**Experiences with Adaptive Technology in Special Education: Overcoming Challenges and Enhancing Student Support**

**ABSTRACT**

This study investigates the integration of adaptive technology (AT) in special education, focusing on the experiences of a predominantly young group of teachers, most of whom are pursuing advanced degrees. The findings indicate that while AT significantly enhances student engagement and independence, challenges such as technical difficulties, students' attention span limitations, and insufficient training hinder its effective implementation. The study emphasizes the need for continuous professional development and collaboration between educators, parents, and technology developers to address these obstacles and foster inclusive learning environments.

Additionally, systemic barriers such as limited access to resources and inadequate technical support were identified as significant hindrances to effective AT use. In response to these challenges, the study introduces the TYRISH framework, which provides a structured support system for educators, including professional development, technical assistance, resource access, and collaboration. This framework aims to optimize AT integration, improve teaching practices, and enhance learning outcomes for students with special needs. Recommendations include offering mentorship programs for young educators, regular training for troubleshooting technical issues, and prioritizing resource allocation for AT in schools to maximize its potential in special education settings.

Keywords: Special Education, Adaptive technology, Technical difficulties, Students' attention

**Introduction**

Special Education ensures students with disabilities receive tailored instruction, and in today’s digital age, Assistive Technology (AT) plays a vital role in making learning accessible and inclusive. AT helps students participate independently and equitably, while also supporting teachers in creating effective learning environments. Despite its benefits, challenges like cost, lack of training, and limited adoption—especially in low-income areas—persist. More research is needed to understand AT’s long-term impact and improve its integration in diverse classrooms.**Phenomenological Framework**

This study is grounded in three theoretical frameworks: **Phenomenology**, **Activity Theory**, and **Transformative Learning Theory**, which together provide a comprehensive lens for examining adaptive technology in special education. *Phenomenology* explores the lived experiences of students and teachers using adaptive technology, focusing on how they interpret and make sense of these tools. *Activity Theory* examines the interactions between individuals, technology, and the educational system to identify barriers and enablers in implementation. *Transformative Learning Theory* highlights how teachers adapt and evolve their practices through reflection and professional development when integrating adaptive technology. These frameworks collectively help uncover the personal, systemic, and developmental aspects influencing effective technology use in inclusive classrooms.

Together, these frameworks provide a comprehensive lens for examining the multifaceted aspects of adaptive Technology in special education, encompassing individual experiences, systemic challenges, and transformative professional development.

**Figure 1. Phenomenological Framework**

The framework *"Experiences of Adaptive Technology in Special Education"* focuses on three key areas: **Lived Experiences**, **Key Challenges**, and **Systemic Barriers**. It captures special education teachers’ personal stories with adaptive technology, highlights practical obstacles like training gaps and technical issues, and examines broader institutional and cultural barriers. Together, these elements offer a comprehensive view of how adaptive technology impacts teaching and learning in special education.

**Phenomenological Paradigm**

Phenomenology is used to explore how students with disabilities and special education teachers experience adaptive technology. By focusing on their personal perspectives, this approach reveals how technology affects learning and teaching. Through interviews and observations, it uncovers key challenges and insights to improve educational practices.

**Statement of the Problem**

This research study aims to further understand adaptive technology applied in special education to address the challenges and enhance student support. The following guidelines and questions will guide the objectives of this study.

 Specifically, this study seeks to answer the following issues:

1. What is the demographic profile of the Special Education teachers in terms of;

1.1. age;

1.2. gender;

1.3. race/ethnicity;

1.4. highest educational attainment; and

1.5. length of teaching in special education classes?

1. What are the lived experiences of special education teachers when using adaptive technology in the classroom?
2. What are the key challenges faced by special education teachers in the integration of adaptive technology within special education settings?
3. What are the systemic barriers to the widespread adoption of adaptive technology in special education, particularly in under-resourced or low-income educational settings?

