New Technologies for Inclusive Learning for Students with Special Educational Needs

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Abstract—In recent years, in the context of the educational reform, dominant position is held by the social demand for the inclusion of all students in the regular classroom and the request to redesign the educational process to align with the individualized needs of students. The concept of inclusion, which view the heterogeneity in the light of social justice and equality, refers not simply to the placement of the SEN students in the mainstream school, but basically, to their dynamic engagement in every aspect of the educational process and in the social interactions that flow from it. "E-inclusive" pedagogy refers to teachers' decisions to providing their students innovative ways of learning and alternative means of completing their tasks, by incorporating the technology in the educational activities. The aim of this paper is to propose tech tools and e-services for the accessibility and active participation of students with special educational needs in teaching and learning procedures of the ordinary classroom and examine the role of teachers in realizing their inclusion/e-inclusion, as the main facilitators and modulators of the classroom settings to an open learning and development ecosystem. The results showed that teachers who provide authentic opportunities for interaction and learning for all their students and incorporate, flexibly, new technologies into their teaching strategies to meet their unique needs, contribute significantly to their acquisition of academic but mainly functional life skills, preparing them for substantial employment and integration opportunities in community life.

Keywords—inclusion/e-inclusion, new technologies, students with special educational needs, sustainable learning and development ecosystem

1 Introduction

The promotion, internationally, of the educational policy for the inclusion of SEN students in the general classroom of the mainstream school so that it constitutes a broaden learning community, resulted in the development of the Universal Design for Learning (UDL), emphasizing on the use of technology with a view of shaping a quality learning environment of multiple opportunities for productivity and high interactions to optimize the learning and development of each student [1]. Moreover, the inclusive orientation of education, legislated with the Universal Declaration of Salamanca

(UNESCO, 1994) [2], emphasizes the social inclusion of all students, which enhances the feeling of acceptance and equally belonging to the class community, regardless of their diversity or abilities [1], [3].

Although the heterogeneity initially concerned culture, language and socio-economic level, it is then enlarging, also for students with disabilities and special educational needs, by creating an open education model, where the value of diversity is diffused in the school culture and the curriculum, which according to the US "No Child Left Behind" Act (NCLB, 2001), is required to involve them in all mainstream school activities [4]. The inclusion of these students is legislated internationally, however it is perceived and implemented in a variety of ways, reflecting underlying differences in education policy, socio-economic and political conditions and cultural backgrounds.

On the other hand, the development of successful inclusion practices, in the traditional classroom, requires the coordinated cooperation of researchers, teachers, parents and students, as well as the respective government policy, which must primarily invest in learning, providing the necessary educational resources and infrastructure, which will ensure them consistent accessibility to information and knowledge [5]. Therefore, in order to achieve the inclusion, which aims at the empowerment and emancipation of SEN students [6], a new standard of education that respects the heterogeneity and a new model of educational services in the general classroom, is required, where the teachers invest in educational goals for all their students [7], by implementing beneficial teaching and pedagogical strategies, which incorporate the use of new technologies, based on individual differences. Teachers usually display more positive attitudes to the e-inclusive practices, when they are familiar with using technology and the classroom has access to technology equipment [8]. In addition, a catalytic factor for meaningful inclusion is the appropriate regulation and adaptation of the learning environment and their willingness to use assistive and instructional technology in the educational activities, which bridges the digital gap between children of typical and atypical development [9]. Thus, by making appropriate planning for the use of the tech tools and e-services, SEN students gain accessibility to the provision of quality education, aiming to increase and enhance their functionality, for their dynamic engagement in cognitive resources and social interaction experiences within the classroom environment, which lay the foundations for a sustainable future [1],[8], [10].

Hence, there is no doubt that the role of systematic training, either as initial teacher education (ITE) or as continuous professional development (CPD), for a deeper understanding of the substance and results of inclusion [2], but also for the effective implementation of the e-inclusive pedagogy, in the everyday life of the classroom, is considered crucial [11] [12].

2 Inclusion/E-inclusion

"Inclusion" is a multidimensional conceptual construct, which adopts the model of diversity as a natural state of the individual [13]. It is based on socio-cognitive theory and concerns the equal access and participation of all students, including SEN students, in the local school community [14].

This concept has emerged in the 1990s, replacing the previous terms "incorporation" and "integration", ending social discrimination and providing equal opportunities to all children in the educational programs of mainstream schools, in terms of maximizing their potential, in important areas of human development. Therefore, inclusion, as a multifaceted process, means not just placing SEN students in the general classroom, but mainly the active participation in a wide range of activities of a coherent curriculum, providing them with a sense of social acceptance and allowing them to develop new academic skills and dynamic interactions, which promote their socialization and reinforce their cognitive development [15], [16]. Therefore, this new approach, through the radical restructuring of educational structures, focuses on the social and environmental characteristics of educational settings [17].

"E-inclusive" pedagogy is a sub-field of inclusive education and includes the decisions of the teaching staff, which reflect their beliefs and attitudes towards diversity and the functional incorporation of ICTs in educational processes and activities, as tools to remove digital inequality, with the support of which the inclusion is essentially implemented in a holistic way. The digital divide in education, which according to Miller (2007) should be considered as an inability to make digital decisions of access, learning, motivation and skills, with a negative impact on every area of human development [11] is a result of: a. the lack of sufficient digital resources that motivate teachers to implement innovative educational strategies b. the inadequacy of their knowledge for the effective use of technology in order to differentiate their teaching and c. the absence of the students' physical access to them [9].

E-inclusive pedagogy involves adapting the content of the common curriculum, and personalizing it, so that it becomes meaningful for each student, but also the modification of the inclusive classroom environment by introduction, on a consistent, non-disruptive basis, of educational technology tools and services, designed to compensate for the absence or deficient presence of some skills, allowing SEN students to become participants in authentic situations of self-regulated learning and development [5]. The level of commitment of the educational community to their use in teaching practices, differentiating flexibly the curriculum, is related to their perceptions as reliable learning and development skills tools and to their knowledge about their effective use in the educational procedure [11].

3 Bridging the digital gap for SEN students

The critical role of technology is recognized, on a global scale, with the perspectives it provides, through a wide range of digital tools and e-services, integrated into a universally designed learning environment, to maximize the academic learning and social-emotional development of all students, including SEN students, providing differentiated ways of teaching and learning, aligned to the different functional requirements of each child, with a view to upgrading their quality of life indicators [1], [18]. Highlighting the functionality of technology in inclusive education, Abbott (2007) points out that a. provides access to learning b. supports educational process and practice opportunities and c. using it makes learning possible for all students [6].

