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THE ADVANTAGES AND DISADVANTAGES OF INTEGRATING TECHNOLOGY IN THE EDUCATION OF CHILDREN ON THE AUTIST SPECTRUM¹⁷

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***Abstract:** The scientific publication comments on several aspects of the work, education and training of children and students with special educational needs. In order to optimize the work of teachers to be more effective and efficient, it is good to implement new, advanced technologies and communications. They contribute to the faster and easier learning of the learning material. They contribute to its understanding, and from there to its application. Because if a topic is not understood, it cannot be implemented. Information and communication technologies are a method, a concept, a model, a way to absorb any kind of information by learners, regardless of their age. At the beginning of the 21st century, they can be said to be a mandatory element of the education of the new generation, whether it is with special educational needs or not. This generation from the baby age contacts and communicates through these technologies, therefore their application in education is a fact.*

But, like any technology, it has its shortcomings, minuses and negatives. Specifically, for children and students with special educational needs, it is expressed in understanding the individuality of the disability, illness or condition. That is, the same resource is not applicable to all learners. Which requires a careful, personal selection of the means of training.

The scientific publication gives several options, suggestions for working with children and students with special educational needs in accordance with information and communication technologies and highlights the negatives.

***Key words:** integration, information and communication technologies, special educational needs, autism spectrum.*

INTRODUCTION

Autism. Autism is a formative issue described by troubles with social connection and correspondence, and by limited and dull conduct. Guardians frequently notice signs during the initial three years of their kid's life. These signs regularly grow step by step, however a few youngsters with mental imbalance experience declining in their correspondence and social abilities in the wake of arriving at formative achievements at an ordinary pace (Stefanatos, p. 305, 2008).

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Autism is related with a blend of hereditary and ecological elements. Hazard factors during pregnancy incorporate certain contaminations, for example, rubella, poisons including valproic corrosive, liquor, cocaine, pesticides, lead, and air contamination, fatal development limitation, and immune system sicknesses. Discussions encompass other proposed ecological causes; for instance, the immunization theory, which has been disproven. Autism influences data preparing in the mind and how nerve cells and their neurotransmitters interface and sort out; how this happens isn't surely known.

The Diagnostic and Statistical Manual of Mental Disorders (DSM-5), consolidates autism and less extreme types of the condition, including Asperger disorder and unavoidable formative issue not in any case indicated (PDD-NOS) into the analysis of chemical imbalance range issue (ASD) (Johnson, p. 1183, 2007).

EXPOSITION

Early conduct intercessions or language training can assist kids with chemical imbalance increase self-care, social, and relational abilities. In spite of the fact that there is no known fix, there have been instances of kids who recuperated. Relatively few medically introverted grown-ups can live autonomously, however some are fruitful. A medically introverted culture has created, with certain people looking for a fix and others accepting chemical imbalance ought to be acknowledged as a distinction to be suited rather than relieved. Universally, chemical imbalance is evaluated to influence 24.8 million individuals as of 2015. In the 2000s, the quantity of individuals influenced was assessed at 1–2 for every 1,000 individuals around the world. In the created nations, about 1.5% of kids are determined to have ASD starting at 2017. from 0.7% in 2000 in the United States. It happens four-to-multiple times more regularly in guys than females. The quantity of individuals analysed has expanded drastically since the 1960s, which might be halfway because of changes in indicative practice. The topic of whether genuine rates have expanded is unresolved (Silverman, p. 325, 2008).

Characteristics. Autism is an exceptionally factor, neurodevelopmental scatter whose side effects initially shows up during outset or youth, and for the most part follows a consistent course without abatement. Individuals with chemical imbalance might be seriously hindered in certain regards yet normal, or even predominant, in others. Clear side effects progressively start after the age of a half year, become set up by age a few years and will in general proceed through adulthood, albeit frequently in increasingly quieted structure. It is recognized by a trademark set of three of side effects: debilitations in social collaboration, hindrances in correspondence, and dull conduct. Different viewpoints, for example, atypical eating, are additionally normal however are not basic for conclusion. Singular indications of mental imbalance happen in everybody and show up not to relate profoundly, without a sharp line isolating pathologically extreme from basic traits (Rabin, p. 1129, 2008).