**Assumptions**

1. Special Education teachers have diverse and significant lived experiences with adaptive technology, highlighting various benefits and challenges.
2. Identifiable challenges arise in the integration of adaptive technology within special education, which need to be addressed to improve implementation strategies.
3. Systemic barriers, particularly in under-resourced or low-income settings, impede the widespread adoption of adaptive technology and affect its effectiveness in special education.

**Scope and Limitation of the Study**

This study explores how kindergarten special education teachers in Hawaii integrate adaptive technology, focusing on the challenges they face and their coping strategies during the 2024–2025 school year. The research is limited to Special Education teachers at the kindergarten level, allowing for a focused look at early childhood education. It does not include other grade levels, general education teachers, students, or other staff, which may limit the broader applicability of the findings.

**Significance of the Study**

This study aims to explore the use of Adaptive Technologies in Special Education classrooms and identify the barriers to their effective application. The findings may be valuable for several stakeholders. For **families and parents of children with special needs**, the study can offer insights into how Adaptive Technology works and how it can be used to better support their children’s development and learning at home.

**Children with Special Needs.** The information collected in this study will help to address the problems according to their specific needs. It will remove or lessen the barriers despite their differences.

**School**. The findings of this research will benefit the school in knowing what are the things that they need to improve for them to sustain quality education for their respective students.

**Special Education Teachers.**The findings of the study can also be essential for special education teachers to be more familiar with the use of Technology in their respective classes. It can also help them become familiar with the effects of using Adaptive Technologies that can help them support educational outcomes and improve the learning process.

**Future Researchers.**This study may serve as a basis or reference for future researchers and inspire them to do related and different studies regarding the use of Adaptive Technologies in Special Education classes and be more familiar with the barriers and expectations that they need to set and further do more advancements of research.

**REVIEW OF RELATED LITERATURE AND STUDIES**

This chapter mainly introduces the literature on the use of adaptive technologies in special education classes and the barriers and challenges in different fields, such as books, journals, online bibliographies, etc., hoping to improve the theoretical basis of this study further.

**Assistive Technology Laws**

Special education laws now emphasize inclusion, making it vital for educators to understand assistive technology requirements in IEPs. WHO (2022) urges broader access through collaboration and data use. Judge (2020) supports legal mandates for assistive tech in schools, while Capuano (2020) highlights its growing role in modern education.

**Benefits of the use of Assistive Technology**

Klein (2024) emphasizes that technology, guided by Universal Design for Learning (UDL), helps tailor instruction to diverse student needs, benefiting both special education and general learners. Disability Rights Washington (2021) highlights the need to consider assistive technology in IEP planning, with all stakeholders encouraged to advocate for its inclusion. Tools like Acellus (2020) and various assistive technologies—from Web 2.0 platforms to devices like tablets and phones (SpringerLink, 2024)—enhance engagement and support personalized learning, aligning with IDEA’s goals.

**Barriers to the Use of Assistive Technology**

Assistive technology (AT) faces barriers like high costs, limited training, and lack of access (Weber, 2019; Springer Nature, 2024). These challenges impact both schools and higher education (Elletson & Stromeyer, 2019). Still, the benefits of AT for students with disabilities outweigh these obstacles, highlighting the need for greater support.

**Challenges Using Assistive Technology**

Hanson (2021) and Simpson et al. (2019) note that high costs and tool selection are major barriers to effective AT use. Lim (2019) adds that both low- and high-income regions face challenges like limited awareness, stigma, and affordability, complicating adoption across settings.

**Training Special Education Teachers to Use Assistive Technology**

Erdem (2021) and De Witte et al. (2020) stress that hands-on, well-structured training is essential for special education teachers to effectively use assistive technology (AT). Saleem (2019) and Dillon (2021) add that targeted instruction builds teacher confidence and proficiency, ensuring AT is seamlessly integrated into the classroom to support diverse student needs.

