AN EXAMINATION OF RESEARCH REGARDING THE IMPACT OF ASSISTIVE TECHNOLOGY ON THE ACADEMIC PERFORMANCE OF STUDENTS WITH VISUAL IMPAIRMENTS IN READING AND WRITING.

Peng Lirong, Khatipah Binti Abdul Ghani

[1] Lincoln University College, Petaling Jaya, Malaysia.

ABSTRACT

According to studies by the United Nations Children's Fund (UNICEF), a specific learning impairment (SLD) impacts up to ten percent of children globally. The majority of these children can assimilate into mainstream classrooms. Granting children with disabilities access to assistive technology in the classroom significantly enhances their prospects for academic success. Teachers bear the obligation of equipping students with the skills and knowledge required to effectively utilise any assistive technology supplied in the classroom. A thorough study was undertaken to gather educators' views on the application of augmentative and alternative communication (AAC) strategies for students with specific learning disabilities (SLD). To compile this review, the researchers utilised six distinct academic articles. The findings of these publications indicate that educators are receptive to integrating assistive technology into their instructional settings. Their opinion was that it served as a method to enhance their reading comprehension and memorisation abilities, as well as their capacity to digest and retain knowledge conveyed in both written and spoken forms. From their perspective, instructors necessitate more support and oversight to effectively integrate assistive technology into their teaching. Consequently, educators must obtain specialised training and utilise suitable technological tools in the classroom to support children with specific learning issues in achieving their full potential. Future research should focus on identifying the most successful strategies for equipping educators with the resources required to integrate augmented reality (AR) into their curricula.

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

INTRODUCTION

A specific learning disability (SLD) is characterised by impairments in one or more fundamental cognitive processes essential for language acquisition and utilisation. This handicap may hinder the individual's ability to progress in mathematics, reading, or writing. Conventional classroom environments may provide greater

difficulties for children with Specific Learning Disabilities (SLD) than for their typically developing counterparts (Molina Roldán et al., 2021). Educators can tackle these challenges by using innovative instructional strategies that have demonstrated efficacy in enhancing students' academic performance and personal development, despite considerable learning difficulties.

Recent years have seen a rise in studies examining the efficacy of technological treatments to improve learning outcomes for students with learning challenges in mainstream classes. This study's findings indicate that to assist pupils struggling with learning, it is essential to integrate technology into effective pedagogical approaches. Limited information about the potential benefits of these technological assistance for students with learning disabilities was communicated to educators. To optimise the utilisation of electronic tools in the classroom, educators must initially possess comfort and a positive outlook regarding these technologies (Boonmoh et al., 2021). Consequently, it is essential to understand teachers' perceptions regarding the accomplishments of LD youngsters utilising technological help.

BACKGROUND OF THE STUDY

Specific Learning Disability: Education facilitates the acquisition of information and skills. In the initial years of education, children of a particular age and cognitive capacity acquire the basics of reading, writing, and mathematics. Certain youngsters, despite possessing average IQs and standard physical, optical, and aural capabilities, consistently decline to acquire knowledge of the alphabet or basic mathematics, irrespective of the numerous opportunities presented to them. Children with learning difficulties do not have intellectual deficiencies; however, their cognitive skill development is frequently delayed. "Learning disabilities" is a broad term that encompasses a wide variety of disorders. Students with learning disabilities may experience difficulties in several academic courses, as well as in social and emotional development, due to limitations in their cognitive processes. Nonetheless, the predominant areas of challenge encompass reading, writing, and fundamental mathematics (Cataudella et al., 2021).

Inclusive Education: All students, irrespective of their background or intellect, merit an equitable opportunity for success in education. By establishing classrooms that accommodate diverse learning styles and skills, educators can guarantee that all children receive a superior education (Prasetyo et al., 2021). Generally, children with special needs are integrated into mainstream schools with their usually developing counterparts. This strategy optimally addresses the needs of all students. Every child is entitled to a sufficient public education, provided at no cost, irrespective of their socioeconomic condition or mental health, as stipulated by the UN Convention on the Rights of the Child. Consequently, it is imperative that children with special needs obtain a high-quality education in either mainstream or specialised institutions to facilitate their integration as contributing members of

society. The Salamanca Manifesto asserts that all students, irrespective of their cognitive, emotional, or physical capabilities, must have equitable access to learning and development in an inclusive classroom environment. Organisations that prioritise employee development should consider the variety of their workforce. Therefore, each student needs personalised courses and study schedules. Visual impairments of a kid must be taken into account when formulating an individualised education program (IEP) to deliver special education services. The individualised education program (IEP) for each student is a joint initiative involving the classroom teacher, the student, their parents, and a special education expert. Children with special needs enrolled in mainstream schools frequently possess individualised education programs (IEPs) tailored to their requirements (Asri et al., 2022).

