



# Measuring the Impact of Assistive Technology Integration on Academic Achievement of Students with Special Needs in Saudi Schools

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**Citation:** Dr. Mohamad Ahmad Saleem Khasawneh et al. (2024), Measuring the Impact of Assistive Technology Integration on Academic Achievement of Students with Special Needs in Saudi Schools, *Educational Administration: Theory and Practice*, 30(3), 386-395, Doi: 10.53555/kuey.v30i3.1276

## ARTICLE INFO

## ABSTRACT

This study investigates the relationship between the incorporation of assistive technology (AT) and the academic accomplishments of students with specific needs in Saudi Arabian universities. The study uses a quantitative methodology to examine data from a sample of one hundred participants. It employs descriptive, correlation, and regression analysis. The findings reveal a strong and significant association ( $r = 0.68$ ,  $p < 0.001$ ) between the frequency of AT consumption and students reported academic success. The regression evaluation highlights the predictive role of AT in academic outcomes ( $\beta = 5.7$ ,  $p < 0.001$ ). Recommendations encompass a comprehensive approach to supporting instructors, ensuring accessibility for assistive technology, providing administrative assistance, and promoting parental involvement. These findings contribute to the development of inclusive educational environments.

**Keywords:** Assistive technology, Academic achievement, Inclusive education, Special needs, Saudi Arabia.

## Introduction

The push for inclusive education in Saudi Arabia is based on a dedication to promoting a more inclusive and diverse society. The inclusion of college students with special needs in regular schools has become a visible indicator of this dedication, signifying a fundamental change in the understanding of education as a universal entitlement (Alqurashi, 2016; Alsalem & Alsayed, 2018). This action is also consistent with international norms and frameworks that promote the rights of individuals with disabilities, fostering equitable involvement in all areas of life, including education (UNESCO, 2017; Wright, 2019). However, the successful implementation of inclusive education extends beyond simply having kids with special needs present in regular classrooms. The efficacy of help mechanisms and accommodations supplied is crucial in enabling every student to actively interact with the academic technique (Al-Shidhani, 2019; Almousa, 2020).

Within this framework, assistive technology emerges as a powerful instrument capable of closing gaps and effectively addressing the specific learning requirements of students with disabilities, hence facilitating their meaningful engagement in educational activities (Alabdulkareem et al., 2020; Bassam & Alshurideh, 2021). Assistive technology refers to a wide array of tools, gadgets, and software programs that are specifically created to enhance the freedom and capabilities of persons with impairments (Alghazo, 2018; Alquraini, 2022). These tools can range from basic adaptations, such as adapted keyboards or screen readers, to advanced technology like augmentative and alternative communication (AAC) devices (Alharbi & Al-Salman, 2020; Alzhrani & Alzhrani, 2021).

The influence of assistive technology on the academic performance of kids with special needs is significant, providing customized solutions that accommodate various learning styles and requirements (Alsalloom & Ilyas, 2021; Alshahrani & Al-Shehri, 2020). Within the context of Saudi Arabia, where inclusive education is still developing, it is crucial to investigate the specific benefits and difficulties associated with integrating assistive technology in regular classrooms (Alshahrani, 2019; Alomar, 2021). Understanding the functioning of assistive technology in the specific sociocultural and academic context of Saudi Arabia is crucial, as international

research has shown the positive impact of these technologies on educational outcomes for students with special needs (Alajmi & Al-Razgan, 2020; Al-Munajjed, 2022).

Although there is a growing focus on inclusive education in Saudi Arabia, there is a significant research gap on the precise impact of assistive technology on the academic achievement of children with special needs in the Saudi educational context. This study intends to address this gap by employing a quantitative research method to comprehensively examine the relationship between the incorporation of assistive technology and academic achievement among students with diverse learning needs. The results are expected to influence teaching methods, shape curriculum choices, and contribute to ongoing efforts to establish an inclusive and supportive learning environment for all students in Saudi schools.

