# THE STUDY OF RESEARCH CONCERNING THE INFLUENCE 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

There is a possibility that as much as ten percent of the young people around the world have a special learning impairment (SLD), according to research conducted by UNICEF. The vast majority of these children are able to easily integrate into regular schools for their education. When it is made possible for children with impairments to make use of assistive technology in the classroom, the likelihood of those children achieving academic achievement is considerably increased. It is the responsibility of teachers to ensure that their pupils are appropriately equipped to make good use of any assistive technology that is available in the classroom with which they are enrolled. A comprehensive study was conducted with the purpose of determining the perspectives of teachers regarding the application of augmentative and alternative communication (AAC) strategies with children who have specific learning disabilities (SLD). Six separate pieces of scientific research were utilised in the construction of this review. In light of the findings presented in these publications, it appears that teachers are open to the idea of incorporating assistive technology into their lectures. They believed that it was an outstanding approach to improve their ability to remember and comprehend knowledge that was both spoken and written, as well as their ability to comprehend what they read and to memorise information. Educators argue that additional resources and supervision are required in order to successfully include assistive technology into their lesson plans. As a consequence of this, teachers need to have specialised training and make use of appropriate technology tools in the classroom in order to assist students who have specific learning issues in reaching their full potential. The primary objective of research in the future should be to determine the most effective means of providing educators with the knowledge and abilities required to incorporate augmented reality into their teaching practices.

**Keywords:** Assistive technology, reading disabilities, writing disabilities, visual impairments.

## INTRODUCTION

Individuals who are diagnosed with specific learning disorders (SLD) are characterised by abnormalities in one or more fundamental cognitive processes that are necessary for the acquisition and usage of language. This disability may make it more difficult for the individual to make scholastic progress in the areas of reading, writing, and mathematics. Students with Specific Learning Disabilities (SLD) may have higher difficulty in excelling within standard educational environments compared to their typically developing counterparts. Educators are able to overcome these problems by adopting new instructional tactics that improve academic achievement and personal development (Gao et al., 2022). This is possible despite the fact that children have significant cognitive limitations.

Recently, there has been an increase in the number of studies that investigate the effectiveness of electronic therapies in aiding children who have learning issues to flourish in regular classroom settings. According to the findings of this study, it is vital to include technology into effective teaching practices in order to provide assistance to children who have difficulty learning from their experiences. There was a lack of adequate awareness among educators regarding the possible advantages that these technology aids could offer to children who demonstrate learning impairments. For teachers to be able to make the most of the technological resources available in the classroom, it is essential for them to have a positive attitude and be proficient with technology (Alieto et al., 2024). Therefore, it is of the utmost importance to gain an understanding of how teachers evaluate the achievements of students with learning disabilities who make use of technological support.

## BACKGROUND OF THE STUDY

Knowledge and proficiency can be more readily acquired through formal schooling. Children of a specific age and cognitive capacity acquire knowledge of the alphabet, numerals, and geometric forms during the initial years of education. Although having sufficient opportunities, some youngsters decline to acquire the alphabet or basic mathematics, although possessing ordinary IQ and standard physical, visual, and aural capabilities. Although they may encounter a delay in the development of their cognitive faculties, children with learning difficulties do not inherently lack intelligence. “Learning disabilities” is a comprehensive term including several forms of mental health disorders. Due to impaired cognitive processes, kids with learning disabilities may encounter difficulties in several academic disciplines and may also struggle with social and emotional development (Hou et al., 2023). Nonetheless, the most challenging elements pertain to fundamental mathematics, reading, and writing.

All students merit an equitable opportunity for academic success, irrespective of their socioeconomic background or intelligence quotient. Educators can guarantee that each student receives a superior education by creating classrooms that

accommodate diverse learning styles and abilities. In many instances, children with special needs participate in mainstream schools alongside their usually developing counterparts. This technique best addresses the demands of all students. No child should be deprived of the right to a sufficient public education due to their family's financial circumstances or mental health; this right is enshrined in the United Nations Convention on the Rights of the Child. Consequently, it is imperative that children with special needs obtain a superior education in either mainstream or specialised institutions to facilitate their complete integration as productive members of society. The Salamanca Manifesto asserts that all students, irrespective of their mental, emotional, or physical capabilities, must have equitable access to education and development within an inclusive classroom environment. Organisations that prioritise employee growth should consider a diverse staff. It is essential to customise courses and study regimens for each unique student.