Teacher Perspectives: Educators of students with specific learning difficulties should employ lesson ideas and resources that address each student's distinct deficiencies to facilitate their improvement. The primary duty of a teacher is to provide an educational environment that enables each student to achieve their utmost intellectual and personal potential. Consequently, educators had to determine the optimal timing, location, and collaborators for the use of these technological tools and thereafter integrate them into their classes. They may understand that a curriculum tailored to the needs of each student and effective instructional methods are essential components of a high-quality education for children. The deficiency of information and pedagogical expertise has left educators apprehensive regarding the integration of assistive technology into the standard curriculum. The study's findings corroborated educators' apprehensions that their degree programs insufficiently prepare them to address the distinct educational demands of pupils (Allam & Martin, 2021).

The dependence of educators on technology in the classroom is determined by students' preferences, interests, and preparedness, rather than by the educators' training or education. Ascertain the child's preferences and aversions, the most effective methods for engagement, as well as their strengths and areas requiring enhancement through the Individualised Education Program (IEP). Educators can enhance students' motivation and engagement in learning through personalised instruction by granting them greater autonomy over their educational experience (Bernacki et al., 2021).

PURPOSE OF THE STUDY

There is an absence of specialised support networks and educational possibilities, and visually impaired pupils sometimes lack sufficient oversight of their development. Educators from public and private sectors collaborate to tackle systemic educational difficulties and share knowledge and techniques applicable to all students (Giannakos et al., 2024). Children with developmental disabilities, particularly those with both cognitive and physical limitations, require increased

opportunities. Contemporary models and IT systems possess several potential applications in current education, which might manifest in various formats. To enhance academic achievement, "visual and auditory supports" are essential for those with visual or auditory impairments. Individuals, regardless of learning issues, may seek assistance from many specialised organisations that have arisen to alleviate the challenges of daily life. This is a beneficial advancement that will aid in addressing the issue. For learning and growth to occur, it is imperative that individuals with disabilities possess equitable access to resources. Significant data indicates that institutions and programs tailored for individuals with impairments enhance outcomes and productivity. The primary factor that influences an individual's character is their integration within the social network, rather than their deviation from a predetermined role. The prevalence and aetiology of physical disability are analogous to this. Numerous possibilities exist for individuals pursuing specialised training; nevertheless, admissions policies differ significantly across these institutions. This study seeks to assess the efficacy of assistive technology in improving the reading and writing skills of visually impaired students.

LITERATURE REVIEW

This study sought to examine the viewpoints on the value of assistive technology among educators working with students with specific learning challenges through a thorough literature review. Seeking study on educators' views regarding the significance of assistive technology in the classroom for students with special needs. Determining if the use of assistive technology applications is as beneficial as traditional literacy acquisition may be more comprehensively assessed through a longitudinal perspective. Several outcomes from this study indicate that assistive technology can facilitate both conventional decoding and compensation for written language deficits. They exhibited increased enthusiasm for textual engagement and academic pursuits following their involvement in critical research. Students with difficulties in reading or writing now have access to sufficient assistive technology, which can serve as a feasible solution, particularly for those most seriously impacted. Concurrently, societal and institutional endorsement of this approach must increase, especially within educational contexts. While assistive technology can benefit all individuals, it is particularly essential for students with impairments. This article employs the concepts of text transmission and assimilation to examine various perspectives. Reading and writing are perceived as conventional practices; nonetheless, comprehending and disseminating literature unveils new opportunities, indicative of a contemporary viewpoint. Consequently, the mechanics are subordinate to ensuring that students have equitable opportunity to absorb and express their comprehension of both factual and imaginative texts, as well as other forms of knowledge. The capacity to read and write, or to assimilate and disseminate information via technology, may soon be accessible to all citizens, irrespective of their challenges with written language. Recent review publications emphasise the necessity of integrating both quantitative and qualitative components, along with

their interaction, into research. Students with writing difficulties can gain advantages from assistive technologies and personal experience (Svensson et al., 2021).

Over time, special education policy has progressed from attempts to prohibit the segregation of kids with disabilities to contemporary requirements for their complete and equitable inclusion in general education classrooms. Students with exceptional needs are required to be educated alongside their typically developing peers as per the most recent regulations. Special education teachers must possess comprehensive knowledge of the legislation governing assistive technology when collaborating with children and their families to develop individualised education programs (IEPs) (Hunt, 2021). This section will focus on the principal legislation adopted to regulate the use and rights associated with assistive technology, as well as the original motivations for its enactment.

