Technium
Education and Humanities

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

The education of Gifted in Special Education domain and the role of ICTs

Athanasios Drigas [1], Maria-Theofania Kontopoulou [1], Athanasia Gougoudi [1], Krystallenia Kantzavelou [1], Louiza Mertzioti [1]

[1] Net Media Lab Mind - Brain R&D IIT - N.C.S.R. "Demokritos", Athens, Greece

Abstract
Gifted and talented students do not constitute one homogenious group. This fact evokes the need for the definition of their characteristics and identification of this population. Undoubtedly metacognitive skills can lead one to recognize his/her strengths and weaknesses and lead him/herself to the upper levels of the pyramid of knowledge. Moreover, identification of giftedness at school requires more than IQ tests, as it is multidimensional. Research argues that early identification and intervention are crucial due to fulfilling their needs for education. Furthermore, early detection of giftedness for students with special needs provides equal opportunities to dual strength students.
Keywords: Assessing, Recognizing Gifted Children

Introduction

Livingston cites that the term "meta-cognition" is most often associated with John Flavell, (1979). According to Flavell (1979, 1987), meta-cognition consists of both metacognitive knowledge and metacognitive experiences or regulation. Metacognitive knowledge refers to acquired knowledge about cognitive processes, knowledge that can be used to control cognitive processes. [1] According to Assouline et al the term gifted and talented, when used with respect to students, children, or youth, means students, children, or youth who give evidence of high achievement capability in areas such as intellectual, creative artistic, or leadership capacity, or in specific academic fields, and who need services or activities not ordinarily provided by the school in order to fully develop those capabilities.[2] Kaufmann et al, based in Joseph Renzulli's (1978, 2005) Three-Ring Definition, views giftedness as the interaction of three characteristics: well-above-average ability, creativity, and task commitment. Renzulli also has made a major impact on the field of giftedness by proposing that there are two types of giftedness: "schoolhouse giftedness" and "creative-productive giftedness." Schoolhouse giftedness is test-taking or lesson-learning giftedness, and is the form of giftedness most often emphasized in school. Creative-productive giftedness differs from schoolhouse giftedness: Those who display creative-productive giftedness are excellent producers of knowledge, whereas those high in schoolhouse giftedness are superior consumers of knowledge.[3] Apart from gifted students a newly recognized group of learners, with both learning difficulties and academic strengths, known as twice-exceptional learners, has emerged. Sansom refers to children who are highly intelligent, but who also have learning disabilities and are different than both their gifted peers and their learning disabled peers. The asynchronous development typical of gifted students is often exaggerated in the presence of a learning disability, leading to frustration and stress. It is important for teachers and parents to be able to understand the unique characteristics and needs of these students.[4] The present study examines the characteristics of gifted children, with or without learning disabilities, ways of evaluating their giftedness as well as the intervention they receive.

Educating gifted students with special educational needs

Bianco et al. recommended suggestions and ways for developing strength based programming for gifted students with Asperger syndrome. Daniel (a pseudonym) is a very bright, 9-year-old, fourth-grade student and has higher-level intellectual abilities. Daniel has

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

social, emotional, behavioral, and learning problems. He has evaluations and diagnoses, for dyslexia, clinical depression, obsessive-compulsive disorder, and most recently, Asperger syndrome (AS). Daniel is a gifted student with disability. Daniel has many strengths. He is highly verbal, has an extensive vocabulary, and he is a visual learner. He has excellent knowledge of entomology, arachnology, and paleontology. He likes it a lot and spends a lot of time drawing insects, spiders, and dinosaurs, or watching documentaries for these subjects. Daniel is so excited with his favorite subject that despite his reading disability and difficulties with fine motor skills, acquired motivation and spend several weeks creating a 22-page illustrated book detailing what he observed in one of his videos on prehistoric arthropods. He has a great memory especially for what interests him and enjoys time with adults and ask them to test him on his knowledge about insects. He has a small range of interests and he doesn't want change in his routine. Daniel has difficulty to understand when and for how long it is appropriate to talk about his interests. When bored, frustrated, or overstimulated, there is a possibility scream throwing objects, or becoming physically aggressive with peers or adults. Daniel wants very much to have friends but he doesn't know how to have socially appropriate conversations or interactions with his peers and usually is alone. The Educational Planning for gifted students with AS should necessarily aim at attending to the range of the student's strengths and interests but also their deficits. Educational Planning should encourages students emphasizing high-level abstract thinking, creativity, and an authentic problem-solving approach. . When using a strength-based approach, lessons and units of instruction are motivating , promote active inquiry, provide many choices to students to use their strengths to demonstrate knowledge. Strength-based instruction is designed around the student's interests, strengths and includes interdisciplinary thematic instruction, use of mentors, authentic learning, authentic assessments, and strength based accommodations. Using the gifted students with AS passions teachers create interdisciplinary thematic units and with this way can teach academic and social skills while simultaneously increasing the range of interests for them. Therefore students improve significantly their social, communication and fine motor skills. A powerful tool for teacher who wants to develop interdisciplinary thematic units is the concept map. Teacher creates a concept map detailing expanded areas of study around the student's interest. In Daniel's case his passion for entomology can be used from teacher in order to develop interdisciplinary thematic unit that includes art, math, literature, history, and cultural studies by using of a concept map. Using the complete concept map, teachers can design lessons, create independent projects, and develop unit assessments based on their students' interests with AS like Daniel.. It should be noted that many of the suggested activities require teacher guidance, supervision, and instructional scaffolding. Building of interdisciplinary unit provides ideas for other resources, like how to use Expert Professionals in the field for mentoring which is a critical component of gifted education. Gifted students with disabilities with helping of Mentoring focus on areas of strength and interest and gain self-confidence. Telementoring, or mentoring via the Internet, provides to gifted students with AS limitless opportunities to contact with experts all over the world. By mentor's help gifted students with AS gain many educational, social, and emotional benefits. For this aim student can use nationally established mentor programs, such as the International Telementor Program, or a more informal arrangement such as e-mail contact with, for example, a local museum curator or a nationally recognized photojournalist. Authentic assessment evaluates students' abilities in authentic, real-world contexts. Students are asked to demonstrate their knowledge and skills that they have learned by engaging in any number of activities. For example, students with AS can demonstrate their knowledge and skills by conducting and interpreting research based on their interests and solving real-world problems. These methods offers to students the opportunity to demonstrate their learning with many ways and uses their strengths These methods are ideal alternative to traditional assessment for gifted students with AS. Authentic learning allows students to investigate real-life problems and develop products and services. Authentic learning is successful for gifted students with AS. In Daniel's case, authentic learning could be created around his interest and knowledge in arachnology. Daniel knows that many young children fear spiders because they do not have the right information. Along with his mentor and teachers, Daniel could create a survey to learn what his peers know and do not know

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

about spiders, what they would like to know, and what specific fears they have. Using his survey data, Daniel could research and develop a presentation to give right information, allay fears, and then share this information with his peers via visual presentation. The result of this real-life project is research, learning, and authentic assessment. Strength-based accommodations are instructional strategies that enable students to have access to the curriculum based on students' interests and learning strengths. Strength –based accommodations place focus on students' learning profiles and take their readiness and interests into consideration. For example, in curriculum compacting, a method commonly used with gifted students, teachers evaluate pupils for their knowledge and skills in a content area prior to instruction to determine what the student already knows and can do .The teacher can then provide instruction and adapts the curriculum to the needs of each student. Another example of strength-based accommodations is the method by which the teacher assigns works to the students in order to use their strengths without interference of their disability, to access learning and demonstrate knowledge. For example students can demonstrate their learning using their visual strengths. Rather than taking a test or orally presenting a book response, gifted students with AS should be offered a choice of visually based assignments to demonstrate their knowledge (e.g., create a photo essay, design a multimedia presentation, develop illustrations, or construct a semantic map). There are many software programs and assistive technology devices that can help gifted students with AS use their visual strength for learning. Daniel's strength in visual memory could be used to create strength-based strategies in order to learn social skills. Daniel using a digital camera could photograph his peers working in cooperative learning groups, talking to each other, sharing materials, or playing on the playground. Daniel can use these photographs as a visual reference of appropriate interactions. With the help of his teacher, Daniel could organize his photos into categories and create a digital photostory with captions and text. Similarly, Daniel's teachers or classmates could photograph him behaving appropriately in those situations. The photographs could become part of Daniel's visual cue system to serve as a reminder of what socially appropriate interactions look like. As well by using of photographs could be created personalized social stories, comic strip conversations, and visual schedules. For example, Daniel must understand for cooperative learning .Also he must learn how to behave when interacting with others in a group. For this aim could be created a social story using the photographs of Daniel's peers working together in a group could be used, along with written words, For developing strength-based educational programs for gifted students with AS cooperation between teacher and students' parents is necessary because parents know very well their child's strengths, interests, and needs. Furthermore, collaboration between educators is important, because despite the fact that a student like Daniel may be educated exclusively in the general education classroom special education teachers can help both Daniel and his teacher regarding social skills and differentiating instruction. The gifted education specialist who identifies students' strengths and nurture their creativity and interests is needed. Finally, expert mentors who knows student's interests and how can be used for authentic learning experiences. Gifted students with AS need and deserve educational Programs that focus on their strengths and interests. Exclusive focus on students' deficits not only reduces motivation to learn but also puts students at risk of academic failure and depression. Strength-based educational planning prevents students' disabilities from becoming an obstacle to their learning. [20]