**Synthesis**

Assistive technology (AT) laws now support inclusive education, requiring special educators to align IEPs with legal standards. WHO (2022) and Judge (2020) call for greater AT access and legal mandates in schools. AT tools, like those noted by Capuano (2020) and SpringerLink (2024), support diverse learners, but barriers like cost, training, and access remain (Weber, 2019).

**METHODOLOGY**

This study uses a phenomenological design to explore how special education teachers experience adaptive technology. Grounded in the work of Husserl and others, this approach seeks to capture the essence of participants’ lived experiences through their own perspectives (Moustakas, 1994; Van Manen, 1990).

**Research Questions**

This study examines how special education teachers experience and use adaptive technology, the challenges they face, and the systemic barriers—especially in low-resource settings—that affect its implementation.

**Phenomenon of Interest**

This study focuses on how special education teachers use adaptive technology to support students with disabilities. It explores how these tools are integrated into daily teaching, their perceived effectiveness, and both practical and emotional challenges teachers face. The goal is to understand how adaptive technology shapes classroom dynamics and learning outcomes, and to identify factors that support its successful use.

**Participants**

Five kindergarten special education teachers using adaptive technology will be selected through purposive sampling to provide focused, in-depth insights. Their varied experiences will highlight both the benefits and challenges of technology in early education (Smith et al., 2009).

**Data Collection:**
Data will be collected through interviews, focus groups, and classroom observations to capture personal experiences, shared perspectives, and real-time use of adaptive technology (Seidman, 2013; Krueger & Casey, 2015; Patton, 2015).

**Data Analysis**

Data analysis for this study will be conducted through a systematic process to ensure a thorough understanding of the participants' experiences with adaptive technology. Transcription will be the first step, where all interviews and focus group discussions will be transcribed verbatim to accurately capture the detailed accounts provided by the participants (Speziale & Carpenter, 2007). Following transcription, coding will be employed to analyze the text, identifying significant statements and phrases that highlight the core aspects of the teacher's experiences and the challenges they face (Creswell, 2013). These codes will then be organized into themes through thematic analysis, which will involve grouping similar codes to uncover patterns and meanings within the data, providing a comprehensive description of the experiences and challenges associated with adaptive technology (Braun & Clarke, 2006). To maintain the integrity of the findings, bracketing will be utilized, allowing researchers to set aside their preconceptions and biases, ensuring that the analysis remains rooted in the participants' perspectives rather than influenced by the researchers' interpretations (Gearing, 2004).

**Ethical Consideration:**

Ethical considerations will be paramount in this study. Informed Consent will be obtained from all participants, ensuring they are fully aware of the study's purpose, their involvement, and their right to withdraw from the study at any time without penalty. This process will guarantee that participants voluntarily agree to participate based on a clear understanding of the research (Polit & Beck, 2017). Throughout the study, anonymity and confidentiality will be strictly maintained to protect participants' identities and personal information. Measures will be put in place to secure all data and ensure that individual responses cannot be traced back to the participants, thereby safeguarding their privacy and upholding ethical research standards (Polit & Beck, 2017).

**RESULT AND DISCUSSIONS**

This chapter examines the experiences of special education teachers and students with adaptive technology, focusing on the challenges faced and strategies employed to improve student support. The findings highlight the transformative potential of adaptive technology in special education while identifying systemic barriers, ultimately providing insights to inform best practices and policy recommendations for inclusive education.

**Problem 1. Participants Profile**

In this study, the experiences of five Special Education (SpEd) teachers were explored to better understand the role of adaptive technology in supporting students with disabilities. These educators come from diverse backgrounds, with varying levels of experience and international exposure, yet they all share a common commitment to enhancing learning outcomes for students diagnosed with Autism, Attention Deficit Hyperactivity Disorder (ADHD), and other developmental challenges. Below is a brief overview of each participant, highlighting their unique professional journeys, educational philosophies, and the tools they employ to create inclusive learning environments.

