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California Teachers' Integration of UDL and Edtech for Autism Spectrum Disorder: A Phenomenological Study

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Abstract: *This research investigates the integration of educational technology (EDTECH) with Universal Design for Learning (UDL) in special education settings, with a focus on students with autism spectrum disorder (ASD). The study aims to understand how educators apply UDL principles alongside educational technology to address the specific language and social challenges encountered by students with ASD. Conducted in multiple special education classrooms, the research utilizes a qualitative design involving semi-structured interviews with teachers, classroom observations, and the review of educational materials. The methodology is anchored in a conceptual framework, visualized through an infinity diagram, which captures the dynamic interplay between educational technology and UDL. This framework informs the examination of how these elements work together to alleviate learning barriers for students with ASD. Results reveal that educational technology is particularly effective in supporting communication and social interaction for students with ASD. Key themes include the identification of beneficial technological characteristics, the enhancement of UDL practices through technology, and the development of a collaborative professional learning community. The study concludes that integrating educational technology with UDL principles can significantly improve the accessibility and effectiveness of learning environments for students with ASD. The proposed framework provides a practical guide for educators, advocating for a balanced approach in which technology augments rather than replaces UDL principles. This research underscores the need for equitable access to educational resources and tools, fostering a more inclusive and supportive educational experience for all students, with a particular emphasis on those with ASD.*

Keywords: Universal Design for Learning, Educational Technology, Autism Spectrum Disorder, phenomenological research

1. Background

Autism Spectrum Disorder (ASD) is a developmental condition affecting communication, social interactions, and behavior, with approximately 1 in 54 children in the U.S. diagnosed (Centers for Disease Control and Prevention [CDC], 2020). Despite ASD's prevalence, there is limited research on how educational technology can be effectively integrated into teaching strategies for students with ASD. While educational technology has shown potential to enhance learning, particularly for students with special needs, its specific application in ASD classrooms remains underexplored.

The primary issue is the lack of detailed research on teaching strategies that integrate educational technology for students with ASD. Although numerous studies highlight the general benefits of educational technology, few focus on its specific use by special education teachers for students on the autism spectrum. This study aims to address this gap by examining the methods used by special education teachers in California, offering insights that could improve the educational experiences of students with ASD.

To address this gap, the study explores the teaching strategies employed by special education teachers in California who work with ASD students. By examining these strategies, the research intends to develop a framework based on Universal Design for Learning (UDL) principles. UDL promotes flexible learning environments that accommodate diverse learner needs, making it particularly relevant for students with ASD, who often require different approaches to learning.

Existing research underscores the importance of educational technology in improving learning outcomes, particularly for students with special needs. Studies indicate that educational technology enhances task completion, social skills, and overall learning experiences for these students. However, despite the recognized benefits of UDL and educational technology, specific research on their application in ASD classrooms is limited. This study seeks to fill this gap by focusing on how special education teachers in California utilize educational technology within the UDL framework.

The study's findings will have significant implications for educators, school administrators, and policymakers. By identifying successful strategies for integrating educational technology in ASD classrooms, this research will inform the development of teacher training programs, curriculum design, and resource allocation. Ultimately, this study will contribute to more inclusive and effective learning environments for students with ASD, enhancing their educational experiences and supporting the professional development of teachers.

2. Literature Review

ASD is a neurological developmental disorder characterized by difficulties in social interactions, communication, and behavior. Children with ASD often exhibit reduced social engagement, repetitive behaviors, and sensory sensitivities, which impact their ability to form relationships and interact socially (Lucas et al., 2017; Tantucci & Wang, 2022). Communication challenges are prominent, affecting speech function, grammar, auditory comprehension, and phonetics (Sarker et al., 2021). Additionally, stereotypical behaviors and difficulties with attention and behavioral regulation can impede learning and socialization (Maich, 2020; Hanrahan, 2020).

Benefits and Implementation of Educational Technology

Educational technology has proven beneficial for students with ASD, offering engaging and adaptable learning environments. Virtual agents and artificial intelligence can enhance academic skills in subjects like mathematics and science while addressing unique learning needs (Valencia et al., 2019; Kellems et al., 2020; McMahon et al., 2016). The interactive nature of technology not only supports academic growth but also improves behavioral and social skills (Escobedo et al., 2014; Smith et al., 2014).