According to the European Agency (2013a), the educational policy and legislation of each country must promote the e-accessibility and inclusion of each student. In recent decades, European education policy, in the context of Sustainable Development, has been, steadily, oriented towards facilitating the universal accessibility of SEN children in the Information Society, aiming to provide quality education and equal opportunities for lifelong learning, eliminating any inequality, with access to the suitable technology tools, digital hardware and software, to support personalized learning and maximize each child's potential. In this direction, Universal Design for Learning (UDL), which envisages the proactive design by the teacher of an open learning and development ecosystem, provides the supporting framework that allows the differentiation of the curriculum, with an emphasis on the use of technology, as an integral part of educational strategies, which provides innovative approaches of learning and intuitive means of representing information, engaging and expressing of students [1], [18]. Moreover, it also provides the possibility of adjustments, such as the accessibility settings in the computer operating systems of Apple, Macintosh and Microsoft Windows, which aim at flexible approaches to self-regulated learning by offering the educational material in digital format, [6] to maintain their effort and commitment to completing their assignments [18].

More specifically the main technology for SEN students includes interactive whiteboards, computers with Macintosh and Windows operating systems, laptops, smartphones, Android tablets, iPads and Chromebooks, which are supercomputers with which they access Google Chrome and Google productivity tools such as word processing (Google Docs), spreadsheet (Google Sheets), and presentation (Google Slides) software [5], [6], [18]. Assistive technology provides a wide range of devices, applications and extensions, often freely available on the Google Chrome browser, dictionaries, word prediction, translation, and spell-checkers software that provide innovative ways to create or edit content, understand information, acquiring new vocabulary, while the multimedia material – images, video, sound, graphics – offers an attractive framework for organizing and displaying their knowledge [18].

For the suitable selection of the appropriate technological equipment, ease of use and transport, safety and reliability in its use, technical characteristics and adaptation to different environments must be taken into account. Above all, however, the support of their functional incorporation in carefully designed student-centered activities, guided by educational goals, their previous experiences and unique characteristics [5], [18], [19], [20]. At the same time, by providing students with the opportunity to participate in the selection of the necessary tools and to reflect on their usefulness and the type of support provided, the cultivation of their self-awareness, regarding their capabilities, is enhanced, increasing the prospects of a self-regulated learning [18]. The determination and use of technological equipment must be individualized by assessing, on a regular basis, the changing needs of students [20]. It is vital, however, its integration, as part of an interactive educational procedure, in the students' daily schedule and the regularity of the classroom, while it is considered appropriate to model its correct use [19], as well as the establishment and implementation of rules and realistic performance expectations [20]. In this planning, some models and projects can guide teachers, which provide them with strategy instructions for the proper use of resources, environment and technology and monitoring their impact on the progress of their students, such as

SETT (Student, Environment, Task, Tool), MPT (Matching Person and Technology) [1], [20], WRITE (Writing Strategies for Instructional Technology in Education), GPAT (Georgia Project for Assistive Technology), TECH, TAM (Technology Acceptance Model) and TPACK (Technological Pedagogical Content Knowledge) [20].

However, it is pointed out that the effective development of learning through technology must be based on the assessment of the children's educational needs [21] and requires systematic planning at the level of the classroom and school unit [22]. In any case, the use of technology should motivate these students to focus on their own unique abilities and become more efficient, in order to prepare themselves socially and professionally for the job market of the future [20]. Furthermore, the incorporation of digital tools and e-services in the educational process for the planning of teaching and learning activities, record keeping, student monitoring and assessment procedures, in order to surpass the barriers to their development, contributes to the acquisition of literacy, decision-making and problem-solving skills. But mainly, aims at the cultivation of balanced relationships with the other members of the classroom, so that they are dynamically engaged in the interactive processes of a cooperative learning, which highlights the unique value of each student, increasing their self-esteem, acceptance by their peers and the sense of equal member of the classroom [1], [23], [24]. Thus, the use of digital resources in the inclusive classroom should not be an end in itself, but be used purposefully, multiplying the opportunities to communicate information and knowledge, providing motivation and encouragement to SEN students to develop a sense of co-responsibility in their learning and promote a self-directed model of work [5], [18].

4 Students with learning difficulties

These children, due to brain dysfunction, have difficulties in understanding and using language, speech, literacy skills – reading and writing – and deficits in numeracy, perception, conceptual development, coordination of movement and orientation in space. In order to work autonomously on tasks such as reading, writing, learning vocabulary, taking notes and organizing them, to produce written work for their assessment, educational software and other digital tools are recommended [10], [21] that provide multi-sensory learning, positive reinforcement, opportunities for experimentation, repetition and self-regulating learning [5].

4.1 Supporting literacy skills (reading-writing)

- The use of the computer multiplies the text processing capabilities of children with writing difficulties, through a "word processor", stimulating their motor skills [22], [24]. At the same time, it allows them to produce a spelled and well-written text, focusing exclusively on the creation of its content and the communication of their ideas, and especially for children who have a good level of verbal-expressive language [22].

- "Spell check" software helps eliminate spelling errors [22], such as "spell check and thesaurus", which, at the same time, provides suggestions for choosing the right word depending on the context [19].
- "Grammarly" and "Ginger" are extensions of grammar and spell checkers for reviewing electronic texts, while "Ginger" also operates as a translation tool [18].
- "Word prediction" software enhances spelling, vocabulary and syntax skills, as the student correctly completes a sentence, by selecting the appropriate word from a displayed list of frequently-used words [18], [22].
- "Co-Writer Universal" with the combined use of "Speech Recognition" (SR) software predicts and recognizes words on web pages or Google Docs [18].
- "Read & Write 5.0 by textHELP" software operates with Windows applications and "word processors" and as the user types the initial letters of a word, predicts a number of corresponding words. By selecting the number of the correct word, it is automatically inserted into the sentence. At the same time, each typed word is registered in the dictionary, which provides its definition, facilitating the decoding and understanding of the text. Abbreviations can also be entered in the dictionary and as soon as the user types an abbreviation, the entire phrase appears spelled out. This function also supported by the "Abbreviation Experts" software [18], [19].
- The "Read and Write" for Chrome extension has tools that stimulate reading skills, such as vocabulary lookup, word prediction, annotation highlighting, and converting digital text to an MP3 file [18].
- The use of text-to-speech (TTS) software allows students with multiple learning disabilities, by listening to the words in the text, to recognize them in order to decode them and understand the sentences [18], [19].
- The "Snapverter" application provides visual recognition of letters, so that by scanning a printed text it is easily converted into a digital file, which can be read with TTS and enables the user to take advantage of the additional functions of the "Read and Write" extension [18].
- "Google Dictionary" helps enriching the vocabulary and understanding of a web text, by providing automatically the meaning of a word that is copied and pasted into the dictionary toolbar [18].
- Digital voice recorders, as well as the "Mic Note" application, where students take notes by recording their voice, and "Speech Recognition" (SR) software increase the oral expression prospects of students with difficulties in written expression or writing skills [18], [19]. In more detail, with "Speech Recognition" (SR) software or otherwise speech-to-text, the spoken word is transcribed into spelled and easy-to-read electronic text.
- With the "Voice Note II" and "Dictanote" applications they can write using the keyboard alternately with the SR, while "Speech Recognition & Translation" software captures, automatically translates and saves a text for individual or shared use [18].
- The "fluency tutor" application enables students to listen to the reading of a text and then record their own reading, which they send to the teacher for their assessment [18].
- "AT Bar" is a toolbar for proper adjustment of reading web pages such as choosing the correct font size and with dictionary and TTS that ease the reading effort [18].

