GSC Advanced Research and Reviews

eISSN: 2582-4597 CODEN (USA): GARRC2

Cross Ref DOI: 10.30574/gscarr

Journal homepage: https://gsconlinepress.com/journals/gscarr/

(REVIEW ARTICLE)

Check for updates

Advancing ADHD education: autonomy, technology, and inclusive strategies

Vana Gkora *

Department of Greek Philology, Democritus University of Thrace, Greece.

GSC Advanced Research and Reviews, 2024, 18(03), 101–111

Publication history: Received on 19 January 2024; revised on 02 March 2024; accepted on 05 March 2024

Article DOI: https://doi.org/10.30574/gscarr.2024.18.3.0084

Abstract

This paper explores the integration of autonomy-supportive practices and technological interventions in primary education for students with Attention-Deficit/Hyperactivity Disorder (ADHD). It underscores the significance of creating educational environments that promote autonomy, leveraging cutting-edge technology to tailor learning experiences to the unique needs of ADHD students. Through a systematic literature review, the study highlights the importance of parental involvement and interdisciplinary approaches in enhancing academic achievement, social integration, and emotional well-being of ADHD students. It presents a collaborative framework that combines autonomy, technology, and inclusive strategies, advocating for policy support, community engagement, and digital equity. The findings suggest that a holistic, adaptive educational model is essential for addressing the multifaceted challenges ADHD students face, offering insights for future research and practice.

Keywords: ADHD Education; Autonomy-supportive Practices; Technological Interventions

1. Introduction

The intersection of Attention-Deficit/Hyperactivity Disorder (ADHD) with educational practices represents a significant challenge and opportunity within the primary education landscape. ADHD, a prevalent neurodevelopmental condition, affects a substantial portion of the global school-age population, with estimates indicating a prevalence rate of approximately 7.6% among children aged 3 to 12 years [1]. This disorder is characterized by symptoms of inattention, hyperactivity, and impulsivity, which can substantially hinder academic achievement and social integration, necessitating an educational approach that transcends traditional pedagogical models [2]. The complexity of ADHD's impact on education demands innovative, inclusive strategies that cater to the unique needs of these students, highlighting the importance of autonomy and technology integration as pivotal elements in this educational paradigm shift.

In recent years, the discourse surrounding ADHD education has increasingly emphasized the need for autonomy-supportive environments. Grounded in Self-Determination Theory (SDT), such environments are posited to enhance intrinsic motivation and engagement among students with ADHD, fostering a sense of agency and control over their learning processes [3]. Autonomy in learning is not merely a pedagogical preference but a critical factor in the educational success and overall well-being of students with ADHD, as it aligns with their need for personalized, flexible learning approaches that can accommodate their variability in attention and executive function [4-6].

Parallel to the emphasis on autonomy is the transformative potential of technology in education. Technological interventions, ranging from computer-assisted instruction to interactive serious games and emerging applications of Artificial Intelligence (AI), Virtual Reality (VR), and Augmented Reality (AR), offer unprecedented opportunities to create engaging, personalized learning experiences that can meet the diverse needs of ADHD students [7,8]. These technologies not only cater to the specific learning styles and challenges of ADHD students but also open new avenues

* Corresponding author: Vana Gkora

for enhancing attention, cognitive functions, and academic skills, offering a more adaptable and responsive educational experience [9,10].

However, the integration of autonomy-supportive practices and technology in ADHD education is not without challenges. The digital divide, for instance, poses a significant barrier to equitable access to educational technology, with disparities in access potentially exacerbating educational inequalities for students from underprivileged backgrounds [11,12]. Moreover, ethical concerns surrounding data privacy and the potential for misuse of student information necessitate a cautious, responsible approach to the implementation of educational technologies [13,14].

Amid these challenges, the role of parental involvement emerges as a crucial factor in the educational outcomes of children with ADHD. Engaging caregivers in the selection and utilization of educational technologies at home can significantly enhance academic motivation and engagement among these children, underscoring the importance of family-school collaboration in supporting the educational journey of students with ADHD [15]. This collaborative approach aligns with the broader call for adaptive educational models that not only address academic challenges but also foster social integration and emotional well-being, incorporating mechanisms for facilitating parental engagement and training [16,17].

In light of these considerations, this paper proposes a collaborative framework that leverages the synergies between autonomy, technology, and inclusive educational strategies to optimize the learning experiences of students with ADHD. Through a systematic literature review, we evaluate evidence-based strategies, interdisciplinary approaches, and the pivotal role of parental involvement in crafting a holistic, adaptive educational model. This model aims to address the multifaceted challenges and opportunities presented by ADHD in educational settings, advocating for a comprehensive approach that encompasses policy support, community engagement, and a commitment to inclusivity and digital equity [18,19].

As educational landscapes continue to evolve, so too must our approaches to supporting all learners, particularly those with ADHD, to thrive in both academic and social realms. This paper contributes to the ongoing discourse on ADHD education, highlighting the imperative for continuous research, policy development, and practice adjustments. By underscoring the transformative potential of autonomy-supportive practices and technological integration, we advocate for a holistic approach that navigates the complexities of ADHD education, aiming to forge more inclusive, engaging, and effective learning environments for students with ADHD.

2. Research method

This review employs a systematic approach to literature synthesis, aiming to amalgamate current research findings on the intersection of ADHD, learning autonomy, and technology integration within primary education. Peer-reviewed articles, meta-analyses, systematic reviews, and seminal works published within the last decade were prioritized to ensure relevance and recency. Databases such as PubMed, ERIC, ResearchGate, and Google Scholar served as primary sources. The selection criteria included studies focusing on ADHD's prevalence, characteristics, and impacts in primary educational settings; interventions promoting autonomy; and technological integrations aiming to support ADHD students. Through a narrative synthesis, the review critically evaluates the evidence, highlighting methodological strengths, limitations, and areas for future research.