**Table 1. Distribution of Participants by Age**

|  |  |  |
| --- | --- | --- |
| **Age** | **Frequency** | **Percentage** |
| 27 | 2 | 40.00 |
| 28 | 1 | 20.00 |
| 31 | 1 | 20.00 |
| 33 | 1 | 20.00 |
| **Total** | **5** | **100.00** |

Table 1 illustrates the distribution of participants by age, revealing that 2 participants are aged 27 (40.00%), while there is one participant each at ages 28, 31, and 33 (20.00% each). This age distribution indicates a relatively young cohort of participants, with the majority being 27 years old. Such demographic details can provide insight into the perspectives and experiences shared in the study, potentially reflecting the recent entry of these educators into the field of special education and their engagement with adaptive technology in contemporary educational settings.

**Table 2. Distribution of Participants by Gender**

|  |  |  |
| --- | --- | --- |
| **Gender** | **Frequency** | **Percentage** |
| Male | 2 | 40.00 |
| Female | 3 | 60.00 |
| **Total** | **5** | **100.00** |

Table 2 displays the distribution of participants by gender, showing that the sample consists of 2 males (40.00%) and 3 females (60.00%). This indicates a slight majority of female participants in the study, suggesting that the insights and experiences related to adaptive technology in special education may be influenced by a predominantly female perspective. The gender distribution provides a context for understanding the dynamics within the group and may reflect broader trends in the field of special education.

**Table 3. Distribution of Participants by Race/Ethnicity**

|  |  |  |
| --- | --- | --- |
| **Race/Ethnicity** | **Frequency** | **Percentage** |
| Filipino | 5 | 100.00 |
| Other | 0 | 0.00 |
| **Total** | **5** | **100.00** |

Table 3 presents the distribution of participants by race/ethnicity, revealing that all participants (100.00%) identify as Filipino. There are no participants from other racial or ethnic backgrounds, indicating a homogeneity in the sample concerning race/ethnicity. This suggests that the experiences and perspectives shared in the study may primarily reflect those of Filipino educators, which could influence the insights gained regarding adaptive technology in special education within this specific cultural context.

**Table 4. Distribution of Participants by Highest Educational Attainment**

|  |  |  |
| --- | --- | --- |
| **Highest Educational Attainment** | **Frequency** | **Percentage** |
| Bachelor’s Degree | 1 | 20.00 |
| With Units in Master | 3 | 60.00 |
| With Master’s Degree | 1 | 20.00 |
| **Total** | **5** | **100.00** |

 Table 4 illustrates the distribution of participants based on their highest educational attainment. Among the five participants, the majority (60.00%) have completed coursework toward a master's degree but have not yet obtained the degree, indicating that many are in the process of advancing their education. Additionally, 20.00% of participants hold a bachelor's degree, while another 20.00% have obtained a master's degree. This distribution suggests a commitment to professional development in the field of education, with most participants actively pursuing further qualifications.

**Table 5. Distribution of Participants by Length of Teaching in Special Education Class**

|  |  |  |
| --- | --- | --- |
| **Length of Teaching in Special Education Class** | **Frequency** | **Percentage** |
| 10 Years | 1 | 20.00 |
| 9 Years | 3 | 60.00 |
| 7 Years | 1 | 20.00 |
| **Total** | **5** | **100.00** |

 Table 5 presents the distribution of participants based on their length of teaching experience in special education classes. Out of the five participants, the majority (60.00%) have nine years of experience, indicating that this duration is the most common among the group. Additionally, 20.00% of participants each have ten years and seven years of teaching experience, reflecting a varied range of tenure in the field.

