growth comparable to that of a control group getting "treatment as usual" and to that of a norm group of kids of the same age. Both the pupils and his parents acknowledged the findings showing a progress in comprehension. The second goal was to see whether they improved at digesting and conveying texts, and the findings were not as clear. The evaluations used for this purpose fell short of completely measuring their intended targets. Students' test scores and their own and their parents' assessments of their performance revealed, however, that they had improved their speed with technology and their ability to listen to and understand a text. It is unclear, however, whether or whether the capacity of children with reading and writing disabilities to assimilate and communicate material using assistive technology truly develops written language competence when compared to more conventional ways. Several studies have stressed the significance of intrinsic motivation in the classroom, especially for children who struggle with reading and writing. Thirdly, assistive technology was essential in increasing students' interest in reading and their engagement with academics more generally. Parents acknowledged that their children felt more confident in their ability to handle academics. Several students said that listening to a text helped them better understand its meaning, and that this method of "reading a text" was generally well-received by both their peers and their instructors. Finally, what does this research contribute toward closing the current void in the field of mobility aids and written language difficulties? When used appropriately, assistive technology may help people of all abilities improve their reading abilities. Most of the research done on the advantages of employing technological aids has been on its impact on decoding and reading skills. This research adds to the literature by including the primary goals of writing and reading: comprehension and expression. To integrate the material and have an equal voice in the conversation.

10. LIMITATION:

Even though all the educators had received training in the exams and treatments and that there was a shared website, it was still challenging to gather all the data, not least during the follow-up. Many educators, for instance, neglected to save the information produced by certain tools. As the trial group was undergoing interventions while the control group received business as usual, it was challenging to get more reliable data on the latter. Nevertheless, majority of the instructors in the control group failed to record the duration of the sessions despite describing the activities that their pupils participated in. One explanation is that the control group's lack of a dedicated instructor throughout the intervention period contributed to their lower achievement. Previous research has noted similar challenges in data collection, particularly during follow-up. Yet, TAU may have been successful since even the control group's kids improved their reading skills as much as the standard group. Therefore, it became difficult to evaluate text comprehension and, more specifically, text communication, which was a drawback. For one thing, evaluating these skills is still a relatively new area of study, and more study is required before assistive technology instruments can be built. The importance of this has been emphasized in previous writings as well.

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