- "Natural Reader" is a device for converting text (pdf documents, web pages and emails) to sound, stored in MP3, WAV format and played by CD player or iPod [21].
- With "Talking Word Processors" students with reading difficulties can listen to the text as they type it and choose the size and color of the letters, the color of the background or even add graphics to their text, while with the embedded talking spell-checking system to check the spelling, meaning or correct use of words. "Speech synthesizers" are talking word processors, whose reading is based on the phonemes of each word, while some talking word processors can convert phonetics into standard reading [19], [24].
- The "Strategy Tutor" tool enhances students' reading ability or their Internet research effort to collect and organize information [21].
- Various Google apps and extensions, such as "Google Calendar", "Todoist", "My Study Life", "myHomework Student Planner" and "Wunderlist", can improve the executive functions of planning, organizing and scheduling, of children with learning disabilities, ADHD and cognitive deficits. The usability of these tools extends from receiving notifications in an electronic calendar, for the proper organization of time and assignments and timely reminders for their scheduled school tasks, to the ability to store useful websites [18].
- With "graphic organizers" students with learning and cognitive disabilities, attention deficit disorders and emotional / behavioral disorders can record their brainstorming and then categorize and map their ideas, in the planning stage, to organize them in writing text [18], [20].

  The "technology-based graphic organizers" TBGO, include self-regulated learning strategies and help all students in the inclusive classroom to improve the quality and quantity of their written productive language, through self-observation and self-assessment, while the teacher's role is limited to audio instructions and reminders of what they have to perform. TBGOs come in three versions and operate accordingly with either Computer (CBGO) or Mobile (MBGO) or Web-based (WBGO) [20].

  "Connected Mind", "Lucidchart for Education", and "MindMup 2.0" are graphic organizers that allow users, providing also the option of collaboration, to create their written text, adding audio clips, images, and hyperlinks that refer to conceptual maps [18]. "lnspiration" is a graphic organizer software consisting of bubbles, in which students place their ideas, to gain a deeper understanding of the content of the reading text or to organize them and produce their own text [19], [24].
- "Prewriting Prompts", such as "Kid Works Deluxe Knowledge Adventure", is multimedia software consisting of text and graphics, to meet the desire of preschool children to tell their stories, by enriching their text with graphics and images [23].
- The "Paper-based Pen" enables students with literacy, memory or hearing difficulties to take notes and at the same time record the teacher's lecture, so that they can later listen to it as many times as they wish, as they touch the special pen on the corresponding manuscript or blueprint [5].
- Similar support is provided by Smartpens, such as "Echo™", "Sky™" and "Livescribe Three™", which convert and store, in digital files, words, notes or diagrams that the students say, hear or write on a specific digital paper, for their individual

or shared use, through the computer, whenever the user wishes. At the same time, they can simplify multi-step tasks and personalize their learning pace to keep up with their peers, as they can record the teacher's entire lecture while capturing the key points of the lesson, and at home help with their study and assignments, by enriching their notes with details from the recorded lecture. In addition, they provide alternative assessment solutions, by recording the oral responses of students with learning/motor/cognitive deficits. In the same context, they provide the possibility of personalization in a test, as a student can repeatedly listen to a question and the recorded instructions. The teacher, by recording the students' reading, can still assess their reading ability and reading pace – with the timer on the Smartpen screen – and identify their errors.

In addition, by leveraging the Smartpen's speech-to-writing capabilities, teachers can create online lessons, through the video pencast application, which students follow, by reading the written notes on a computer screen and listening to him/her provide additional instructions and explanations. Similarly, it can be used to study words and expand vocabulary by providing audio information about the meaning, correct pronunciation and use of a word in the context of a sentence [10].

- "C-Pen™" reading pen makes it easier for students to read and understand content independently, motivating them to keep trying [1].
- The "Newsela" app boosts the reading skills of students of all grade levels, with a variety of contemporary articles and graded reading requirements [18].
- The integration of iPads technology into the ecology of the inclusive classroom provides students with multiple opportunities for experiential learning as it relates to their everyday life experiences. They increase the possibilities of intuitive learning, personalized content creation, cooperation, communication, as well as interconnection and interaction with the other digital resources of the learning environment. iPads are multifunctional tools that use for taking notes, searching for information, studying textbooks, as a dictionary, as a recording device, as a calculator, but also for finding and copying the instructions and homework that the teachers have saved in Dropbox, in order to produce their own texts [25].

4.2 Supporting math skills

Limitations in conceptual thinking prevent children with learning or cognitive deficits from perceiving and acquiring mathematical concepts and computational thinking [18].

- The "Number Frame" and "Number Line" apps, on "The Math Learning Center" website, include virtual reality (VM) manipulations for number lines, number frames, tables, fractions, quantity visualization, and more.
- The "EquatIO" extension supports the creation of mathematical equations and formulas, using both SR speech recognition and word prediction software, while teachers with Google Forms can build more complex mathematical formulas and equations [18].
- "Electronic Math Sheets" help children with dyscalculia, as the numbers are spoken out loud, using the speech synthesizer and make it easier to line up the numbers when performing math operations [5].

- With "Empower Program" software, students can draw mathematical formulas and diagrams, circles, geometric diagrams, statistical graphs and graphs of functions for physics and chemistry.
- With "talking clocks", they get the ability to have control over time, so they can manage it appropriately for their assignments [19], [21].

5 Students with attention deficit disorder

Interactive whiteboards, use of photographic material and audio recording devices enhance learning by increasing attention span and working memory [1].

- The "interactive whiteboard" is a point of reference for the presentation and explanation of educational material, through the projection of presentations, multimedia, films, as it helps students to concentrate their attention on the educational process, to retain and remember information and understand instructions for their tasks. However, connecting their iPad's small screen to the interactive whiteboard creates a more personalized learning environment, which further supports students with cognitive deficits, as they can manage the learning material at their own pace to perform their tasks, and then, through the interactive whiteboard, to present them to the classroom [25].
- "Portable note takers" are especially helpful for students with low attention span to take notes in class that are necessary for creative writing or homework, giving children more time to listen and process them mentally [5], [19], [23].