3. Understanding ADHD and its Impact on Education

3.1. Prevalence and Characteristics of ADHD

ADHD stands as a prevalent neurodevelopmental disorder, impacting approximately 7.6% of children between the ages of 3 to 12 and 5.6% of adolescents from 12 to 18 years worldwide [1]. Characterized by symptoms of inattention, hyperactivity, and impulsivity, the manifestations of ADHD can significantly vary among individuals but generally lead to considerable disruption in both academic and social spheres [20]. The disorder's impact on cognitive and behavioral functions necessitates a nuanced understanding and approach within educational settings to facilitate effective learning and social integration [21].

In educational settings, students with ADHD often face challenges that extend beyond academic difficulties, including problems with social integration and maintaining positive peer relationships [2,22]. The transition from child to adult health services for young people with ADHD is a critical period that highlights the need for a coordinated approach between education and healthcare services to ensure continuity of support [22].

Moreover, accommodating learners with specific learning difficulties, including ADHD, in educational settings presents both problems and solutions. A comprehensive approach that includes adjustments in the teaching-learning process is essential to accommodate these learners effectively. This necessitates recognition of the importance of inclusive practices at the policy level and a deep understanding of such practices among educators [23].

3.2. ADHD and educational settings

Educational settings pose various challenges for students diagnosed with ADHD, significantly affecting their learning experiences and social interactions. The core symptoms of ADHD—namely inattention, hyperactivity, and impulsivity—often result in difficulties with executive function tasks, including organizing, planning, and sustaining attention to tasks. These challenges can lead to underperformance academically, despite having the intellectual capabilities to succeed. Furthermore, the social dynamics within school environments can exacerbate feelings of isolation or difference, as peers and educators may not fully understand the implications of ADHD on a student's behavior and learning needs.

3.2.1. Academic Challenges

Students with ADHD frequently experience academic difficulties that stem from their symptoms. The inability to maintain attention on tasks or instructions can result in missed details, incomplete assignments, and lower academic achievements. Hyperactivity and impulsivity can disrupt classroom activities, making it challenging for these students to integrate into structured learning environments without adequate support. Moreover, executive function deficits can hinder their ability to organize work, manage time effectively, and follow through on tasks, further impacting their academic performance [24].

3.2.2. Social and Emotional Implications

The impact of ADHD extends beyond academic challenges, affecting social interactions and emotional well-being. Students with ADHD may struggle with social cues, leading to difficulties in forming and maintaining friendships. The impulsivity characteristic of ADHD can result in behavior that is seen as disruptive or inappropriate by peers, contributing to social isolation or conflict. These social challenges, combined with academic struggles, can significantly affect a student's self-esteem and emotional health, leading to increased risk of anxiety and depression [25].

3.2.3. Strategies for Support

Effective support for students with ADHD in primary education settings involves a multi-faceted approach that addresses academic, social, and emotional needs. Strategies include:

Behavioral Interventions: Implementing positive behavioral support strategies, such as token reward systems or structured routines, can help manage hyperactivity and impulsivity in the classroom. These interventions encourage positive behavior while providing the consistency and structure that students with ADHD need [26].

Social Skills Training: Programs designed to enhance social skills can be beneficial for students with ADHD, helping them navigate peer interactions more effectively. These programs can focus on teaching empathy, conversation skills, and problem-solving strategies to improve social integration and relationships. Training in empathy and problem-solving skills has been shown to improve social self-efficacy and mental security among students, indicating its effectiveness in enhancing interpersonal skills and emotional well-being [25,26].

Collaborative Approaches: A team-based collaborative care model (TBCCM) is proposed to foster communication and collaboration among health care and education teams, embedding implementation science methods to promote and sustain evidence-based practices for youth with ADHD. This model emphasizes effective leadership, teamwork, and the use of data from multiple informants, advocating for the adoption and adaptation of evidence-based practices [27].

Executive Function Training: Integrating executive function training into educational strategies significantly enhances the cognitive skills that are crucial for students with ADHD, such as organizing, planning, and maintaining attention. This targeted approach directly addresses the core executive function deficits associated with ADHD, leading to improvements in academic performance and behavioral issues. Schools implementing these training sessions can offer students a comprehensive support system, improving their learning experiences, emotional well-being, and social integration, thereby providing a multifaceted framework for addressing the challenges of ADHD [4,6].

3.3. The Importance of Autonomy in ADHD Education

The development of autonomy in the education of students with ADHD is pivotal. Aligning with the principles of Self-Determination Theory, autonomy-supportive environments are instrumental in enhancing intrinsic motivation and engagement, fostering a sense of agency and control in the learning process. These environments not only cater to individual learning preferences but also provide the necessary structure and consistency ADHD students require. Champ, Adamou, and Tolchard [3] discuss how self-regulation in ADHD, underpinned by a need for connection, autonomy, and emotional feedback, is crucial for the educational success and well-being of these students. Serrano et al. [5] further demonstrate the positive impact of psychological need fulfillment on the academic and personal development of college students with ADHD, highlighting the importance of supportive and autonomy-enhancing educational frameworks. The evidence from Morsink et al. [17] and Rogers & Tannock [28] reinforces the potential of Self-Determination Theory in motivating ADHD learners, suggesting that classrooms that meet the psychological needs of children with ADHD symptoms foster a more inclusive and effective learning environment.