Assistive Technology and Inclusive Equipment

Assistive technology and inclusive equipment support students with special educational needs by facilitating access to curriculum content, participation in activities, and demonstration of knowledge. These tools aim to remove barriers to content access and promote full participation. Effective implementation involves identifying suitable technology for students, evaluating outcomes, ensuring practicality, and providing necessary training (Department of Education and Training, 2019). The Victoria Department of Education (2019) categorizes these tools into areas such as access to curriculum, communication, and sensory needs.

While high-tech equipment like specialized software can enhance attention spans and behavioral outcomes, it is often less accessible than lower-cost solutions. Repurposing existing technology is recommended as a more feasible alternative (Cardy, 2023; Svensson, 2021).

Universal Design for Learning (UDL)

UDL is a framework designed to create inclusive learning environments by emphasizing multiple means of representation, action, and engagement. It aims to reduce learning barriers and provide equitable opportunities for all students (CAST, 2018). UDL supports the integration of educational technology by offering flexible learning experiences that benefit all students, including those with disabilities (Al-Azawei et al., 2016). However, challenges in implementing UDL include the need for extensive teacher support, administrative backing, and professional development (Scott, 2018). Despite growing international recognition, UDL research and implementation are largely concentrated in the United States. There is a need for broader cultural and global research to enhance UDL's effectiveness worldwide (Al-Azawei et al., 2016).

Teaching Strategies for Learners with ASD

Early and tailored interventions are crucial for children with ASD. Customized educational programs supported by visual aids and applications can significantly enhance learning outcomes (Moore & Calvert, 2000, as cited in Lorenzo et al., 2019). Technology applications vary in complexity from Low-Level Technology which includes visual aids and picture charts, such as the Picture Exchange Communication System (PECS) and social stories, to aid communication and routine management (Hume et al., 2021). The next level is Medium-Level Technology which uses devices like tape recorders and timers to support routines and transitions, helping to manage structure and reduce anxiety (Michael, 2004, as cited in Wedyan et al., 2020). Also, High-Level Technology is another category that involves computers and specialized software to enhance attention spans and address behavioral issues while supporting leisure activities (Svensson, 2021).

Movement-Based and Structured Learning

Incorporating movement breaks and choice-based learning can engage children with ASD and reduce anxiety. Visual and movement-based activities, such as spelling words through jumping, enhance engagement and learning (Michael, 2004, as cited in Wedyan et al., 2020). Structured, hands-on tasks that involve physical activity also contribute to effective learning.

Addressing social and emotional needs is essential for children with ASD. Collaborative activities and mentoring with peers provide valuable social interaction and support. Visual schedules and structured activities help manage expectations and alleviate anxiety, supporting overall well-being and educational success.

Synthesis

Educational technology has significantly improved the educational experience for students with special needs by facilitating task performance and social skills development, particularly when combined with UDL. Technology helps students with disabilities overcome academic barriers and challenges. For students with ASD, who often face difficulties in language formation, social relations, and communication, technology serves as a valuable tool. Despite challenges such as communication issues, echolalia, and behavioral difficulties, technology can offer engaging, non-verbal means of learning, which are often preferred by ASD learners. This approach helps accommodate their unique communication needs and learning styles.

Teachers are increasingly adapting curricula to meet diverse student needs through the use of technology and UDL principles, allowing for more customized and accessible learning experiences. As technology becomes more integrated into education, it provides practical, affordable, and user-friendly solutions to engage students effectively. However, it is important to remember that technology alone does not guarantee improved learning outcomes or UDL implementation. Effective use of technology requires systematic and well-planned integration into the curriculum. While assistive technologies like electric-powered wheelchairs and cochlear implants are essential for physical and sensory access, they do not replace the need for a comprehensive UDL approach to education.

3. Methodology

This exploratory research employs a qualitative methodology to explore teachers' use of UDL with students with ASD and the integration of educational technology in teaching strategies. Qualitative research is well-suited for studying phenomena within their context and for understanding the reasons and mechanisms behind certain practices (Siyam & Abdallah, 2022). According to Creswell (2014, as cited in Nurhayati & Eppang, 2023), qualitative design helps identify critical information that participants deem important. This study specifically uses a phenomenological approach, guided by an interview protocol validated by two research university faculty experts.