To deliver special education services, an individualised education program (IEP) must account for a child's visual impairments. The individualised education program (IEP) for each student is a collaborative endeavour involving the classroom teacher, the student, their parents, and a special education expert (Means, 2023). Students with disabilities enrolled in mainstream schools frequently possess tailored to their specific needs.

Educators of kids with particular learning difficulties should customise their lessons and additional resources to address the distinct requirements of their students. Any competent educator understands that their primary obligation is to establish a classroom environment conducive to the academic and personal growth of each student. Consequently, prior to integrating new technological tools into their lessons, educators must ascertain the optimal timing, location, and collaborators. An exemplary education for children necessitates effective pedagogical approaches and a curriculum tailored to the individual needs of each student. Teachers are hesitant to include assistive technology into their regular lessons due to insufficient expertise and experience in the sector (Ji, 2024). The study's findings corroborated the apprehensions of educators who believe their degree programs insufficiently prepare them to address the distinct requirements of their students.

The dependence of educators on technology in the classroom is influenced more by students' interests, preparedness, and individual choices than by the educators' formal education or training. The objective of the Individualised Education Program (IEP) is to ascertain the child's preferences, optimal engagement strategies, strengths, and areas requiring enhancement. Educators can enhance students' engagement and motivation to study through tailored instruction by granting them greater autonomy over their educational experience (Wang et al., 2024).

## PURPOSE OF THE STUDY

There are instances of inadequate oversight for the development of visually impaired children, coupled with a deficiency of specialised support networks and educational opportunities accessible to them. Collaborative initiatives involving educators from both public and commercial sectors are being undertaken to tackle systemic challenges in education and to disseminate good strategies that benefit all children. Children with developmental disabilities, especially those with physical and cognitive impairments, should be afforded greater opportunities. This is particularly significant for youngsters who possess both. Contemporary models and information technology systems possess several potential uses in modern education, which might manifest in various forms. Students with visual or hearing impairments must have access to "visual and auditory supports" to enhance their academic performance. A multitude of speciality organisations has arisen to assist individuals with diverse needs, including those who struggle with learning and managing daily stressors. This represents a significant advancement that will greatly aid in resolving the issue. To improve learning and development, it is essential that individuals with disabilities have equitable access to accessible resources. Evidence indicates that institutions and programs tailored for individuals with impairments enhance both results and productivity. The extent to which an individual diverges from the customary behaviours of their social group is less important than the extent to which they adhere to the norms of that group. There are parallels between the manifestation of physical disabilities and their underlying causes. Individuals seeking specialised training have access to several alternatives; nevertheless, the entrance rules of various schools vary significantly. This study serves the purpose to examine the efficacy of assistive technology in supporting visually impaired pupils with reading and writing tasks.

## LITERATURE REVIEW

Assessment of teachers' perceptions on the efficacy of assistive technology for children with distinct learning challenges can be identified thorough a comprehensive literature review. Conducting research on educators' viewpoints regarding the significance of assistive technology for students with special needs in the classroom. A comprehensive assessment of the effectiveness of assistive technology applications in enhancing literacy could be attained by employing a longitudinal perspective. Supportive technology can assist with both conventional decoding and compensating for weaknesses in written language, as indicated by numerous findings in the previous researches (Hirshorn & Harris, 2022). Subsequent to their involvement in significant researchers, they exhibited an increased enthusiasm for interacting with literature and scholarly pursuits. Students significantly impacted by reading and writing difficulties now have access to appropriate assistive technology, offering a viable option. This method requires increased support from institutions and society, especially in the field of education. While assistive technology can benefit all individuals, it is particularly essential for children with disabilities (Botelho, 2021). This indicated development of the

subjective perspectives through the concepts of assimilation and text transmission while utilization of assistive technology to improve academic performance of students with visual impairments.

While reading and writing are seen as conventional pursuits, comprehending and disseminating literature unveils novel viewpoints that reflect a contemporary viewpoint. Consequently, the mechanics are subordinate to ensuring that all students get an equitable opportunity to study and disseminate knowledge acquired from diverse sources, encompassing both factual and imaginative elements. In the near future, all citizens, irrespective of their challenges with written language, may gain access to the capacity to read and write, or to acquire and disseminate information via technology. Recent reviews have emphasised the necessity of integrating quantitative and qualitative methodologies, along with their interaction, in scientific research. Students who encounter difficulties in writing can get advantages from personal experience and supportive technologies (Kerimbayev et al., 2023).