4. Technological Interventions in ADHD Education

4.1. Overview of Educational Technologies

The landscape of educational technology is vast, featuring tools and platforms designed to enhance engagement, interactivity, and personalization in learning. From interactive software and educational games to comprehensive digital learning environments, these technologies aim to transform the learning experience, making it more adaptable and responsive to individual needs. For example, BCI-based games have been identified as effective for training attention abilities in children with ADHD, providing a therapeutic and engaging approach to managing symptoms [29].

The integration of technology in education for ADHD students has shown promise, yet its effectiveness can vary significantly across different cultural and socio-economic contexts. A study by Xie [30] emphasizes that technological tools, such as educational apps and software, improve engagement and learning outcomes for ADHD students in well-resourced schools but are less effective in under-resourced settings due to the digital divide. This finding points to the necessity of developing context-specific technological solutions that are accessible and effective for all students, regardless of their background. This research underscores the importance of creating online education platforms that cater specifically to the learning characteristics and needs of ADHD students, thereby enhancing their online learning experience and concentration.

4.2. Technologies Supporting Students with ADHD

Technological advancements have opened new horizons for educational support tailored specifically to students with ADHD, offering tools that cater to their unique learning needs. Computer-assisted instruction emerges as a pivotal resource, providing a customizable learning pace that respects the diverse attention spans and processing capacities of ADHD learners. This methodological flexibility ensures that students can engage with educational content in a manner that aligns with their individual learning profiles, thereby enhancing comprehension and retention.

Moreover, the advent of interactive serious games marks a significant stride forward in educational technology, particularly for children with ADHD. These games, designed with educational objectives in mind, combine learning with engaging gameplay, making them a powerful tool for capturing the attention and interest of ADHD students. The interactive and immersive nature of serious games addresses the motivational and engagement gaps often observed in traditional learning environments. Research by Coma-Roselló et al. [9] underscores the efficacy of interactive serious games in enhancing learning outcomes for children with ADHD, highlighting their role in improving attention, cognitive functions, and academic skills.

Additionally, the study on the effectiveness of computer-assisted instruction on mathematical operations in ADHD and typical students by Botsas and Grouios [31] provides further evidence of the benefits of technological interventions in education for ADHD learners. This research demonstrates significant improvements in the mathematical operations performance of ADHD students when engaged in computer-assisted learning, illustrating the positive impact of technology on academic achievement in this demographic.

4.3. Interdisciplinary Perspectives on ADHD Education

Incorporating insights from neuroscience, psychology, and educational technology can offer a more holistic understanding of ADHD and its educational implications. Neuroscientific research highlights the brain's executive functions in children with ADHD, indicating the potential of personalized learning technologies that adapt to the

cognitive profiles of these students [6,32]. Studies like those conducted by Liao et al. [33] on neurofeedback-based neuropsychotherapy demonstrate significant improvements in executive functions and academic achievements among ADHD children, suggesting the effectiveness of tailored educational interventions. Furthermore, psychological theories on motivation, as outlined by Morsink et al. [17] within the framework of Self-Determination Theory (SDT), support the use of autonomy-supportive teaching methods to enhance intrinsic motivation and engagement in students with ADHD. These approaches emphasize the importance of satisfying basic psychological needs for autonomy, competence, and relatedness, which are crucial for motivating students with ADHD.

4.4. Personalized Learning Environments through Technology

One of the most significant contributions of technology to education is the ability to create personalized learning environments. These environments, tailored to meet the unique needs of each student, are especially beneficial for students with ADHD, who often require a more personalized approach to learning. For instance, the integration of educational games based on distributed and tangible user interfaces stimulates cognitive abilities in children with ADHD, supporting their educational needs in innovative ways [34].

4.5. Emerging Technologies

The integration of technology in educational settings holds transformative potential, especially for students with ADHD, by facilitating personalized learning environments. Beyond the current suite of educational technologies, emerging technologies such as Artificial Intelligence (AI), Virtual Reality (VR), and Augmented Reality (AR) promise to further revolutionize this landscape. These technologies, grounded in the latest neuroscientific research and psychological theories, offer unprecedented opportunities for creating highly adaptive and engaging learning experiences [7].

Neuroscientific research indicates that the dynamic and interactive elements of VR and AR can significantly enhance cognitive engagement and learning outcomes for students with ADHD, by providing sensory-rich environments that capture their attention and stimulate their executive functions [6,32]. Similarly, AI-driven learning platforms can adapt in real time to the unique learning pace and style of each student, offering personalized educational experiences that traditional teaching methods cannot [7].

The potential of these technologies extends beyond mere academic achievement; they also offer novel approaches to developing social skills, emotional regulation, and executive function capabilities [6,32]. For instance, VR simulations can be used to practice social scenarios in a controlled, repeatable manner, helping students with ADHD to improve their interpersonal skills and emotional responses.

Integrating these emerging technologies requires a thoughtful approach that considers the specific needs and challenges faced by students with ADHD. It also necessitates ongoing collaboration between educators, technologists, neuroscientists, and psychologists to ensure that these tools are effectively tailored to support and enhance ADHD education.

4.6. Role of Parental and Caregiver Involvement

Parental involvement in technology-assisted learning plays a critical role in the educational outcomes of children with ADHD. Research underscores the importance of engaging caregivers in the selection and utilization of educational technologies at home to enhance academic motivation and engagement among children with ADHD. This highlights the necessity for educational strategies tailored to ADHD that incorporate mechanisms for fostering and facilitating parental engagement and training.

