INCLUSIVE PEDAGOGY IN SOCIETY 5.0: SOCIAL ASPECT

[a]LARYSA SUSHCHENKO, [b]ROMAN SUSHCHENKO, [c]TETIANA MARTYNIUK, [d]IRYNA PUSHCHYNA, [e]ALONA SADYKINA, [f]GNAT STRYZHAK

[a]*Zaporizhzhia National University, 66, Zhukovsky Str., 69600, Zaporizhzhia, Ukraine*
[b,d,f]*National University Zaporizhzhia Polytechnic, 64, Zhukovsky Str., 69063, Zaporizhzhia, Ukraine*
[c]*Lesya Ukrainka Volynian National University, 13, Voli Ave., 43025, Lutsk, Ukraine*
[e]*National University Zaporizhzhia Polytechnic, 64, Zhukovsky Str., 69063, Zaporizhzhia, Ukraine / Classical Private University, 70-b, Zhukovsky Str., 69002, Zaporizhzhia, Ukraine*
email: [a]*zcpu@ukr.net,* [b]*rvstt@zp.edu.ua,*
[c]*Martynyuk.t@gmail.com,* [d]*pushchyna@zp.edu.ua,*
[e]*alena980320@gmail.com,* [f]*ignat201120112012@gmail.com*

Abstract: The article represents an attempt to comprehend and conceptually describe features of inclusive pedagogy within Society 5.0, which is the convergence of innovative technologies, including artificial intelligence, the Internet of Things, big data, and robotics. It is shown, in particular, that digital technology can make a sound contribution to this improvement agenda in the inclusive education environment by enriching education across all areas of Curriculum for Excellence. Multimodal learning is embraced by inclusive EdTech, giving students several ways to interact with the material. Moreover, EdTech, applied within project-based learning and Agile paradigm, is capable of providing training of life skills in the inclusive education system students - 4C: Creativity, Critical Thinking, Communication, Collaboration.

Keywords: inclusive pedagogy, Society 5.0, excellence, curriculum, technology, migrants, internally displaced persons.

1 Introduction

The idea of a technology-based society has evolved into the "Society 5.0" age, which emphasizes the integration of artificial intelligence, the Internet of Things (IoT), and people to attain inclusive social welfare. Education is essential for establishing a foundation of pertinent information, skills, and values in the face of these shifting dynamics.

Simultaneously, Society 5.0 tackles the extent and objectives of an all-encompassing society capable of accommodating both personal preferences and societal variety. It goes beyond innovations in technology, imagining a day where people are the primary emphasis. According to this viewpoint, society should be inclusive, harmoniously balance social variety, provide room for personal preferences, and be technologically advanced. The idea recognizes that development is truly valuable when it empowers people and improves their quality of life - rather than just being about technology. Therefore, Society 5.0 lays the groundwork for a society that values variety and recognizes the individuality of every person [27].

In the context of Society 5.0, education necessitates that students be more inventive, productive, flexible, and competitive. Furthermore, life skills education, or what is referred to as the 4C, is necessary in the twenty-first century. Here, "4C" stands for creativity, critical thinking, collaboration, and communication.

The introduction of education for students has been significantly impacted by the Era of Society 5.0, which offers chances and difficulties for educators in each educational unit. Inclusive education is one area of education that is affected by this. Special assistant instructors in inclusive education learning designs likely to be more social constructivist than normal education teachers [23]. According to their circumstances and community requirements, children with special needs can grow to their full potential with the support of an inclusive education learning design. It is obvious that inclusive education learning designs that are appropriate for Era Society 5.0 must be created based on national education standards, which include requirements for infrastructure, standards for instructors, and standards for procedures [14].

In today's classrooms, teachers engage with more diverse groups of students than ever before, but they commonly express a lack of preparation for the role [5]. This is mostly due to the fact that the reality of education paradigms in Society 5.0 and the abilities of instructors using current inclusive pedagogy are out of alignment.