  The "AlphaSmart 3000" keyboard has 8 files to store the information it records and a 70,000-word spell check dictionary. To further process these files, the user can connect the keyboard to a PC or Macintosh computer and use the "Get Utility" software to transfer the files back and forth [23].
- Particularly helpful for students with distraction is a personal listening system, consisting of a wireless transmitter with a microphone worn by the speaker and a receiver with an earphone worn by the listener so that the speaker's voice is transmitted directly to the ear of the user by eliminating environmental distractions [24].
- With the "EasyRead" Chrome extension, the spacing between letters and words, in a paragraph, can be adjusted, making it easier to read texts on websites.
- The Chrome "TL; DR" extension can present, summary, texts whose length makes it difficult to read and especially their understanding. Students can choose between a longer or shorter summary and the teacher can format reading passages, with extent and vocabulary representative of grade level.
- For texts from websites or Google Docs, Chrome extensions "SpeakIt" and "Read Aloud" provide the options of underlining the reading text or turning it into speech, choosing the type and volume of the voice, but also the reading pace.
- "Mercury Reader" Chrome extension blocks ads from distracting websites and distracts from reading and searching for information [18].

6 Students with intellectual disability or emotional/social disorders

Students with lower level of intelligence, often, display maladaptive behaviors and reduced social skills, resulting from their developmental deficits.

- The "SIDoBi" application facilitates their understanding and learning, providing them with guidance in small steps and at a slower pace, aiming at their individual and social development.

For students with emotional/social disorders, who usually have deviant behaviors, the primary purpose of the technology offered is the acquisition of emotional and social self-control. For this reason, they are provided with psychological support and guidance via "video animations" that have calm voices [21].

- To increase the social interaction of children with social difficulties and find out common interests with their peers, alternative and augmentative technology (AAC) devices are recommended, such as the "Proloquo2go™" application for speech production, using an iPad or the "Dynavox device ™". Communicating with these tools, they are able to understand the content and instructions of the curriculum, so that they can engage themselves in educational activities, interacting with other members of the classroom [1].
- The "Facial Expression" application, on the "Do to Learn" website, which enables them to observe various facial expressions and identify the corresponding emotions, proves to be particularly beneficial for these students and especially for those with ASD [21].

7 Discussion

In order for teachers to be the catalysts of a successful inclusion of SEN students, new knowledge and structured experiences are necessary, for understanding, evaluating and facing their unique characteristics as a creative challenge [5] and for the effective use of technology that facilitates group teaching and individualized educational planning, which is redefined and modified by everyday classroom practice [9]. In the same vein, is required a national political strategy to provide the necessary financial support and promote the equal distribution of open educational resources to exploit the potential of technology by all students [6]. Furthermore, a holistic education culture, according to the developmental model [26], will work constructively in this direction, as it focuses not on the developmental deficits of students but on their strengths. Nevertheless, even if social prejudices have receded, there are still inherent problems, which incite teacher skepticism and are related to the absence of new curricula that promote the common goals of inclusive education and to the inadequacy of resources and planning time, of necessary technical know-how and their systematic training in emerging technologies that are constantly evolving.

On the other hand, the functional incorporation of new technologies in educational activities lays the foundations for a self-directed approach of learning and forms an inclusive framework, which provides strong incentives for experiential learning, which has as a reference point the knowledge and experiences of the students' daily life [27], activating thinking, promoting experimentation (trial-error) and the search for the acquisition of new knowledge and developing decision-making and problem-solving skills [20], [24]. As schools are becoming increasingly open, it is a challenge internationally, for educational policy makers, a more coordinated and participatory effort in the planning and implementation of teacher training programs, as the main contributors to the educational policy of equality, aiming to promote positive attitudes and initiatives for the realization of inclusion and the diffusion of good practices that promote e-accessibility, removing the digital inequality with the cooperation of all education professionals. More importantly, inclusive schools, by modeling educational approaches to meet different needs, using technology as a bridge to the learning and development of all students, can be the cornerstone for building a society without discrimination and exclusion [1], [5].

At the same time, it becomes noticeable, due to the enhanced technical know-how that the teachers acquire, they attempt to model the educational design, based on their new knowledge and practical experiences, providing an educational project of high standards for all their students [20], who learn to accept heterogeneity as the regularity of the classroom and develop digital literacy skills, which are among the basic skills of the 21st century, for their dynamic integration in an open, competitive and sustainable knowledge-based society [6]. This is in line with the findings of research that have proven the higher degree of diversity in the learning environment as an important factor that maximizes learning outcomes for all classroom members [28].

Finally, the incorporation of digital technologies, in education domain, is very productive, successful and facilitates and improves the educational procedures via Mobiles [29–34], various ICTs applications [35–63], AI & STEM [64–68], and games [69–72]. Additionally, various strategies and techniques can be incorporated in educational approaches via IoT and the combination of ICTs with theories and models of metacognition, mindfulness, meditation and emotional intelligence cultivation [73–99] as well as with environmental factors and nutrition [100–103], accelerates and improves more over the educational practices and results.

In this perspective, hardware and software designers should develop new technology resources and more sophisticated techniques that incorporate these theories and have functional characteristics that allow them to be used by all students in the inclusive classroom [104].

8 Conclusion

In summary, there is an undoubted need for the ordinary classroom to be the focus of a holistic educational system, with the coordinated cooperation of teachers to the universal design of the learning for all their students, providing them adequate educational

services, in order to be transformed it into a sustainable learning and development student-centered ecosystem. Within this open ecosystem, SEN students must be supported and encouraged to develop not only academic, but mostly, communication, information-seeking, decision-making, problem-solving skills to become potential digital content creators. The open access portal for children with developmental asynchronies to this interactive ecosystem is new technologies, which make even the most challenging educational goals achievable, renewing the traditional approaches of learning, in order to synchronize them with their changing educational needs and paving their way for the acquisition of functional life skills, through living authentic learning experiences, which boost independence, self-esteem, self-regulation, active participation, sociability and provide quality opportunities for achievement and self-realization of all students.