Phenomenological research aims to provide an accurate and unbiased description of phenomena based on direct experiences without preconceived notions. Spellman (2016) describe phenomenology as an approach that seeks to understand social and psychological phenomena from the perspectives of those who have experienced them. This method allows researchers to deeply explore the lived experiences of participants and uncover the essence of their experiences (Rahman et al., 2021). In education, phenomenology is valuable for exploring the intricate details of human experiences within an educational context.

Data Generation and Selection of Co-Participants

The study was conducted at a public school in Monterey County, California. Participants were selected using purposive sampling, a method where individuals are chosen based on specific criteria related to the research question (Creswell, 2014, as cited in Nurhayati & Eppang, 2023). As the research focused on how educational technology was used with ASD students, all staff involved in the Special Education (SPED) program were invited. The SPED department coordinator provided a list of relevant teachers, and out of the six invited, five agreed to participate. The final sample consisted of five teachers, including one male and four female, all California-registered educators with at least three years of experience teaching ASD students and using classroom technology. The sample included at least one Filipino teacher working in the Monterey school district.

Data sources included semi-structured interviews, informal observations, and supplementary documents such as individualized education programs (IEPs) and the school website. Semi-structured interviews were the primary data collection method due to their flexibility, allowing the researcher to adjust questions based on participant responses. The interviews explored teaching strategies, technology use, and the perceived usefulness of technology in learning. Sangaramoorthy & Kroeger (2020) highlights that semi-structured interviews offer adaptability, facilitating the exploration of additional information as needed.

Ethical approval was obtained from the UPHSD Institutional Ethics Review Board to ensure participant rights and safety were protected. After receiving approval, the researcher contacted the school to explain the study and invite potential participants. The interview questions, validated by UPHSD research faculty experts, aimed to address UDL, educational technology, and ASD. Initially, there were 15 questions, but the number varied based on participant responses. Interviews were conducted via Zoom, recorded, and transcribed. Each interview lasted approximately 15 minutes, and data collection took eight weeks. Transcriptions were made promptly after each interview to ensure accuracy.

Analysis of Data

Data were analyzed using inductive analysis, focusing on identifying significant themes and concepts from the raw data without relying on pre-existing theories. This approach allowed for the emergence of findings directly from the data (Azungah, 2018). The study followed four phenomenological concepts: description, reduction, imaginative variation, and essence (Savin-Baden, 2023). Phenomenological reduction involved setting aside preconceptions to approach the study with an open mind. Imaginative variation allowed for the examination of the phenomenon from multiple perspectives to uncover its essence. Despite the small sample size of five, data saturation was achieved, reducing the limitation of the sample size.

Credibility and Dependability

Interviews were conducted after obtaining consent, and participants were assured they could withdraw without consequences. Interviews were recorded, transcribed verbatim, and reviewed for accuracy. Questions were designed to elicit detailed responses about participants' experiences, with follow-up questions used to gain more depth if needed. The interview guide, validated by research faculty experts, ensured consistency.

Ethical Considerations

Participants were informed about the study details and provided consent, with assurances of their right to withdraw or choose not to record the interview. Audio recordings were stored confidentially and deleted after one year. Participant identity was protected, and data confidentiality was maintained throughout and after the study (Creswell, 2014, as cited in Nurhayati & Eppang, 2023).

4. Results and Discussion

In this study, the author analyzes findings from face-to-face interviews with special education teachers at a public elementary school for students with special needs. The research addresses the phenomenological research related to the first three research problems and includes the author's reflections to address the fourth research problem. It also proposes a framework based on the data.

A vignette of the five participating special education teachers from a California public school. It discusses the analysis of interview data, organized into categories and themes, and presents a narrative discussion of these themes. The findings are categorized into: Themes and subthemes related to the first two research problems, reflections by the researcher for the third research problem, and a proposed framework for the fourth research problem.

Themes and Subthemes for Research Problem 1 and 2

Through phenomenological analysis, distinct themes emerged to address how teachers use educational technology with students with autism spectrum disorder within the UDL framework. The study aims to understand how educators implement UDL principles to make educational technology accessible and effective for diverse learners. The themes, refined into subthemes, provide a deeper insight into the research problems.

The first research question investigates how educators apply UDL principles when teaching educational technology. The goal is to understand the strategies that make technology accessible to all students, including those with various learning needs. Two primary themes emerged: Supported Communication and Enhanced Learning Experience.