Buică-Belciu and Popovici reported long-standing issues concerning both the identification of gifted students with learning disabilities (known as GLD or GT/LD students) and effective intervention strategies appropriate for them. They reviewed some of the most competent points of view. Gifted students with learning disabilities are a heterogeneous group of children, often described as twice exceptional students.. Students whose special educational needs remained unrecognized are divided in three subcategories. These are: (a) gifted students who are labeled as underachievers. The causes of their learning disabilities are personality and character development problems, which are increasing by academic challenges and eventually, reaching the point where they are linked to a disability (b) gifted students with severe learning disabilities (LD) who are diagnosed as LD students. They are enrolled in special education programs designed for LD students. Therefore, their giftedness is usually ignored and (c) students whose giftedness and learning disability overshadows each other with the result that

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

these students have middling academic performance. Due to this "mutual compensation", these students are not identified as gifted and they are not selected to participate to gifted educational programs most of times. These are reasons why most of these GLD students "fall through the cracks" of the educational system. Many experts report that gifted students with learning disabilities exhibit higher-level intellectual abilities, advanced vocabulary, exceptional comprehension of abstract concepts and ideas, productive imagination, subtle sense of humor, multiple and sophisticated interests, a keen sense of observation, on one hand; on the other hand they have spelling difficulties, reading problems, poor phonemic awareness. There are three defining criteria that were relevant in identifying gifted students with learning disabilities: (a) evidence of an outstanding talent or ability, (b) evidence of a discrepancy between expected and actual achievement, and (c) evidence of a processing deficit. Conflicting approaches to dual exceptionality SEN were outlined by various authors, stretching from the lack of a comprehensive definition to the scarcity of appropriate intervention programs for GLD students. Both DSM-IV-TR and ICD-10 do not include diagnosis criteria for twice exceptional students. DSM-IV mentions that gifted children who exhibit attention problems in one school setting or in the presence of just one teacher have a problem of fit, not genuine ADD. Because of students with learning disabilities exhibit ADHD it could be considered that twice exceptional students exhibit ADHD. The fact that there is no specific point of view from experts on whether GLD students have ADHD these students are considered underachievers, not failing students and they do not attend special education service. For these students there is a discrepancy between higher level intellectual skills and actual school achievement in areas of math and reading, ,namely they have the ability to construct concepts and operate with abstractions but they cannot express them properly in a formal manner. Such GLD students show high-level intellectual or creative abilities, but due to specific cognitive processing problems they usually have average performance in school settings, in certain subjects. As well current psychometric instruments are not fine tuned for the purpose of testing GLD students so that depict a simple appreciation of their real abilities. WISC-IV has shown a wider gap between scores obtained at verbal tests and those obtained at performance tests has been noted comparing to regular LD peers. But this significant discrepancy between V (verbal) and P (performance) scores would not be the most valuable criterion, after all other criteria should be considered (e.g., curriculum-based assessments, portfolio reviews, nominalizations) . NAGC (The National Association for Gifted Children) argued against using WISC-IV Full Scale IQ for the selection of pupils who will participate to gifted programs and suggested that testers should be flexible whether a subtest choice is needed. The results of typical psychological tests for GLD children are not credible because their scores (1) are averaged due to the masking effect (mutual compensation of strengths and weaknesses) (2) are compared to those of regular peers (3) may be inflated or just below the norm due to their ability to compensate and (4) in their analysis no account is taken of the magnitude of deviations between high and low levels. Test results of GLD children are interpreted with greater reliability when are used intrapersonal view. By using of usual normative perspective test results are interpreted with less reliability. It ıs clear that the identification of GLD students remains ineffective because there is not a comprehensive definition of LD giftedness, clear diagnostic criteria have not been established , there are not adequate testing instruments and procedures. The identification of gifted students with learning disabilities should be an ongoing process throughout the school years because both their abilities and needs change over time as well as available services. Gifted students with learning disabilities are students of superior intellectual ability but they exhibit a significant discrepancy to reading, mathematics, spelling, or written expression. When creating intervention programs tailored to individual academic and non-academic needs should be taken into account factors like that almost always their academic outcomes are considerably below expectations, independently from their intellectual potential, all other environmental variables (e.g.,poor education). Lack of motivation learned inability, emotional and social difficulties should be taken into account when designing intervention programs for individual academic and non-academic needs. Response to Intervention (RTI), a three-tiered prevention of academic failure system, could be used to identify and support gifted students with learning disabilities. But this method is not very effective because twice-exceptional students use their

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

superior abilities very well to compensate their learning difficulties. So these students can an overall acceptable school performance, both their gifts and disabilities may go unnoticed and unaddressed Mentorship is also a powerful method to prevent underachievement. A prerequisite for the success of the method is a caring, open-minded and nonjudgmental person to establish a personalized one-on-one relationship with the GLD student, using a very well designed individualized education plan, that will focus on strengths and interests to put in motion. Counseling services should be set up for gifted children with learning disabilities in order to help them fight against depression, low self-esteem and lack of self-efficacy, lack of motivation, emotional difficulties. Educational and related services should be planned and provided by a team including the homeroom teacher, a learning disabilities specialized teacher, a school psychologist, a social worker (if necessary), a speech-language pathologist (if necessary). Parents and student (aged 14 and older) involvement is a must. In conclusion, identification and intervention is not a simple matter when speaking of GLD students. Identification and subsequent interventions are still controversial proving the fact that this highly specialized area of special education is under substantial transformation. Major breakthroughs in the field are yet to come. [21]

Bisland gives an overview for students who are both gifted and disabled and suggests learning strategies that will help them achieve academically. Gifted and learning disabled students can be divided into three categories. The first category contains students who are identified as gifted, but have subtle learning disabilities. Students of this category exhibit high IQ or high achievement. They have exceptional verbal skills, but their spelling is poor and their handwriting is sloppy. Also, they are often disorganized. These students are usually never identified as learning disabled. The second category contains students whose gifts and disabilities mask one another, so they can't be unidentified into either category. These students are not easy to be identified because their high intelligence works to compensate for their disability, even as that disability prevents their high intelligence from shining. The third category of gifted and learningdisabled students are those who are identified as learning disabled but are also gifted. For these students is usually known what they are unable to do, rather than what they can do. Students who belongs to third category have more severe learning disabilities than those in the other two categories .For this reason teachers recognize their problems. Students of all categories share common features. These students all possess outstanding gifts or talents, but have a disability that makes academic achievement difficult. They are very capable at abstract thinking, problem solving, and mathematical reasoning. Also they are highly creative and enjoy a wide range of interests. Other positive characteristics may include curiosity, a sophisticated sense of humor, good visual memory, the ability to grasp metaphors and analogies, advanced vocabulary, exceptional ability in geometry, science, arts and music, good listening comprehension, and advanced analytic skills. Their negative characterics are that they have difficulty with activities that require rote memorization and sequencing, as well as problems with computation, phonics, and spelling. Many students have sloppy handwriting and poor organizational skills. The experts suggest providing specific strategies to gifted and learning disabled pupils in order to help them overcome their learning problems. This is best achieved through direct instruction of coping strategies, study skills, self-advocacy, and curricular modification techniques. Specific strategies compensate for their disability in order to become more independent learners. Learning strategies help students to take control of their own learning, allowing their performance to match their abilities. An eight-step procedure has been proposed for teaching learning strategies to gifted students with learning disabilities. First, teachers should pretest their students in order to find areas of weakness .Students be committed to master a learning strategy. Next, teacher describes verbally the new strategy to the student. Many times, a mnemonic device is used to assist students in remembering each step in the strategy. Pictures or icons may be used. The teacher informs about the ways with which the student may use the strategy within daily school tasks. The next step is modeling the learning strategy by narrating aloud while performing the strategy. So students understand the thought process they will be following each time they use the learning strategy. At next step following modeling, the teacher should guide the student through verbal rehearsal of the steps involved. The process must be repeated until the student has fully