For instance, Silverman et al. [15] demonstrated that parental factors, including internalizing symptoms, parenting style, and confidence in assisting with remote learning, conferred risk and resilience for children with and without ADHD's learning and emotional outcomes during the COVID-19 pandemic. Their findings emphasize that parental confidence in educating their child predicted better outcomes, while increased parental involvement was associated with greater child difficulties, particularly pronounced in families of children with ADHD. This study suggests that parental engagement in technology-assisted learning environments is pivotal for addressing the unique educational needs of children with ADHD, highlighting the need for strategies that bolster parental involvement in a supportive manner.

5. Navigating the Challenges of Technology Integration in ADHD Education

5.1. Addressing the Digital Divide and Ensuring Digital Equity

The digital divide, a significant barrier to the effective integration of technology in education, refers to the gap between those who have access to modern information and communication technology and those who do not. This divide can be particularly pronounced for students from low-income families or rural areas, potentially exacerbating existing educational inequalities. Bridging this divide is essential for ensuring equitable access to technological resources and opportunities for all students, including those with ADHD. Research highlights the need for initiatives that address digital equity, emphasizing the development of local technologies to enhance data privacy and security in educational technology, thereby mitigating one aspect of the digital divide [11,12].

Angwaomaodoko, E. A. [19] emphasize the critical role of policy and infrastructure in bridging the digital divide. Supportive policies that ensure equitable access to technology are paramount. This includes investing in digital infrastructure, providing schools with the necessary devices and high-speed internet access, and training teachers to effectively use technology in their classrooms.

Furthermore, policies must also address the affordability and accessibility of technology for students at home, ensuring that learning does not end at the school gates. This involves subsidizing internet access and devices for low-income families and creating accessible educational content that is tailored to diverse learning needs, including those of students with ADHD.

Achieving digital equity is not just a matter of technological investment but also requires a comprehensive strategy that encompasses policy support, community engagement, and a commitment to inclusivity. Only then can the potential of technology to transform education for students with ADHD be fully realized.

5.2. Balancing Technology with Human Interaction

While technology offers numerous advantages, it is crucial to maintain a balance between its use and human interaction. Over-reliance on digital devices can lead to a diminished emphasis on personal interaction and hands-on activities, which are fundamental to a comprehensive educational experience. It is necessary to strike a balance, ensuring that technology serves as a complement to traditional educational elements. Studies on the application of multimedia human-computer interaction technology in preschool children's drama education highlight the importance of balancing technological advancements with human-centric teaching methods to foster interactive learning experiences [35].

5.3. Ethical Considerations and Data Privacy in Educational Technology

The use of technology in education also raises important ethical considerations, particularly regarding data privacy and the potential for misuse of student information. As educational technologies often collect and analyze student data to personalize learning experiences, it is imperative to ensure responsible data handling and the protection of student privacy. Ethical considerations in using artificial intelligence to improve teaching and learning include addressing data privacy, security concerns, and the potential for discrimination and bias [13,14].

5.4. Digital Technologies Overview

In conclusion, we emphasize the importance of all digital technologies in the field of education and in ADHD training. These technologies are highly effective and productive and facilitate and improve assessment, intervention, and educational procedures through mobile devices that bring educational activities anywhere [36-39], various ICTs applications that are the main supporters of education [40-59], and AI, STEM, Games and ROBOTICS that raise educational procedures to new performance levs [60-67]. In addition, the development and integration of ICTs with theories and models of metacognition, mindfulness, meditation, and the development of emotional intelligence [68-96], accelerates and improves educational practices and results more than those, particularly in children with ADHD, treating domain and its practices like assessment and intervention.

6. Conclusion

This study underscores the critical importance of integrating autonomy-supportive practices and advanced technological interventions in the education of students with ADHD. Our systematic review of the literature indicates that fostering autonomy and leveraging technology can significantly enhance the learning experiences, academic achievement, and social integration of ADHD students. However, realizing the full potential of these strategies requires

overcoming challenges such as the digital divide and ensuring ethical considerations in technology use. The paper advocates for a collaborative, interdisciplinary approach that includes educators, parents, technologists, and policymakers, aiming to create a more inclusive and effective educational ecosystem for ADHD students. Future research should focus on developing and testing innovative educational technologies, exploring the impact of parental involvement in technology-assisted learning, and addressing equity and accessibility issues to ensure that all students, regardless of their socio-economic background, can benefit from these advances. By adopting a comprehensive approach that combines autonomy, technology, and inclusivity, educators and stakeholders can better support the diverse needs of students with ADHD, facilitating their academic success and overall well-being.

Compliance with ethical standards

Acknowledgments

The Authors would like to thank the SPECIALIZATION IN ICTs AND SPECIAL EDUCATION: PSYCHOPEDAGOGY OF INCLUSION Postgraduate studies Team, for their support.

References

[1] Salari, N., Ghasemi, H., Abdoli, N., Rahmani, A., Shiri, M. h., Hashemian, A., Akbari, H., & Mohammadi, M. (2023). The global prevalence of ADHD in children and adolescents: a systematic review and meta-analysis.

[2] Gkora, V., & Driga, A. M. (2023). The role of ICTs in student's emotional and behavioral difficulties.

[3] Champ, R. E., Adamou, M., & Tolchard, B. (2022). Seeking connection, autonomy, and emotional feedback: A self-determination theory of self-regulation in attention-deficit hyperactivity disorder. Psychological Review.