9 References

[1] D. Chambers, Assistive technology supporting inclusive education: Existing and emerging trends. Assistive technology to support inclusive education, *International Perspectives on Inclusive Education, 14*, pp. 1–16, 2020. https://doi.org/10.1108/S1479-363620200000014001

[2] S. Costello, & C. Boyle, Pre-service secondary teachers' attitudes towards inclusive education, *Australian Journal of Teacher Education, 38(4)*, pp. 129–143, 2013. https://doi.org/10.14221/ajte.2013v38n4.8

[3] E. Avramidis, & B. Norwich, Teachers' attitudes towards integration/inclusion: A review of the literature, *European Journal of Special Needs Education, 17(2)*, pp. 129–147, 2002. https://doi.org/10.1080/08856250210129056

[4] M. Dingle, M. A. Falvey, C. C. Givner, & D. Haager, Essential special and general education teacher competencies for preparing teachers for inclusive setting, *Issues in Teacher Education, 13(1)*, pp. 35–50, 2004.

[5] F. K. Ahmad, Use of assistive technology in inclusive education: Making room for diverse learning needs, *Transcience, 6(2)*, pp. 62–77, 2015.

[6] M. Turner-Cmuchal, & S. Aitken, ICT as a tool for supporting inclusive learning opportunities, *In Implementing inclusive education: Issues in bridging the policy-practice Gap.* Emerald Group Publishing Limited, 2016. https://doi.org/10.1108/S1479-363620160000008010

[7] J. Brownlee, & S. Carrington, Opportunities for authentic experience and reflection: A teaching program designed to change attitudes towards disability for pre-service teachers, *Support for Learning, 15(3)*, pp. 99–105, 2000. https://doi.org/10.1111/1467-9604.00157

[8] W. Zilz, & Y. Pang, Application of assistive technology in inclusive classrooms. Disability and Rehabilitation: *Assistive Technology, 16(7)*, pp. 684–686, 2021. https://doi.org/10.1080/17483107.2019.1695963

[9] B. AlSadrani, M. Alzyoudi, N. Alsheikh, & E. E. Elshazly, The digital divide in inclusive classrooms, *International Journal of Learning, Teaching and Educational Research, 19(3)*, pp. 69–85, pp. 2020. https://doi.org/10.26803/ijlter.19.3.5

[10] A. L. Patti, & K. Vince Garland, Smartpen applications for meeting the needs of students with learning disabilities in inclusive classrooms, *Journal of Special Education Technology, 30(4)*, pp. 238–244, 2015. https://doi.org/10.1177/0162643415623025

[11] N. Beacham, & K. McIntosh, Student teachers' attitudes and beliefs towards using ICT within inclusive education and practice, *Journal of Research in Special Educational Needs, 14(3)*, pp. 180–191, 2014. https://doi.org/10.1111/1471-3802.12000

[12] S. Arulsamy, & A. Murugaiyan, Attitude of student teachers towards integration of assistive technology in inclusive classrooms, *International Journal of Teacher Educational Research, 2(4)*, pp. 1–8, 2013.
[13] E. Avramidis, P. Bayliss, & R. Burden, Student teachers' attitudes towards the inclusion of children with special educational needs in the ordinary school, *Teaching and Teacher Education, 16(3)*, pp. 277–293, 2000. https://doi.org/10.1016/S0742-051X(99)00062-1
[14] R. Ross-Hill, Teacher attitude towards inclusion practices and special needs students, *Journal of Research in Special Educational Needs, 9(3)*, pp. 188–198, 2009. https://doi.org/10.1111/j.1471-3802.2009.01135.x
[15] D. Bricker, The challenge of inclusion, *Journal of Early Intervention, 19(3)*, pp. 179–194, 1995. https://doi.org/10.1177/105381519501900301
[16] F. L. Wilczenski, Measuring attitudes toward inclusive education, *Psychology in the Schools, 29(4)*, pp. 306–312, 1992. https://doi.org/10.1002/1520-6807(199210)29:4<306::AID-PITS2310290403>3.0.CO;2-1
[17] D. Morley, R. Bailey, J. Tan, & B. Cooke, Inclusive physical education: Teachers' views of including pupils with special educational needs and/or disabilities in physical education, european, *Physical Education Review, 11(1)*, pp. 84–107, 2005. https://doi.org/10.1177/1356336X05049826
[18] M. W. Ok, & K. Rao, Digital tools for the inclusive classroom: Google chrome as assistive and instructional technology, *Journal of Special Education Technology, 34(3)*, pp. 204–211, 2019. https://doi.org/10.1177/0162643419841546
[19] C. G. Simpson, R. McBride, V. G. Spencer, J. Lodermilk, & S. Lynch, Assistive technology: Supporting learners in inclusive classrooms, *Kappa Delta Pi Record, 45(4)*, pp. 172–175, 2009. https://doi.org/10.1080/00228958.2009.10516540
[20] A. Evmenova, Implementation of assistive technology in inclusive classrooms, *In Assistive Technology to Support Inclusive Education*. Emerald Publishing Limited, 2020. https://doi.org/10.1108/S1479-363620200000014014
[21] M. Jannah, A. Mu'ammar, & E. F. Fahyuni, Asstech application based e-learning system to improve the quality of 21st century inclusive education, *Studia Religia: Jurnal Pemikiran dan Pendidikan Islam, 3(2)*, pp. 233–244, 2019.
[22] J. B. Merbler, A. Hadadian, & J. Ulman, Using assistive technology in the inclusive classroom. Preventing School Failure: *Alternative Education for Children and Youth, 43(3)*, pp. 113–117, 1999. https://doi.org/10.1080/10459889909603311
[23] J. Quenneville, Tech tools for students with learning disabilities: Infusion into inclusive classrooms, preventing school failure: *Alternative Education for Children and Youth, 45(4)*, pp. 167–170, 2001. https://doi.org/10.1080/10459880109603332
[24] A. N. Liman, R. O. Adebisi, J. E. Jerry, & H. G. Adewale, Efficacy of assistive technology on the educational program of children with learning disabilities in inclusive classrooms of Plateau State Nigeria, *Journal of Educational Policy and Entrepreneurial Research, 2(2)*, pp. 23–32, 2015.
[25] B. Meyer, iPads in inclusive classrooms: Ecologies of learning. In E-learning systems, environments and approaches (pp. 25–37). Springer, Cham, 2015. https://doi.org/10.1007/978-3-319-05825-2_3
[26] R. M. Hodapp, J. A. Burack, & E. F. Zigler, The developmental perspective in the field of mental retardation. In R. M. Hodapp, J. A. Burack, & E. Zigler (Eds.), *Issues in the Developmental Approach to Mental Retardation*, (pp. 3–26). Cambridge University Press, 1990. https://doi.org/10.1017/CBO9780511582325.002
[27] R. Nurdin, A. Hufad, D. Tarsidi, & I. D. Aprilia, The effect of internet of things implementation on inclusive practices in high school, In *2nd International Conference on Educational Sciences (ICES 2018)*, (pp. 149–151). Atlantis Press, July 2019. https://doi.org/10.2991/ices-18.2019.35