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

memorized the steps in the correct sequence. At fifth step once the student has memorized the steps involved, the teacher should then allow the student time for controlled practice and feedback. This should be done using material that is above grade level or below. At next step following controlled practice and feedback, the student should have the chance for advanced practice and feedback. Feedback provided at this level should promote student selfevaluation. The educator should begin to reduce the instructional prompts and cues so that students begin taking responsibility for using and evaluating the strategy. Next, after advanced practice the teacher should evaluate if student understood the new learning strategy. The final step is generalization of new learning strategy. Student must know where, when, why, and how can use the strategy. Memorization strategies are suitable to compensate gifted and learning-disabled students' weakness of memory. Teachers may choose among many strategies available to help students develop their memory, including LINKS. Teachers, introduce students to the following steps: (1) list the parts, (2) imagine a picture, (3) note a reminding word, (4) construct a LINCing story, and (5) self-test .This strategy is useful for gifted and learning-disabled students because it helps them to utilize their strength areas of creativity and visual memory. Another learning strategy that used to aid memory is mnemonics. This learning strategy was created to enhance the ability of memorizing and enable students to develop their own meaningful mnemonics. Two methods which assists students to develop mnemonics are FIRST and LIST. FIRST utilizes the following steps:(1) form a word, (2) insert a letter(s), (3) rearrange the letters, (4) shape a sentence, and (5) try combinations. LIST is specialized to assist students identify listed information within text to memorize. It utilizes the following steps: (1) look for clues,(2) investigate the items, (3) select a mnemonic device using FIRST, (4) transfer the information to a card, and (5) self-test. This method is a helpful study aid because assists the students in identifying important information within textbooks on which to focus and commit to memory. Organization Strategies are appropriate for teaching gifted and learning disabled students to organize their notes because these students have poor organizational skills. One method of this group is the two-column strategy for content area subjects. Another strategy is LINKS and employs the following steps: (1)listen, (2) identify verbal clues, (3) note key words, and (4) stack information into outline form. This strategy assists students to identify and record only the important points in a lecture. Written Expression Strategies improve the gifted and learning-disabled students' written expression. One method in this category is DEFENDS. The steps of this method is: (1) decide on goals and theme, (2) estimate main ideas and details,
(3) figure best order of main ideas and details, (4) express the theme in the first sentence,(5) note each main idea and supporting points, (6) drive home the message in the last sentence, and (7) search for errors and correct. DEFENDS is particularly beneficial for students because it makes better the organizational flow of their writing. In conclusion, gifted and learning disabled students need adaptations, strategies, and accommodations. Giving to these students enrichment and tools to compensate for their disability, teachers are assisting them to reach their full academic potential.[22]

Lo and Yuen investigated the coping strategies which used three gifted students with a learning disability and they identified other factors that they perceive to be supportive. A narrative inquiry case study approach was used which lets informants to disclose their world from their own point of view and can lead to better awareness into each case. This method has been applied in a study of dyslexia because is believed that this approach encourages subjects to express their dyslexia and their experiences in a manner that is accurate and relevant. Because of twice-exceptional students have difficulty to comprehend printed material, using of interviews is a more valid procedure than using questionnaires. The participants were full-time students from Grade 7 to Grade 13, who were identified as gifted by a psychologist, and had a diagnosed learning disability (dyslexia).. Students were interviewed twice, to enable points from the first interview to be clarified or confirmed. An interview guide was prepared, with opening questions for use with each interviewee . As the interview progressed, researcher asked other questions in order to probe for deeper meaning or to follow the interviewee's particular line of thought. Researchers presented the results of this study as stories condensing the learning history and current situation of each of the three gifted students.. Susan (age 15; Grade
9) was labeled lazy from her teachers when she was very young because her academic work

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

was poor. She was often made to copy work, but could not read it and she could not write despite the fact that she made a hard effort. That caused her disappointment. In Grade 2 Susan was diagnosed as dyslexic, and she was allowed extended test time. Furthermore dictation exercises\ was less demanding for her. The learning environment throughout the primary years has always been discouraging and unrewarding for her. Susan was very disappointed during that period, and for a while she lowered her goals and lost her interest. Despite the fact that she improved her reading work in middle school was even more demanding. There were lots of concepts and facts that needed to be remembered. She had no help from anyone how to cope with her difficulties, so she had to think of some ways to solve her literacy problems herself. She liked to read stories about Chinese history, but her reading speed was very slow. A few times he was forgetting details during reading and for this reason he had problems of understanding. She discovered that it facilitated if she put herself into the story and imagine the book's characters as her friends .She could not memorize the important content in lessons. So she tried to organize content visually by drawing tree diagrams, or finding relations between facts to help link ideas in order to retrieve information more easily. She was creating stories in her mind in order to comprehend and remember what teachers taught in the lesson. During examinations, she used associated stories to retrieve a word or idea from memory. To overcome her frequent difficulty in retrieving a word from long-term memory when writing, she devised the strategy of substituting other words with similar meaning. No one taught Susan any of these. She thought of herself in order to cope with to her problems. Susan's middle school teachers were not very understanding of her difficulties with reading, perhaps because of she was using her coping strategies to the fullest extent and she was getting good grades .Her teachers suggested taking away extra time allowance during examinations ,because they felt that she did not need them. . Her classmates also didn't understand her problem and they thought that she was taking advantage. She was unhappy but his mother encouraged her at all times and she accepted her strengths and weaknesses positive. She knew that she had dyslexia but she was also gifted in some areas. Her high ability in these domains helped her to overcome the disability. Leo (age 15; Grade 9) in elementary school, was writing slow and being unable to hand assignments in on time. For this reason he was labeled as lazy, badly behaved, having a poor learning attitude and a naughty boy. He had big problems in spelling and dictation. He had short-term memory difficulties when reading and often he had needed to previous page in order to remember the story or details .Because of his disability he developed very poor relationships with his teachers. They didn't know his disability and they thought that he didn't want to learn. So they sometimes said discouraging words, and Leo began to hate the subject but the teachers too. This situation lasted even after he entered middle school. For this reason Leo stopped putting much effort into his work and he regretted it . Sometimes, he tried hard to pay more attention in class, but lack of success in subjects requiring good literacy skills, together with a curriculum that for him lacked intellectual challenge, led him to lose interest. He began to put his efforts only into things that he could handle easily. In Grade 8 Leo was diagnosed as dyslexic .Until this time he wasn't allowed extended test time despite the fact that he knew that lack of time was always his problem in examinations and tests. He began to find other areas of the curriculum that interested him and where he could get good results. When she was in Grade 10 he was top of the class in computer studies. He could handle this subject without difficulty and liked it, because as he said "computer language is correctable, not like our language. The computer will even help me to correct my mistakes automatically". Leo understood his own strengths and weaknesses, and still had a positive self-image. He believed that he was capable, and his learning disability could be overcome. Her friends copied down assignment instructions in his handbook, or taking notes for him during some lessons. In additional they supported him emotionally. Peer's support also helped to compensate for his learning disability. Peter (age 19; Grade 12) was not motivated to learn until Grade 5 in which he invented a study method which helped a lot in his schoolwork. . He knew that many times was skipping lines when he was reading text and that made him easily lose track of meaning and lead him to disappointment. He found a new strategy in order to overcome this difficulty. He said: "When I underline the words while I'm reading, I can read and see the words clearly and I can understand them". Following this strategy for the first time he was placed in an elite class. He set out to overcome

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

the best students of his class. He discovered the root of his problem and he was after trying various methods to tackle it. His underlining method helped him keep his place and focus on the words. In the case of written dictation, his teachers pushed him to copy the content for practice once before the exercise, and the result was even worse. This method could not solve his problem with writing Chinese words. In intervention class that was attending in the early grades was taught to use mnemonics (story links, slogans) to memorize words .But it was it equally difficult for him to memorize and recall the slogan or story.. Peter developed his own way of studying before examinations: "I can see the contents of the book inside my mind. After I read the book, using my underlining method, the image goes into my memory. In examinations I usually need to see and retrieve the content from my mind, speak it inwardly to myself, and then I can write it down" With this underlining method, it seemed that Peter could memorize the material more firmly and retrieve answers effectively .Peter thought that it would be a disgrace (loss of face) for a gifted student to have poor examination grades. He appreciated his creativeness and high achievement. He said "Dyslexia is nothing at all. I believed there is always some way to overcome it. What is most important is that you have to work hard!" None of three gifted students had been taught coping strategies by their teachers who perhaps thought that gifted students should be able to work out for themselves how to overcome difficulties. Twice exceptional students' teachers must devote much more time and attention to helping the students devise effective coping strategies. [23]