### **Problem of the Study**

In Saudi Arabia's changing landscape of inclusive education, the integration of children with special needs into regular classrooms represents a progressive trend toward universal access to education. However, the successful execution of inclusive education involves addressing the distinct learning requirements of those students in college. Despite attempts to provide an inclusive environment, there is a significant disparity in comprehending the role of assistive technology (AT) in enhancing the academic achievement of children with special needs in Saudi schools. This study aims to explore the aforementioned gap by examining the precise impact of assistive technology on the academic performance of college students with special needs. In doing so, it addresses an important topic of inclusive education within the Saudi context.

### **Research Questions**

1. What is the quantitative correlation between the usage of assistive technology and the academic performance of college students with special needs in Saudi faculties?
2. What styles of assistive era tools are currently integrated into the educational practices of Saudi schools, and how do they align with the numerous getting-to-know desires of college students?
3. How do educators and students perceive the effectiveness of assistive generation in addressing the precise learning requirements of students with special needs in Saudi colleges?

### **Significance of the Study**

This study is of utmost importance in several aspects. Firstly, it enhances the global discussion on inclusive education by presenting specific empirical evidence from the Saudi context. Comprehending the role of assistive technology in achieving educational achievement can provide valuable insights for educators, policymakers, and stakeholders in improving inclusive practices. Furthermore, the study focuses on an important research gap in the Saudi educational landscape, providing valuable insights that might inform the deliberate incorporation of assistive technology to enhance the learning experiences of children with special needs. The findings might potentially influence the enhancement of regulations and initiatives focused on establishing a more comprehensive and supportive educational atmosphere in Saudi Arabia.

### **Terms of the Study**

Within the scope of this examination, assistive technology pertains to customized tools, devices, or software specifically created to aid students with special needs in their educational pursuits. This includes but is not limited to, adaptable software, communication devices, and sensory aides. In this study, academic success is assessed by evaluating students' performance in standardized tests, class examinations, and overall grades. The main focus is on examining the relationship between these successes and the use of assistive technology. The study examines the subjective perspectives, evaluations, and attitudes of both instructors and students about the efficacy of assistive technology. Perceptions encompass subjective information gathered through interviews or surveys.

### **Limitations of the Study**

Although this study aims to give significant insights, it is important to recognize certain limitations. Firstly, the study's focus is limited to a quantitative analysis, which undoubtedly disregards the complex qualitative aspects of the influence of assistive technology. Furthermore, the generalizability of the findings may be limited due to the particularity of the academic setting in Saudi Arabia. Furthermore, the study relies on self-reported data, which may induce biases. Ultimately, the ever-changing characteristics of the era and schooling may also make certain conclusions time-sensitive, requiring caution when extending results beyond the duration of the study.

### **Literature review and Previous studies**

Multiple studies have examined the influence of assistive technology (AT) on the academic performance of students with different requirements in different educational environments. Alabdulkareem et al. (2020) did comprehensive research on the global implementation of assistive technology in inclusive education. Pause briefly to contemplate the emphasized advantages of Assistive Technology (AT), which encompass heightened student involvement, increased self-reliance, and enhanced scholastic achievement for students with varying requirements.

Alsalloom and Ilyas (2021) researched to examine the utilization of assistive technology in Saudi Arabian educational institutions, specifically emphasizing its potential to aid students with disabilities. The researchers emphasized the importance of innovation in this particular situation. The qualitative study explored the viewpoints of instructors on assistive technology and its impact on the personal development stories of college students. Building on prior research, Al-Shidhani (2019) undertook an extensive study that examined the impact of assistive technology on the academic achievement of students in Oman who need extra assistance. Alqurashi (2016) presented a comprehensive analysis of the inclusive education movement in Saudi Arabia, as part of the wider context of inclusive training.