Communication. About a third to a portion of people with chemical imbalance don't grow enough characteristic discourse to meet their day by day correspondence needs. Contrasts in correspondence might be available from the principal year of life, and may incorporate deferred beginning of chattering, unordinary motions, lessened responsiveness, and vocal examples that are not synchronized with the guardian. In the second and third years, youngsters with mental imbalance have less successive and less assorted chattering, consonants, words, and word mixes; their motions are less regularly coordinated with words.

Youngsters with chemical imbalance are less inclined to make demands or offer encounters, and are bound to just recurrent others' words (echolalia) or turn around pronouns. Joint consideration is by all accounts fundamental for practical discourse, and deficiencies in joint consideration appear to recognize new born children with ASD. For instance, they may take a gander at a pointing hand rather than the pointed-at them, and they reliably neglect to point at objects so as to remark on or share an encounter. Kids with chemical imbalance may experience issues with inventive play and with forming images into language (Landa, p. 16, 2008).

Integrating technology into learning.

Innovative learning environments that incorporate electronic resources have enormous potential to revolutionize teaching and learning processes. They allow students to actively participate in the learning process while receiving immediate feedback from the teacher or the technological tool. This approach contributes greatly to a deeper understanding of the subject matter and the development of new knowledge. The innovative technologies serve as a lever for a dynamic and diverse pedagogy and open a window for innovative ways to improve teaching and learning. They make it possible to deliver information and content in a variety of ways while significantly reducing costs. (Al-Mosawi, Fatima R., Yaseen I. K., 2019).

Distance education has many advantages. Among the most important benefits are the variety of teaching methods, increasing interest and engagement in learning, enhancing learners' understanding and knowledge acquisition and improving interaction between teachers and learners as well as between learners themselves. More benefits include accessibility to information sources during lessons, and expanding the learning environment; the possibility of visual and dynamic illustration of concepts and processes, the ability to store and share lesson plans and student solutions and products, interactivity that enables student activation, and relevance to students' lives. Besides introducing learning environments that are student-centered, multisensory and multidimensional stimuli, collaborative, active, authentic and inquiry-based learning and critical thinking (Al-Obaydi, L. H., 2019).

Interaction between participants is also an important advantage as it contributes to the expansion of knowledge through exposure to new information and a variety of cultures, as well as the growth of creative ideas. Interaction between learners in e-learning develops social skills and higher order thinking skills, increases trust and cooperation between group members and even allows friendships to form between them. In addition, cooperative learning makes it possible to bridge cultural differences and strengthen the interaction of group members with their environment. If all of this is not enough, e-learning makes it possible to deal with dynamic knowledge in an intelligent learning environment in which the amount of knowledge is infinite and independent of time and place. Online learning enables the redesign of processes, tasks and definitions of learning products, and also enables changes in teaching methods, teachers' roles and students' roles so that the teacher acts as a facilitator and promotes learning and is not necessarily the only source of knowledge (Stoyanova, D., V. Vassileva, 2022). The use of technology can be a compensatory mechanism for poor skills and reinforcement of existing skills. In computer-based learning environments, the student is required to be active and engaged in learning, which leads to active and meaningful learning (Ilieva, B., 2022).

On the other hand, distance learning also has disadvantages as it is dependent on knowledge of the subject matter, group members agreeing to the form of work, providing clear instructions for each assignment and task, and ensuring a time frame and space to carry out the tasks. If that is not enough, then distance learning also depends on the social climate. E-learning requires that members of the group have social interaction based on trust, on the sharing of information between all members of the group, and on the equal contribution of all members of the group; it requires coordination, sharing, listening and respect for a variety of opinions, a high level of self-discipline and computer skills (Estabraq R Ibrahim, Fatima R. Abdulhusein and Juliya Doncheva, 2024). These disadvantages are particularly significant for students with special needs (Legurska, M., 2015).