The objective of special education policy has transitioned from averting the segregation of students with disabilities to guaranteeing their complete and equitable involvement in general education classes. The latest regulations stipulate that students with special needs are required to attend mainstream schools alongside their typically developing peers. Special education teachers must possess a comprehensive understanding of the legislation governing assistive technology when collaborating with families to develop individualised education plans (IEPs) (Gao et al., 2024).

Addressing the principal legislation enacted to regulate the rights and use of assistive technology, along with the original motivations for its enactment. The previous researches have extensively addressed approximately forty distinct rights conferred under the Individuals with visual impairments concerning assistive technology. Public universities and governmental organisations responsible for the education of children and adolescents with impairments, aged three to twenty-one, shall furnish appropriate assistive devices and services. All pupils, irrespective of disability, are legally entitled to the same high-quality, free public education provided by public schools. The findings indicate that visually impaired children require substantial additional support from teachers to effectively utilise assistive technology for reading and writing (Kamali Arslantas et al., 2021).

## RESEARCH QUESTION

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

## METHODOLOGY

## RESEARCH DESIGN

A researcher's "research methodology" refers to the systematic and implemented actions that constitute a study. Quantitative research methods depend on the enumeration and assessment of data to obtain conclusions. Enquiries such as "who," "how much," "what," "where," "when," "how many," and "how" can be addressed with numerical data and certain statistical methodologies. Researchers may openly indicate their intention to employ mathematical or statistical tools to characterise a problem or phenomena in their quantitative study. Secondly, the study of numerical data through statistical methods is a defining characteristic of quantitative research. Conversely, quantitative research is essential as it necessitates the collection of measurable facts that can be statistically examined to validate or refute knowledge claims. Moreover, researchers indicate that problem identification, hypothesis formulation, literature assessment, and quantitative data analysis are the initial stages of quantitative research.

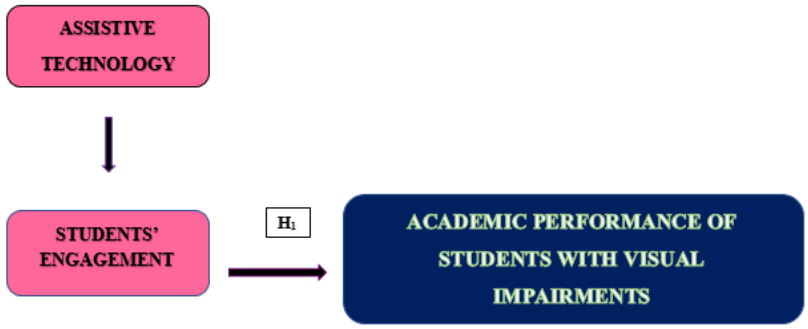
## SAMPLING

A pilot study initially polled twenty Chinese consumers using a questionnaire. A total of 700 consumers were polled for the conclusive study. Clients were surveyed via a method known as systematic random sampling. The researcher disregarded any incomplete surveys or questionnaires. Surveys and questionnaires frequently employ the Likert scale to gauge public sentiment on various topics. When asked to rate a notion or assertion, participants are typically given five choices: "strongly agree," "agree," "did not respond," "disagree," and "strongly disagree." Any study intending to employ numerical coding—such as designating a score of 5 to "strongly agree," 4 to "agree," etc.—must first define the precise meaning of each response category. Researchers can employ a Likert scale from 1 to 20 to compare preferences for online and in-store shopping. The survey commenced with many "control" questions aimed at gathering the respondent's fundamental information, such as age, gender, and experience level with online versus in-store buying.

## STATISTICAL TOOLS

SPSS Version 25.0 and MS Excel has been utilised for data analysis tasks.

## CONCEPTUAL FRAMEWORK



## RESULTS

**Factor Analysis:** Verifying the fundamental component structure of observable data is a common application of Factor Analysis (FA). Regression coefficients are frequently utilised to generate ratings when visual or diagnostic indicators are not readily apparent. Effective financial analysis requires models. The fundamental aims of modelling are error detection, intrusion identification, and observable correlations. The Kaiser-Meyer-Olkin (KMO) Test is employed to evaluate datasets obtained from multiple regressions. An evaluation of the model's and the sample's representativeness is performed. The statistic illustrates data convergence. A diminished fraction indicates data that is more readily comprehensible. The KMO output varies between 0 and 1. A sample size within the range of 0.8 to 1 is deemed adequate for KMO calculations. The admittance standards set forth by Kaiser are as follows:

Kaiser's acceptability thresholds are delineated as follows:

A dismal 0.050 to 0.059.