Although inclusive teaching begins with the premise that all students differ, this does not imply that individual differences are insignificant. For instance, when asked to deduce meaning from a text, two students in a class can have identical difficulty. The nature of the learning difficulties could differ, though, if one is learning English as a second language while the other is autistic. In order to achieve the goals of the lesson, the teacher must employ tactics that are appropriate for the students and modify them accordingly. Therefore, the teacher can use graphic organizers to structure and record the discussion in order to encourage participation from the child on the autistic spectrum. They can also share information about a subject to support students who are learning English as a second language and introduce a story through a discussion. This method would have the advantage of meeting each learner's unique demands while also offering an interesting environment and encouraging visual clues that would help all learners [29]. In this case, specifically, the use of Society 5.0 education technology may be the most effective means of achieving pedagogical objectives while also making it easier for students with special needs to fully integrate into the contemporary, digitally altered educational environment.

2 Materials and Methods

To solve the tasks set in the research, the study and comparative analysis of sources, as well as the analysis and generalization of theoretical and empirical scientific material on the problem of inclusive education were used. The theoretical and methodological basis of this work consisted of the provisions in the field of application of the systemic approach in education, in the field of structural and functional analysis and synthesis, as well as in the field of development of a personality-oriented approach in education.

3 Results and Discussion

The confluence of cutting-edge technology, such as robots, big data, the Internet of Things, and artificial intelligence, is fundamental to the concept of Society 5.0 [15]. It is intended for these developments to become a seamless part of society, going beyond traditional bounds to enhance social well-being, environmental sustainability, and economic prosperity. The concept of Society 5.0 is an all-encompassing strategy that goes beyond simple technical progress, putting the needs and goals of people at its center [8].

Key elements of Society 5.0 imply the following [11]:

- Human-Centered Approach: Enhancing peoples' quality of life is a top priority in Society 5.0. It seeks to address social issues while making sure that technology meets people's needs and promotes their wellbeing
- Integration of the Real and Virtual Worlds: The idea presents a highly networked society in which the digital and real worlds coexist peacefully. Better data exchange, analysis, and decision-making are made possible by this integration, enabling successful social issue resolution
- Sustainable Development: The goal of Society 5.0 is to establish a sustainable society that strikes a balance between environmental preservation and economic progress. It aims to use technology to reduce waste, create clean energy solutions, and encourage eco-friendly behavior
- Cross-Sector Collaboration: Society 5.0 acknowledges the value of cooperation amongst many sectors, such as the public sector, private sector, academic institutions, and private individuals. It promotes collaboration and partnerships in order to tackle societal issues as a group.

Employing the tenets of inclusive pedagogy in the context of Society 5.0 challenges certain presumptions and methods related to education. Teachers are especially ready to acknowledge that it is neither beneficial nor required to forecast or predetermine students' learning outcomes prior to instruction. Instead, choices are made based on how to guarantee high levels of motivation and engagement.

Inclusive pedagogy differs from other approaches in that it considers the ways in which teachers respond to individual variety, make decisions that influence how children and adolescents learn together, and employ specialized knowledge. For instance, deaf kids are frequently integrated into regular classes with extra assistance from a teacher who specializes in teaching the deaf. Nonetheless, whether or not the practice is inclusive depends on how the specialist instructor interacts with the learner. The additional assistance will be helpful if the specialist and the class teachers adopt a collaborative teaching approach, ensuring that the deaf kid is not isolated by the presence of an additional adult. What matters in this case is how educators collaborate to make sure that nobody feels excluded from the classroom. Furthermore, this method does not deem classroom teachers unable to instruct specific students. Instead, they have the freedom to collaborate with their peers to improve the learning possibilities they offer to everyone [22].

It is critical to avoid seeing some students as less capable or as additional labor for educators. The tenets of inclusive education encompass acknowledging diversity without framing it as an issue. This method opposes the idea that failure is inevitable for some students while acknowledging the distinctions amongst them.