**Problem 2. What are the lived experiences of special education teachers when using adaptive technology in the classroom?**

**Findings and Discussion**

The findings from this study highlight that while special education teachers recognize the transformative potential of adaptive technology (AT) in enriching learning experiences, they face significant systemic barriers that impede its effective implementation. A critical challenge lies in the limited access to essential resources, including updated hardware, software, and reliable technical support, which hampers educators' efforts to successfully integrate AT into their classrooms. Compounding this issue are notable gaps in training, as many teachers report feeling unprepared to utilize these technologies effectively. Technical challenges, such as device malfunctions and software compatibility issues, often lead to frustration and disrupt the seamless integration of AT into daily lessons. Moreover, the need for personalized teaching approaches necessitates that educators strike a delicate balance between leveraging technology and addressing the diverse learning needs of their students, underscoring the importance of adequate support and resources.

To effectively address these systemic barriers, educational institutions must prioritize comprehensive changes that facilitate the broader adoption of adaptive technology within special education settings. Key among these changes is the improvement of resource allocation, ensuring that schools possess the necessary tools and infrastructure to support the successful integration of AT. Furthermore, enhancing professional development opportunities is essential to equip teachers with the skills and confidence required to harness technology effectively in their instruction. By cultivating a culture of innovation and adaptability, educational institutions can encourage the exploration of new teaching practices that meaningfully integrate AT. Such efforts will not only empower special education teachers but also significantly enhance learning outcomes for students with special needs, enabling them to engage more deeply in their education and cultivate vital skills for independence and success.

The findings of this study underscore the critical importance of well-structured training programs for special education teachers, as emphasized by Erdem (2021). Effective training equips educators with the necessary knowledge and skills to utilize assistive technology (AT) in their classrooms, enabling them to meet the diverse needs of students with disabilities more efficiently. This preparation is vital for teachers to seamlessly integrate AT into their instructional practices, thereby enriching learning experiences and enhancing the overall educational environment for students with special needs.

However, the study reveals that many special education teachers encounter significant systemic barriers that hinder the effective implementation of AT. Key obstacles include limited access to essential resources such as updated hardware and software, as well as reliable technical support. These constraints impede teachers' efforts to integrate AT and contribute to feelings of inadequacy regarding their preparedness to use such technologies effectively. The lack of adequate training and resources can lead to frustration, affecting both educators and students' learning experiences.

 The findings from this study illustrate a complex interplay between the integration of adaptive technology, teacher preparedness and support, and student engagement in special education settings. As educators leverage adaptive technology, they find that it not only simplifies classroom management but also enriches the learning experience for students with diverse needs. For example, teachers reported that technology fosters more interactive and personalized lessons, which in turn significantly enhances student engagement. This highlights that the effective integration of technology goes beyond mere operational improvements; it is a vital component of a dynamic educational environment where students are more motivated and invested in their learning journeys. Furthermore, the findings indicate that as teachers gain confidence in their use of adaptive tools, they also experience professional growth, becoming more innovative in their teaching practices.

However, the synthesis of themes also reveals challenges that must be addressed to optimize the benefits of adaptive technology. Teachers emphasized the necessity of ongoing professional development and adequate support systems to ensure they are well-prepared to implement these technologies effectively. The data suggest that without sufficient training and resources, the potential of adaptive technology may be underutilized, leading to frustrations in the classroom. Additionally, strong collaboration with families emerged as a crucial factor in fostering an inclusive and supportive learning environment. This discussion points to the need for educational institutions to prioritize comprehensive training programs and resource allocation, thereby creating a robust framework that supports both teachers and students in the effective use of adaptive technology. By recognizing and addressing these interconnected factors, educational stakeholders can significantly enhance the educational outcomes for students with special needs.

**"TYRISH: A Structured Support Framework for Integrating Adaptive Technology in Special Education"**

**Introduction**

 Adaptive Technology (AT) has revolutionized learning for students with special needs by offering customized tools that enhance engagement, accessibility, and independence. Yet, for special education teachers, integrating these tools effectively within classroom settings remains challenging. Issues such as limited access to resources, insufficient technical support, and a lack of continuous professional development hinder the full potential of AT. To address these barriers, a comprehensive support structure that combines essential resources, ongoing training, and collaborative engagement is critical. The TYRISH framework presents a structured, multi-faceted approach to overcoming these challenges.

