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# Evaluating the Efficacy of Tablet-Based Assistive Technology in Saudi Special Education Settings

Mohamad Ahmad Saleem Khasawneh\* 

Special Education Department, King Khalid University, Saudi Arabia,

**Abstract.** This study examined the experiences of special education teachers in Saudi Arabian classrooms regarding the integration of tablet-based assistive technologies (TBAT). It explored the thoughts and issues encountered by educators, as well as the outcomes of these innovations on academic progress and functionality. The demographic of the study was a group of educators consisting of staff members with a moderate level of expertise, primarily located in high schools that serve diverse communities. The participants indicated favorable sentiments towards the advantages of TBAT, such as heightened involvement, customized learning results, and enhanced communication abilities. Nevertheless, obstacles, such as insufficient training, restricted resources, and reluctance to embrace change, were acknowledged. Correlation and regression studies demonstrate the connections between perceived advantages, difficulties, and the influence of TBAT on academic advancement, highlighting the predictive nature of educators' opinions. Enhancing the results of special education in Saudi Arabia may be achieved by providing specialized professional development to professionals, improving technical assistance, aligning TBAT implementation guidelines with local settings, and establishing a consistent framework for continuing evaluation.

**Keywords:** Tablet-based assistive technologies; special education; educator perceptions

## 1. Introduction

The emergence of tablet-based assistive technology (TBAT) has provided valuable insights into the necessary adaptations of educational models to accommodate the diverse demands of students with specific learning requirements (Alanazi et al., 2023). Given the intersection of inclusive education and global technology advancements in Saudi Arabia, it is imperative to conduct an urgent study to assess the impact of TBAT (Yousaf et al., 2020; Wadhera, & Kakkar, 2022). This study sought to examine the impact of TBAT in Saudi special education

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\*Corresponding author: Mohamad Ahmad Saleem Khasawneh; mkhasawneh@kku.edu.sa

environments comprehensively and to correct significant research deficiencies about this emerging educational technology.

There is a lack of empirical research that examines these conclusions within the context of the Saudi educational environment and so there is a clear necessity to conduct a thorough investigation into this matter. Alshahrani and Almutairi (2022) emphasized the importance of tailored strategies and professional vocational development programs to effectively incorporate TBAT into Saudi special education practices. They highlighted the discrepancy between the theoretical effectiveness of TBAT and its actual application (Tan et al., 2022; Alqahtani, 2020).

This research directly addresses the need for comprehensive studies within the Saudi context by attempting to uncover the impact of TBAT on academic pursuits, skill enhancement, and overall learning experiences for students with diverse needs. Moreover, this study addresses the issues highlighted by Alsuwayl (2020) regarding the acceptability and interaction with technology in Saudi educational settings. It aimed to bridge this gap by localizing the usage of TBAT.

This analysis is significant as it corresponds with the objectives stated in Saudi Vision 2030, which emphasizes the need to alter educational procedures to ensure inclusivity. This project aimed to explore how technological interventions might improve inclusion and effectiveness in special education, with a particular focus on TBAT. Furthermore, on a global scale, UNESCO (2022) has proposed the need for a comprehensive study to assess the efficacy of various digital interventions in diverse educational contexts. This research is both novel and pertinent, given the growing utilization of digital tools in education.

The objective of this research is to provide practical recommendations based on the empirical evaluation of the implementation challenges, benefits, and contextual adaptations of TBAT. This study aimed to fill important research gaps and cater to the distinct socio-cultural characteristics of Saudi Arabia. It seeks to provide a valuable resource for teachers, policymakers, and stakeholders who are interested in promoting inclusive and effective learning environments for students with special needs.

### **1.1 Problem of the Study**

Empirical research investigating the incorporation of TBAT into Saudi special education systems might greatly benefit the field by examining its nature and surroundings. While several studies highlight the potential benefits of utilizing technology-based adaptive teaching for students with diverse requirements, they fail to address the various challenges that may arise in implementing this method inside the Saudi educational system.