0.60 - 0.69 inadequate

The typical range for a medium grade is 0.70 to 0.79.

A quality point value between 0.80 and 0.89.

The range from 0.90 to 1.00 is noteworthy.

**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 corroborates the claims for sampling objectives. "Bartlett's Test of Sphericity" was performed to evaluate 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 determined to be 0.00. "Bartlett's test of sphericity" demonstrated that the correlation matrix is not an identity matrix, producing a significant test outcome.

## INDEPENDENT VARIABLE

**Assistive Technology:** Assistive technology (AT) can aid children with reading difficulties in comprehending and retaining information from texts. Utilising assistive technology, students enhanced their reading abilities without conventional remedial instruction, achieving reading performance comparable to a control group. In the classroom, augmentative and alternative communication (AAC) can assist students with difficulties in reading and writing, thereby enhancing their motivation to learn these skills (Syriopoulou-Delli & Eleni, 2022).

## FACTOR

**Students' Engagement:** According to China's legislation on "inclusive education for students with special needs," students with disabilities must participate in standard classes alongside their usually developing peers. Students with special needs can acquire competence, experience acceptance and inclusion, and access a broader array of information and skills through this approach. They can establish a foundation for future career and social involvement by cultivating an increased capacity for learning and a passion for education through a diverse educational experience. The degree of students' involvement in class, characterised by their active participation in diverse classroom activities, significantly influences their capacity to learn and enhance their language skills. Students with visual impairments, as a distinct group, face challenges in vision and communication. They obtain knowledge and abilities through the use of their other senses, including auditory and tactile perception. To enhance language skills and overall linguistic competence, it is essential to engage actively in class and develop auditory, verbal, and communicative abilities. Intervention is essential to tackle the challenges of classroom engagement for visually impaired students and to execute suitable strategies to enhance their participation in the educational environment (Li, 2023).

## DEPENDENT VARIABLE

**Academic Performance of Students with Visual Impairments:** Local, national, and international organisations now prioritise the assessment of academic achievement throughout all educational levels. The OECD's Program for International Student Assessment has significant implications, prompting various national governments to initiate educational reform initiatives aimed at enhancing student performance. A student's academic achievement is influenced by both internal and external factors. Governments should advocate for improvements that enhance students' academic performance universally, rather than solely concentrating on instructors' pedagogical methods or course content (Buinwi et al., 2024).

**Relationship between Students' Engagement and Academic Performance of Students with Visual Impairments:** Visually challenged students must engage actively to achieve success in reading and writing lessons. The phrase "engagement"

denotes the degree of a student's involvement in their learning, encompassing participation, motivation, and perseverance. Active student participation in their learning enhances the effective utilisation of assistive technology, hence improving reading comprehension and writing abilities. Student participation is essential for screen readers and braille displays to enhance accessibility efficiently. Reading proficiency and academic success are enhanced when pupils actively interact with the material and can adapt to contemporary technology. However, superior methods are futile without commitment. Student engagement influences the relationship between academic achievement and students' grades. Students with visual impairments are more likely to achieve academic success when their educators strive to create an inclusive and stimulating classroom environment for all learners (Page et al., 2023).

The researcher expanded upon prior talks to examine the relationship between the academic performance of visually impaired students and engagement of students.

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

**$H_1$: There is a significant influence of students' engagement 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** | 39588.620 | 294 | 5322.301 | 1,063.821 | .000 |
| **Within Groups** | 492.770 | 405 | 5.003 | | |
| **Total** | 40081.390 | 699 | | | |

This investigation will result in a significant revelation. In this context, F = 1,063.821 is a statistically significant outcome, as the p-value is .000, which is below the .05 alpha threshold. Consequently, the researcher may assert that the null hypothesis is false, and therefore **"$H_1$: There is a significant influence of teachers' training on students' engagement of students with visual impairments"** is accepted.