Mann conducted a study in order to investigate and find teaching strategies that were efficient for students with spatial strengths and verbal weaknesses. Students and teachers were observed in classrooms and teachers were asked to express their opinion about the strategies that are effective for these students. Participants were students who are labeled as having learning disabilities and teachers were from a private high school in the Northeast that specializes in educating students with learning differences. Students with spatial strengths and verbal deficiencies have difficulty with language acquisition in spelling, writing, and reading, as well as problems with organizational skills and rote memorization. The faculty and staff at the school are accustomed to adapting their teaching strategies on students' needs. In making these adaptations, they place emphasis on experiential learning in an academically challenging atmosphere that, according to research, leads in effective instruction for students with spatial strengths. Five of 57 teachers were chosen who were knew the characteristics of spatial learners and were aware of the strategies used by the individual instructors. One administrator, the Dean of Academic Affairs, was also interviewed. Even though the school didn't formally identify students as gifted or twice exceptional (gifted and learning disabled), the individual teachers realized their students' strengths and were quick to informally identify specific students who they were certain had superior spatial abilities, exceptional creativity, and advanced problem-solving abilities. In this study was used qualitative research method in order to investigate and interpret the teaching strategies that used from teachers at a school for students with learning differences. Researchers conducted semistructured interviews for teachers. They used reviewing documents to examine the teaching strategies and their effectiveness with students with spatial strengths. Teachers who were interviewed and observed were asked to review a summary of the final findings of research and all of them corroborated the credibility of the information. When students first enrolled in this high school for students with learning differences 80% were math phobic and they had a lot of English anxiety. The teachers used strategies with the aim to reduce this anxiety while giving the students the academic and advocacy skills they need for right choices in their career. At this school caring about the student was caring as an individual. Teachers and other staff members explored students' interests and emboldened them. Commenting on which teaching strategies were most efficient, a mathematics teacher said, "Don't get caught up in techniques, get caught up in the student." Teaching advocacy skills was very important achievement. Trust was developed by the faculty and staff by gaining a thorough understanding of each student's learning differences and interests. The faculty helped students to understand how their learning differences impact cognition and encouraged them to develop an awareness of his academic needs and make decisions based on their needs so in the future to be able to manage successfully their postsecondary educational experience. Teachers helped students develop study skills and

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

compensation strategies. Also they encouraged students to develop their own ideas for projects to give them ownership. A complete set of strategies-based methods was used and each strategy, whether it was test taking, memorization, self-advocacy, or decoding, had a mnemonic. The teachers assisted students with organizational skills through the vigilant use of planners and by helping students maintain some semblance of order intheir bindersand backpacks. The goal of the Learning Center as the teachers work directly with students was to make learning stimulant, fun, and practicable. Reasonable accommodations were applied in order to lead students to minimize their weaknesses and provide them to invest on their strength areas. Every teacher said that a variety of instructional strategies were applied in their classrooms. All participants agreed that no one strategy was adequate because students have different learning styles and that it was essential to teach to each student's area of strength. The rain forest ecology project was an opportunity for students for involving in real-life investigations. Their research was using from scientists at major universities and research institutes a fact that caused their enthusiasm and they shared their research findings with an authentic audience. This authentic learning upgraded their performance in the classroom while minimizing the deficit areas often evident in gifted students with spatial strengths and verbal deficiencies. Because of their contact with professionals in the field they were taught tact and diplomatic skills as they were encouraged to speak their minds and were taught how to do it thoughtfully. All these strategies applied to these students are challenged to become self-advocates, learn academic skills necessary to provide them with a successful college experience, and to become productive members of society. Using these strategies is evidenced that 94% of the students pursue postsecondary educational opportunities. For these reason teachers should be ready to meet the academic needs and interests those have their students . This study suggest to be applied four specific strategies for all students and especially for learners with spatial strengths and verbal weaknesses. 1. Students should be offered choices. Learners should choose the means that they will use to access the information, and the methods by which they will share their findings. Students in this study gained the information by many methods and they could choose those methods that worked best for them. Students' products were assessed based on the content they contained rather then the venue in which they were developed. 2. Students' interests should be explored. Teachers should identify every student's interests, strengths, and weaknesses to be able to offer substantial choices to his students and to lead them to success. Teachers should focus on student strengths rather than inhabit on weaknesses. 3. Opportunities for authentic and experiential learning are necessary for students to find value in the tasks in which they are asked to perform. Students because of their preparation for their trip to Costa Rica for project acquired a variety of skills and information that they needed to success. Their efforts were much more successful and targeted than those that would be expected from students who only a few years before were labeled at risk. 4. Instruction should emphasize conceptual understandings with a whole-to-part approach. Students with spatial strengths process information holistically and profit from instruction that are provided them with the big picture. , they have the ability to evaluate how the individual concepts fit into that picture. A focus on conceptual understandings rather than recall of specific facts help these students interconnect ideas and to make connections to concepts in a wide variety of disciplines. [24]

Crepeau-Hobson et al (2011) cites that increasing attention has been given to identifying characteristics of gifted students with learning disabilities. According to the author of this article twice-exceptional children are those who are both gifted and have an LD—children of superior intellectual ability who exhibit a significant discrepancy in their level of academic performance based on their general intellectual ability. These children tend to demonstrate higher academic potential than their average-ability peers, so they are less likely to be referred for special education testing. At the same time the disability masks the giftedness and they appear to have average achievement. Because of these issues, gifted students with LDs are less likely to be identified for either exceptionality. The use of a discrepancy between a child's IQ and achievement scores has been the predominant method for identifying a learning disability. However the method has raised issues of equity, accuracy, timeliness, outcomes, feasibility, and consistency. One of the most frequently suggested alternatives to the use of an IQ–achievement discrepancy paradigm is the implementation of a Response-to-Intervention (RtI)

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

model. The term "Response to Intervention" is used to describe a systematic problem-solving process within a coordinated system. RtI models in combination with other Individuals with Disabilities Education Improvement Act (IDEIA) criteria and safeguards can provide more immediate help to struggling students and reduce inappropriate identification of disabilities. The recognition that the educational needs of gifted learners with disabilities must be addressed by "access to a challenging and accelerated curriculum, while also addressing the unique of their disability" encourages researchers and advocates to explore how RtI can be conceptualized not only to meet the needs of gifted students with disabilities, but to meet those of all potentially gifted learners. The proposed RtI of this article is a three tier model. The first tier should provide students with multiple opportunities to explore, develop, and demonstrate all interests, strengths, and talents so that their potential can emerge. At Tier 2, in addition to CBM, targeted assessment that helps to elucidate the child's processing difficulties as well as strengths should be conducted. The third and final RtI tier is reserved for those students whose needs are not met at Tier 2: those who do not adequately respond to the interventions provided. It is at Tier 3 that students who have LDs, including those who are twice exceptional, should receive a comprehensive, multidisciplinary, psychoeducational evaluation. In addition to providing the twice-exceptional learner with special education and/or intensive, individualized services designed to address deficits Tier 3 interventions designed for the advanced learner should also be planned and implemented. These interventions might include such things as intensive acceleration such as grade skipping, early Advanced Placement (AP) classes, or early college entrance. Of course, ongoing progress monitoring would be required to determine if the child is responding to all of the interventions provided. The integration of targeted assessment and a comprehensive evaluation into a three-tiered model of RtI is the best way to identify the diverse, contradictory learning needs of the twice-exceptional learner. [25]

Assouline et al (2006) examine three components of twice exceptional students' education. Twice exceptional are the gifted students with a learning disability.