[4] Shuai, L., Daley, D., Wang, Y. F., Zhang, J. S., Kong, Y. T., Tan, X., & Ji, N. (2017). Executive function training for children with attention deficit hyperactivity disorder. Chinese medical journal, 130(05), 549-558.

[5] Serrano, J. W., Abu-Ramadan, T. M., Vasko, J. M., Leopold, D. R., Canu, W., Willcutt, E., & Hartung, C. (2023). ADHD and Psychological Need Fulfillment in College Students. Journal of Attention Disorders.

[6] Gkora, V., & Christou, A. I. (2023). Executive functions, self-regulation and social media for peace-based inclusive education. Magna Scientia Advanced Research and Reviews, 8(2), 129-140.

[7] Drigas, A., Mitsea, E., & Skianis, C. (2023). Meta-learning: A Nine-layer model based on metacognition and smart technologies. Sustainability, 15(2), 1668.

[8] Doulou, A., Drigas, A., & Skianis, C. (2023). Intercultural Education and ADHD: The Use of Virtual Reality as a Means of Intervention and Assessment. International Journal of Online and Biomedical Engineering (iJOE).

[9] Coma-Roselló, T., Blasco-Serrano, A. C., Garrido, M. A., & Aguelo-Arguis, A. (2020). Mediation criteria for interactive serious games aimed at improving learning in children with attention deficit hyperactivity disorder (ADHD).

[10] Putri, N. K. S., Karsen, M., Juwitasary, H., Rumondor, P., & Kristin, D. M. (2023). The Use of Interactive Digital Content as Assistive Technology for Student with ADHD. 2023 International Conference on Information Management and Technology (ICIMTech).

[11] Amo, D., Prinsloo, P., Forment, M. A., Fonseca, D., Kompen, R. T., Canaleta, X., & Herrero-Martín, J. (2021). Local Technology to Enhance Data Privacy and Security in Educational Technology.

[12] Vallée, É., & Hsu, Y. (2023). Protecting Students: Data Privacy in the African Union.

[13] Bajaj, S. D., Boruah, A. S., Nirban, S., Nimavat, D., & Bajaj, K. K. (2023). Ethical Considerations in Using Artificial Intelligence to Improve Teaching and Learning.

[14] Kaddoura, S., & Al Husseiny, F. (2023). The rising trend of Metaverse in education: challenges, opportunities, and ethical considerations.

[15] Silverman, M. R., Stadterman, J., Lorenzi, D., Feuerstahler, L., Hirsch, E., & Roy, A. (2022). Parental Factors That Confer Risk and Resilience for Remote Learning Outcomes During the COVID-19 Pandemic Among Children With and Without Attention-Deficit/Hyperactivity Disorder. Journal of Attention Disorders, 26(11), 1381-1393.

[16] Tessarollo, V., Scarpellini, F., Costantino, I., Cartabia, M., Canevini, M., & Bonati, M. (2021). Distance Learning in Children with and without ADHD: A Case-control Study during the COVID-19 Pandemic. Journal of Attention Disorders, 26, 902-914.

[17] Morsink, S., Van der Oord, S., Antrop, I., Danckaerts, M., & Scheres, A. (2022). Studying motivation in ADHD: The role of internal motives and the relevance of self determination theory. Journal of Attention Disorders, 26(8), 1139-1158.

[18] Gavin, B., Twomey, C., Minihan, E., O'Reilly, G., & Mcnicholas, F. (2023). Parenting interventions, ADHD and homework: a systematic review. Irish Educational Studies.

[19] Angwaomaodoko, E. A. (2024). An appraisal on the Role of Technology in Modern Education, Opportunities and Challenges. Path of Science, 9(12), 3019-3028.

[20] Chankalal, R., & Daily, R. (2014). Evaluating and Treating ADHD in Primary Care Settings with Updated AAP Guidelines.

[21] Pham, A., & Riviere, A. (2015). Specific Learning Disorders and ADHD: Current Issues in Diagnosis Across Clinical and Educational Settings.

[22] Benham-Clarke, S., Ford, T., Mitchell, S. B., Price, A., Newlove-Delgado, T., Blake, S., Eke, H., Moore, D., Russell, A. E., & Janssens, A. (2021). Role of education settings in transition from child to adult health services for young people with ADHD.

[23] Indrarathne, B. (2019). Accommodating Learners with Specific Learning Difficulties in Educational Settings: Problems and Solutions.

[24] Arnold, L., Hodgkins, P., Hodgkins, J., Kahle, J., Madhoo, M., & Kewley, G. (2020). Long-Term Outcomes of ADHD: Academic Achievement and Performance. Journal of Attention Disorders, 24(1), 73-85.

[25] Humenny, G., Świtaj, P., Rębisz, S., & Anczewska, M. (2019). BETWEEN ISOLATION AND LONELINESS: SOCIAL NETWORKS AND PERCEIVED INTEGRATION WITH PEERS OF CHILDREN DIAGNOSED WITH ADHD IN REGULAR CLASSROOMS.

[26] Storebø, O. J., Andersen, M. E., Skoog, M., Hansen, S. J., Simonsen, E., Pedersen, N., ... & Gluud, C. (2019). Social skills training for attention deficit hyperactivity disorder (ADHD) in children aged 5 to 18 years. The Cochrane Database of Systematic Reviews, 6, CD008223.

[27] Talbott, E., De Los Reyes, A., Power, T., Michel, J., & Racz, S. J. (2020). A Team-Based Collaborative Care Model for Youth With Attention-Deficit Hyperactivity Disorder in Education and Health Care Settings. Journal of Emotional and Behavioral Disorders, 29, 24-33.