The integration of technology with children on the autism spectrum

The accelerated pace of technological development is having a major impact on education, treatment and rehabilitation, including the lives of children and adults with disabilities. Today, we are seeing an increasing proliferation of unique technological systems that support learning, communication, and increased motivation in this population (Vassileva, V., 2021). While talking to a friend has become easier than ever through the cell phone, technology opens a window to a completely new world for people with communication disorders. With the help of advanced technological tools, they can now communicate more effectively and quickly, both verbally and in

writing, and significantly reduce social gaps (Shoilekova, K., 2021). People who have difficulty speaking find in these technologies not only an aid, but a true substitute for speech. Software and assistive software help them overcome their disability, express themselves freely and integrate more actively into society (Krastev, G, V. Voinohovska, V. Dineva, 2023).

The integration of technology in the treatment of children with autism opens a window to a new world of communication. Various technologies bypass difficulties in expressing and understanding language and help these children overcome their communication disorders (Koleva, I, M. Legurska, 2002). A wide variety of technological tools is customized to meet the unique needs of each child. Each tool is designed to help them overcome their difficulties and enhance their development (Neminska, R., 2019). The integration of technology in the treatment of children with autism opens a window to a new world of communication. Various technologies bypass difficulties in expressing and understanding language and help these children overcome their communication disorders. A wide variety of technological tools is customized to meet the unique needs of each child. Each tool is designed to help them overcome their difficulties and enhance their development (Ilieva, B., Ioana Stefanova, 2023). These technological interventions provide a supportive and predictable environment for children with autism while reducing social pressure. They provide visual and auditory support, repetition and rewards, allowing these children to build important language infrastructure and acquire interpersonal communication skills (Al-Obaydi, L. H., Doncheva, J., & Nashruddin, N., 2021). For many children with autism, technology is an essential need. It enables them to communicate more effectively, express themselves and build social relationships. For these children, technology is not just a tool, but a window to a whole world of possibilities (Alexandrache, C., 2014).

Studies show that children with autism enjoy many of the unique benefits that computers offer. The computer's ability to repeat actions and events repeatedly, using attractive visual and auditory elements, makes it a particularly effective tool for these children (Spence, 2004). In addition, the use of computer technologies can be used as an alternative form of communication for children with autism. These technologies provide tools that allow them to express themselves, communicate and share their thoughts and feelings with others, even in cases where they have difficulty doing so verbally or in writing. Through computer-based technologies, children with autism can experience and experiment, receive immediate multi-sensory feedback, and provide a sense of accomplishment and satisfaction. They provide a virtual environment that reduces the need to learn through the real world, that causes anxiety in children with autism, and allows skills to be practiced in a safe and non-threatening place (Doncheva Julia, 2020).

To summarize, computer technologies open a window to a new world for children with autism. They offer them unique tools to improve their communication skills, learning and behaviour, while creating a supportive and motivating environment.

The area of computer science education has witnessed significant evolution in recent years, driven by the escalating demand for proficient coders in the workforce (Shoilekova, K. 2022). However, the traditional approaches to teaching coding often struggle to keep pace with the dynamic requirements of the field.

Based on the real changes that have taken place, a change in the ways, methods, forms of education, upbringing and development is unconditionally necessary. On this basis, the idea and goal are to consider the theoretical and practical aspects and to give effective proposals in the approaches to solutions for teachers, educators, from a modern point of view of teaching digital technologies.

In order for the goals for the use of interactive multimedia presentations in teaching to be effective, didactic products are used in the acquisition and consolidation of knowledge, as materials that are developed by teachers and students and are used in all types of lessons - for new knowledge, negotiation and summary, for exercise. This creates a favourable atmosphere for creative work: learning becomes attractive and interesting, creates self-confidence in students based on personal training and achievements, supports the development of basic knowledge of science and digital competencies in students. It can be said that the goal of integrating ICT in the education of students from I - IV grade in the following algorithm:

- Expanding and enriching the learning environment.
- Improving training through effectively implemented ICT.
- Increasing the level of computer use within the learning process.
- Increasing the contribution of ICT in the application of interactive teaching and learning methods and strategies.