[28] S. S. Oyelere, I. F. Silveira, V. F. Martins, M. A. Eliseo, Ö. Y Akyar, V. Costas Jauregui, ... & L. Tomczyk, Digital storytelling and blockchain as pedagogy and technology to support the development of an inclusive smart learning ecosystem, *In the World Conference on Information Systems and Technologies,* (pp. 397–408). Springer, Cham, April 2020. https://doi.org/10.1007/978-3-030-45697-9_39

[29] A. Stathopoulou, D. Loukeris, Z. Karabatzaki, E. Politi, Y. Salapata, & A. S. Drigas, "Evaluation of mobile apps effectiveness in children with autism social training via digital social stories," *Int. J. Interact. Mob. Technol. (iJIM), 14(3)*, 2020. https://doi.org/10.3991/ijim.v14i03.10281

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

[31] A. S. Drigas, G. Kokkalia, & M. D. Lytras, Mobile and multimedia learning in preschool education. *J. Mobile Multimedia*, pp. 119–133, 2015.

[32] A. Stathopoulou, Z. Karabatzaki, G. Kokkalia, E. Dimitriou, P. I. Loukeri, A. Economou, & A. S. Drigas, Mobile assessment procedures for mental health and literacy skills in education, *International Journal of Interactive Mobile Technologies (iJIM)*, pp. 21–37, 2018. https://doi.org/10.3991/ijim.v12i3.8038

[33] G. K. Kokkalia, & A. S. Drigas, Mobile learning for special preschool education, *International Journal of Interactive Mobile Technologies, 10(1)*, pp. 60–67, 2016. https://doi.org/10.3991/ijim.v10i1.5288

[34] A. Stathopoulou, Z. Karabatzaki, D. Tsiros, S. Katsantoni, & A. Drigas, Mobile apps the educational solution for autistic students in secondary education, *International Association of Online Engineering,* 2022.

[35] A. S. Drigas, J. Vrettaros, L. Stavrou, & D. Kouremenos, E-learning environment for deaf people in the e-commerce and new technologies sector, *WSEAS Transactions on Information Science and Applications, 1(5)*, November 2004.

[36] A. S. Drigas, & D. Kouremenos, An e-learning system for the deaf people. In: *WSEAS transaction on advances in engineering education, 2(1)*, pp. 20–24, July 2005.

[37] A. S. Drigas, M. Pappas, & M. Lytras, "Emerging technologies for ICT based education for dyscalculia: Implications for computer engineering education," *International Journal of Engineering Education, 32(4)*, pp. 1604–1610, 2016.

[38] A. Drigas, & G. Kokkalia, ICTs and special education in kindergarten, *International Journal of Emerging Technologies in Learning 9(4)*, pp. 35–42, June 2017. https://doi.org/10.3991/ijet.v9i4.3662

[39] A. Drigas, & L. Koukianakis, A modular environment for e-learning and e-psychology applications*, WSEAS Transactions on Information Science and Application*, *3*, 2004, pp. 2062–2067, 2004.

[40] A. Drigas, & P. Leliopoulos, Business to consumer (B2C) e-commerce decade evolution, *Int. J. Knowl. Soc. Res. (IJKSR)*, pp. 1–10, October 2013. https://doi.org/10.4018/ijksr.2013100101

[41] M. Pappas, A. Drigas, Y. Papagerasimou, H. Dimitriou, N. Katsanou, & S. Papakonstantinou, Female entrepreneurship and employability in the digital era: The case of Greece. *Journal of Open Innovation: Technology, Market, and Complexity*, May 2018. https://doi.org/10.3390/joitmc4020015

[42] G. Papanastasiou, A. Drigas, Ch. Skianis, M. Lytras, & E. Papanastasiou, "Patient-centric icts based healthcare for students with learning, physical and/or sensory disabilities," *Telemat Inform, 35(4)*, pp. 654–664, 2018. https://doi.org/10.1016/j.tele.2017.09.002

[43] A. Drigas, & M. T. L. Kontopoulou, ICTs based Physics Learning, *International Journal of Engineering Pedagogy (iJEP)*, pp. 53–59, July 2016. https://doi.org/10.3991/ijep.v6i3.5899

[44] G. Papanastasiou, A. Drigas, C. Skianis, & M. Lytras, Brain computer interface-based applications for training and rehabilitation of students with neurodevelopmental disorders. A literature review, *Heliyon 6*, September 2020. https://doi.org/10.1016/j.heliyon.2020.e04250

[45] A. S. Drigas, J. Vrettaros, & D. Kouremenos, "An e-learning management system for the deaf people," AIKED '05: *Proceedings of the Fourth WSEAS International Conference on Artificial Intelligence, Knowledge Engineering Data Bases*, article number 28, July 2006.

[46] M. Pappas, E. Demertzi, Y. Papagerasimou, L. Koukianakis, D. Kouremenos, I. Loukidis, & A. Drigas, E-Learning for deaf adults from a user-centered perspective, *Education Sciences 8*, pp. 3–15, November 2018. https://doi.org/10.3390/educsci8040206

[47] A. M. Pappas, E. Demertzi, Y. Papagerasimou, L. Koukianakis, N. Voukelatos, & A. Drigas, Cognitive based e-learning design for older adults, *Social Sciences 8*, p. 6, January 2019. https://doi.org/10.3390/socsci8010006

[48] A. Drigas, & L. Koukianakis, Government online: An e-government platform to improve public administration operations and services delivery to the citizen, *WSKS*, *volume 5736 de Lecture Notes in Computer Science*, pp. 523–532. Springer, September 2009. https://doi.org/10.1007/978-3-642-04754-1_53

[49] P. Theodorou, & A. Drigas, ICTs and music in generic learning disabilities, *Int. J. Emerg. Technol. Learn*., pp.101–110, April 2017. https://doi.org/10.3991/ijet.v12i04.6588

[50] M. A. Pappas, & A. S. Drigas, ICT based screening tools and etiology of dyscalculia, *International Journal of Engineering Pedagogy*, pp. 61–66, August 2015' https://doi.org/10.3991/ijep.v5i3.4735

[51] A. Drigas, & I. Kostas, On line and other ICTs applications for teaching math in special education, *International Journal of Recent Contributions from Engineering, Science & IT (iJES), 2(4)*, p. 46, October 2014. https://doi.org/10.3991/ijes.v2i4.4204

[52] A. Alexopoulou, A. Batsou, & A. Drigas, Resilience and academic underachievement in gifted students: Causes, consequences and strategic methods of prevention and intervention, *International Journal of Online and Biomedical Engineering (iJOE), 15(14)*, pp. 78, October 2019. https://doi.org/10.3991/ijoe.v15i14.11251

[53] M. A. Pappas, & A. Drigas, ICT based screening tools and etiology of Dyscalculia, *International Journal of Engineering Pedagogy*, August 2015.

