

# Educating Gifted Students and the role of ICTs and STEM

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## Abstract

Gifted and talented students do not constitute one homogenous group. This fact evokes the need for 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 is crucial due to fulfill 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

## 1. 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.

## 2. Stem education for gifted and talented students

Bernstein conducted a study about how introducing arts and crafts into STEM education could be beneficial for gifted and talented students. The study was conducted for the National University of Seoul and it took place in 2015. Bernstein studying previous researches analyzes how arts and crafts can contribute to one's creative thinking and refers to many successful and gifted STEM scientists as examples for the development of this skill. More specifically he believes that creativity can be cultivated to gifted students through arts and crafts. Furthermore he explains Four types of evidence are brought together in this review to explore why such avocations might stimulate the creative capacity of STEM professionals. First, STEM professionals themselves argue that beyond verbal and mathematical skill, success requires a vivid visual and spatial imagination; hand-eye coordination and manipulative ability; skill with making and interpreting models; and a highly developed aesthetic or artistic sensibility. Second, controlled statistical studies of large groups (hundreds to thousands) of STEM professionals reveal strong correlations between artistic, musical, literary and crafts activities and measures of success in STEM subjects such as Nobel Prizes, numbers of patents or companies founded. Third, STEM professionals involved in these statistical studies themselves can describe specific ways in which their avocations stimulate their vocational successes. And fourth, many of these specific stimuli (such as improved observational and visual thinking skills, manipulative skills and tool use, and improved learning and retention strategies) also improve STEM learning in well-controlled classroom trials. Many studies proved the poor correlation between IQ and creativity. The reason that IQ and creativity tests are not predictive may lie in the fact that creativity is learned through example and practice, not an inherent psychological trait. STEM professionals have long recognized the need to acquire and develop skills beyond verbal and mathematical ones. Literature shows that the greatest scientists differ from the average as they spend their energy in pursuit of literature, art, philosophy, and all the recreations of mind and body. Until 1988, no statistically significant correlations were found between any of the psychological measures (which included a measure of IQ) or personality profiles and any measure of career success. What did correlate was participation in artistic, musical, crafts, literary pursuits and physical recreations. The same results came out for University Graduates who had scientific careers and who produced patents or founded scientific companies. The entrepreneurial innovators were likely to have had sustained participation over their lifetimes in drawing and photography, musical composition, dancing and crafts such as mechanics, woodworking and electronics. The results were the same for creative engineers as those engineers who excelled at research and innovation at major industrial companies could be distinguished in having a higher tolerance for ambiguity, greater empathy for other people, skill at inducing patterns, were "less practical" and "more artistic" or "poetic," and they were unusually cultured and skilled with mechanical devices. In sum, there is a compelling statistical correlation between the highest levels of creative success and entrepreneurial endeavors in mathematics, science and engineering and persistent participation in arts and crafts from childhood through professional training and into career years. Arts and crafts can provide STEM students and professionals with: (1) mental skills such as observing, imaging and abstracting; (2) sensual and manipulative skills; (3) analogies that provide novel approaches to solving STEM problems; (4) experience with materials, structures, phenomena and techniques; (5) practice with the creative process; and (6) recreation to relax and re-energize their minds. A few examples, mainly from the work of Nobel Prizewinners, are provided below as illustrations and additions to previously published examples. In conclusion, What this integrative approach to creativity tells us is that the purpose of introducing arts and crafts into STEM education for gifted and talented students must be to take into account the need for such students to

individually, idiosyncratically and uniquely build their own creative integrated networks of enterprise and talents. [12]