[28] Rogers, M. A., & Tannock, R. (2018). Are Classrooms Meeting the Basic Psychological Needs of Children With ADHD Symptoms? A Self-Determination Theory Perspective. Journal of Attention Disorders.

[29] Bravou, V., & Drigas, A. (2021). BCI-based games and ADHD. Research, Society and Development, 10(4), e52410413942-e52410413942.

[30] Xie, Y. (2023). Research on Online Education Web Design for Children with ADHD. Highlights in Science, Engineering and Technology.

[31] Botsas, G., & Grouios, G. (2019). COMPUTER-ASSISTED INSTRUCTION OF MATHEMATICAL OPERATIONS IN ADHD AND TYPICAL STUDENTS – THE ONLINE LEARNING EXPERIENCE.

[32] Gkora, V., & Driga, A. M. (2023). VIRTUAL REALITY, DIGITAL TECHNOLOGIES AND BRAIN REWIRING TECHNIQUES FOR INTERVENTION IN ATTENTION-DEFICIT/HYPERACTIVITY DISORDER (ADHD). Journal Health and Technology-JHT, 2(2), e2237-e2237.

[33] Liao, Y.-C., Guo, N., Su, B.-Y., Chen, S.-J., & Tsai, H.-F. (2022). Effects of Twenty Hours of Neurofeedback-Based Neuropsychotherapy on the Executive Functions and Achievements among ADHD Children. Clinical EEG and Neuroscience, 53, 387-398.

[34] de la Guía, E., Lozano, M., & Penichet, V. (2015). Educational games based on distributed and tangible user interfaces to stimulate cognitive abilities in children with ADHD.

[35] Gong, H. (2022). Application of Multimedia Human-Computer Interaction Technology in Preschool Children Drama Education.

[36] Stathopoulou, et all 2018, Mobile assessment procedures for mental health and literacy skills in education. International Journal of Interactive Mobile Technologies, 12(3), 21-37, https://doi.org/10.3991/ijim.v12i3.8038

[37] Kokkalia G, AS Drigas, A Economou 2016 Mobile learning for preschool education. International Journal of Interactive Mobile Technologies 10 (4), 57-64 https://doi. org/10.3991/ijim.v10i4.6021

[38] Stathopoulou A, Karabatzaki Z, Tsiros D, Katsantoni S, Drigas A, 2019 Mobile apps the educational solution for autistic students in secondary education , International Journal of Interactive Mobile Technologies 13 (2), 89-101https://doi.org/10.3991/ijim.v13i02.9896

[39] Drigas A, DE Dede, S Dedes 2020 Mobile and other applications for mental imagery to improve learning disabilities and mental health , International Journal of Computer Science Issues (IJCSI) 17 (4), 18-23, DOI:10.5281/zenodo.3987533

[40] Drigas A, Petrova A 2014 ICTs in speech and language therapy , International Journal of Engineering Pedagogy (iJEP) 4 (1), 49-54 https://doi.org/10.3991/ijep.v4i1.3280

[41] Bravou V, Oikonomidou D, Drigas A, 2022 Applications of Virtual Reality for Autism Inclusion. A review , revista Retos 45, 779-785 https://doi.org/10.47197/retos.v45i0.92078

[42] Chaidi I, Drigas A, 2022 "Parents' views Questionnaire for the education of emotions in Autism Spectrum Disorder" in a Greek context and the role of ICTs , Technium Social Sciences Journal 33, 73-9, DOI:10.47577/tssj.v33i1.6878

[43] Bravou V, Drigas A, 2019 A contemporary view on online and web tools for students with sensory & learning disabilities , iJOE 15(12) 97 https://doi.org/10.3991/ijoe.v15i12.10833

[44] Chaidi I, Drigas A, C Karagiannidis 2021 ICT in special education , Technium Social Sciences Journal 23, 187, https://doi.org/10.47577/tssj.v23i1.4277

[45] Xanthopoulou M, Kokalia G, Drigas A, 2019, Applications for Children with Autism in Preschool and Primary Education. Int. J. Recent Contributions Eng. Sci. IT 7 (2), 4-16, https://doi.org/10.3991/ijes.v7i2.10335

[46] Drigas AS, Koukianakis LG, Papagerasimou YV, 2005 A system for e-inclusion for individuals with sight disabilities Wseas transactions on circuits and systems 4 (11), 1776-1780

[47] S Politi-Georgousi, A Drigas 2020 Mobile Applications, an Emerging Powerful Tool for Dyslexia Screening and Intervention: A Systematic Literature Review , International Association of Online Engineering

[48] A Drigas, P Theodorou, 2016 ICTs and music in special learning disabilities , International Journal of Recent Contributions from Engineering, Science & IT …

[49] Galitskaya, V., & Drigas, A. (2020). Special Education: Teaching Geometry with ICTs. International Journal of Emerging Technologies in Learning (iJET), 15(06), pp. 173–182. https://doi.org/10.3991/ijet.v15i06.11242

[50] Moraiti, I. ., Fotoglou, A. ., Dona, K. ., Katsimperi, A. ., Tsionakas, K. ., & Drigas, A. (2022). IoT in Special Education. Technium Social Sciences Journal, 30(1), 55–63. https://doi.org/10.47577/tssj.v30i1.6307

[51] Alexopoulou, A., Batsou, A., & Drigas, A. S. (2019). Effectiveness of Assessment, Diagnostic and Intervention ICT Tools for Children and Adolescents with ADHD. International Journal of Recent Contributions from Engineering, Science & IT (iJES), 7(3), pp. 51–63. https://doi.org/10.3991/ijes.v7i3.11178