The author extensively discussed forty various rights given by the Individuals with Disabilities Education Act (IDEA) within the realm of assistive technology. All public universities and governmental organisations responsible for educating students with disabilities are mandated by law to provide children and adolescents with disabilities, aged three to twenty-one, with appropriate assistive devices and services. Public schools are mandated to provide all kids, irrespective of handicap, with access to the same high-quality, free public education that is legally provided to all pupils. The findings indicate that children with visual impairments require substantial teacher support to utilise assistive technology effectively for reading and writing (Kamali Arslantas et al., 2021).

RESEARCH QUESTION

What is the influence of teachers' training on academic performance of students with visual impairments?

METHODOLOGY

RESEARCH DESIGN

"Research methodology" refers to the systematic sequence of procedures undertaken by a researcher during a study. Thus, to draw conclusions from data, a quantitative research method involves counting and analysing the data. Numerical data and specific statistical methods are two approaches to addressing enquiries such as "who," "how much," "what," "where," "when," "how many," and "how." Researchers may clarify that quantitative research approaches will be employed to delineate an issue or phenomena through mathematical or statistical instruments. The second defining aspect of quantitative research is the collection and analysis of numerical data through statistical methods. Conversely, quantitative research is essential as it necessitates the gathering of data that can be quantified and

subjected to statistical analysis to either corroborate or refute competing knowledge claims. Furthermore, researchers note that quantitative research commences with the identification of a problem, the development of a hypothesis or research question, a review of pertinent literature, and a quantitative analysis of data.

SAMPLING

A preliminary study involving 20 Chinese consumers initially employed a questionnaire. The concluding study survey encompassed a sample of 700 clients. A total of questionnaires was given to clients utilising a method known as systematic random sampling. The researcher disregarded any survey or questionnaire that was incomplete.

The Likert scale is a prevalent assessment tool for gauging respondents' thoughts and perspectives in surveys and questionnaires. Participants are generally presented with five response options when asked to evaluate a topic or statement: "strongly agree," "agree," "did not respond," "disagree," and "strongly disagree." It is essential to define the values for each response category if the study aims to employ numerical coding, such as 5 for "strongly agree," 4 for "agree," and so forth. Researchers can employ a Likert scale from 1 to 20 to assess consumers' preferences for both online and traditional buying. Initially, the survey included a set of "control" questions aimed at gathering data on the respondent's demographics and their familiarity with online compared to in-store buying.

STATISTICAL TOOLS

SPSS Version 25.0 is the Statistical Software has been used here for data analysis activities.

CONCEPTUAL FRAMEWORK

RESULTS
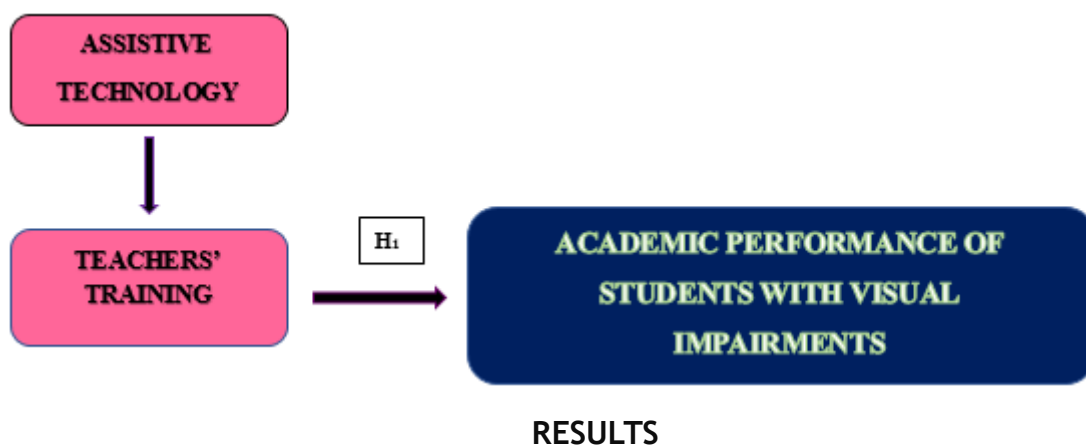
Factor Analysis: Confirming the underlying component structure of observable data is a prevalent application of Factor Analysis (FA). Regression coefficients are often

employed to produce scores when visual or diagnostic signals are not easily observable. Effective financial analysis necessitates models. The primary objectives of modelling are error identification, intrusion detection, and observable connections. The Kaiser-Meyer-Olkin (KMO) Test is utilised to assess datasets derived from multiple regressions. An assessment of the model's and the sample's representativeness is conducted. The statistic demonstrates data overlap. A lower proportion signifies data that is more easily interpretable. The KMO output ranges from 0 to 1. A sample size within the range of 0.8 to 1 is deemed adequate for KMO calculations. The admission criteria established by Kaiser are as follows:

Kaiser's thresholds for acceptance are as follows:

A bleak 0.050 to 0.059.