Kanli&Özyaprak (2016) examined the Stem education for gifted and talented students in Turkey. The education of gifted children in Turkey dates back to the 15th century. STEM, which stands for Science, Technology, Engineering and Mathematics , were the courses the education program has consisted of. World-wide competitions urged and encouraged the investment in gifted children’s education, which, as the time went by, has been enriched and diversified in order to correspond to pupils’ needs and interests. It should not be neglected to be said that the term “gifted” is considered to be an elitist one, so the terms “highly talented” and “high intellectual” are preferable in this culture. Identifying gifted children relying completely or basically on traditional I.Q. tests is a common practice across Turkey, indeed. At this point, it would be helpful to examine the educational practices supported by various and numerous institutions in this country. First of all, Beyazit Ford Otosan Primary School (BFOPS) has applied a differentiated program so as to meet children’s expectations. They are taught the core lessons, such as Language, Mathematics and Science, and they are also divided into three groups according to the progress and achievement level. As a consequence, enrichment and acceleration have been added to the basic curriculum. Moreover, creativity, thinking and social-affective skills are cultivated, so as the students will be able to practice their abilities. In addition, Private Schools follow the educational models proposed by the different universities’ gifted education departments. Furthermore, Turkish Education Foundation InancTurkes Special High School (TEFITSHS) is a unique high school consisted of a multistep identification process. They use a three-step selection progress: Exam, Individual Evaluation and Observation Camp. What’s more, Science High Schools aim to upgrade gifted children’s skills by offering a wide variety of differentiated, enriched and accelerated courses. Nevertheless, kids seldom deal with real – life and scientific problems and they mainly do homework instead of facing projects and complex issues. Anatolian High Schools also select their students via a general exam mostly based on the academic achievement. In those schools, students attend a prep class at the beginning in which they learn a foreign language, and then, they continue their education. What not be skipped to be mentioned is Science and Arts Centers (SAC). They intend to enhance primary, middle and high school’s gifted and talented learners’ scientific thinking abilities, creativity, productivity, problem solving ability and social and aesthetic values. SAC work like an out-of-school program and active in weekend or after school hours. Its educational philosophy is mostly based on project and problem-based learning. Students work in small groups and the national curriculum is not followed. Education process includes five different steps, namely orientation, support education, discovery of personal skills, development of specific talents and projects. In SAC, process modifications dominate the differentiation interventions. Higher levels of thinking, open-endedness, discovery and invention, freedom of choice and cooperative learning seem to be the main frameworks are used; instead, students are expected to learn what they need while they carry out research. The learning environment is student centered; students learn from each other and develop their social skills. Educational Programs for Talented Students ( EPTS) is a university-based after-school program for students talented in mathematics and science. Its components involve identification, curriculum, instruction, assessment, program organization and teacher training models. These are supported to the theory of successful intelligence. The EPTS identification is composed of domain specific identification, use of multiple criteria, sample based identification and natural selection. The EPTS curriculum is consisted of analytical, creative, practical and knowledge components and involves forty-four defined problem solving and thinking skills. Child Universities offer special after-school and summer programs for all students at their campuses. The identification is done via WISC-R, and the selected students can take different courses from a pool accordingly with their interest. The courses are given by the university academicians and tracks are about science, mathematics and technology, which can provide enriched learning environment to those students who are talented on STEM fields. Finally, Funding and Supporting Institutions contribute to the implementation of the STEM’s philosophy. [13]

### 3. Educating the gifted and talented

The theory of successful intelligence, provides a basis for identification, intervention, and evaluation in gifted programs. This article describes the model, allowing practitioners and other interested parties to apply the model in a gifted education environment. Successful intelligence is the ability to succeed in life, by capitalizing on one's strengths and correcting or compensating for one's weaknesses; in order to adapt to, shape, and select environments; through a combination of analytical, creative, and practical abilities. People who are gifted are those who are particularly well able to achieve such success. They do so by combining analytical, creative, and practical abilities. Gifted people may perform one of these abilities or they may perform these abilities in balance in order to succeed. People who are analytically gifted are particularly well able to analyze, judge, critique, compare and contrast, evaluate, and explain. They typically do well in school and on standardized tests. Tests of IQ measure largely analytical abilities, as well as memory abilities. These people have the kind of intelligence that is most likely to lead them to be labeled as gifted in school. The fact that they are well able to learn and analyze ideas does not necessarily mean that they are well able to come up with their own ideas or to apply what they have learned in everyday life. A person who is creatively gifted is particularly well able to create, invent, discover, explore, imagine, and suppose. Conventional tests of intelligence do not really measure creative intelligence. Creativity is the ability to generate ideas that are novel, high in quality, and task appropriate. Therefore, to measure creativity, we typically use tasks that are somewhat different, such as writing short stories, drawing pictures, formulating advertisements, and solving novel scientific problems. A person who is practically gifted is particularly well able to use, utilize, apply, implement, and put into practice. Such a person shows intelligence in highly contextualized situations. The person may or may not be notable for his or her formal knowledge, often is distinguished by his or her tacit knowledge, that is, knowledge of what one needs to know to succeed in an environment that usually is not directly taught and that often is not even verbalized. A person who is gifted in a balanced way may not be extremely high in analytical, creative, or practical intelligence. Rather, he or she may be particularly well able to balance the levels of the three abilities, knowing more precisely than most people when and how to use them. Successful intelligence is viewed as a form of developing expertise. In other words, it is not a fixed entity, but a flexible and dynamic one. Successful intelligence is viewed as a form of developing expertise. In other words, it is not a fixed entity, but a flexible and dynamic one. All intelligence tests measure only an aspect-typically a limited aspect-of developing expertise. Developing expertise is defined here as the ongoing process of the acquisition and consolidation of a set of skills needed for a high level of mastery in one or more domains of life performance. Many human attributes, including intelligence, reflect the covariation and interaction of genetic and environmental factors. The upshot of this view is that successful intelligence, and giftedness in it, is not wholly inborn. Genetic factors interact with environmental ones to produce variable levels of developing expertise. Good schools help children maximize their development of such expertise. The study was based on the Sternberg triarchic abilities test (STAT) to investigate the internal validity of the theory (in other words, whether the division into analytical, creative, and practical abilities is justifiable). The test comprised 12 subtests and was taken by 326 high school students, primarily from diverse parts of the United States, identified as gifted by their schools. Analytical, creative, and practical abilities were each measured by four subtests, three multiple choice tests and one essay test. The multiple-choice tests, in turn, involved, respectively, verbal, quantitative, and figural content. Ideally, measurement of creative and practical abilities probably should be accomplished with other kinds of testing instruments that complement multiple-choice instruments. Thus a test was developed that supplements the creative and practical measures with performance-based measures. For example, creative abilities are additionally measured by having people write and tell short stories, do captions for cartoons, and use computer software to design a variety of products. Practical skills are measured additionally by an everyday situational-judgment inventory and a college-student tacit-knowledge inventory. These tests require individuals to make decisions about everyday problems faced in life and in school. The results further suggest the need for measuring not