An important area of inclusive pedagogy is strategies to make education refugee-inclusive. Refugees and internally displaced persons belong to the category of vulnerable population, and a framework for the promotion of inclusive school systems that ultimately look to create quality learning environments that prevent discrimination, and support migrant and internally displaced students' holistic needs is of great importance. Moreover, teachers who are migrants, refugees, or internally displaced also frequently encounter insurmountable obstacles. Many migrant and refugee teachers lack the chance to perform their profession in their home nation or area, despite having extensive training and experience. Thus, this issue also needs addressing.

By 2030, all learners should have access to inclusive, egalitarian, high-quality education and lifelong learning, according to UN Sustainable Development Goal (SDG) 4. In Europe, the 2018 the Brussels Declaration defined inclusive education as "…the right to safe, quality education and learning throughout life ….that requires particular attention be given to those in vulnerable situations, persons with disabilities, indigenous peoples, those in remote rural areas, ethnic minorities, the poor, women and girls, migrants, refugees, and displaced persons whether as a result of conflict or natural disaster". This concept places special emphasis on those groups that are exposed to social and educational marginalization due to their circumstances. Although migrants constitute one of these categories, it is crucial to recognize that families and young people coming to search for a new home do not form a monolithic group. Although they may be recognized as migrants, this is only one of the aspects of who they are.

In all this context, it is expedient to note that the objectives of Curriculum for Excellence, which was created by Scottish educators and has now expanded to other European nations, are quite consistent with the tenets of inclusive pedagogy [20]. Schools now have more freedom to choose the curricular frameworks they use thanks to curricular for Excellence. The two primary points of this concept's vision are as follows [24]:

- Excellence by increasing attainment: making certain that each student reaches the greatest requirements in all subject areas as outlined in the Curriculum for Excellence levels and that they have the necessary combination of

abilities, credentials, and accomplishments to be successful;
- Achieving equity is making sure that every student has an equal chance to thrive, with an emphasis on reducing the achievement gap that is associated with poverty.

Digital technology has the potential to significantly advance this development goal by enhancing instruction in all Curriculum for Excellence subject areas. Digital technology has the potential to improve education when utilized wisely and efficiently. It can also provide kids and teenagers the tools they need to succeed in the digital age and, most importantly, increase learning results in inclusive classrooms.

Digital technologies have the ability to guarantee inclusion in its fundamental paradigm, even though even the most effective instructional approaches and procedures really result in integration rather than true inclusion (see Figure 1 below).
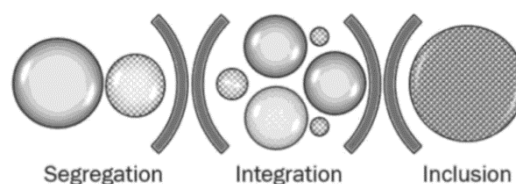

Figure 1. Continuum of segregation, integration and inclusion [10]

The path to inclusive education through ICT includes a range of options, from basic tools to cutting-edge technology breakthroughs, even if there is no "magic bullet" for creating accessible digital solutions [9]. There are several possible ways to support inclusiveness in both in-person and online learning contexts.

A number of factors should be taken into account when choosing the right technology for children with disabilities, including accessibility and age appropriateness, the students' degree of digital proficiency, their physical and cognitive demands, and the curriculum's or content's relevancy [5]. It is critical to recognize the requirements of learners and the contextual elements influencing EdTech and digital inclusion.

The ecosystem of digital and non-digital materials to support inclusive educational environment is depicted in Figure 2 below.
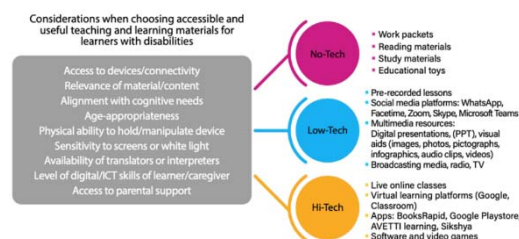

Figure 2. Ecosystem of digital and non-digital materials to support inclusive educational environment [19]

The World Bank Group released the "Landscape Review of ICT for Disability-Inclusive Education" in 2022 after realizing the critical role that technology plays in advancing inclusive education. This report served as a roadmap, outlining the main obstacles to and opportunities presented by utilizing technology for inclusive learning. The six key elements of the complete ecosystem - people, goods, pedagogy, policy, location, and provision - are summed up in the 6Ps framework (see Figure 3).