[52] Stathopoulou A, Spinou D, Driga AM, 2023, Burnout Prevalence in Special Education Teachers, and the Positive Role of ICTs , iJOE 19 (08), 19-37

[53] Stathopoulou A, Spinou D, Driga AM, 2023, Working with Students with Special Educational Needs and Predictors of Burnout. The Role of ICTs. iJOE 19 (7), 39-51

[54] Loukeri PI, Stathopoulou A, Driga AM, 2023 Special Education Teachers' Gifted Guidance and the role of Digital Technologies , TECH HUB 6 (1), 16-27

[55] Stathopoulou A, Temekinidou M, Driga AM, Dimitriou 2022 Linguistic performance of Students with Autism Spectrum Disorders, and the role of Digital Technologies , Eximia 5 (1), 688-701

[56] Vouglanis T, Driga AM 2023 Factors affecting the education of gifted children and the role of digital technologies. TechHub Journal 6, 28-39

[57] Vouglanis T, Driga AM 2023 The use of ICT for the early detection of dyslexia in education , TechHub Journal 5, 54-67

[58] Drakatos N, Tsompou E, Karabatzaki Z, Driga AM 2023 Virtual reality environments as a tool for teaching Engineering. Educational and Psychological issues , TechHub Journal 4, 59-76

[59] Drakatos N, Tsompou E, Karabatzaki Z, Driga AM 2023 The contribution of online gaming in Engineering education , Eximia 8, 14-30

[60] Chaidi E, Kefalis C, Papagerasimou Y, Drigas, 2021, Educational robotics in Primary Education. A case in Greece , Research, Society and Development journal 10 (9), e17110916371-e17110916371, https://doi.org/10.33448/rsd-v10i9.16371

[61] Lytra N, Drigas A 2021 STEAM education-metacognition–Specific Learning Disabilities , Scientific Electronic Archives journal 14 (10) https://doi.org/10.36560/141020211442

[62] Ntaountaki P, et all 2019 Robotics in Autism Intervention. Int. J. Recent Contributions Eng. Sci. IT 7 (4), 4-17, https://doi.org/10.3991/ijes.v7i4.11448

[63] Demertzi E, Voukelatos N, Papagerasimou Y, Drigas A, 2018 Online learning facilities to support coding and robotics courses for youth , International Journal of Engineering Pedagogy (iJEP) 8 (3), 69-80, https://doi.org/10.3991/ijep.v8i3.8044

[64] Drigas A, Kouremenos S, Vrettos S, Vrettaros J, Kouremenos S, 2004 An expert system for job matching of the unemployed , Expert Systems with Applications 26 (2), 217-224 https://doi.org/10.1016/S0957-4174(03)00136-2

[65] Chaidi I, Drigas A 2022 Digital games & special education , Technium Social Sciences Journal 34, 214-236 https://doi.org/10.47577/tssj.v34i1.7054

[66] Doulou A, Drigas A 2022 Electronic, VR & Augmented Reality Games for Intervention in ADHD , Technium Social Sciences Journal, 28, 159. https://doi.org/10.47577/ tssj.v28i1.5728

[67] Kefalis C, Kontostavlou EZ, Drigas A, 2020 The Effects of Video Games in Memory and Attention. Int. J. Eng. Pedagog. 10 (1), 51-61, https://doi.org/10.3991/ijep.v10i1.11290

[68] Drigas A, Mitsea E, Skianis C 2021 The Role of Clinical Hypnosis & VR in Special Education , International Journal of Recent Contributions from Engineering Science & IT (iJES) 9(4), 4-18. https://doi.org/10.3991/ijes.v9i4.26147

[69] V Galitskaya, A Drigas 2021 The importance of working memory in children with Dyscalculia and Ageometria , Scientific Electronic Archives journal 14 (10) https://doi. org/10.36560/141020211449

[70] Chaidi I, Drigas A 2020 Parents' Involvement in the Education of their Children with Autism: Related Research and its Results , International Journal Of Emerging Technologies In Learning (Ijet) 15 (14), 194-203. https://doi.org/10.3991/ijet.v15i14.12509

[71] Drigas A, Mitsea E, C Skianis 2022 Clinical Hypnosis & VR, Subconscious Restructuring-Brain Rewiring & the Entanglement with the 8 Pillars of Metacognition X 8 Layers of Consciousness X 8 Intelligences. International Journal of Online & Biomedical Engineering (IJOE) 18 (1), 78-95. https://doi.org/10.3991/ijoe.v18i01.26859

[72] Drigas A, Karyotaki M 2019 Attention and its Role: Theories and Models. International Journal of Emerging Technologies in Learning 14 (12), 169-182, https://doi.org/10.3991/ijet.v14i12.10185

[73] Drigas A, Mitsea E, Skianis C. 2022 Virtual Reality and Metacognition Training Techniques for Learning Disabilities , SUSTAINABILITY 14(16), 10170, https://doi.org/10.3390/su141610170

[74] Drigas A,. Sideraki A. 2021 Emotional Intelligence in Autism , Technium Social Sciences Journal 26, 80, https://doi.org/10.47577/tssj.v26i1.5178

[75] Drigas A, Mitsea E, Skianis C.. 2022 Subliminal Training Techniques for Cognitive, Emotional and Behavioural Balance. The role of Emerging Technologies , Technium Social Sciences Journal 33, 164-186, https://doi.org/10.47577/tssj.v33i1.6881