only a variety of abilities, but also for measuring these abilities through various modalities of testing. In sum, studies with large numbers of participants in three different countries have supported the theory of successful intelligence. Other studies in other countries, such as Russia and Kenya, have also supported the distinction between academic-analytical and practical abilities. We thus believe we have solid (as well as peer-reviewed) empirical data that support the theory of successful intelligence. IQ tests and their equivalents can provide one among several useful bases for identification. While they provide useful information, in many cases, about children's analytical abilities, they say little or nothing about creative and practical abilities. To identify gifted students in terms of the theory of successful intelligence, there should be a variety of measures such as standardized tests, teachers' grades and comments, Sternberg Triarchic Abilities Test, evaluations of existing products, projects, and portfolios for analytical, creative, and practical skills, questionnaire for students regarding their preferences and skills, Teacher Questionnaire, tasks created by teachers, such as having students write stories or reports, draw pictures, create advertisements, solve novel problems, solve practical problems, and so forth. Teaching and assessing achievement for successful intelligence involves three basic sets of ideas. These sets of ideas include a set of principles, a set of techniques, and a set of skills to be developed. All students receive all kinds of instruction (analytical, creative, and practical). Such instruction helps students capitalize on strengths and correct or compensate for weaknesses. When teachers initiate, monitor, and evaluate their teaching behavior in terms of an easy-to-learn set of cues, it is easier for them to adopt successfully the principles of teaching for successful intelligence. It is provided a framework to balance their teaching (including instruction and assessment) for successful intelligence. Examples are given here for some of the cues in each of the domains of reading/language arts, mathematics, and science: 1. For emphasis on analytical thinking, 2. For emphasis on creative thinking, 3. For emphasis on practical thinking. Processes always act on mental representations. Instruction and assessment should take into account individual differences in preferred mental representations, including verbal, quantitative, and figural, as well as modalities for input (visual, auditory, kinesthetic) and output (written, oral, performance-based). To conclude, the theory of successful intelligence provides a proven model for gifted education. The model has implications for identification, instruction, and assessment of achievement. All three should be viewed in terms of analytical, creative, and practical abilities. The results of diverse studies suggest that the theory of successful intelligence is valid as a whole and provides successful interventions in classrooms. [14]

Rogers (2007) discusses five reconsiderations (lessons) the research on the education of the gifted and talented suggests in a large Midwestern school. Results of the evaluation were used as an "opportunity" to restructure the program, rather than to eliminate gifted services altogether, a "strategy" quite commonly experienced across the country in this yet another time of diminishing resources and attention on gifted education. The first lesson is about gifted and talented learners who need daily challenge in their specific areas of talent. Consistent practice at progressively more difficult levels in skill, coupled with the talented learner's natural ability to link new knowledge to prior knowledge and skill, accounts for what ultimately is perceived as expert performance. This first lesson of daily talent development requires some form of regrouping for such instruction, whether that be for a whole class of high talent students, a like-performing cluster group, or a like-peer dyad or like-ability cooperative group, for which the students are provided with cooperative challenges to be completed with their peers. If this grouping is not possible, then a structured program of independent learning supervised by a gifted resource teacher, media specialist, or talent area mentor either within or outside of the schools must be developed. The second lesson refers to opportunities that should be provided on a regular basis for gifted learners so to be unique and to work independently in their areas of passion and talent. Independent study does have an impact on motivation to learn, and it is possible that with appropriate structuring through the use of a curriculum model, well-trained teachers and collaboration between the teacher and the library that the independent skills learned through individual study will be transferable to other academic areas, ultimately affecting overall academic achievement. We must give intellectually gifted and talented youngsters the chance to feel they are making "progress" in their learning; in order to lessen