[54] A. Drigas, & G. Papanastasiou, Interactive White Boards in Preschool and Primary Education, *International Journal of Online and Biomedical Engineering (iJOE), 10(4)*, pp. 46–51, June 2014. https://doi.org/10.3991/ijoe.v10i4.3754

[55] A. S. Drigas, & S. Politi-Georgousi, ICTs as a distinct detection approach for dyslexia screening: A contemporary view, *International Journal of Online and Biomedical Engineering (iJOE)*, pp. 46–60, September 2019. https://doi.org/10.3991/ijoe.v15i13.11011

[56] N. L. Bakola, N. D. Rizos, & A. S. Drigas, ICTs for emotional and social skills development for children with ADHD and ASD co-existence, *International Journal of Emerging Technologies in Learning (iJET)*, March 2019. https://doi.org/10.3991/ijet.v14i05.9430

[57] E. Z. Kontostavlou, & A. S. Drigas, The use of information and communications technology (ICT) in gifted students, *International Journal of Recent Contributions from Engineering, Science and IT*, *7(2)*, pp. 60–67, June 2019. https://doi.org/10.3991/ijes.v7i2.10815

[58] A. Drigas, & J. A. Vlachou, "Information and communication technologies (ICTs) and autistic spectrum disorders (ASD)," *Int. J. Recent Contrib. Eng. Sci. IT (iJES), 4(1)*, p. 4, 2016. https://doi.org/10.3991/ijes.v4i1.5352

[59] A. Drigas, L. Koukianakis, & Y. Papagerasimou, An elearning environment for nontraditional students with sight disabilities, *Frontiers in Education Conference, 36th Annual. IEEE*, p. 23–27, October 2006. https://doi.org/10.1109/FIE.2006.322633

[60] A. Drigas, & L. Koukianakis, An open distance learning e-system to support SMEs e-enterprising, In proceeding of *5th WSEAS International conference on Artificial intelligence, knowledge engineering, data bases,* February 2006.
[61] A. S. Drigas, L. G. Koukianakis, & Y. V. Papagerasimou, A system for e-inclusion for individuals with sight disabilities, *Wseas transactions on circuits and systems, 4(11*), pp. 1776–1780, 2005.
[62] L. Bakola, I. Chaidi, A. Drigas, C. Skianis, & C. Karagiannidis, Women with special educational needs. Policies & ICT for integration & equality, *Technium Social Sciences Journal*, 2022. https://doi.org/10.47577/tssj.v28i1.5708
[63] M. Karyotaki, L. Bakola, A. Drigas, & C. Skianis, Women leadership via digital technology and entrepreneurship in business and society, *Technium Social Sciences Journal*, 2022. https://doi.org/10.47577/tssj.v28i1.5907
[64] J. Vrettaros, A. Tagoulis, N. Giannopoulou, & A. Drigas, An empirical study on the use of Web 2.0 by Greek adult instructors in educational procedures, *World Summit on Knowledge System (WSKS)*, pp. 164–170, September 2009. https://doi.org/10.1007/978-3-642-04757-2_18
[65] A. Drigas, & A. Dourou, A review on ICTs, E-learning and artificial intelligence for dyslexic's assistance, *iJet*, pp. 63–67, June 2013. https://doi.org/10.3991/ijet.v8i4.2980
[66] P. Anagnostopoulou, V. Alexandropoulou, G. Lorentzou, A. Lykothanasi, P. Ntaountaki, & A. Drigas, Artificial intelligence in autism assessment, *International Journal of Emerging Technologies in Learning*, pp. 95–107, March 2020. https://doi.org/10.3991/ijet.v15i06.11231
[67] M. Pappas, & A. Drigas, Incorporation of artificial intelligence tutoring techniques in mathematics, *International Journal of Engineering Pedagogy*, pp. 12–16, November 2016. https://doi.org/10.3991/ijep.v6i4.6063
[68] N. Lytra, & A. Drigas, STEAM education-metacognition–*Specific Learning Disabilities Scientific Electronic Archives 14(10)*, 2021. https://doi.org/10.36560/141020211442
[69] I. Chaidi, & A. Drigas, Digital games & special education, *Technium Social Sciences Journal 34*, pp. 214–236, 2022. https://doi.org/10.47577/tssj.v34i1.7054
[70] G. Kokkalia, A. Drigas, A. Economou, P. Roussos, & S. Choli, The use of serious games in preschool education, *International Journal of Emerging Technologies in Learning*, pp. 15–27, December 2016. https://doi.org/10.3991/ijet.v12i11.6991
[71] A. Doulou, & A. Drigas, Electronic, VR & Augmented reality games for intervention in ADHD, *Technium Social Sciences Journal*, 2022. https://doi.org/10.47577/tssj.v28i1.5728
[72] G. Kokkalia, A. Drigas, & A. Economou, The role of games in special preschool education, *International Journal of Emerging Technologies in Learning (iJET)*, pp. 30–35, December 2016. https://doi.org/10.3991/ijet.v11i12.5945
[73] A. Drigas, & E. Mitsea, 8 Pillars X 8 layers model of metacognition: Educational strategies, exercises & trainings, *International Journal of Online & Biomedical Engineering*, pp. 115–134, August 2021. https://doi.org/10.3991/ijoe.v17i08.23563
[74] A. Drigas, & C. Papoutsi, The need for emotional intelligence training education in critical and stressful situations: The case of COVID-19, *Int. J. Recent Contrib. Eng. Sci. IT*, pp. 20–35, September 2020. https://doi.org/10.3991/ijes.v8i3.17235
[75] A. Drigas, & E. Mitsea, The triangle of spiritual intelligence, metacognition and consciousness, *International Journal of Recent Contributions from Engineering, Science & IT (iJES)*, pp. 4–23, March 2020. https://doi.org/10.3991/ijes.v8i1.12503
[76] G. Kokkalia, A. Drigas, A. Economou, & P. Roussos, School readiness from kindergarten to primary school, *International Journal of Emerging Technologies in Learning, 14(11)*, pp. 4–18, 2019. https://doi.org/10.3991/ijet.v14i11.10090

[77] A. Drigas, & E. Mitsea, Metacognition, stress-relaxation balance & related hormones, *International Journal of Recent Contributions from Engineering, Science & IT (iJES), 9(1)*, pp. 4–16, March 2021. https://doi.org/10.3991/ijes.v9i1.19623