• Improving the existing static forms of teaching materials and carrying out dynamic multimedia developments.

According to V. Voinohovska, the IT used in the educational activities contributes to:

• Providing appropriate electronic educational resources to students (students, author's note UD) in order to actively search, find and classify adequate information to solve the problem. When setting a task, if necessary, the teacher presents to the students the resources needed to solve them.

• Use of communication tools with which students exchange information and ideas with each other.

All students are in a common network and have the opportunity to exchange files and text messages.

• Use of computer and multimedia technologies for demonstrations through a video lesson or presentation developed in advance by the teacher.

• Using the web space to present important problems from practice, solvable with the help of knowledge of the discipline, revealing the prospects for the cognitive activity of students, demonstrating actually developed and existing products, and clarifying the practical application of the concepts to be studied and their relationship to other disciplines.

• Use of the computer not only as a subject of study but also as a means of illustration - the introduction of a concept, command or sequence of actions for implementation is demonstrated by direct implementation of the computer in front of students or by using a multimedia projector

• Use of a multimedia didactic product. (Voinohovska, V., Julia Doncheva, 2022). In the period of primary school age there is a change of play activity with school. The computer helps to make this process smoother, by combining educational tasks with gaming opportunities. The use of information and communication technologies (ICT) supports the learning process, on the one hand improving the methods and means of learning, on the other hand it improves the forms of organization. The use of multimedia resources makes it possible to rank the tasks in terms of difficulty and encourage the correct answers. On the other hand, their use increases the motivation of students to learn and take an active part in the lessons. Information and communication technologies diversify lessons, manage to reduce high emotional stress and enliven the learning process. (Neminska, R., 2019).

What was said above fully corresponds to the Virtual Classroom Tour - VCT. The purpose of the Virtual Practice is to share positive experiences between teachers and to promote new ideas, effective practices and learning resources.

The words of Michael Fulan, a Canadian scientist at the University of Toronto, are an occasion to reflect on the need to learn from each other: *“This is one of the greatest ironies of life: teachers are in the field of teaching and learning, but they know how to learn from each other. If they ever figure out how to do it, their future is assured.”* In our opinion, they have already found it, helping each other (with resources, advice, ideas, etc.) in the established pandemic situation. VCT is a universal PowerPoint presentation template that is used to describe a learning activity carried out by a teacher or team of teachers in the course of the learning process. The template is used worldwide and is accepted as a standard within Microsoft's Innovative Teachers program. The VCT format allows the teacher to share his experience with colleagues from the country and abroad.

On several slides, he describes in general the essence of the educational project he has implemented, giving information about himself and the school in which he works. Each slide can contain one or more embedded documents (usually WORD, PDF, PPT, etc.) to give a more detailed description of the successful learning activity. These embedded documents could also be student work, teacher resources, photos, videos, and more.

There are three formats for describing a virtual practice:

- Quick Ideas (VCT). Outlining the idea of the realized educational project. The template is made in yellow and has only two slides. The first is given general information about the project - educational area, age group, goals, software used, etc. On the second - information about the teacher and the school (Figure 1).



Figure 1. Quick idea template

- Curriculum (VCT - Lesson Plans). This is a PowerPoint presentation template with three slides.

Here, a third with learning resources has been added to the previous two slides. The template is implemented in green (Figure 2).



Figure 2. Curriculum Template

- Detailed description of the study project (Virtual Classroom Tours). This template provides detailed information about the learning project and the software used. In addition to the three slides from the previous format, more data on the management of the study project, on the assessment system used, as well as on the standards covered by the project work are added here. The template is implemented in blue (Figure 3).