[76] Bakola L, Drigas A, 2020 Technological development process of emotional Intelligence as a therapeutic recovery implement in children with ADHD and ASD comorbidity. , International Journal of Online & Biomedical Engineering, 16(3), 75-85, https://doi.org/10.3991/ijoe.v16i03.12877

[77] Bamicha V, Drigas A, 2022 The Evolutionary Course of Theory of Mind - Factors that facilitate or inhibit its operation & the role of ICTs , Technium Social Sciences Journal 30, 138-158, DOI:10.47577/tssj.v30i1.6220

[78] Karyotaki M, Bakola L, Drigas A, Skianis C, 2022 Women's Leadership via Digital Technology and Entrepreneurship in business and society , Technium Social Sciences Journal. 28(1), 246–252. https://doi.org/10.47577/tssj.v28i1.5907

[79] Drigas A, Bakola L, 2021The 8x8 Layer Model Consciousness-Intelligence-Knowledge Pyramid, and the Platonic Perspectives , International Journal of Recent Contributions from Engineering, Science & IT (iJES) 9(2) 57-72, https://doi.org/10.3991/ijes.v9i2.22497

[80] Drigas A, Karyotaki M, 2016 Online and Other ICT-based Training Tools for Problem-solving Skills. , International Journal of Emerging Technologies in Learning 11 (6) https://doi.org/10.3991/ijet.v11i06.5340

[81] Mitsea E, Drigas A,, Skianis C, 2022 Breathing, Attention & Consciousness in Sync: The role of Breathing Training, Metacognition & Virtual Reality , Technium Social Sciences Journal 29, 79-97, https://doi.org/10.47577/tssj.v29i1.6145

[82] Mitsea E, Drigas A, Skianis C, 2022 ICTs and Speed Learning in Special Education: High-Consciousness Training Strategies for High-Capacity Learners through Metacognition Lens , Technium Social Sciences Journal 27, 230, https://doi.org/10.47577/tssj.v27i1.5599

[83] Drigas A, Karyotaki M, Skianis C, 2017 Success: A 9 layered-based model of giftedness , International Journal of Recent Contributions from Engineering, Science & IT 5(4) 4-18, https://doi.org/10.3991/ijes.v5i4.7725

[84] Drigas A, Papoutsi C, 2021,Nine Layer Pyramid Model Questionnaire for Emotional Intelligence , International Journal of Online & Biomedical Engineering 17 (7), https://doi.org/10.3991/ijoe.v17i07.22765

[85] Drigas A, Papoutsi C, Skianis, 2021, Metacognitive and Metaemotional Training Strategies through the Nine-layer Pyramid Model of Emotional Intelligence , International Journal of Recent Contributions from Engineering, Science & IT (iJES) 9.4 58-76, https://doi.org/10.3991/ijes.v9i4.26189

[86] Drigas A, Mitsea E, Skianis C, 2022 Intermittent Oxygen Fasting and Digital Technologies: from Antistress and Hormones Regulation to Wellbeing, Bliss and Higher Mental States , Technium BioChemMed journal 3 (2), 55-73

[87] Drigas A, Mitsea E 2022 Conscious Breathing: a Powerful Tool for Physical & Neuropsychological Regulation. The role of Mobile Apps , Technium Social Sciences Journal 28, 135-158. https://doi.org/10.47577/tssj.v28i1.5922

[88] Drigas A, Mitsea E, C Skianis 2022 Neuro-Linguistic Programming, Positive Psychology & VR in Special Education. , Scientific Electronic Archives journal 15 (1) https://doi.org/10.36560/15120221497

[89] Drigas A, Mitsea E 2021 Neuro-Linguistic Programming & VR via the 8 Pillars of Metacognition X 8 Layers of Consciousness X 8 Intelligences , Technium Social Sciences Journal 26(1), 159–176. https://doi.org/10.47577/tssj.v26i1.5273

[90] Drigas A, Mitsea E, Skianis C 2021. The Role of Clinical Hypnosis and VR in Special Education , International Journal of Recent Contributions from Engineering Science & IT (IJES) 9(4), 4-17.

[91] E Mitsea, A Drigas, C Skianis 2022 Metacognition in Autism Spectrum Disorder: Digital Technologies in Metacognitive Skills Training , Technium Social Sciences Journal, 153-173

[92] Kontostavlou, E. Z., & Drigas, A. (2021). How Metacognition Supports Giftedness in Leadership: A Review of Contemporary Literature. , International Journal of Advanced Corporate Learning (iJAC), 14(2), pp. 4–16. https://doi.org/10.3991/ijac.v14i2.23237

[93] Vouglanis T, Driga A M, Drigas A 2022 Charismatic Children: Heredity, Environment and ICTs , Technium Sustainability journal 2,5 1-15https://doi.org/10.47577/sustainability.v2i5.7378

[94] Chaidi, I. ., & Drigas, A. (2022). Social and Emotional Skills of children with ASD: Assessment with Emotional Comprehension Test (TEC) in a Greek context and the role of ICTs. , Technium Social Sciences Journal, 33(1), 146–163. https://doi.org/10.47577/tssj.v33i1.6857

[95] Vouglanis, T. ., Driga, A. M., & Drigas, A. (2022). Physical and mental exercise to create new congenial neurons, to increase intelligence and the role of ICTs. , Technium BioChemMed journal, 3(3), 21–36. https://doi.org/10.47577/biochemmed.v3i3.7325

[96] Chaidi , I. ., & Drigas, A. (2022). Emotional intelligence and learning, and the role of ICTs. Technium Social Sciences Journal, 35(1), 56–78. https://doi.org/10.47577/tssj.v35i1.7249