## DISCUSSION

Analysing how students' access to technology has both facilitated and hindered their conventional reading abilities, comprehension and communication of information, as well as their drive to read and learn. The researcher collected extensive data while conducting this study. The authors of the study provided a practical definition of "assistive technology." The Assistive Technology Act of 1998 defines "assistive

technology" as "products, devices, or equipment, whether commercially acquired, modified, or customised, that are employed to support, enhance, or augment the functional capabilities of individuals with disabilities." The results indicated that an overwhelming 92% of participants did not report any impairment, whereas only 7% asserted having a disability. Research indicated that just 21.4% of pupils utilised assistive technology during their education, while 78.6% reported never using it. Utilise the assistance devices to their fullest potential. Only 25% of students reported being denied assistive technology in the classroom, whereas 75% indicated they received assistance. Only 3% of survey respondents contest the notion that the utilisation of assistive technology significantly improves students' performance. Such evidence indicates that kids with disabilities may experience academic advantages from assistive technology.

Advocates assert that students struggling to complete activities can benefit from assistive technology (AT). Educators may perceive the assistive technology (AT) as a resource to aid their students in surmounting challenges. Approximately 85 percent of poll respondents rejected the assertion that permitting students with disabilities to utilise assistive technology in the classroom is inequitable to their non-disabled peers. Participants indicated that the term "fair" implies that children should have access to classroom adjustments to facilitate their academic success, and assistive technology provides such support. However, 14% believed it was unjust to offer auxiliary aids and services (AT) to non-disabled students to facilitate the participation of impaired students in the classroom. Participants indicated that the degree of disability and the particular type of impairment influenced the utilisation of assistive technology. Most respondents regarded the statement "All students with disabilities, regardless of their socioeconomic status, have the opportunity to obtain the necessary assistive technology" as unhelpful, noting that financial constraints are likely a barrier to technology for students with disabilities. The degree of assistive technology proficiency possessed by educators. Only 10% of individuals believe that educators comprehend the significance of assistive technology, while 89% assert that teachers are unaware of its numerous advantages for kids.

Teachers' perceptions of the advantages of assistive technology exceed their actual understanding. Given that these organisations are tasked with both educating youngsters and offering financial assistance, the majority of participants contended that schools ought to furnish pupils with impairments with assistive technology. A minority of respondents (10%) believe that schools should not be obligated to provide such gadgets, and they did not offer any justifications for their position. "Ninety-two percent of respondents unanimously concurred that the availability of assistive technologies in educational environments enables learners with disabilities to access the general curriculum, highlighting the necessity of providing AT training to students with impairments." Nonetheless, 7% of the participants contested the aforementioned assertion, believing that pupils facing these challenges would find it difficult to maintain pace with their peers in an academic setting. The beneficial

impacts of assistive technology for children and educators have been extensively praised. A significant number of respondents believed that assistive technology could foster a more inclusive classroom environment for children with diverse abilities. Participants said that children with disabilities can engage more actively in classroom activities and exhibit greater independence through the utilisation of assistive technology. According to respondents, students with impairments may experience mental distress due to the stigma associated with utilising assistive technology. The subsequent figures offer further visual representations of the survey results.

## CONCLUSION

From the above discussion, it can be concluded that required decoding practice is absent, the preceding argument indicates that extensive research shows students can enhance their phonemic awareness through the utilisation of assistive and other technology methods in the classroom. The developmental progress of students was analogous in two groups are identified as one receiving “treatment as usual” and another comprising usually developing peers of the same age. Both the students and their guardians observed an enhancement in comprehension, which corresponds with his findings. When assessing supplementary research attributes, including reading and comprehension skills of students using assistive technology f. The efficacy of the employed assessments was inadequate. Exam results, together with assessments from students and their parents, corroborated the notion that the kids had enhanced their computer abilities and reading comprehension. The data regarding the effectiveness of assistive technology in enhancing written language proficiency among students with reading and writing difficulties is inconclusive, in contrast to more traditional instructional methods. Furthermore, to cultivate intrinsic motivation in the classroom, focus should be given to students experiencing difficulties in reading and writing. Thirdly, the integration of assistive technology in the classroom enhanced both academic engagement and reading comprehension. According to the parents, their children’s intellectual self-esteem has risen. All participants, including students and educators, regarded this “textual engagement” as excellent. Several students reported that auditory engagement with the subject facilitated their learning more effectively than alone reading. This research contributes to the existing knowledge by examining the two fundamental purposes of literacy. We will utilise various assistive technologies to enhance the reading and writing abilities of visually impaired students, enabling their full participation in class discussions and comprehension of the material.

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