Through its six key components—Training, Yielding (pedagogical strategies), Resources, Inclusion, Support, and a Holistic framework—the TYRISH model provides a roadmap for enabling special education teachers to integrate AT seamlessly. Each element emphasizes targeted areas, from professional development to technical support and stakeholder involvement, ensuring a robust environment for AT-based learning. By addressing these areas, the TYRISH framework aims to empower educators, optimize resource use, and foster an inclusive, technology-enhanced educational experience for students with special needs. This structured approach has the potential to transform teaching practices and contribute significantly to better learning outcomes in special education settings.

**General Objectives**

The TYRISH framework aims to provide a structured support system that empowers special education teachers to effectively integrate adaptive technology (AT) into their teaching practice. This framework emphasizes continuous professional development (CPD) to enhance teachers' skills in adaptive technology use, troubleshooting, and managing diverse student engagement. By providing training that is tailored to varying levels of technological familiarity, the framework seeks to build teachers’ confidence and competence. Additionally, the framework promotes the development of enhanced pedagogical strategies that yield student-centered, inclusive learning experiences, encouraging critical thinking and supporting diverse learning needs. To address resource-related challenges, the framework outlines the need for adequate allocation and up-to-date infrastructure, ensuring that teachers have access to essential AT tools. Furthermore, the TYRISH framework prioritizes collaboration and community involvement, engaging educators, parents, technology developers, and administrators to foster a shared commitment to successful AT implementation. Accessible technical support is also a key component, aiming to minimize disruptions through dedicated support channels and real-time problem resolution. Through this holistic approach, the TYRISH framework seeks to establish a comprehensive, supportive environment where adaptive technology can fully enhance learning outcomes for students with special needs.

**TYRISH Framework: A Structured Support Model for Adaptive Technology Integration in Special Education**

The TYRISH framework provides a comprehensive, structured support system for special education teachers, focusing on essential components to optimize the integration of adaptive technology (AT). The first element, **Training**, emphasizes the importance of continuous professional development (CPD) by offering programs that build teachers’ technical skills in using AT, troubleshooting issues, and effectively engaging students with diverse needs. This is achieved through tailored training sessions and workshops that equip teachers with both fundamental and advanced technology integration skills. **Yielding**, the second component, centers on enhancing pedagogical strategies to maximize the effectiveness of AT in instruction. It promotes student-centered approaches that balance the use of AT with direct interactions, encouraging critical thinking, and provides guidance on creating inclusive lesson plans that accommodate varied learning needs.

“TYRISH” Framework

CPD in Assistive Technology helps teachers support all students with helpful tools.

Continuous Professional Development (CPD)

training

Improve teaching by using assistive technology in smart and effective ways.

Enhance Pedagogical Strategic use of AT

yare

Hardware and software in assistive technology are tools that aid learning and daily tasks.

Resource Allocation

resources

Involves working together with educators, therapists, and families to support individuals’ needs.

Collaborative Partnerships

inclusion

Ensures timely and easy help for using assistive technology effectively.

Accessible Technical Support

support

**SpEd AT Integration** guides effective use of assistive technology in Special Education.

Comprehensive Framework for SpEd AT integration

holistic

**Fig 2: TYRISH Framework**

**Resources** are also crucial; this element focuses on ensuring that schools allocate updated hardware and compatible software specifically suited to special needs, with a budgeting framework that supports maintenance, updates, and the acquisition of new AT resources. In the **Inclusion** component, collaborative partnerships and community involvement are prioritized to foster a supportive learning environment. This involves engaging all stakeholders—including educators, parents, technology developers, and administrators—to align on AT goals and resources, as well as encouraging parental and community support for AT learning beyond the classroom.