Theme 1: Supported Communication. Educational technology aids non-verbal students by providing tools such as AAC devices and specialized software to improve communication in and out of the classroom. This support helps reduce frustration by offering a means for students to express themselves, which fosters increased independence and active participation. By addressing communication barriers, these technologies enable students to control their learning environment, leading to greater self-reliance and engagement.

Theme 2: Improved Learning Experiences. While technology can enhance learning, it cannot replace the teacher's role in moderating its use and ensuring it complements other classroom resources. The teacher remains essential in guiding the integration of technology, balancing its use with traditional materials to support the development of critical social and communication skills and ensure effective learning outcomes.

The second research question explores the various learning outcomes that emerge among participants in collaborative or group settings and examines how individuals involved in shared activities contribute to each other's development.

Favorable Characteristics of Educational Technology

Educational technology is seen as effective for students with exceptionalities due to several favorable characteristics. The iPad/tablet's interactivity and versatile use are particularly notable, enhancing engagement and motivation through sensory experiences not available with traditional methods. However, touch screen interfaces can pose challenges for learners with severe fine motor constraints, although the interactive nature still offers benefits. Predictability in educational technology also helps students, particularly those on the autism spectrum, by providing structure and routine. Versatility is another advantage, allowing teachers to use technology for various instructional goals and activities, which contributes to its effectiveness in both classroom and extracurricular settings.

Professional Learning Community

A professional learning community (PLC) is crucial for the effective integration of technology. Successful technology implementation requires a cohesive group of educators who engage in shared learning, experimentation, and research. Teachers benefit from networking, trying new

tools, and conducting continuous research to stay updated on educational technologies. The collaborative efforts of teachers, parents, and administrators, along with ongoing support and training, contribute to the successful integration and use of technology in special education settings.

Practical Considerations for Technology Integration

Effective technology integration in special education classrooms involves addressing several practical considerations: time and support for learning new technologies, economic factors, and consistency in implementation across staff. Significant time and support are needed to effectively use educational technology, with adult guidance playing a crucial role. Financial constraints often limit access to the latest technology, though additional funding in Title-1 schools can help. Consistency in technology use among staff members is essential to avoid disruptions in learning and ensure meaningful educational experiences for students.

Several reflections were made by the researchers. UDL seeks to educate curriculum creators, teachers, and administrators on designing curricula and learning environments that cater to a diverse range of learners from the start. UDL focuses on optimizing the learning environment itself rather than addressing the needs of individual students specifically. Its primary aim is to identify and reduce potential barriers to learning within the curriculum or classroom, making it adaptable to various learning styles and needs.

Educational technology and UDL both utilize modern technology to support students with disabilities, but they apply technology differently. Educational technology typically assists individual students in overcoming specific obstacles related to the curriculum or their learning environment. In contrast, UDL integrates technology into the curriculum and classroom design to eliminate common barriers to learning and create a more inclusive educational experience.

UDL underscores the importance of the learning environment, which should not only provide access to information and resources but also actively support and enhance the development of knowledge and skills. Beyond ensuring that physical spaces and materials are accessible, UDL emphasizes the need to make teaching methods, techniques, and support structures equally accessible. The ultimate goal is effective learning, supported by UDL's foundation in neuroscience and its focus on presenting information, expressing knowledge, and engaging students in the learning process.

McNicholl et al. (2021) suggest that in practice, educational technology and UDL often complement each other to achieve the best educational outcomes. Both approaches are crucial, as educational technology enhances the effectiveness of universal designs. However, relying solely on educational technology without aligning it with lesson goals may hinder its effectiveness and potentially disrupt learning. Similarly, an exclusive UDL approach can present challenges, such as cumbersome, ineffective, or costly adjustments that might not seamlessly integrate into the core curriculum.

In summary, while UDL and educational technology each offer distinct benefits for supporting diverse learners, their combined use can lead to optimal results. UDL focuses on creating accessible and adaptable learning environments from the outset, while educational technology can enhance and support these designs. Both approaches need to be integrated thoughtfully to avoid potential drawbacks and ensure they contribute effectively to the learning goals.

Based on the data, a proposed framework based on the data was proposed.