This study aimed to address this gap by undertaking a comprehensive analysis of the integration of TBAT in Saudi special education settings, focusing on its effectiveness, obstacles, and socio-cultural consequences.

## 1.2 Research Questions

1. What are the perceived benefits and challenges of implementing tablet-based assistive technologies in Saudi special education settings?
2. How do tablet-based assistive technologies impact the academic progress and functional skill development of students with diverse needs in Saudi Arabia?
3. What socio-cultural factors influence the acceptance and utilization of tablet-based assistive technologies within the Saudi special education framework?

## 1.3 Significance of the Study

This research holds relevance that goes beyond the scope of schooling in Saudi Arabia. By addressing the lack of information on the practical application and results of TBAT in special education, this study offers vital insights for educators, policymakers, and other stakeholders to make well-informed decisions. The study is also in line with the objectives of Saudi Vision 2030, emphasizing the capacity of technology to facilitate inclusiveness in education. Moreover, the thorough examination of socio-cultural aspects provides a profound comprehension of the distinct obstacles encountered in the implementation of TBAT in Saudi Arabia, so successfully enlightens future strategies and policies.

## 1.4 Term of the Study

The duration of this study spanned 18 months and comprises three unique periods. The initial stage, spanning four months, entails a comprehensive examination of existing literature and the formulation of the research framework. The subsequent stage, lasting for 10 months, is dedicated to the acquisition and examination of data. Finally, the ultimate stage, which spans four months, involves amalgamating the discoveries, assembling a comprehensive report, and disseminating the outcomes.

## 1.5 Limitations of the Study

Given the study's temporal constraints, there may be limits in thoroughly investigating the long-term consequences of applying TBAT. Moreover, although the study aimed to achieve thoroughness specifically within the Saudi context, its findings may not be generally generalizable to other cultural and educational settings. The investigation may be limited in scope and depth due to resource constraints, such as restricted access to diverse special education settings or technology.

## 2. Literature Review and Previous Studies

The employment of assistive technology in the field of special education has seen substantial global expansion. A recent study has investigated the possible advantages of using tablets as supportive tools in education. The research done by Hasan et al. (2021) showed that the adoption of TBAT had a notable beneficial effect on students with disabilities. It increased the level of interaction in the learning process and strengthened their ability to communicate effectively (Alkhasawneh & Khasawneh, 2024).

Alotaibi (2023) researched the effects of TBAT on special schooling in Saudi Arabia. Recent findings indicate that the use of TBAT is linked to improved cognitive capacities in children with various needs. Their research highlighted the effectiveness of TBAT in promoting cognitive growth among students, a critical determinant of academic achievement.

Nevertheless, implementing these ideas may be difficult. Alsuwayl (2022) examined the need to formulate accurate methodologies and deliver tailored instruction to educators to successfully integrate task-based assessment and training into Saudi Arabia's special education system. The effectiveness of Saudi schools relies on the implementation of well-defined techniques tailored to individual conditions. Alsuwayl (2022) recognized the potential benefits of task-based assessment and training.

Alharbi (2020) conducted a thorough study to identify the cultural factors that impact the willingness of Saudis to adopt technology advancements. The study elucidated the advantages and disadvantages of employing technology in classrooms and emphasized the importance of taking cultural factors into account while introducing TBAT in schools in Saudi Arabia.

It is equally important to assess the effectiveness of TBAT from a broader international viewpoint. A study by Lancioni et al. (2020) further elucidated the significance of TBAT in fostering autonomy among students with impairments. In addition, Alotaibi (2020) offered valuable information on individualized and flexible TBAT treatments, and they established a structure to address the unique requirements of children in special education settings in Saudi Arabia.

The objectives of Saudi Arabia's Saudi Vision 2030, which prioritizes inclusive education, are in line with UNESCO's (2022) global guidelines that highlight the significance of extensive research on digital interventions in education. Given the current global circumstances, it is crucial to assess the effectiveness of TBAT in conjunction with domestic and international efforts to reform education (Ahmad et al., 2023).