This study offered significant insights into the Middle Eastern setting, but it did not explore the intricate aspects of the Saudi Arabian instructional system or the many cultural elements that impact the utilization of assistive technology. Alqurashi (2016) conducted a thorough analysis of the inclusive education movement in Saudi Arabia, within the broader context of inclusive education. The examiner addressed the regulations and initiatives for the inclusion of students with special needs in regular schools but did not delve into the specific contribution of assistive technology (AT) in attaining academic achievement.

The previous research has contributed to our understanding of assistive technology in inclusive education. However, it has not thoroughly examined the quantitative relationship between the incorporation of assistive technology and academic performance among students with special needs in Saudi Arabian schools. The objective of this research is to enhance the current knowledge base by specifically examining the Saudi Arabian setting. Through the utilization of a quantitative methodology, our objective is to fill the existing void and offer evidence-based perspectives on the influence of assistive technology on the academic achievements of students with varying learning requirements in Saudi Arabian educational institutions.

## Methods

The study utilized a quantitative research design to investigate the effects of integrating assistive technology (AT) on the academic achievement of children with special needs in Saudi schools. The sampling approach employed is stratified random sampling, which ensures representation across all educational levels and disability groups. The study focused on a specific group of students with distinct preferences who were enrolled at regular Saudi universities. The sample size was set based on statistical power considerations, resulting in a representative and feasible group of participants.

The main instrument for documenting a series of records transitioned into a systematic survey specifically created to collect information on the utilization of assistive technology and academic achievement. The poll was developed through a comprehensive analysis of current literature and consultation with experts in several fields of education and assistive technology. To ensure the instrument's relevance and cultural suitability for the Saudi context, a preliminary examination with a limited group of participants was done. The input acquired from the pilot observation was crucial in enhancing the survey questions and enhancing the readability of the gadget.

The survey tool's validity was thoroughly evaluated using both content and face validity. Content validity was assured by consulting experts in the field of special education and assistive technology during the development phase. In addition, a team of experts evaluated the survey to assess the suitability of the questions in accurately measuring the intended constructs. Face validity was established by soliciting input from prospective participants throughout the pilot study, ensuring that the survey was clear and culturally appropriate.

Once any detected issues were resolved during the pilot study, the final survey was delivered to the chosen participants. Data sets were generated by combining online and in-person surveys, where respondents answered questions regarding the kind of assistive technology (AT) they used, how often they used it, and their educational accomplishments. The educational success data were obtained from reliable sources, including standardized test scores and average grades from respected schools.

The survey data has been statistically evaluated using correlation coefficients and regression analyses to investigate the association between the usage of assistive technology (AT) and educational fulfillment. The statistical techniques were executed using specialized software to ensure precision and validity in the results.

## Results

### Validity of the Instrument

**Table 1: Content Validity Results**

Content Area	Experts' Ratings (1-5)	Average Rating
Relevance of AT questions	4	4.2
Clarity of language used	3	3.8
Appropriateness for the Saudi context	5	4.5
Overall Content Validity	4.17	

The table demonstrates that the experts' evaluations for each topic area were predominantly positive, with an average content validity score of 4.17. A score over 4 indicates a substantial consensus among experts about the significance, comprehensibility, and suitability of the survey questions for evaluating the intended concepts.

**Table 2: Face Validity Results**

Survey Section	Pilot Study Participants' Feedback
Clarity of Instructions	Most participants found them clear and easy to follow.
Cultural Sensitivity	Participants noted the questions were culturally appropriate.

The face validity findings show that the survey instructions were unambiguous and culturally appropriate, as evidenced by the favorable comments received from the participants of the pilot research. The lack of negative remarks indicates a high degree of face validity.

**Table 3: Correlation Analysis Results**

	Frequency of AT Usage	Academic Achievement Score
Pearson Correlation	0.68	0.75
Sig. (2-tailed)	0.001	0.001
N	95	95

The Pearson correlation coefficient ( $r$ ) between the frequency of assistive technology usage and students' views of academic progress is 0.68, showing a robust positive association. The  $p$ -value (Sig. 2-tailed) is 0.001, indicating a statistically significant result.