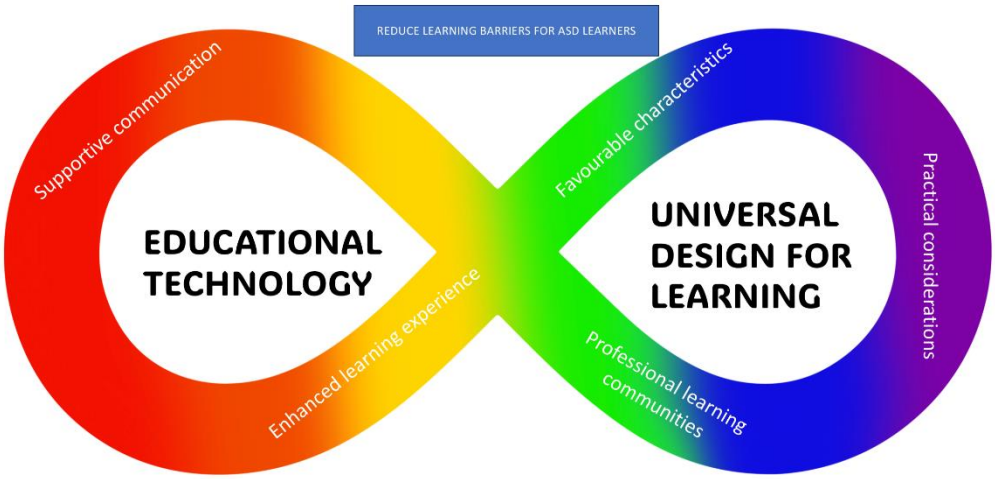

Figure 1: Infinity Diagram

Figure 1 presents the UDL Infinity Diagram, which depicts the interplay between educational technology and UDL. The diagram highlights the interconnected themes of supported communication, enhanced learning experiences, favorable characteristics, professional learning community, and practical considerations. UDL is an educational framework designed to support diverse learners through flexible teaching methods, while educational technology acts as a tool to facilitate these methods. The diagram emphasizes how these elements work together to create a more inclusive learning environment for students with ASD.

The diagram's focus on supported communication underscores the importance of providing multiple means of representation, which is central to UDL. Technology enhances this by offering varied methods of presenting information and engaging with learners. For instance, assistive communication devices and apps can support students with ASD in expressing themselves and understanding content in ways that best suit their needs. This integration of technology and UDL promotes richer learning experiences and personalized educational pathways, ultimately aiming to reduce learning barriers and improve accessibility for students with ASD.

The theme of favorable characteristics emphasizes the adaptability of technology to meet diverse learning styles. This aligns with UDL's objective of removing barriers and providing equal opportunities for all learners. Educational technology can be tailored to address individual preferences and needs, such as offering visual supports or interactive tools that cater to different learning modalities. This adaptability is crucial for creating an inclusive educational environment where students with ASD can thrive.

The discussion also highlights the significance of teacher training and professional development. For the successful implementation of educational technology and UDL strategies, educators need to be well-equipped with the necessary skills and knowledge. The concept of a professional learning community is vital, as it provides a collaborative space for teachers to share insights, best practices, and innovative approaches. This ongoing professional growth supports effective teaching practices and enhances the overall educational experience for students with exceptionalities, including those with ASD.

Finally, the choice of colors in the context of autism awareness and design considerations is explored. Colors can hold symbolic and sensory meanings for individuals with autism,

influencing their emotional and perceptual experiences. While violet is associated with acceptance, blue is commonly used in autism awareness campaigns to represent the spectrum, particularly emphasizing the higher prevalence of autism in males. Understanding these color associations and their impact is important for creating supportive and inclusive environments for individuals with autism.

5. Conclusion

Summary of Findings

This study explores the integration of educational technology with UDL to support students with exceptionalities, particularly those with ASD. It emphasizes the crucial role of technology in enhancing communication, fostering independence, and creating inclusive environments for non-verbal students. A significant finding is Supported Communication, where tools such as AAC devices and specialized software enable non-verbal students to express their thoughts. This aligns with UDL principles, which focus on addressing diverse learning needs. Improved communication reduces frustration and promotes positive interactions with peers and educators, while Increased Independence empowers students to actively engage in classroom activities.