Our understanding of how TBAT operates within Saudi Arabia's distinctive educational, cultural, and societal framework remains incomplete. Nevertheless, this research has contributed to bridging some knowledge gaps. Additional research is necessary for deeper comprehension of the intricate impact of TBAT on special education in Saudi Arabia, as evidenced by this literature review.

### **3. Methodology**

A total of 150 educators from various special education institutes throughout different regions of Saudi Arabia voluntarily participated in this study. We deliberately selected participants who provided a diverse representation of educators across different educational levels and specialist areas within the field of special education.

To collect data, we created a survey questionnaire using recognized scales derived from prior studies on assistive devices. We customized it to suit the setting of

TBAT in Saudi special education. The questionnaire encompassed parts on demographics, educators' perceptions of the advantages and difficulties associated with TBAT, and their observations on its influence on the academic and functional skill development of children with diverse needs.

We extended invitations to educators to participate in the online survey and ensured that their consent was obtained before the study's commencement. The survey was administered using an internet-based platform, allowing participants to choose a convenient time to provide their responses. We conducted data collection for six weeks, providing educators with the opportunity to provide thorough and all-encompassing responses.

We employed descriptive statistics, such as frequencies, percentages, means, and standard deviations, to summarize succinctly the demographic information and survey results. In addition, we employed inferential statistical methods, such as correlation analysis and regression modeling, to investigate the associations between various variables and identify the key elements influencing educators' perceptions of TBAT's efficacy.

### **3.1 Instrument of the Study**

The survey utilized in this study sought to enhance comprehension regarding the utilization of TBAT in the field of special education in Saudi Arabia. The study had distinct segments that examined many aspects, including demographic information, instructors' perspectives on the advantages and challenges of utilizing TBAT, and its impact on students' abilities and educational development.

The demographics focused on collecting information regarding the educators themselves, including their professional duties, tenure in special education, educational background, and areas of specialization. This facilitated our comprehensive perspective on various aspects of special education, enhancing our understanding of diverse viewpoints.

The survey inquired about the positive aspects of TBAT, such as the extent to which it enhanced the enjoyment of studying or facilitated improved communication among students. Additionally, it inquired about the obstacles encountered, such as insufficient training or technical assistance, encountering opposition to change, or confronting restricted availability of TBAT resources. It also assessed the impact of TBAT on students' academic advancement, their proficiency in interpersonal communication, and their level of self-sufficiency in practical abilities.

### **3.2 Validity of the Instrument**

The survey instrument's robustness was evaluated by undertaking comprehensive examinations of its content and construct validity. A comprehensive review of the literature and consultation with experts were carried out to guarantee the accuracy and relevance of the content in the fields of special education and assistive technology. The survey questions were precisely designed

to align with known theoretical frameworks and comprehensively assess the advantages and disadvantages of utilizing TBAT.

We employed exploratory factor analysis to determine the validity of the constructs. Before conducting exploratory factor analysis, we employed statistical tests, such as Bartlett's test of sphericity and the Kaiser-Meyer-Olkin measure of sample adequacy, to ensure that the dataset was appropriate for analysis. The viability and sufficiency of the data for subsequent factor analysis, which investigated the fundamental connections between survey variables, relied on these initial assessments.

**Table 1: Kaiser-Meyer-Olkin and Bartlett's test of sphericity results**

Measure	Value
Kaiser-Meyer-Olkin	0.85
Bartlett's test of sphericity	$p < 0.001$

These results suggested that the data were appropriate for factor analysis, as shown by a high Kaiser-Meyer-Olkin value and a statistically significant Bartlett's test.

**Table 2: Rotated component matrix - factor loadings**

Item	Factor 1	Factor 2	Factor 3
TBAT enhances student engagement	0.85	0.12	0.09
TBAT facilitates personalized learning	0.78	0.15	0.21
TBAT improves communication skills	0.10	0.92	0.07
TBAT positively impacts academic progress	0.19	0.80	0.15
Lack of training on TBAT usage	0.10	0.15	0.92
Insufficient technical support for TBAT	0.12	0.20	0.85
Resistance to change among educators	0.89	0.13	0.11
Limited access to TBAT resources	0.15	0.88	0.09
Impact of TBAT on academic progress	0.23	0.19	0.85
Impact of TBAT on communication skills	0.10	0.87	0.14
Impact of TBAT on independence and functional skills	0.15	0.81	0.18

Factor loadings over 0.70 were deemed significant, signifying a distinct pattern in the data and affirming the survey instrument's construct validity.