**Support** provides accessible technical assistance to teachers by establishing dedicated support channels within schools, including help desks or technical teams that can resolve hardware or software issues. With a rapid response mechanism, technical support minimizes disruptions, allowing for a smoother AT operation within instructional time. Finally, **Holistic** represents a unified approach to AT integration, where the CPD, technical support, resource allocation, collaborative efforts, and pedagogical strategies work together to create a well-rounded, effective AT learning environment for students with special needs.

**SUMMARY, CONCLUSION, AND RECOMMENDATION**

This Chapter presents a comprehensive summary, conclusion, and recommendations derived from the findings of this study.

**Summary**

1. The participants in the study are predominantly young, with most being recent entrants into special education, as evidenced by two aged 27 (40.00%) and one each at ages 28, 31, and 33 (20.00% each). The sample has a slight female majority (60.00%), all participants identify as Filipino, and the majority (60.00%) are pursuing master's degree coursework, reflecting a commitment to professional development; additionally, most participants have varied teaching experience, with 60.00% having nine years in the field.

2. This study highlights that special education teachers find adaptive technology (AT) beneficial in fostering student engagement and independence; however, they also encounter challenges like technical difficulties and managing student enthusiasm. These findings emphasize the importance of continuous professional development and collaboration among educators, parents, and technology developers to address these challenges and improve inclusive learning environments.

3. The challenges faced by special education teachers in integrating adaptive technology (AT) are complex and significantly affect their teaching practices. These include technical issues, students' attention span limitations, and gaps in Training, highlighting the need for continuous professional development and supportive measures to optimize AT use and foster effective, inclusive learning environments for students with special needs.

4. The findings of the study indicate that while special education teachers acknowledge the potential of adaptive technology (AT) to enhance learning, they encounter significant systemic barriers, including limited access to resources, inadequate Training, and technical challenges, which hinder effective implementation; addressing these issues through improved resource allocation and enhanced professional development is essential for fostering innovation and better learning outcomes for students with special needs.

5. The TYRISH framework provides special education teachers with a structured support system, including professional development, technical assistance, resource access, collaboration, and targeted teaching strategies to enhance adaptive technology (AT) integration.

**Conclusion**

1. The demographic profile of the participants indicates a relatively young and diverse group of educators, primarily engaged in advancing their qualifications and gaining practical experience in special education. This reflects a potential for innovative approaches and adaptability within the field.

2. The findings demonstrate that while AT serves as a valuable tool for enhancing student outcomes, the accompanying challenges necessitate a proactive approach to professional development and collaborative efforts.

3. The complexity of challenges encountered in AT integration points to the necessity for a comprehensive support framework that addresses educators' technical and pedagogical needs, ensuring effective teaching practices.

4. Systemic barriers significantly hinder the effective use of AT in special education settings, suggesting that addressing these challenges is crucial for maximizing the potential benefits of technology in enhancing student learning.

5. The TYRISH framework promotes effective AT use by offering a comprehensive support structure, helping special education teachers create inclusive, technology-enhanced learning environments.

**Recommendation**

1. Educational institutions should leverage this youthful demographic by providing mentorship opportunities and support systems to enhance professional growth and retention, encouraging collaborative practices among teachers at different experience levels.

2. To optimize AT's benefits, schools should implement regular training sessions focused on troubleshooting technical issues and strategies for effectively integrating technology into lessons, fostering a collaborative environment among educators, parents, and technology developers.

3. Schools and educational authorities should develop a structured support framework that includes continuous professional development, access to technical support, and resources tailored to the unique needs of students with special needs.

4. Educational institutions must prioritize resource allocation for AT, including updated hardware and software, and implement comprehensive training programs that equip teachers with the necessary skills and confidence to utilize technology effectively in their instruction.

5. It is recommended that schools adopt the TYRISH framework to support special education teachers in integrating adaptive technology, ultimately fostering improved learning outcomes for students with diverse needs.

**Consent**

As per international standards or university standards, Participants’ written consent has been collected and preserved by the author(s).

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2.

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