Figure 3. 6Ps Framework for Digital Technology [28]

In an attempt to help academics, practitioners, and policy makers figure out what is and is not working, the framework places a strong emphasis on the interactions between each of the six components.

The Tech-Enabled Disability Inclusive Education (TEDDIE) Costing Tool was also introduced by the World Bank Education Global Practice. In light of the dearth of evidence regarding the costs of digital solutions, the tool uses the 6Ps framework to support education policy makers and decision-makers in planning, budgeting, and costing for inclusive digital solutions that support students with disabilities [28]. In addition to the initial cost of purchase, the TEDDIE tool may be used for data collecting and analysis, including market analysis based on local prices for technology maintenance and repair. It may also be used to ascertain what kind of further training educators and other stakeholders will require in order to use digital technologies in the classroom efficiently. The TEDDIE tool provides a comprehensive knowledge of the expenses involved with deploying ICT solutions for students with disabilities, which aids in decision-making and resource allocation. This ensures the successful implementation and long-term viability of inclusive and tech-enabled education programs.

Students' abilities should not be a barrier to their participation in class or achievement of their learning objectives. All special needs students need are specific tools. Additionally, a whole new generation of technological instruments is prepared to handle learning difficulties and unique demands. According to the Getting Smart team, schools that utilize Microsoft Office 365 have access to software that improves accessibility for reading. A visual dictionary and an Immersive Reader are included in this software package. A certain requirement may be helped by certain applications. A wearable scheduler based on pictures, such as the one provided by learning solutions supplier Enuma, might be beneficial for kids with autism. When using a literacy help tool like Spell Better, dyslexic students may be more engaged with the material covered in class.

According to Alvarado et al. [1], a case study on autistic children produced positive outcomes for the system's assistive technology for instruction and learning. The authors emphasize how assistive technology may aid students with impairments in the areas of education, psychology, and social interaction. From a psychological standpoint, assistive technology use may be transformational and facilitate social and academic involvement.

Another field that is still developing and helping students learn is robotics. Particularly beneficial to those with autism are robots.

Early research has shown that engaging technologies, such as robots, can increase autistic children's involvement in therapy sessions and teach them useful skills and behaviors for everyday life [7, 16]. Milo is one robot that has a lot of potential; using voice-activated instruction, kids may practice recognizing facial expressions and emotions. Milo, a 2013 RoboKind release, is a set of voice-activated courses designed to improve the social and emotional, behavioral, and communication abilities of autistic

kids. Students engage through modules with an instructor, such as recognizing emotions and showing empathy, while paying attention to Milo's facial expressions and spoken signals. Throughout a session, Milo's head and boyish body sway to convey a variety of facial expressions, including anger, sadness, happiness, and frustration; on occasion, he even dances to get the right answers [6].

Virtual reality is a rapidly developing technology that has several applications. Eyeflite, a startup, is one such. The Oculus Go VR headset is being used by Eyeflite. Researchers are working on software that would enable those who have trouble typing or touching a touch screen to use their eyes to operate a computer.

Users with impairments may play games, exchange texts, and access the internet with ease thanks to virtual reality. This kind of technology can make it easier for kids who have trouble using their hands or arms to obtain information, communicate, and play with other students.

Increasing the dynamic, effective, and interactive nature of learning via the use of technology tools may enhance inclusive education [3]. Virtual reality (VR) has the potential to change students' learning styles in inclusive education systems by offering additional difficulties, focusing and attracting students' attention, giving sufficient control over the learning environment, and emotionally involving the participants [12]. In order to address these issues, a learning platform that exposes kids to social teachings like "a route to school", "behavior in computer class", "interaction with peers", or "safety skills" was developed using virtual reality and machine learning [12].