#### 4. Results and Discussion

The demographic data revealed a blend of seasoned and novice professionals in the field of special education, with an average of 7.5 years of experience.

**Table 3: Descriptive statistics for demographic information**

Demographic Information	Mean / %
Years of experience	7.5
<b>Educational level</b>	
– Elementary	35%
– Middle school	25%
– High school	40%

<b>Specialization</b>	
– Learning disabilities	20%
– Autism spectrum disorders	45%
– Intellectual disabilities	25%
– Other (Specify)	10%

An increase in the number of individuals employed in high schools may indicate a heightened emphasis on this educational level in the present investigation. The substantial competence in autism spectrum disorders (45%) underscores the significance for these instructors. Examining this analysis, we may discern the diverse proficiencies and passions among participants, providing us with insight into their knowledge and expertise in certain techniques of special education.

**Table 4: Descriptive statistics for perceived benefits of TBAT**

Perceived Benefits of TBAT	Mean Score	Standard Deviation
Enhances student engagement	4.1	0.6
Facilitates personalized learning	3.9	0.8
Improves communication skills	4.2	0.5
Positively impacts academic progress	3.8	0.7

The prevailing consensus among participants is that TBAT is highly beneficial in enhancing student engagement, as seen by the average score of 4.1, which suggests a notable level of consistency in their attitudes. Furthermore, with an average rating of 4.2, there is a distinct agreement that TBAT aids in improving communication skills. There is unanimous consensus about its use in this specific setting. Views about customized learning vary significantly. The average score of 3.9 indicates that people hold diverse viewpoints on the effectiveness of TBAT for tailored learning experiences. The status of academic progress is similarly ambiguous. The mean score is 3.8, indicating that respondents have a moderate level of uncertainty regarding the direct impact of TBAT on academic performance. There is a divergence of viewpoints on the extent of the benefits in this specific field.

**Table 5: Descriptive statistics for perceived challenges of TBAT**

Perceived Challenges of TBAT	Mean Score	Standard Deviation
Lack of training on TBAT usage	3.5	0.9
Insufficient technical support for TBAT	3.7	0.6
Resistance to change among educators	3.2	0.8
Limited access to TBAT resources	3.6	0.7

Considering the average score of 3.5 and the significant standard deviation of 0.9, it is evident that there is a perceived deficiency in the training provided for TBAT usage. This indicates that there is a general agreement among participants on the limited availability of training opportunities, while there are some variations in respondents' perspectives on the extent of this issue. The participants said that a lack of sufficient technical support for TBAT was a significant barrier, with an average score of 3.7 and a standard deviation of 0.6. This indicates a greater

consensus among participants on the insufficient endorsement of employing TBAT in educational contexts.

Another challenge that arose was the instructors' resistance to change when TBAT was introduced; this barrier had an average score of 3.2 and a standard deviation of 0.8. While there are differing viewpoints on the level of resistance, there appears to be a general agreement among participants that it does exist. Furthermore, the presence of limited access to TBAT resources was regarded as a hindrance, as shown by a mean score of 3.6 and a standard deviation of 0.7. In general, participants generally agreed that there is a restriction on the utilization of TBAT resources, but their opinions on the extent of this limitation differed.

**Table 6: Descriptive statistics for the impact of TBAT on academic and functional skills**

Impact of TBAT	Mean Score	Standard Deviation
Academic progress	4.0	0.5
Communication skills	4.1	0.4
Independence and functional skills	3.8	0.6

The majority of participants, with an average score of 4.0, believed that TBAT effectively facilitates academic progress. All participants agreed that TBAT has a substantial positive impact on students' academic achievement. Consensus was reached among all individuals about TBAT's communication skills, as the group achieved a noteworthy score of 4.1. There was a consensus among all individuals that TBAT greatly improves students' ability to communicate. Conversely, opinions about the impact of TBAT on functional capabilities and self-reliance were somewhat more polarized. The participants' perspectives on the degree to which it facilitates these domains were more diverse, notwithstanding the average rating of 3.8, which suggests a positive impact.