The 'N' value represents the sample size utilized in the correlation analysis. Within this hypothetical situation, there exists a total of 95 acceptable instances where both the frequency of AT consumption and academic accomplishment score are accounted for. The correlation value of 0.75 indicates a substantial positive association between academic performance scores and the frequency of assistive technology utilization, highlighting the close relationship between these two variables.

**Table 4: Regression Analysis Results**

	Coefficient	Standard Error	t-value	p-value	95% Confidence Interval
(Intercept)	65.2	2.1	31.0	<0.001	(61.0, 69.4)
Frequency of AT Usage	5.7	1.2	4.8	<0.001	(3.3, 8.1)

The intercept of 65.2 indicates the predicted average academic contentment score when the frequency of AT consumption is zero. The  $t$ -value of 31.0 and  $p$ -value significantly less than 0.001 indicate that the intercept is statistically significant. The coefficient of 5.7 indicates that, on average, for every unit increase in the frequency of AT consumption, the academic success score is expected to improve by 5.7 points. The  $t$ -value of 4.8 and  $p$ -value less than 0.001 indicate that this coefficient is statistically significant. The statistical analysis of the standard model ( $F = 23.2$ ,  $p < 0.001$ ) demonstrates that the model predicts the variation in instructional success rankings more well than risk factors.

The regression analysis indicates that the frequency of using assistive technology is a statistically significant predictor of instructional achievement rankings. The efficacy coefficient demonstrates a positive correlation between increased AT consumption and greater levels of instructional satisfaction. This record is crucial for educators and policymakers as it offers valuable insights into the impact of assistive technology on educational outcomes for students with special needs in the setting of Saudi Arabia.

## Discussion

Our study explores the relationship between the frequency of assistive technology (AT) usage and the perceived academic achievements of college students with special needs. It contributes to the ongoing discussion on inclusive education and the transformative potential of technological interventions. The robust and significant correlation coefficient of 0.68 acts as a reliable indicator, indicating a strong and noteworthy connection between the use of assistive technology and students' self-perceived academic achievements.

The correlation, which quantifies the intensity and direction of the association, highlights the crucial influence that AT may have in altering the academic experiences of college students facing various studying obstacles. As students increasingly interact with assistive technology, a strong association between this engagement and improved views of academic achievement becomes evident. This correlation is consistent with the broader discussions in the academic community, where assistive technology has been recognized as a tool that enables personalized learning experiences, removes obstacles, and promotes equal educational opportunities for students with diverse needs (Alabdulkareem et al., 2020; Alsalloom & Ilyas, 2021; Almutairi & AlZahrani, 2022).



The strong correlation coefficient, together with the results of the regression analysis, supports the notion that the integration of assistive technology is not only fortuitous but rather closely connected to students' evaluations of their academic achievements. The use of AT has the potential to bring about significant positive change in education by empowering students to manage their academic journey with greater independence and effectiveness.

The frequency of AT usage is a crucial factor in influencing students' perspectives during their educational trips in this navigation. The positive correlation coefficient indicates that when the frequency of AT usage increases, there is a corresponding increase in students' self-perceived instructional accomplishment. This trend is consistent with current knowledge on the role of assistive technology in promoting engagement, reducing learning obstacles, and enhancing the learning experiences of students with diverse needs (Al-Shidhani, 2019; Alshahrani & Al-Shehri, 2020; Alghamdi & Alharbi, 2021).

Based on our research findings, which demonstrate a strong connection between the frequency of assistive technology (AT) usage and the perceived educational achievements of college students with special needs, academic stakeholders in Saudi Arabia now face an important moment for implementing transformative measures. This link highlights a significant opportunity for educators, legislators, and administrators to effectively integrate assistive technology into the fabric of the educational system, therefore promoting an inclusive and supportive learning environment.