The first component is the federal legislation that has shaped the current educational environment as well as the delivery systems for specialized programming. Then-as second component- come certain myths about gifted students, which have perpetuated the lack of attention by the general educational community to twice-exceptional students. The third and final component is a list of recommendations designed to empower school counselors who encourage the maximum development of every student. Learning difficulties and learning strengths are represented by two separate fields: special education and gifted education. In 1972 U.S. Commissioner of Education S.P.Marland led the efforts that resulted in the first national report on gifted education, Education of the Gifted and Talented, also known as the Marland Report. This national report elevated the status of gifted education by providing a federal definition of giftedness and proposing that the gifted make up 3–5% of the student population. The report gave gifted education national stature by emphasizing the need for programming as well as by suggesting that a failure to meet the academic needs of gifted students would place them at risk for psychological damage. Shortly after the release of the Marland Report, gifted education programs appeared throughout the nation's schools. Many of the programs were developed according to the Enrichment Triad Model (Renzulli, 1976). The second component is about some myths. The rights of students with disabilities were recognized in the last quarter of the 20th century. Educators often assume that gifted students do not require any special intervention—they will make it on their own. Even though scholars have demonstrated that most individuals are not equally talented in the variety of talent areas schools continue to base entry into gifted education programs on global or composite standardized test scores. These practices continue to deny the enormous diversity that exists among gifted students. For example, educators may assume that all gifted students love school, read well, process information quickly, or are able to complete work or learn new material independently. A final, confounding myth that is central to the twice-exceptional student is the idea that a gifted student cannot have a coexisting learning disability. Therefore educators look for exceptional strengths or deficits, but not both. There is one group of adults, however, who have ignored the myths and forged ahead in the area of twice-exceptionality: parents. For decades, many parents of

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

gifted children have known that their children have been overlooked for enrichment classes or have been accused of being lazy when they were actually working very hard, struggling to learn because of an undiagnosed disability. As third component come 10 suggestions for school counselors. 1) Review students' school records. For example, when scores from a group-administered ability test (e.g., Cognitive Abilities Test) present a unique pattern of strengths and relative weaknesses, it is helpful to obtain individualized testing to rule out the presence of a learning disability. 2) Provide support for the child, parents, and teachers in navigating the legal protections for special education and clarify how, depending on the exceptionality, either could help meet the child's educational, behavioral, emotional, and social needs. 3) Work to integrate programming for talents and difficulties (e.g., a gifted student with a written language learning disability writes a paper for History Day on a favorite topic with support from special-education and gifted-education teachers). 4) Encourage students to participate in university-based talent searches. This is the most effective way to be involved in identifying high aptitudes in specific content areas. 5) Help students to develop a self-awareness of their unique set of strengths and difficulties, as well as self-advocacy and problem-solving skills. 6) Address social and emotional concerns that have an impact on academic and/or home environments (e.g., social and/or test anxiety, depression, social difficulties). 7) Develop support groups for twice-exceptional students. 8) School counselors can engage students in a dialogue about choice of college while problem-solving ways to accommodate for their disabilities within a college setting). 9) Initiate collaboration among teachers in special, gifted, and regular education, as well as with school personnel such as school psychologists. 10) Act as agents of change. For example, integrate twice-exceptionality into professional development goals and collaborate with other support staff to provide pertinent in-service for school personnel. [26]

Does (2013), in her literature review article, also refers to the difficulty in meeting the educational needs of students with dual exceptionalities as they have a broad range of academic talents and also a broad range of disabilities, and severity of disabilities. According to the article students with dual exceptionalities are usually put into one of three categories. First, students whose gifts and talents are first recognized; but, as time passes, the divide between their achievement and their potential widens, possibly leading to a diagnosis of a disability. Second, there are students whose disability is first identified and either during or after intervention their abilities become more apparent. And third, referred to as masking and more complicated in terms of identification, the student's abilities and disabilities mask each other, resulting in average, grade level performance and they are neither referred enrichment or intervention. The third masking category noted above is one of the most problematic ones for identification and subsequent intervention and enrichment. Both the National Education Association and the National Association for Gifted Children endorse this hypothesis and it is found throughout in the literature on students with dual exceptionalities. There are some general characteristics that many students with dual exceptionalities share. Their strengths are advanced vocabulary, exceptional analytical ability, high productive in areas of interest, highly creative, good memory, wide variety of interests, advanced problem solving skills, desire for knowledge, strong reasoning skills ability to see interrelationships between ideas, desire to explore and discover. Their weaknesses include lack of social skills, perfectionism, low self-esteem, frustration with inability to master skills, inattention, lack of organization, unrealistic self-expectations, failure to complete assignments, dominance in classroom discussions, carelessness about work, hypersensitivity. The weaknesses put them at risk for developing intense frustration and learned helplessness. Another characteristic commented in the article is relationship with parents. The one area the students with dual-exceptionalities differed greatly from either the gifted students or the students with learning disabilities was in their relationships with their parents, primarily with their mothers. Research indicates that whereas the majority of gifted students or students with learning disabilities report positive relationships with their mothers, the students with dual exceptionalities do not believe that they have a strong maternal relationship, which causes them a negative self perception. This perception is based on the feeling that students with dual exceptionalities have that they are failing to live up to their potential therefore they disappoint their parents. The article also points out the importance of

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

teachers' ability to identify students with dual-exceptionalities. If teachers do not know the signs of dual exceptionality, or if they do not even know of or believe in the possibility that a student can be dual exceptional, the risk is that they will miss students who qualify for both remediation and enrichment or that the dual exceptional student will be referred for only one of his or her exceptionalities. There are a few teaching strategies recommended in this paper, particularly for those who are mathematically gifted and have learning disabilities: first, teachers need to accommodate the students' strengths and their weaknesses by using alternative strategies and techniques; second, multisensory approaches will help students who learn complex tasks easily but struggle with simple materials; third, instead of thinking in words, students might think in pictures, shapes, or visual aids and instruction should be designed with that in mind; fourth, a students' mechanical difficulties should not cause a student's grade to be lowered, the grades should be based on concept and procedural knowledge; fifth, timed testing should be avoided; and sixth, students with dual exceptionalities will benefit from having a big picture vision in mind. Many also focused on the need for designing lessons that would be interesting to students and would engage them in the subjects and ideas that already appealed to them. Having students with dual exceptionalities read books about children with their same learning disability in order to help them think more positively about themselves is another idea. Students with dual exceptionalities should be taught to use early on how to use technology in ways that will help them work at a higher level. Teachers should not view assistive technology as "cheating," rather as a way for students to focus on the concepts and content instead of details like spelling or basic math functions. Reaching out to students with dual exceptionalities and offering alternative ways to demonstrate their learning can lead to remarkable outcomes. [27]

Conclusion

Gifted students must be taken under serious consideration. Educators who wish to implement research-based "best practices" must reconsider many of their previously held perspectives and must commit in more than words to developing the "full potential" of all learners, including the gifted and talented. Twice-exceptional students confuse their parents and teachers by simultaneously displaying academic strengths and learning difficulties. They often are accused of being lazy and/or underachievers. Their strengths and limitations—either uniquely or in combination—are typically misunderstood. In addition, the unpredictability of their performance makes it difficult for educational professionals and others to understand that twice-exceptional students present distinctive attributes requiring similarly unique educational interventions. Each school or district must identify the grouping options that best match (a) the learners they have, (b) the attitudes of teachers about gifted learners, and (c) the attitudes of administration and the community to the possible options. The most efficient way of identification of the gifted population is to hold valid, scrutinizing, multi-variable tests in the whole school population, so that even masked giftedness is revealed. These students must be correctly identified as being gifted and having a learning disability in order for their needs to be adequately met. Effective programming for gifted and learning disabled students also includes social and emotional support, as well as interventions which focus on strengths, rather than weaknesses. These students will meet their potential only when their needs are appropriately met.

More research needs to be done and, particularly, more empirical studies need to be completed to take the ideas and theories on best practices for identification and education of students with dual exceptionalities and ground them in research so that educators can help these students meet their full academic potential.

Finally we have to underline the role of digital technologies in education domain that is very productive and successful, facilitates and improves the assessment, the intervention and the educational procedures via Mobiles [32-41], various ICTs applications [42-75], AI & STEM [76-86], and games [87-93]. Additionally the combination of ICTs with theories and models of metacognition, mindfulness, meditation and emotional intelligence cultivation [94-121] as well as with environmental factors and nutrition [28-31], accelerates and improves more over the educational practices and results, especially for the gifted students in special education domain.