**Table 7: Correlation matrix for perceived benefits and challenges of TBAT**

	Enhances Engagement	Personalized Learning	Communication Skills	Academic Progress	Lack of Training	Technical Support	Resistance to Change	Limited Access
Enhances engagement	1.00	0.65	0.75	0.58	-0.45	-0.38	-0.50	-0.42
Personalized learning	0.65	1.00	0.40	0.55	-0.33	-0.29	-0.45	-0.37
Communication skills	0.75	0.40	1.00	0.62	-0.27	-0.20	-0.35	-0.28
Academic progress	0.58	0.55	0.62	1.00	-0.23	-0.15	-0.30	-0.24
Lack of training	-0.45	-0.33	-0.27	-0.23	1.00	0.68	0.75	0.70
Technical support	-0.38	-0.29	-0.20	-0.15	0.68	1.00	0.62	0.58
Resistance to change	-0.50	-0.45	-0.35	-0.30	0.75	0.62	1.00	0.68
Limited access	-0.42	-0.37	-0.28	-0.24	0.70	0.58	0.68	1.00

When one of the benefits is experienced, it typically has a discernible influence on the others. Improved participation is likely to result in beneficial changes in academic achievement (0.58), communication skills (0.75), and customized



learning (0.65). The encountered obstacles, meanwhile, adhere to a clear pattern. The perceived benefits in terms of involvement, acquisition of knowledge, interaction, and scholastic achievement are compromised when faced with challenges, such as insufficient technological support, resistance to change, restricted availability, and absence of training.

**Table 8: Correlation between perceived impact of TBAT and perceived benefits/challenges**

	Academic Progress	Communication Skills	Independence and Functional Skills
Academic progress	1.00	0.80	0.65
Communication skills	0.80	1.00	0.70
Independence and functional skills	0.65	0.70	1.00

The perceptions about the impact of TBAT on students' academic progress appear to be influenced by their viewpoints on its influence on their communication skills and level of independence/functional capabilities. There is a strong link (0.80) between communication skills and favorable opinions on TBAT. Similarly, there is a correlation (0.65) between independence/functional abilities and positive opinions on TBAT. When participants regard TBAT as favorably enhancing academic progress, there is a perfect correlation (1.00) between these factors. This implies that if TBAT is seen as enhancing academic achievement, it is probable that it will be regarded as having a similar beneficial effect on communication and functionality. Like the positive link between TBAT and academic development (0.80) and independence/functional abilities (0.70), TBAT is also strongly correlated with better communication skills (correlation of 1.00). Simply, those who perceive TBAT as excellent for communication are likely to view it as very beneficial for academic accomplishment, self-reliance, and operations. Similarly, the assessments of academic progress (0.65) and communication abilities (0.70) are also positively influenced by the perception that TBAT enhances independence and functional skills (correlation of 1.00). Hence, it is evident that individuals' favorable perceptions of TBAT's impact in a particular domain generally emulate their perceptions in other domains.

**Table 9: Regression analysis for impact of TBAT on academic progress**

Predictor Variables	Coefficients (B)	Standard Error	t-value	p-value
Enhances engagement	0.68	0.12	5.67	< 0.001
Personalized learning	0.52	0.09	4.89	< 0.001
Communication skills	0.75	0.14	5.36	< 0.001
Lack of training	-0.42	0.11	-3.81	0.002
Technical support	0.38	0.08	4.78	< 0.001
Resistance to change	-0.55	0.13	-4.25	< 0.001
Limited access	-0.48	0.10	-4.67	< 0.001
Constant	3.20	0.25	12.88	< 0.001

Table 9 presents the factors that affect the influence of TBAT on academic achievement. Each component has an estimated impact on academic achievement, such as engagement improving by 0.68 and customized learning increasing by

0.52. Assuming that all other factors stay the same, an increase in the engagement score is linked to a 0.68 unit enhancement in academic progress.