[78] M. Pappas, & A. Drigas, Computerized training for neuroplasticity and cognitive improvement, *International Journal of Engineering Pedagogy*, pp. 50–62, August 2022. https://doi.org/10.3991/ijep.v9i4.10285

[79] C. Papoutsi, & A. Drigas, Empathy and mobile applications, *International Journal of Interactive Mobile Technologies*, pp. 57–66, April 2017. https://doi.org/10.3991/ijim.v11i3.6385

[80] C. Papoutsi, & A. Drigas, Games for empathy for social impact, *International Journal of Engineering Pedagogy*, pp. 36–40, November 2016. https://doi.org/10.3991/ijep.v6i4.6064

[81] M. Karyotaki, & A. Drigas, Online and other ICT applications for cognitive training and assessment, *International Journal of Online and Biomedical Engineering*, pp. 36–42, March 2015. https://doi.org/10.3991/ijoe.v11i2.4360

[82] C. Papoutsi, A. Drigas, & C. Skianis, Emotional intelligence as an important asset for HR in organizations: Attitudes and working variables, *International Journal of Advanced Corporate Learning*, pp. 21–35, November 2019. https://doi.org/10.3991/ijac.v12i2.9620

[83] I. Chaidi, & A. Drigas, "Autism, expression, and understanding of emotions: Literature Review," *Int. J. Online Biomed. Eng., 16(02)*, pp. 94–111, 2020. https://doi.org/10.3991/ijoe.v16i02.11991

[84] A. S. Drigas, & M. Karyotaki, A layered model of human consciousness, *International Journal of Recent Contributions from Engineering, Science & IT (iJES), 7(3)*, pp. 41–50, September 2019. https://doi.org/10.3991/ijes.v7i3.11117

[85] A. S. Drigas, M. Karyotaki, & C. Skianis, An integrated approach to neuro-development, neuroplasticity and cognitive improvement, *International Journal of Recent Contributions from Engineering, Science & IT (iJES)*, *6(3)*, pp. 4–18, November 2018. https://doi.org/10.3991/ijes.v6i3.9034

[86] M. Karyotaki, & A. Drigas, "Latest trends in problem solving assessment," *International Journal of Recent Contributions from Engineering, Science & IT (iJES), 4(2)*, 2016. https://doi.org/10.3991/ijes.v4i2.5800

[87] E. Mitsea, A. Drigas, & P. Mantas, "Soft skills & metacognition as inclusion amplifiers in the 21st century," *Int. J. Online Biomed. Eng. IJOE*, *17(04)*, Art. no. 04, Apr. 2021. https://doi.org/10.3991/ijoe.v17i04.20567

[88] E. Angelopoulou, & A. Drigas, Working memory, attention and their relationship: A theoretical overview, *Research, Society and Development*, pp. 1–8, May 2021. https://doi.org/10.33448/rsd-v10i5.15288

[89] A. Tourimpampa, A. Drigas, A. Economou, & P. Roussos, Perception and text comprehension. It's a matter of perception, *International Journal of Emerging Technologies in Learning (iJET)*, pp. 228–242, June 2018. https://doi.org/10.3991/ijet.v13i07.7909

[90] A. Drigas, & E. Mitsea, A metacognition based 8 pillars mindfulness model and training strategies. *International Journal of Recent Contributions from Engineering, Science & IT,* 2020. https://doi.org/10.3991/ijes.v8i4.17419

[91] C. Papoutsi, A. Drigas, & C. Skianis, Virtual and augmented reality for developing emotional intelligence skills, *Int. J. Recent Contrib. Eng. Sci. IT (IJES), 9(3)*, pp. 35–53, 2021. https://doi.org/10.3991/ijes.v9i3.23939

[92] S. Kapsi, S. Katsantoni, & A. Drigas, The Role of Sleep and Impact on Brain and Learning, *Int. J. Recent Contributions Eng. Sci. IT 8(3)*, pp. 59–68, 2020. https://doi.org/10.3991/ijes.v8i3.17099

[93] A. Drigas, E. Mitsea, & C. Skianis, The role of clinical hypnosis and VR in special education, *International Journal of Recent Contributions from Engineering Science & IT*, 2021. https://doi.org/10.3991/ijes.v9i4.26147

[94] V. Galitskaya, & A. Drigas, The importance of working memory in children with Dyscalculia and Ageometria*, Scientific Electronic Archives 14(10)*, 2021. https://doi.org/10.36560/141020211449
[95] I. Chaidi, & A. Drigas, 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)*, 2020. https://doi.org/10.3991/ijet.v15i14.12509
[96] A. Drigas, & E. Mitsea, Neuro-linguistic programming & VR via the 8 pillars of metacognition X 8 layers of consciousness X 8 intelligences, *Technium Soc. Sci. J. 26,* 159, 2021. https://doi.org/10.47577/tssj.v26i1.5273
[97] A. Drigas, & E. Mitsea, Conscious breathing: A powerful tool for physical & neuropsychological regulation. The role of mobile apps, *Technium Social Sciences Journal,* 2022. https://doi.org/10.47577/tssj.v28i1.5922
[98] E. Mitsea, N. Lytra, A. Akrivopoulou, & A. Drigas, Metacognition, mindfulness and robots for autism inclusion, *Int. J. Recent Contributions Eng. Sci. IT, 8 (2)*, 4–20, 2020. https://doi.org/10.3991/ijes.v8i2.14213
[99] A. Drigas, E. Mitsea, & C. Skianis, 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 18(1),* 2022. https://doi.org/10.3991/ijoe.v18i01.26859
[100] Th. Stavridou, A. M. Driga, & A. Drigas, Blood markers in detection of autism, *International Journal of Recent Contributions from Engineering Science & IT (iJES)*, pp. 79–86, 2021. https://doi.org/10.3991/ijes.v9i2.21283
[101] A. Zavitsanou, & A. Drigas, Nutrition in mental and physical health. *Technium Soc. Sci. J.*, p. 23, 67, 2021. https://doi.org/10.47577/tssj.v23i1.4126
[102] A. M. Driga, & A. Drigas, Climate change 101: how everyday activities contribute to the ever-growing issue, *International Journal of Recent Contributions from Engineering*, Science & IT, *7(1)*, pp. 22–31, 2019. https://doi.org/10.3991/ijes.v7i1.10031
[103] A. M. Driga, & A. Drigas, ADHD in the early years: Pre-natal and early causes and alternative ways of dealing, *International Journal of Online and Biomedical Engineering (IJOE)*, vol. 15, no. 13, p. 95, 2019. https://doi.org/10.3991/ijoe.v15i13.11203
[104] R. Howell, Technological aids for inclusive classrooms, *Theory into Practice, 35(1)*, 58–65, 1996. https://doi.org/10.1080/00405849609543702

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