Figure 3. Template "Detailed description of the study project"

- In cyberspace there is a huge variety of learning materials in the form of VCT presentations.
- Voinohovska proposes to use the following software products available in computer

Laboratories for practical exercises:

- Microsoft Word - text editor for pre-preparation and formatting of the text.
- Microsoft PowerPoint - a program for creating presentations.
- Adobe Photoshop - a graphic editor for creating and editing images and creating appropriate effects.
- Adobe Premiere - software for creating and editing audio and video.
- Adobe Captivate - software for creating training courses, including software simulations.
- Adobe FineReader - Optical Character Recognition (OCR) software. Inspiration 9 – computer-based tool for creating concept maps. Provides the ability to use 4 environments:

Diagram View, Map View, Outline View and Presentation Manager. Changes that are made in the Diagram or Map environment are also reflected in the Outline. Content that is created in a Diagram, Map, and Outline environment can be used to create a presentation. Allows the organization of concepts and ideas, helps to create graphic organizers to present concepts and the relationships between them, and the ability to create a report. The Diagram environment is used to create diagrams that show the relationships between ideas and concepts. The Map environment is used to create a map that presents a basic idea with individual units associated with it. The Outline environment is used to create a plan of ideas or to organize a report. Once all the content has been created in the form of a chart, map or plan, the Presentation environment is used to create the presentation."

- Padlet - a wall on which learners can express their thoughts and opinions on a topic. Ideas can be placed on it through text, link, images, video, bookmarks, etc.

- Kahoot - a free learning platform used to discover, create, run and share learning games. With it you can make fun games for school hours in a very short time. Kahoot can be used for any subject, any age and with any device. The product can be used in a variety of settings – from classrooms to business meetings and charities to raise funds, awards, ceremonies and events. Kahoot was created to work together to make learning truly engaging. One of the things that makes KAHOOT suitable for use in the learning process is the ability to use millions of free public games to adapt to the learning needs of students.

- Google forms - a free Google application that is used to create an online form (form, survey, survey, quiz, questionnaire, etc.) or a test to check the students' knowledge.

- Thinglink - a tool that teachers and students can use to present all the information they gather when studying a particular topic. It provides the ability to use an image from the Internet or a computer to which to add links and information. This is done by inserting dots (called tags) on the image that will show users the content and links to more information on the selected topic.

- Hot Potatoes - an application for making various types of tests, questionnaires and crossword puzzles for students.
- Padlet - a free online interactive "board / board" for storing various types of files and links.
- Google Drive applications: Google Docs, Google Sheets, Google Forms, Google Slides, Blogger, Google Drawings, Maps, Calendar, Translate, Google+, Photos, Search, YouTube, Contacts, etc.
- Linoit - online interactive "canvas /board/ board" (canvas) for storing messages through stickers, different types of files and links.
- Geogebra - Graphing calculator for functions, geometry, algebra, statistics and three-dimensional mathematics. Dynamic mathematics for teaching and learning.

The educational work is unique and dynamic. It considers the unique conditions in the personal development of students, their specific experience, the degree of perception and understanding of information about objective reality, and their orientation in natural and social phenomena. Through his pedagogical influences on the disciplines, the teacher brings the life experience of the children/students from the state of pre-scientific and pre-theoretical fragmentation and un systematization to cognitive and intellectual readiness for mastering the social sciences in the upper grades and levels of education. (Shoilekova, K., 2022).

The presented information technologies are one part of the application possibilities in the education of children on the autism spectrum. Due to the extreme individuality of the autistic condition, it can be categorically said that some of them have great advantages, effectiveness and development. Other, and sometimes the same information technologies and resources, show deficiencies in different children, precisely because of the individual characteristics of the manifestations of the autism spectrum. The advantages and disadvantages of the integration of information technologies in children on the autism spectrum are strictly individual, but it can be said that they are fully applicable in the field of education.

CONCLUSION

The rapid development of information and communication technologies (ICT) in recent decades has led to their widespread use by both adults and the younger generation. Life in the 21st century is impossible and unthinkable without these technologies. They are an integral part of our daily life, accompanying us around the clock and everywhere. Chips and sensors with different applications are integrated into our surroundings and communicate with each other in the Internet of Things (IoT) environment. Items, cars and buildings are equipped with all sorts of sensors to make people's lives easier, turning these devices into smart technologies (smart technologies). Labs are even attempting to integrate chips and sensors into living organisms, and the time is not far off when all individuals will be technologically connected with the world wide web.

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