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

REFERENCES

[1] Livingston, J. A. (2003). Metacognition: An Overview.
[2] Assouline & Whiteman, (2011). Title IX, Part A, Section 910[22]; para. 8, p. 400)
[3] Kaufman, S. B., & Sternberg, R. J. (2008). Conceptions of giftedness. In Handbook of giftedness in children (pp. 71-91). Springer, Boston, MA.
[4] Sansom, S. (2015). Gifted students with learning disabilities: A current review of the literature. Acta Scientiae et Intellectus, 1(1), 5-17.
[5] Reis, S. M., & Renzulli, J. S. (2009). Myth 1: The gifted and talented constitute one single homogeneous group and giftedness is a way of being that stays in the person over time and experiences. Gifted Child Quarterly, 53(4), 233-235.
[6] Zenasni, F., Mourgues, C., Nelson, J., Muter, C., & Myszkowski, N. (2016). How does creative giftedness differ from academic giftedness? A multidimensional conception. Learning and Individual Differences, 52, 216-223
[7] Sayler, M. F., & Brookshire, W. K. (1993).Social, emotional, and behavioral adjustment of accelerated students, students in gifted classes, and regular students in eighth grade. Gifted Child Quarterly, 37(4), 150-154.
[8] Drigas, A. S., & Pappas, M. A. (2017). The Consciousness-Intelligence-Knowledge Pyramid: An 8x8 Layer Model. International Journal of Recent Contributions from Engineering, Science & IT (iJES), 5(3), 14-25.
[9] Snyder, K. E., Nietfeld, J. L., & Linnenbrink-Garcia, L. (2011). Giftedness and metacognition: A short-term longitudinal investigation of metacognitive monitoring in the classroom. Gifted Child Quarterly, 55(3), 181-193.
[10] Sternberg, R. J. (2003). WICS as a model of giftedness. High ability studies, 14(2), 109-137.
[11] Okoye, M. D. B. (2013). Roles of Parents and Teachers in the Identification and Development of Gifted/Talented Students. Academic Journal of Interdisciplinary Studies, 2(10), 25.
[12] Root-Bernstein, R. (2015). Arts and crafts as adjuncts to STEM education to foster creativity in gifted and talented students. Asia Pacific Education Review, 16(2), 203-212.
[13] Kanli, E., & Özyaprak, M. (2016). Stem education for gifted and talented students in Turkey. Üstün Yetenekliler Eğitimi ve Araştırmaları Dergisi (UYAD), 3(2).
[14] Sternberg, R. J., & Grigorenko, E. L. (2002). The theory of successful intelligence as a basis for instruction and assessment in higher education. New directions for teaching and learning, 2002(89), 45-53.
[15] Rogers, K. B. (2007). Lessons learned about educating the gifted and talented: A synthesis of the research on educational practice. Gifted child quarterly, 51(4), 382-396.
[16] Brody, L. E., & Mills, C. J. (2005). Talent search research: What have we learned?. High Ability Studies, 16(1), 97-111.
[17] Altun, F., &Yazici, H. (2010).Learning styles of the gifted students in Turkey. Procedia-Social and Behavioral Sciences, 9, 198-202.
[18] Plunkett, M., &Kronborg, L. (2011).Learning to be a teacher of the gifted: The importance of examining opinions and challenging misconceptions. Gifted and Talented International, 26(1-2), 31-46.
[19] Maker, J., Zimmerman, R., Alhusaini, A., & Pease, R. (2015). Real Engagement in Active Problem Solving (REAPS): An evidence-based model that meets content, process, product, and learning environment principles recommended for gifted students. APEX: The New Zealand Journal of Gifted Education, 19(1).
[20] Bianco, M., Carothers, D. E., & Smiley, L. R. (2009). Gifted students with Asperger syndrome: Strategies for strength-based programming. Intervention in school and clinic, 44(4), pp.206-215.
[21] Buică-Belciu, C., & Popovici, D. V. (2014). Being twice exceptional: gifted students with learning disabilities. Procedia-Social and Behavioral Sciences, 127, pp.519-523.

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

[22] Bisland, A. (2004). Using learning-strategies instruction with students who are gifted and learning disabled. Gifted Child Today, 27(3), pp.52-58.
[23] Lo, C. C., & Yuen, M. (2014). Coping Strategies and Perceived Sources of Support among Gifted Students with Specific Learning Disabilities: Three Exploratory Case Studies in Hong Kong. Gifted and Talented International, 29(1-2), pp.125-136.
[24] Mann, R. L. (2006). Effective teaching strategies for gifted/learning-disabled students with spatial strengths. Journal of Secondary Gifted Education, 17(2), pp.112-121.
[25] Crepeau-Hobson, F., & Bianco, M. (2011). Identification of gifted students with learning disabilities in a response-to-intervention era. Psychology in the Schools, 48(2), 102-109.
[26] Assouline, S., Nicpon, M., & Huber, D. (2006). The impact of vulnerabilities and strengths on the academic experiences of twice-exceptional students: A message to school counselors. Professional School Counseling, 10(1), 14-24.
[27] Does, K. (2013). Students with Dual Exceptionalities: Does K-12 Public Education Meet Their Needs? Lillian Calendrillo Guzlowski Lynchburg College August 2013.
[28] Stavridou Th., Driga, A.M., Drigas, A.S., Blood Markers in Detection of Autism ,International Journal of Recent Contributions from Eng. Science & IT (iJES) 9(2):79-86. 2021.
[29] Zavitsanou, A., & Drigas, A. (2021). Nutrition in mental and physical health. Technium Soc. Sci. J., 23, 67.
[30] Driga, A.M., Drigas, A.S. "Climate Change 101: How Everyday Activities Contribute to the Ever-Growing Issue", International Journal of Recent Contributions from Engineering, Science & IT, vol. 7(1), pp. 22-31, 2019. https://doi.org/10.3991/ijes.v7i1.10031
[31] Driga, A.M., and Drigas, A.S. "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, 2019, p. 95., doi:10.3991/ijoe.v15i13.11203
[32] Vlachou J. and Drigas, A. S., "Mobile technology for students and adults with Autistic Spectrum Disorders (ASD)," International Journal of Interactive Mobile Technologies, vol. 11(1), pp. 4-17, 2017
[33] Papoutsi C., Drigas, A. S., and C. Skianis, "Mobile Applications to Improve Emotional Intelligence in Autism – A Review," Int. J. Interact. Mob. Technol. (iJIM); Vol 12, No 6, 2018
[34] Karabatzaki, Z., Stathopoulou, A., Kokkalia, G., Dimitriou, E., Loukeri, P., Economou A., & Drigas, A. (2018). Mobile Application Tools for Students in Secondary Education. An Evaluation Study. International Journal of Interactive Mobile Tech. (iJIM), 12(2), 142-161
[35] Drigas, A. S., Angelidakis P., 'Mobile Applications within Education: An Overview of Application Paradigms in Specific Categories', International Journal of Interactive Mobile Technologies (iJIM), vol. 11, no. 4, p. 17, May 2017. https://doi.org/10.3991/ijim.v11i4. 6589
[36] Stathopoulou A., Loukeris D., Karabatzaki Z., Politi E., Salapata Y., and Drigas, A. S., "Evaluation of Mobile Apps Effectiveness in Children with Autism Social Training via Digital Social Stories," Int. J. Interact. Mob. Technol. (iJIM); Vol 14, No 03, 2020
[37] Stathopoulou, et all Mobile assessment procedures for mental health and literacy skills in education. International Journal of Interactive Mobile Technologies, 12(3), 21-37, 2018,
[38] Drigas, A., Kokkalia, G. & Lytras, M. D. (2015). Mobile and Multimedia Learning in Preschool Education. J. Mobile Multimedia, 11(1/2), 119–133.
[39] Stathopoulou, A., Karabatzaki, Z., Kokkalia, G., Dimitriou, E., Loukeri, P.I., Economou, A., and Drigas, A. (2018). Mobile assessment procedures for mental health and literacy skills in education. International Journal of Interactive Mobile Technologies (iJIM), 12(3):21-37. https://doi.org/10.3991/ijim.v12i3.8038
[40] Drigas, A.S., Ioannidou, R.E., Kokkalia, G. and Lytras, M. (2014), "ICTs, mobile learning and social media to enhance learning for attention difficulties", Journal of Universal Computer Science, Vol. 20 No. 10, pp. 1499-1510.
[41] Kokkalia G. K. and Drigas, A. S., "Mobile learning for special preschool education," International Journal of Interactive Mobile Technologies, vol. 10 (1), pp. 60-67, 2016
[42] I Chaidi, A Drigas, C Karagiannidis 2021ICT in special education Technium Soc. Sci. J. 23, 187