0.60 - 0.69 subpar

The standard range for a middle grade is 0.70 to 0.79.

A quality point value ranging from 0.80 to 0.89.

The interval from 0.90 to 1.00 is remarkable.

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 validates the assertions for sampling purposes. Bartlett's Test of Sphericity was conducted to further ascertain the significance of the correlation matrices. The Kaiser-Meyer-Olkin Sampling Adequacy Value is 0.959. The p-value for Bartlett's test of sphericity was found to be 0.00. Bartlett's test of sphericity indicated that the correlation matrix is not an identity matrix, yielding a significant test result.

INDEPENDENT VARIABLE

Assistive Technology: Children experiencing reading difficulties can get advantages from assistive technology (AT) that aids in comprehension and retention of text. Students' reading abilities enhanced without conventional reading remedial teaching when utilising assistive technology; thus, their reading performance

equalled that of a control group. Students facing reading and writing difficulties can gain from augmentative and alternative communication (AAC) in the classroom, which may enhance their motivation to learn to write and read (Svensson et al., 2021).

FACTOR

Teachers' Training: Technology possesses the capacity to enhance access to the general education curriculum for all learners in myriad ways. Researchers examined the resources accessible to special education institutions for students and educators with visual impairments and discovered that a limited number of the schools included in the study provided any training on assistive technology or software for those individuals. Research into educators' perspectives revealed that students with learning difficulties are more likely to achieve academic success when provided with assistive technology in an inclusive classroom environment. This discovery has significant ramifications for the formulation of effective educational programs for these students (Adebayo & Ayorinde, 2022).

DEPENDENT VARIABLE

Academic Performance of Students with Visual Impairments: The examination of academic achievement across all educational levels is now greatly esteemed by local, national, and worldwide organisations. The OECD's Program for International Student Assessment has significant ramifications, prompting educational reform initiatives from many national governments aimed at enhancing student performance. Both personal and environmental factors influence a student's academic performance. Governments must to advocate for initiatives that enhance all facets of student performance in the classroom, rather than solely focussing on the curriculum or pedagogical techniques employed by educators (Alvarez-Peregrina et al., 2020).

Relationship between Teachers' Training and Academic Performance of Students with Visual Impairments: The extent of teachers' knowledge significantly influences visually impaired students, especially those who face challenges in reading and writing. Proficient educators can structure instruction utilising assistive technologies to enhance their students' reading efficacy. This category encompasses screen readers, Braille displays, and speech-to-text technology. If educators cannot assist their students in optimising technology improvements, the students may experience detriment. Qualified educators may adapt class plans, ensure course materials are readily accessible, and offer personalised attention to pupils. The students' self-assurance and autonomous learning capabilities are enhanced, along with their reading and writing proficiency. Inadequately prepared instructors may lead to diminished student achievement and less chances for inclusive education. Visually impaired students can significantly benefit from enhanced assistive technology and

elevated academic performance when educators engage in professional development programs (Alsolami, 2022).

The researcher expanded upon prior talks to examine the relationship between the academic performance of visually impaired students and the professional development of their instructors.

H_{01}: There is no significant influence of teachers' training on academic performance of students with visual impairments.

H_1: There is a significant influence of teachers' training on academic performance of students with visual impairments.

Table 2: H_1 ANOVA Test.

ANOVA					
Sum					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	39856.458	287	5204.136	961.414	.000
Within Groups	504.407	412	5.413		
Total	41081.249	699			

A substantial revelation will emerge from this investigation. The p-value of .000 (below the .05 alpha threshold) signifies that the F value of 961.414 is statistically significant. Consequently, the researcher can conclude that the null hypothesis is rejected and that "**H_1: There is a significant influence of teachers' training on academic performance of students with visual impairments**" is accepted.