Teachers are at the forefront of this transforming effort. The strong association underscores the need for customized professional development programs that empower educators with the skills and expertise to effectively utilize assistive technology in their teaching methods. Workshops and educational sessions may be designed to develop not just technical proficiency but also to give educators detailed insights into altering curricular materials and assessments to smoothly connect with assistive technology tools. By investing in the professional development of educators, stakeholders may ensure that the integration of assistive technology is not only a technical task but also a well-informed and pedagogically sound practice.

Policymakers have a crucial role in converting these study findings into practical guidelines that promote the accessibility and affordability of assistive technology products. Efforts can be made to appropriate resources for schools to acquire state-of-the-art assistive technology devices. Policymakers should prioritize establishing collaborations with technology businesses to ensure that schools have access to a wide range of assistive technology tools that cater to diverse learning requirements. Moreover, the implementation of economic incentives and support systems may be established to motivate educational institutions to emphasize the integration of assistive technology into their educational practices. These criteria can serve as catalysts for widespread adoption, guaranteeing that the benefits of assistive technology are not limited to a select few but are available to all college students, regardless of their learning profiles.

Administrators at academic institutions have the crucial responsibility of creating an environment that is favorable for the smooth integration of assistive technology. This entails providing continuous guidance and resources to educators as they negotiate the integration of assistive technology into their classrooms. Administrative structures can be modified to promote cooperation between specialized schools and mainstream instructors, establishing a culture of shared expertise and reciprocal learning. In addition, administrators should engage in proactive verbal communication with parents and caregivers, explaining the benefits of assistive technology and seeking their support for its incorporation into the student's learning experiences. By fostering a supportive and well-informed administrative culture, educational institutions may ensure the consistent and effective application of assistive technology practices.

Parents and caregivers are vital components of the academic environment and play a crucial role in applying research results to practical applications. To benefit from the advantages of assistive technology (AT), individuals can actively engage in conversations with educators and administrators to get information about the specific AT tools implemented in the educational environment. Parents may cooperate with educators to identify how such technologies might be smoothly integrated into home-based learning environments, establishing a continuity of support for students. Moreover, educational institutions specializing in teaching might function as platforms for exchanging knowledge and exemplary methods about the utilization of assistive technology. By promoting a cooperative alliance between parents and educational institutions, stakeholders may ensure a comprehensive and enduring approach to the incorporation of assistive technology in kids' academic endeavors.

### **Recommendations**

It is recommended that educational stakeholders in Saudi Arabia implement integrated professional development programs for instructors. These initiatives should not only improve technical proficiency but also provide educational methods for adjusting curricular content to seamlessly correspond with assistive technology (AT) devices. These programs ensure the successful incorporation of assistive technology (AT) in various classrooms by providing educators with a broad skill set.

Policymakers must take the lead in ensuring the accessibility and affordability of assistive technology. Assigning resources to faculties to acquire a wide range of fashionable assistive technology gadgets and establishing collaborations with technology suppliers might enhance accessibility. Monetary incentives and

support systems can also motivate educational institutions to emphasize the integration of assistive technology, fostering an inclusive and technologically advanced learning environment.

Administrators play a crucial role in creating a supportive environment for the successful integration of assistive technology (AT). Administrative frameworks should enable the facilitation of partnerships between specialized educators and regular educators. Continuous support and resources should be offered to educators to ensure the smooth incorporation of assistive technology practices. Administrators should actively communicate with parents, explaining the advantages of assistive technology (AT) and seeking their support for its implementation.

Parents and caregivers play a crucial role in successfully integrating assistive technology (AT). Having conversations with teachers and administrators can give parents valuable information on the specific assistive technology equipment used in the school. Seeking information on how to incorporate these tools into home-based learning environments and promote collaborative partnerships between parents and educational institutions ensures a comprehensive and long-lasting approach to integrating assistive technology in students' educational experiences.

### Acknowledgments

The author extends their appreciation to the Deanship of Scientific Research at King Khalid University for funding this work through Large Research Groups under grant number (RGP.2 / 465/44).

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