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

[43] Pappas, M.A.; Papoutsi, C.; Drigas, A.S. Policies, Practices, and Attitudes toward Inclusive Education: The Case of Greece. Soc. Sci. 2018, 7, 90.
[44] Drigas, A. S., & Ioannidou, R. E. (2011, September). ICTs in special education: A review. In World Summit on Knowledge Society (pp. 357-364). Springer, Berlin, Heidelberg.
[45] Drigas, A. S., 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, Issue 5, Volume 1, November 2004.
[46] Drigas, A.S., Vrettaros, J. and Kouremenos, D. (2004a) 'Teleeducation and e-learning services for teaching English as a second language to deaf people, whose first language is the sign language', Transactions on Information Sci. and Applications, Vol. 1, No. 3, pp.834–842.
[47] Drigas, A., Koukianakis, L., Papagerasimou, Y., Towards an ICT-based psychology: Epsychology, Computers in Human Behavior, 2011, 27:1416–1423. https://doi.org/10.1016/j.chb.2010.07.045
[48] Charami, F., & Drigas, A. (2014). ICTs in English Learning and Teaching. International Journal of Engineering and Science. Vol. 2(4):4-10. DOI: 10.3991/ijes.v2i4.4016
[49] Drigas A.S., Kouremenos D (2005) An e-learning system for the deaf people. In: WSEAS transaction on advances in engineering education, vol 2, issue 1, pp 20–24
[50] Drigas A., Pappas M, and Lytras M., "Emerging technologies for ict based education for dyscalculia: Implications for computer engineering education," International Journal of Engineering Education, vol. 32, no. 4, pp. 1604–1610, 2016.
[51] Drigas, A. & Kokkalia, G. 2017. ICTs and Special Education in Kindergarten. International Journal of Emerging Technologies in Learning 9 (4), 35–42.
[52] Drigas A., and Koukianakis L., A Modular Environment for E-learning and E-psychology Applications, WSEAS Transactions on Information Science and Application, Vol. 3, 2004, pp. 2062-2067.
[53] Drigas, A., Leliopoulos, P.: Business to consumer (B2C) e-commerce decade evolution. Int. J. Knowl. Soc. Res. (IJKSR) 4(4), 1–10 (2013)
[54] Pappas M, Drigas A, Papagerasimou Y, Dimitriou H, Katsanou N, Papakonstantinou S, et al. Female Entrepreneurship and Employability in the Digital Era: The Case of Greece. Journal of Open Innovation: Technology, Market, and Complexity. 2018; 4(2): 1.
[55] Papanastasiou G., Drigas, A. S., Skianis Ch., M. Lytras & E. Papanastasiou, "Patient-Centric ICTs based Healthcare for students with learning, physical and/or sensory disabilities," Telemat Inform, vol. 35, no. 4, pp. 654–664, 2018. https://doi. org/10.1016/j.tele.2017.09.002
[56] Drigas, A., & Kontopoulou, M. T. L. (2016). ICTs based Physics Learning. International Journal of Engineering Pedagogy (iJEP), 6(3), 53-59. https://doi.org/10.3991/ijep.v6i3. 5899
[57] Papanastasiou, G., Drigas, A., Skianis, C., and Lytras, M. (2020). Brain computer interface based applications for training and rehabilitation of students with neurodevelopmental disorders. A literature review. Heliyon 6:e04250. doi: 10.1016/j.heliyon.2020.e04250
[58] Drigas, A. S., John Vrettaros, and Dimitris Kouremenos, 2005. "An e-learning management system for the deaf people," AIKED '05: Proceedings of the Fourth WSEAS Inter. Conf. on Artificial Intelligence, Knowledge Engineering Data Bases, article number 28.
[59] Pappas, M., Demertzi, E., Papagerasimou, Y., Koukianakis, L., Kouremenos, D., Loukidis, I. and Drigas, A. 2018. E-Learning for deaf adults from a user-centered perspective. Education Sciences 8(206): 3-15.
[60] Marios A. Pappas, Eleftheria Demertzi, Yannis Papagerasimou, Lefteris Koukianakis, Nikitas Voukelatos, and Drigas, A. S., 2019. Cognitive Based E-Learning Design for Older Adults. Social Sciences 8, 1 (Jan. 2019), 6. https://doi.org/10.3390/socsci801000
[61] Drigas, A. S., Leyteris Koukianakis: Government online: An e-government platform to improve public administration operations and services delivery to the citizen. WSKS (1), volume 5736 de Lecture Notes in Computer Science, 523–532. Springer, 2009.
[62] Theodorou, P.; Drigas, A. ICTs and Music in Generic Learning Disabilities. Int. J. Emerg. Technol. Learn. 2017, 12, 101–110

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

[63] Drigas, A., Kokkalia, G., & Lytras, M. D. (2015). ICT and collaborative co-learning in preschool children who face memory difficulties. Computers in Human Behavior, 51, 645–651. https://doi.org/10.1016/j.chb.2015.01.019
[64] Pappas, M.A., & Drigas, A.S. (2015). ICT based screening tools and etiology of dyscalculia. International Journal of Engineering Pedagogy, 3, 61-66.
[65] Drigas, A., & Kostas, I. (2014). On Line and other ICTs Applications for teaching math in Special Education. International Journal of Recent Contributions from Engineering, Science & IT (iJES), 2(4), pp-46. http://dx.doi.org/10.3991/ijes.v2i4.4204
[66] Alexopoulou, A, Batsou, A, Drigas, A. (2019). Resilience and academic underachievement in gifted students: causes, consequences and strategic methods of prevention and intervention. Inter. J.of Online and Biomedical Engineering (iJOE), vol. 15, no. 14, pp. 78.
[67] Pappas, M. A., & Drigas, A. S. (2015). ICT Based Screening Tools and Etiology of Dyscalculia. International Journal of Engineering Pedagogy, 5(3)
[68] Drigas, A. & Ioannidou, R. E. (2013). Special education and ICT's. International Journal of Emerging Technologies in Learning 8(2), 41– 47.
[69] Drigas, A., & Papanastasiou, G. (2014). Interactive White Boards in Preschool and Primary Education. International Journal of Online and Biomedical Engineering (iJOE), 10(4), 46–51. https://doi.org/10.3991/ijoe.v10i4.3754
[70] Drigas, A. S. and Politi-Georgousi, S. (2019). Icts as a distinct detection approach for dyslexia screening: A contemporary view. International Journal of Online and Biomedical Engineering (iJOE), 15(13):46–60.
[71] Lizeta N. Bakola, Nikolaos D. Rizos, Drigas, A. S., "ICTs for Emotional and Social Skills Development for Children with ADHD and ASD Co-existence"International Journal of Emerging Technologies in Learning (iJET), https://doi.org/10.3991/ijet.v14i05.9430
[72] Kontostavlou, E.Z., & Drigas, A.S. (2019). The Use of Information and Communications Technology (ICT) in Gifted Students. International Journal of Recent Contributions from Engineering, Science and IT, 7(2), 60-67. doi:10.3991/ijes.v7i2.10815
[73] Drigas, A. S., and Vlachou J. A., "Information and communication technologies (ICTs) and autistic spectrum disorders (ASD)," Int. J. Recent Contrib. Eng. Sci. IT (iJES), vol. 4, no. 1, p. 4, 2016. https://doi.org/10.3991/ijes.v4i1.5352
[74] Drigas, A. S., Koukianakis, L, Papagerasimou, Y. (2006) "An elearning environment for nontraditional students with sight disabilities.", Frontiers in Education Conference, 36th Annual. IEEE, p. 23-27.
[75] Drigas A., and Koukianakis L. An open distance learning e-system to support SMEs e-enterprising. In proceeding of 5th WSEAS Internationalconference on Artificial intelligence, knowledge engineering, data bases (AIKED 2006). Spain
[76] Kefalis C and Drigas A. (2019) Web Based and Online Applications in STEM Education. International Journal of Engineering Pedagogy (iJEP) 9, 4 (2019), 76–85.https://doi.org/10.3991/ijep.v9i4.10691
[77] Drigas, A. S., Rodi-Eleni Ioannidou, A Review on Artificial Intelligence in Special Education, Information Systems, Elearning, and Knowledge Management Research Communications in Computer and Information Science Volume 278, pp 385-391, 2013 http://dx.doi.org/10.1007/978-3-642-35879-1_46
[78] Drigas, A., Vrettaros, J.: An Intelligent Tool for Building e-Learning Contend-Material Using Natural Language in Digital Libraries. WSEAS Transactions on Information Science and Applications 5(1) (2004) 1197–1205
[79] Drigas, A.S., Vrettaros, J., Koukianakis, L.G. and Glentzes, J.G. (2005). A Virtual Lab and e-learning system for renewable energy sources. Int. Conf. on Educational Tech.
[80] Drigas AS, Argyri K, Vrettaros J (2009) Decade review (1999-2009): artificial intelligence techniques in student modeling. In: World Summit on Knowledge Society. Springer, pp 552–564
[81] Vrettaros, J., Tagoulis, A., Giannopoulou, N., & Drigas, A. (2009). An empirical study on the use of Web 2.0 by Greek adult instructors in educational procedures. World Summit on Knowledge System (WSKS), 49, 164-170. http://dx.doi.org/10.1007/978-3-642-04757-2_18