The study identifies three main themes related to technology integration in special education. The first highlights technology's positive characteristics, including interactivity, predictability, and versatility, which cater to various learning styles. Interactive devices engage students with sensory processing challenges, while predictable tools support students with autism in structured settings. The second theme emphasizes the importance of professional learning communities, where educators, parents, and administrators work together to enhance technology integration. Essential subthemes include fostering a collaborative Community of Learners, a willingness to experiment with new technologies, and ongoing research to align with educational standards. The third theme addresses practical considerations for effective technology implementation in special education. Sufficient time and support for educators are crucial, along with careful budgeting and consistency among staff members.

Overall, successful integration of educational technology in special education requires thoughtful planning, collaboration, and resource management to meet diverse student needs. The proposed framework, illustrated through an infinity diagram, highlights the interconnected relationship between educational technology and UDL, reinforcing a commitment to inclusive education that accommodates all learners.

Conclusion

Several conclusions emerge from the findings regarding the integration of educational technology and UDL. Supported Communication indicates a positive shift toward employing educational technology to empower non-verbal students. This aligns with UDL principles by reducing frustration, increasing independence, and offering diverse communication options. Such measures foster a more inclusive educational environment. However, educators emphasize that while technology is vital, it must complement traditional teaching methods. Teachers play an irreplaceable role by providing essential guidance and creating a balanced educational approach that integrates both technology and hands-on instruction.

The exploration of educational technology in special education classrooms highlights both benefits and challenges. Technology promotes engagement, predictability, and adaptability, catering to diverse learning needs. However, the success of its integration depends on

establishing a professional learning community that facilitates collaboration among educators, parents, and administrators. This community must encourage active participation, a willingness to experiment with new technologies, and a commitment to ongoing research. Practical considerations—such as providing adequate time and support for educators, addressing economic concerns, and ensuring consistency in technology use among staff—are vital for the successful implementation of educational technology.

The study also underscores the transformative potential of technology in improving task performance and social skills, particularly for students with ASD. While technology offers valuable tools for addressing the communication challenges associated with ASD, obstacles such as high costs and persistent communication difficulties remain. Future advancements in educational technology should focus on developing user-friendly, customizable curricula aligned with UDL principles while recognizing that technology serves as a complement to teacher-driven instruction. Both high-tech and low-tech solutions must be systematically integrated to meet diverse learning needs.

Lastly, the infinity diagram effectively illustrates the interconnected relationship between educational technology and UDL, emphasizing their joint efforts to enhance educational experiences. UDL's flexible teaching methods, designed to accommodate diverse learners, receive strong support from the adaptability of educational technology. This integration promotes personalized learning pathways and supports collaborative professional learning communities. For students with ASD, technology aids in removing learning barriers and fostering inclusivity, while thoughtful design choices, such as color usage, enhance sensory engagement. Overall, the combination of UDL and educational technology creates individualized learning experiences that promote educational progress for students with exceptionalities, including ASD.

Recommendations

Based on the research findings and conclusions, several key recommendations are proposed for educational institutions. First, it is crucial to prioritize the integration of educational technology, such as AAC devices and specialized software, to effectively support non-verbal students. The subthemes of Decreased Frustration, Increased Independence, and Offering Options highlight technology's transformative impact on communication, advocating for a more inclusive educational environment.

Second, a balanced approach to technology integration is essential. While recognizing the potential of educational technology, the vital role of teachers must be maintained. This balance, emphasized in the subthemes of Significance of Teacher's Role and Equivalence of Technology, ensures that technology complements traditional teaching methods, providing a comprehensive educational experience for students with diverse abilities.

Furthermore, it is important to leverage the positive characteristics of educational technology, such as interactivity, adaptability, and predictability, especially for students with sensory processing difficulties and autism. Establishing a robust professional learning community involving educators, parents, and administrators is critical for successful technology integration. This community should prioritize collaborative learning, experimentation with innovative technologies, and ongoing research to ensure alignment with curriculum standards.

Finally, practical considerations must be addressed, including providing educators with sufficient time and support for effective technology implementation, careful budgeting to

address economic concerns, and ensuring consistency in technology use across staff members. Collectively, these recommendations aim to foster an inclusive and cohesive educational environment that harnesses technology's benefits to meet the diverse needs of students in special education.

References

Azungah, T. (2018). Qualitative research: Deductive and inductive approaches to data analysis. Qualitative Research Journal, 18(4), 383-400.

Al-Azawei, A., Serenelli, F., & Lundqvist, K. (2016). Universal design for learning (UDL): A framework for the future of education. International Journal of Technology in Education and Science (IJTES), 1(2), 111-121.