The t-value and standard error provide information about the relevance of each component and the level of confidence we have in our evaluations. When the p-value is less than 0.05 (or less than 0.001 in this particular situation), the impact is more pronounced. If an individual were to begin their academic advancement at the constant (3.20), they would be exempt from concerns related to these matters. The study assists in identifying the crucial aspects, such as engagement, tailored teaching, communication abilities, and others, that are genuinely significant for academic progress while using TBAT. The impact of TBAT on academic success seems to be greatly influenced by elements of greater magnitude, such as heightened engagement or improved access to more specialized support.

**Table 10: Regression analysis for impact of TBAT on independence and functional skills**

Predictor Variables	Coefficients (B)	Standard Error	t-value	p-value
Enhances engagement	0.55	0.10	5.42	< 0.001
Personalized learning	0.48	0.08	6.12	< 0.001
Communication skills	0.62	0.12	5.24	< 0.001
Lack of training	-0.35	0.09	-3.92	0.001
Technical support	0.30	0.07	4.28	< 0.001
Resistance to change	-0.48	0.11	-4.38	< 0.001
Limited access	-0.42	0.09	-4.67	< 0.001
Constant	2.80	0.22	12.73	< 0.001

Factors such as improved engagement, customized learning, and enhanced communication skills are quantified by a coefficient that represents their expected impact on independence and functional capacities. For example, if the score for increasing engagement is higher, it suggests an anticipated increase of 0.55 units in independence and functional abilities, assuming all other parameters stay constant. The table also includes metrics such as standard error, t-value, and p-value. These metrics help evaluate the degree of certainty in our estimates and the extent of each factor's impact. A p-value less than 0.05 (particularly represented as < 0.001 in this instance) signifies a substantial influence. The constant value (2.80) is used as a reference point to evaluate independence and functional abilities, without considering any external factors.

Sulaimani and Bagadood (2023) asserted that the utilization of assistive technology has brought about substantial transformations in the instructional approaches utilized by educators, particularly with the advent of tablet-based solutions, which are well recognized for their considerable potential. This study investigated the viewpoints of educators about the use of TBAT in special education settings in Saudi Arabia. The study examined individuals' perspectives on the benefits, challenges, and impacts of TBAT on academic progress and the acquisition of practical abilities.

Upon analyzing the research participants, it was found that the teachers had an average of 7.5 years of experience in this specific field of competence (Liang & Zaharudin, 2024). The sample of teachers consisted of a substantial proportion of staff employed in high schools that primarily served children with autism spectrum disorders. The diverse variety of experiences and distinct areas of expertise underscores the multitude of perspectives within the realm of special education (Mohammed, 2022).

The incorporation of instructors with diverse perspectives, including varying degrees of expertise and specialized domains, is of paramount significance. The study illustrated that the adoption of TBAT necessitates customized approaches to tackle the distinct demands of different educational levels and specialized fields (Cheng & Lai, 2020; Almurashi et al., 2022).

The teachers hold a mainly positive view of TBAT. They recognized the importance of its role in improving student involvement, personalized education, and communication skills. These viewpoints correspond with contemporary research that highlights how technology facilitates interactive and personalized learning experiences (Hasan et al., 2023; Khasawneh, 2021).

However, certain challenges emerged that hindered the smooth integration of TBAT into Saudi Arabia's special education system. The main problems identified were insufficient training, limited technical support, educators' reluctance to adapt, and restricted availability of TBAT materials. The cited limitations underscore the broader challenges faced when integrating educational technology, underscoring the need for focused training and effective resource allocation strategies (Susanto et al., 2020; Olszewski et al., 2022).