Given that virtual reality (VR) offers the possibility of user involvement and immersion in a virtual world, this may also apply to children with disabilities, particularly those with intellectual impairments who reject actual experiments and encounters [21]. This allows for the provision of an accurate description of the real world devoid of any fantastical elements, the visual aiding of abstract concepts, and the placement of children in situations in which they are unable to be placed in real life due to various social constraints, resource limitations, or disability-related constraints. For instance, virtual reality (VR) offers authenticity and realism in a regulated setting for kids with autism, which can improve learning and perception processes and help them acquire practical skills [17].

Virtual reality (VR) settings may be used to teach logical-mathematical ideas or even for recreational purposes, including preventing accidents [4]. Through the assistance of VR in overcoming obstacles related to handicap, depression may be avoided and self-esteem and empowerment can be increased. Lastly, there is always room for improvement in the interactions and exchanges between students and professors.

Scripting languages may be used to design 3D objects and define their behavior in virtual world systems like Second Life or OpenSim. Students are able to construct their own buildings, such as a museum or a home. Avatars, which are self-representations of individuals in virtual worlds, may play particular roles to solve problems and can cooperate and interact with other avatars in collaborative activities that can be developed in virtual worlds. Virtual environments give users the chance to experiment with different social interactions, which promotes introspection on emotions and ideas [18]. Virtual environments for inclusive education can provide a secure setting for skill practice without the dangers of the real world.

It should be mentioned that specific needs of impaired students can be met through customization of virtual reality (VR). It offers the chance for customized learning experiences, which might be very beneficial for the program's enrolled students.

VR and AR labs and simulations offer secure settings for training and skill improvement. Through social simulations and avatars, they also help with social skills and communication. Furthermore, these technologies convert instructional resources

into accessible and interactive formats, improving the content's readability and engagement - a critical component of inclusive pedagogy.

In addition, to guarantee inclusive and broadly accessible VR and AR experiences, cooperation between educators, developers, and accessibility specialists is essential.

Towards the end of the 1990s, a brand-new paradigm in human-computer interaction known as "Tangible User Interfaces" - in which users interact with digital content using common physical objects - arose. It is possible to run serious games with instructional objectives using tangible interfaces. When educational games are designed with the skill levels of the players in mind, they work better. If the degree of difficulty is too high or too low, the user may become discouraged or bored.

Activities that test cognitive and physical abilities via the use of many senses - vision, hearing, and touch - are made easier by tangible interfaces. Additionally, students gain skills in space sharing, teamwork, organization, and problem-solving planning, all of which support contextual learning. Tangible interfaces provide a multitouch interface, encourage group conversation, and improve action visibility so that children may learn by copying their peers' actions [17]. Children and those with learning difficulties can utilize tangible interfaces more easily and intuitively. Students' ability to reflect may grow when they physically work with concrete items. Furthermore, it is crucial that kids study in an environment that is more carefree, enjoyable, and amusing.

Because mixed reality technology offers immersive and engaging learning experiences, it has the potential to completely transform the special needs education sector. For kids with a variety of special needs, mixed reality opens up new possibilities for individualized learning, skill development, and social engagement by fusing the actual and virtual worlds. The uses of mixed reality in special needs education are numerous and exciting, ranging from augmenting sensory experiences and strengthening motor abilities to fostering social communication and cognitive growth.

All-inclusive With the multimodal approach to learning that EdTech adopts, students may interact with the material in a variety of ways. For instance, text-based resources, audio lectures, interactive simulations, and films may all be used to teach students. This wide array of resources accommodates varying learning styles and lets students select the format that best fits their comprehension. With the help of EdTech, students may collaborate on projects and assignments with one another wherever they are in the world. Students may work together in real time through collaborative document editing, video conferencing, and virtual classes, which encourages cooperation and peer support. Additionally, EdTech gives teachers useful information about the performance and advancement of their students. Teachers who keep an eye on their students' learning journeys are better able to see any problems early on and provide timely solutions. This data-driven strategy makes sure that students get the help they need to overcome obstacles and be successful in their academic endeavors.