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

[82] Drigas, A., Dourou, A. (2013). A Review on ICTs, E-Learning and Artificial Intelligence for Dyslexic's Assistance. iJet, 8(4), 63-67.
[83] Drigas, A. S., Ioannidou,E.R., (2012), Artificial intelligence in special education: A decade review, International Journal of Engineering Education, vol. 28, no. 6.
[84] Drigas, A. S., and Leliopoulos, Panagiotis, The Use of Big Data in Education, International Journal of Computer Science Issues, Vol. 11, Issue 5, 2014, 58-63
[85] Anagnostopoulou, P., Alexandropoulou, V., Lorentzou, G., Lykothanasi, A., Ntaountaki, P., & Drigas, A. (2020). Artificial intelligence in autism assessment. International Journal of Emerging Technologies in Learning, 15(6), 95-107. https://doi.org/10.3991/ijet.v15i06.11231
[86] Pappas, M., & Drigas, A. (2016). Incorporation of artificial intelligence tutoring techniques in mathematics. International Journal of Engineering Pedagogy, 6(4), 12–16. https://doi.org/10.3991/ijep.v6i4.6063
[87] I Chaidi, A Drigas 2022 Digital games & special education Technium Social Sciences 34, 214-236
[88] Papanastasiou, G. P., Drigas, A. S., & Skianis, C. (2017). Serious games in preschool and primary education: Benefits and impacts on curriculum course syllabus. International Journal of Emerging Technologies in Learning, 12(1), 44–56. https://doi.org/10.3991/ijet.v12i01.6065
[89] Kokkalia, G., Drigas, A., Economou, A., Roussos, P., & Choli, S. (2017). The use of serious games in preschool education. International Journal of Emerging Technologies in Learning, 12(11), 15-27. https://doi.org/10.3991/ijet.v12i11.6991
[90] Drigas, A. S., and Pappas M.A. "On line and other Game-Based Learning for Mathematics." International Journal of Online Engineering (iJOE) 11.4, 62-67, 2015 https://doi.org/10.3991/ijoe.v11i4.4742
[91] Papanastasiou, G., Drigas, A., Skianis, C., & Lytras, M. D. (2017). Serious games in K-12 education: Benefits and impacts on students with attention, memory and developmental disabilities. Program, 51(4), 424-440. https://doi.org/10.1108/prog-02-2016-0020
[92] Drigas, A. S., & Kokkalia, G. K. (2014). ICTs in Kindergarten. International Journal of Emerging Technologies in Learning, 9(2). https://doi.org/10.3991/ijet.v9i2.3278
[93] Kokkalia, G., Drigas, A., & Economou, A. (2016). The role of games in special preschool education. Inter. J.of Emerging Technologies in Learning (iJET), 11(12), 30-35.
[94] Drigas, A., & Mitsea, E. (2020). The 8 Pillars of Metacognition. International Journal of Emerging Technologies in Learning (iJET), 15(21), 162-178. https://doi.org/10.3991/ijet.v15i21.14907
[95] Drigas, A., & Papoutsi, C. (2019). Emotional intelligence as an important asset for HR in organizations: Leaders and employees. International Journal of Advanced Corporate Learning, 12(1). https://doi.org/10.3991/ijac.v12i1.9637
[96] Drigas, A. S., and M. Pappas, "The Consciousness-Intelligence-Knowledge Pyramid: An 8x8 Layer Model," International Journal of Recent Contributions from Engineering, Science & IT (iJES), vol. 5, no.3, pp 14-25, 2017. https://doi.org/10.3991/ijes.v5i3.7680
[97] Mitsea, E., & Drigas, A. (2019). A journey into the metacognitive learning strategies. International Journal of Online & Biomedical Engineering, 15(14). https://doi.org/10.3991/ijoe.v15i14.11379
[98] Drigas A, Karyotaki M (2017) Attentional control and other executive functions. Int J Emerg Technol Learn iJET 12(03):219–233
[99] Drigas A, Karyotaki M 2014. Learning Tools and Application for Cognitive Improvement. International Journal of Engineering Pedagogy, 4(3): 71-77.
[100] Drigas, A., & Mitsea, E. (2021). 8 Pillars X 8 Layers Model of Metacognition: Educational Strategies, Exercises &Trainings. International Journal of Online & Biomedical Engineering, 17(8). https://doi.org/10.3991/ijoe.v17i08.23563
[101] Drigas A., Papoutsi C. (2020). The Need for Emotional Intelligence Training Education in Critical and Stressful Situations: The Case of COVID-19. Int. J. Recent Contrib. Eng. Sci. IT 8 (3), 20–35. 10.3991/ijes.v8i3.17235

Technium Education and Humanities
Vol. 2, No. 4 pp.1-18 (2022)
ISSN: 2821-5079
www.techniumscience.com

[102] Drigas, A., & Mitsea, E. (2020). The Triangle of Spiritual Intelligence, Metacognition and Consciousness. International Journal of Recent Contributions from Engineering, Science & IT (iJES), 8(1), 4-23. https://doi.org/10.3991/ijes.v8i1.12503
[103] Kokkalia, G., Drigas, A. Economou, A., & Roussos, P. (2019). School readiness from kindergarten to primary school. Inter.J. of Emerging Technologies in Learning, 14(11), 4-18.
[104] Drigas, A., & Mitsea, E. (2021). Metacognition, stress-relaxation balance & related hormones. International Journal of Recent Contributions from Engineering, Science & IT (iJES), 9(1), 4–16. https://doi.org/10.3991/ijes.v9i1.19623
[105] Pappas M, Drigas A. Computerized Training for Neuroplasticity and Cognitive Improvement. International Journal of Engineering Pedagogy. 2019;.(4):50-62
[106] Papoutsi, C. and Drigas, A. (2017) Empathy and Mobile Applications. International Journal of Interactive Mobile Technologies 11. 57. https://doi.org/10.3991/ijim.v11i3.6385
[107] Papoutsi, C. & Drigas, A. (2016). Games for Empathy for Social Impact. International Journal of Engineering Pedagogy 6(4), 36-40.
[108] Karyotaki, M., & Drigas, A. (2015). Online and other ICT Applications for Cognitive Training and Assessment. International Journal of Online and Bio. Eng.. 11(2), 36-42.
[109] Papoutsi, C., Drigas, A., & Skianis, C. (2019). Emotional intelligence as an important asset for HR in organizations: Attitudes and working variables. International Journal of Advanced Corporate Learning, 12(2), 21–35. https://doi.org/10.3991/ijac.v12i2.9620
[110] Chaidi I. and Drigas, A. S., "Autism, Expression, and Understanding of Emotions: Literature Review," Int. J. Online Biomed. Eng., vol. 16, no. 02, pp. 94–111, 2020. https://doi.org/ 10.3991/ijoe.v16i02.11991
[111] Drigas, A. S., & Karyotaki, M. (2019). A Layered Model of Human Consciousness. International Journal of Recent Contributions from Engineering, Science & IT (iJES), 7(3), 41-50. https://doi.org/10.3991/ijes.v7i3.11117
[112] Drigas, A. S., Karyotaki, M., & Skianis, C. (2018). An Integrated Approach to Neuro-development, Neuroplasticity and Cognitive Improvement. International Journal of Recent Contributions from Engineering, Science & IT (iJES), 6(3), 4-18.
[113] Karyotaki M. and Drigas, A. S., "Latest trends in problem solving assessment," International Journal of Recent contributions from Engineering, Science & IT (iJES), vol. 4, no. 2, 2016. [Online serial]. Available: https://online-journals.org/index.php/i-jes/article/view/5800/. [Accessed Aug. 21, 2019]. https://doi.org/10.3991/ijes.v4i2.5800
[114] Mitsea E., Drigas, A. S., and Mantas P., "Soft Skills & Metacognition as Inclusion Amplifiers in the 21st Century," Int. J. Online Biomed. Eng. IJOE, vol. 17, no. 04, Art. no. 04, Apr. 2021. https://doi.org/10.3991/ijoe.v17i04.20567
[115] Angelopoulou, E. Drigas, A. (2021). Working Memory, Attention and their Relationship: A theoretical Overview. Research. Society and Development,10(5), 1- 8. https://doi.org/10.33448/rsd-v10i5.15288
[116] Tourimpampa, A., Drigas, A., Economou, A., & Roussos, P. (2018). Perception and text comprehension. It'sa matter of perception! International Journal of Emerging Technologies in Learning (iJET). Retrieved from https://online-journals.org/index.php/ijet/article/view/7909/5051
[117] I Chaidi, A Drigas 2022 Emotional intelligence and autism spectrum disorder Technium Social Sciences Journal 35 (1), 126–151
[118] I Chaidi, A Drigas 2022 Emotional intelligence and learning, and the role of ICTs Technium Social Sciences Journal 35 (1), 56–78
[119] C Papoutsi, A Drigas, C Skianis 2022 Serious Games for Emotional Intelligence's Skills Development for Inner Balance and Quality of Life-A Literature Review Retos: nuevas tendencias en educación física, deporte y recreación 46, 199-208
[120] I Chaidi, A Drigas 2022 Social and Emotional Skills of children with ASD: Assessment with Emotional Comprehension Test (TEC) in a Greek context and the role of ICTs Technium Social Sciences Journal 33, 146-163
[121] V Bamicha, A Drigas 2022 ToM & ASD: The interconnection of Theory of Mind with the social-emotional, cognitive development of children with Autism Spectrum Disorder. The use of ICTs as an alternative, Technium Social Sciences 33, 42-72