DISCUSSION

Analysing the adverse impacts on students' traditional reading skills, beneficial effects on their comprehension and presentation of material, and detrimental consequences on their drive to read and learn due to the accessibility of technology. The researcher conducted this survey to collect extensive data. The researchers in this study offered a functional definition of the word "assistive technology." The 1998 Act on Assistive Technology defines "assistive technology" as "products, devices, or equipment, whether purchased commercially, modified, or customised, that are utilised to sustain, enhance, or augment the functional capabilities of individuals with disabilities." The results indicated that an overwhelming 92% of participants reported no impairment, whereas only 7% asserted the presence of a disability. Research revealed that 21.4% of students utilised assistive technology during their schooling, while 78.6% reported never using such technology in their

academic experiences. Utilise the assistive devices to their fullest potential. Twenty-five percent of participants reported being denied access to assistive technology in the classroom, whereas seventy-five percent indicated they received it. Only 3% of survey participants contest the notion that students' performance is significantly improved by the use of assistive technology (AT). This indicates that assistive technology (AT) enables students with impairments to enhance their academic performance. Proponents of assistive technology (AT) have elucidated its potential to aid students who are experiencing difficulties in task completion. Educators may also regard the (AT) as a resource to aid students in surmounting challenges. Approximately 85% of poll respondents dismissed the assertion that "permitting students with disabilities to utilise assistive technology in the classroom is unfair to those without disabilities." Participants indicated that the term "fair" implies that students should get classroom adaptations to enhance their academic performance, and assistive technology provides that opportunity. Conversely, fourteen percent of respondents believed it was inequitable to furnish non-disabled students with auxiliary aids and services (AT) to accommodate students with disabilities. Participants indicated that the utilisation of assistive technology was affected by the type of impairment and the degree of disability. Most respondents deemed the statement "All students with disabilities, regardless of their socioeconomic status, have the opportunity to obtain the necessary assistive technology" unhelpful, elaborating that financial constraints are likely the primary barriers to access for students with disabilities. The degree of AT proficiency possessed by instructors. Merely 10% of individuals believe that professors comprehend the significance of assistive technology; conversely, a substantial 89% perceive that educators are oblivious to the various advantages it offers students. The actual understanding of the advantages of assistive technology among teachers is inferior than the perceptions held by respondents. The majority of participants contended that educational institutions ought to furnish students with disabilities with assistive technology, as these organisations bear the responsibility for both educating youngsters and providing financial assistance. Nevertheless, 10% of respondents believe that schools should not be mandated to provide such equipment; these individuals did not present any justifications for their assertion. An overwhelming 92% of respondents concurred that "the availability of assistive technologies in educational settings affords learners with disabilities access to the general curriculum," highlighting the necessity of offering AT training to students with impairments. Nonetheless, seven percent of participants believed that children with these problems would have difficulty keeping pace with their peers in the school, thus they disagreed with the aforementioned assertion. Educators and students have praised the beneficial impacts of assistive technology in the classroom. To foster a more inclusive educational environment for children with diverse abilities, numerous respondents indicated that assistive technology could be beneficial. The participants asserted that with the aid of assistive technology, students with disabilities can achieve greater autonomy and actively participate in classroom activities.

Respondents said that students with disabilities might experience emotional distress owing to stigma associated with their usage of assistive technology. The subsequent figures offer further visual representations of the survey results.

CONCLUSION

The aforementioned argument concludes that multiple studies have shown that children can enhance their phonemic awareness with the use of TTS or other technological methods in the classroom, even in the absence of required decoding exercise. The findings of this study confirmed those of prior studies, which indicated that pupils' growth was analogous to that of two groups: one receiving "treatment as usual" and another comprising usually developing peers of the same age. His findings indicated improved understanding, as reported by both the students and their parents. The evaluation of supplementary research attributes, including their aptitude for reading and comprehending material, produced inconclusive outcomes. The effectiveness of the utilised assessments was inadequate. Conversely, kids' enhanced computer proficiency and reading comprehension were corroborated by their exam scores, along with assessments from both themselves and their parents regarding their advancement. The effectiveness of assistive technology in enhancing written language proficiency among students with reading and writing difficulties is ambiguous, in contrast to traditional teaching methods. Moreover, students experiencing difficulties in reading and writing should be prioritised for intrinsic motivation within the educational environment. Thirdly, students' involvement with reading and academics, in general, was significantly enhanced by the utilisation of assistive technology. The parents reported an increase in their children's intellectual self-esteem. This kind of "textual engagement" was positively received by both students and instructors; some students even asserted that they acquired more knowledge through auditory comprehension than through solitary reading. This research contributes to existing knowledge by examining the two fundamental purposes of literacy. To assist students with visual impairments in enhancing their writing and reading abilities through the wide application of assistive technology, enabling them to comprehend the subject and participate meaningfully in conversations.

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