The use of EdTech in inclusive education is becoming ever more promising as technology develops. Teachers can build learning environments that celebrate diversity, give every student a sense of empowerment, and foster a lifelong love of learning by adopting and implementing inclusive EdTech solutions. A future of education that is more inclusive and fair is being paved by educators, students, and technology working together.

Universal Design for Learning (UDL) is a fundamental tenet of inclusive learning in EdTech. The goal of Universal Design for Learning (UDL) is to provide access to education for every learner. It entails developing several avenues for students to interact with the subject, including giving them alternatives for student involvement, a variety of content forms, and ways to demonstrate what they have learned. The fundamental tenet of UDL is that there is not a single, universally applicable strategy

for teaching and learning. Teachers may design a flexible, responsive learning environment that meets the requirements of every student by implementing UDL principles [25].

With its emphasis on equality and inclusion for all people, inclusive education may also be used through the Project Based Learning (PjBL) paradigm, which gives students - including those with special needs - the opportunity to engage in meaningful and in-depth learning experiences. A useful strategy for motivating inclusive students to participate actively in their education and get fresh insights into pedagogy and learning methodologies is project-based learning [26]. The integration of Project-Based Learning into the inclusive education framework significantly improves students' abilities. In addition to being effective teaching methods, project-based learning motivates students to actively search for knowledge and engage in project work. We believe that the Agile methodology and the distribution of team responsibilities, particularly those that, according to Belbin, are focused on fostering a varied and inclusive environment, are crucial to the success of teams [13]. These factors have a great deal of potential to improve the inclusive pedagogic environment in Society 5.0. Research indicates that learners in Belbin teams outperformed learners in self-selected teams. In addition, teamwork, positive interdependence, and interpersonal skills were mandated [2]. With the help of this team-building technique, students may learn about their own strengths and shortcomings as well as the roles and behaviors of their colleagues. Additionally, it pushes students to concentrate specifically on group work abilities.

Consequently, incorporating agility into teaching and learning methods has to be a powerful means of breaking down barriers and putting universal education ideas into action. Adaptability and flexibility are essential building blocks of agile processes. This relates to education and is about acknowledging that every student has a unique learning style, capacity, and affordances. Scrum masters are advised by agile approaches to have several feedback sessions so they can keep an eye on student performance and adjust as needed. Since no learner should be left behind, the cyclical approach enables the educators to personally cater to the requirements of each individual student.

Agile methodologies have a number of observable advantages for advancing diversity in the classroom:

1. Personalized learning. The fundamental ideas of Agile approaches demonstrate how much instructors value using a customized approach when giving instructions, which in turn enables them to modify the curriculum to better meet the requirements and preferences of their students. As to the findings published in the Journal of Educational Technology & Society, "technology enhanced personalized learning environments improve learners' engagement and achievement".
2. Accessibility. Learning materials should be made available to all students, not only those with disabilities, in accordance with the principles of "inclusive education". Agile methodologies recommend that curriculum accessibility be taken into account from the very beginning of the design process. It is important to develop a wide variety of material that is accessible to everyone.
3. Continuous improvement. The idea of continuous improvement, which calls on educators to consider their work and consider ways to make it better, is one of the fundamental ideas behind agile approaches. This means that, in the context of education, self-evaluation will entail assisting teachers in considering how they instruct, providing feedback to peers and students, and using iterative techniques to enhance the process of teaching, learning, and assessment for the underprivileged.
4. Empowerment. Giving students authority over the process and empowering them to make decisions is the fundamental tenet of adopting the agile methodology. For handicapped kids who may suffer from the consequences of inclusion or exclusion in conventional educational systems, this kind of school is extremely relevant.

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