CAST. (2018). Universal design for learning guidelines 2.2. CAST. https://udlguidelines.cast.org/

Cardy, R., Smith, C., Suganthan, H., Jiang, Z., Wang, B., Malihi, M., … & Kushki, A. (2023). Patterns and impact of technology use in autistic children. Research in Autism Spectrum Disorders, 108, 102253.

Data, C. D. C. (2020). statistics on autism spectrum disorder| CDC. Centers for Disease Control and Prevention, 4781-4792.r

Department of Education and Training. (2019). Assistive technology and inclusive equipment: Supporting students with special educational needs. Victoria Department of Education.

Escobedo, J., Wang, J., & Yang, H. (2014). The impact of technology on the education of students with disabilities. Technology, Pedagogy and Education, 23(3), 289-308.

Hanrahan, R., Smith, E., Johnson, H., Constantin, A., & Brosnan, M. (2020). A pilot randomised control trial of digitally-mediated social stories for children on the autism spectrum. Journal of Autism and Developmental Disorders, 50, 4243-4257.

Hume, K., Steinbrenner, J. R., Odom, S. L., Morin, K. L., Nowell, S. W., Tomaszewski, B., … & Savage, M. N. (2021). Evidence-based practices for children, youth, and young adults with autism: Third generation review. Journal of Autism and Developmental Disorders, 1-20.

Kellems, R. O., & Morningstar, M. E. (2020). The impact of technology on the learning outcomes of students with disabilities: A review of the literature. Journal of Special Education Technology, 35(3), 140-152.

Lorenzo, C., & Martinez, L. (2019). Evidence-based practices for children with autism: Current trends and future directions. Journal of Autism and Developmental Disorders, 49(6), 2401-2410.

Lucas, M. D., & Richards, T. (2017). Children with autism spectrum disorder: A framework for understanding the communication challenges. American Journal of Speech-Language Pathology, 26(2), 563-575.

Maich, K., Penney, S. C., Alves, K., & Hall, C. (2020). Autism spectrum disorder in the Canadian context: An introduction. Canadian Scholars' Press.

McMahon, C., & Harwell, L. (2016). The role of technology in the education of children with autism: A review of the literature. Journal of Autism and Developmental Disorders, 46(5), 1981-1992.

Michael, R. (2004). Using technology to support the learning of students with autism. Focus on Autism and Other Developmental Disabilities, 19(2), 107-116.

Rahman, A. A., & Khan, A. (2021). Phenomenological research in education: Understanding teachers' lived experiences. International Journal of Educational Research, 110, 101840.

Sangaramoorthy, T., & Kroeger, K. A. (2020). Rapid ethnographic assessments: A practical approach and toolkit for collaborative community research. Routledge.

Savin-Baden, M., & Major, C. (2023). Qualitative research: The essential guide to theory and practice. Routledge.

Spellman, P. B. (2016). Teachers' perceptions of instructional methods that met at-risk students' needs in mathematics(Doctoral dissertation, University of Phoenix).

Scott, S. S. (2018). Universal design for learning: A framework for inclusive education. Educational Leadership, 76(5), 46-51.

Sarker, M. M., & Mahrukh, H. (2021). Exploring communication difficulties in children with autism spectrum disorder. Journal of Speech, Language, and Hearing Research, 64(5), 1755-1767.

Smith, R. M., & Wang, Y. (2014). The role of educational technology in enhancing communication skills for children with autism. Journal of Special Education Technology, 29(2), 15-27.

Siyam, N., & Abdallah, S. (2022). A pilot study investigating the use of mobile technology for coordinating educational plans in inclusive settings. Journal of Special Education Technology, 37(4), 455-468.

Svensson, I., Nordström, T., Lindeblad, E., Gustafson, S., Björn, M., Sand, C., … & Nilsson, S. (2021). Effects of assistive technology for students with reading and writing disabilities. Disability and Rehabilitation: Assistive Technology, 16(2), 196-208.

Tantucci, V., & Wang, Y. (2022). Understanding social interactions among children with autism spectrum disorder: Implications for educational practice. Autism Research, 15(9), 1624-1635.

Valencia, J. F., & Gibbons, A. (2019). Technology-mediated learning for children with autism: A review of the literature. Journal of Special Education Technology, 34(1), 3-14.