The data analysis revealed clear relationships between perceived benefits, challenges, and the impact of TBAT on academic progress. The direct relationship between acknowledging the merits of TBAT and achieving academic achievement illustrates how valuing the benefits of TBAT may positively influence academic performance. Conversely, the inverse relationship between perceived difficulties and academic progress highlights how these barriers hinder TBAT's capacity to effectively promote academic growth.

Further analysis confirmed these findings. The study emphasized that perceived benefits, such as increased engagement, personalized teaching, and improved communication skills, are indicators of positive academic progress. Nevertheless, obstacles such as resistance to change and limited availability hurt academic progress, underscoring the importance of resolving these issues to effectively implement TBAT (Khasawneh, 2023).

Legislators, institutions, and stakeholders with a strong interest in special education should consider the study's results. To fully achieve the potential of TBAT in improving educational outcomes, it is essential to solve the identified issues while strategically leveraging the recognized advantages.

## 5. Conclusion

The study recognized the importance of personalized professional development programs and strongly supports their implementation. These programs seek to provide instructors with the knowledge and skills necessary to effectively integrate TBAT into their teaching methodologies. Alsaleh (2019) highlighted the need to establish robust technical support mechanisms and execute focused interventions to address and overcome oppositions to change. These procedures should create an atmosphere that enables the smooth integration of TBAT.

Additionally, the study highlights the significance of aligning teachers' views and experiences with the implementation strategies for TBAT. According to Galway et al., (2021), for TBAT to be effectively implemented and utilized over an unlimited period, it is essential to have this alignment. Achieving this objective relies on the collaborative endeavors of lawmakers, educational establishments, and technical enterprises to function in unison. The collaboration between them has the potential to create favorable conditions for the success of TBAT, in particular in Saudi special education settings, in which there is a strong need and support for it.

## 6. Recommendations

Education authorities and institutions should prioritize specialized professional development programs as their foremost concern. To provide instructors with comprehensive training in TBAT, it is imperative to implement these specific programs. It is crucial to integrate several methodologies, including seminars, skill-enhancement sessions, and ongoing support. The primary goal should be to leverage the perceived benefits of TBAT while concurrently addressing the identified challenges. Enhancing the accessibility of TBAT resources and optimizing the procedures for delivering technical assistance is of paramount importance. To ensure that instructors have convenient access to technical assistance, novel devices and software, legislators and educational establishments must collaborate. Help desks, resource centers, and easily accessible software and hardware can all contribute to achieving this goal.

To foster a culture of knowledge exchange and reciprocal support, it is imperative to encourage collaboration among professionals, educators, and technical specialists. Facilitating opportunities for educators to exchange TBAT-related best practices, challenges, and achievements considerably enhances the dissemination of knowledge and the sharing of skills among peers. Policymakers should prioritize the development of regional protocols for TBAT as their main task. The criteria must include sufficient flexibility to satisfy the many educational backgrounds and fields encompassed by Saudi Arabia's special education programs. The incorporation of TBAT in a variety of educational contexts should encompass pedagogical methodologies, curriculum alignment, and successful strategies.

It is essential to establish a robust system for monitoring and evaluating the effectiveness of TBAT deployment in real time. Regular assessment of teacher readiness, student engagement, and academic accomplishment connected to TBAT is necessary. Establishing mechanisms for consistent feedback is crucial for adapting strategies to evolving needs and challenges. The primary emphasis of

lobbying activities should be on securing funding and governmental support for TBAT initiatives. To do this, it is necessary to lobby for the allocation of money explicitly designated for training and education, the enhancement of current technical infrastructure, and the equitable distribution of resources.

Enhancing the effectiveness of TBAT programs may be achieved by fostering community participation and encouraging parental involvement. Parents may contribute to fostering a hospitable environment for the use of TBAT in both the classroom and at home by engaging in parent-centered conferences, seminars, and outreach projects. This may ensure that children with diverse needs receive continuous support and education. Long-term encouragement and funding for research on the efficacy of TBAT in Saudi special education settings is central. The field of education is always changing and being optimized by well-informed decision-making that relies on ongoing research discoveries. Consequently, this results in modifications to policies, improvements to curriculum, and advancements in technology.

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