low self-esteem and dysfunctional behavior. The third lesson provides various forms of subject-based and grade-based acceleration to gifted learners as their educational needs require. Many subject based acceleration options show substantial, positive academic effects in specific subject areas. Some of these accelerative options include early entrance to school, university-based programs ( Saturday, summer, or commuter courses for middle and high school gifted learners, cross-graded classes, college courses on the high school campus for both high school and college credit, and mentorships. Studies of early entrants found that they kept pace with their classmates academically and in many cases surpassed them. Studies of subject acceleration, especially related to science or mathematics, show dramatic achievement gains for gifted elementary students and secondary students. Cross-grading for gifted students shows extraordinary academic gains in mathematics and reading. The shortening of the actual years spent in the K-12 school system is often defined as grade-based academic acceleration. The fourth lesson provides opportunities for gifted learners to socialize and to learn with like-ability peers. The options include sorting and placing students in a classroom with others who are performing at the same level of difficulty in the curriculum or pull-out groups (gifted students removed for a consistent set time to a resource room for extended curriculum differentiation). Students in pull-out programs are more positive about school, have more positive perceptions of giftedness, and are more positive about their program of study at school. It is clear that the grouping has positive effects whether full time or part-time, although logically the more time this occurs for gifted children, the more positive the effects on them, socially and emotionally. The fifth lesson refers to the differentiated pace that should be kept in specific curriculum areas. The consistent conclusions for precocious mathematicians and scientists are that they succeed in these fast-paced classes offered early at or above the rates documented for their older peer and tend to retain more accurately what they have learned in these accelerated situations. In every case, participating students successfully completed a full year of coursework in a small number of hours or weeks with content presented at a pace of presentation many times faster than encountered in their regular classrooms. They also offer an alternative to the issues of boredom and perceived stress for gifted children as discussed because there will be less “down” time in which these students will lose focus, become distracted because of their lack of attention on the presentation. There should be a qualitatively different presentation of content in areas such as mathematics, science, and foreign language for students who are extraordinary in these areas. This will require separate instruction, either individually or in a like-performing group, followed by individual practice and application.[15]

Brody et al (2005) summarize the lessons learned from the over 25 years of research of talent development. Research strongly supports the use of above-level aptitude tests for talent identification. Students’ performance in the talent searches confirms that the above-level tests are not too difficult for gifted middle school students because many Grade 7 and 8 talent search participants score above the mean of college-bound high-school seniors. Other studies of top talent search scorers have shown that they achieve at high levels in accelerated programs and are 50 times more likely to pursue doctoral degrees than the general population. So, the validity of the talent search assessment has been well established. A large body of evidence now exists that demonstrates high achievement by students who participate in the programs offered by the talent searches. In fact, studies demonstrate that summer program participants successfully take more advanced courses throughout high-school following their summer experience than comparison groups. With regard to the residential summer programs in particular, studies have also documented their social benefits. Students report on the value of being able to interact with their intellectual peers, and these enhanced peer relationships have been shown to impact on self-concept and social skills development. Researchers have investigated a variety of ways to accelerate students’ educational programs. Talent search students who moved ahead in subject and/or grade placement have been found to benefit academically from utilizing accelerative strategies without exhibiting concomitant social and emotional difficulties. An important area of investigation has been early college entrance. These early entrants were followed up and were found to be highly successful in college and afterwards. Groups of early college entrants fare well academically without having social and emotional problems. The need to offer appropriate accelerated instruction to advanced learners has been well documented by the talent

searches and this can be done more effectively when students with the same academic needs are grouped together. Studies of talent search students have also confirmed that, as a group, these students are socially well adjusted, report having friends and have positive self concepts. There are some indications, however, that students with extremely high talent search scores may have more difficulty fitting in socially than students with more moderate scores. Also, students with exceptional verbal talents may have more difficulty than those with exceptional mathematical talents. Gender differences favoring males in performance on the mathematical portion of the SAT were observed on the first talent search. Our research has shown that recognition of mathematical and scientific talent by the talent searches, as well as intervention programs aimed at females have contributed to increasing participation and achievement by females in these fields. Research showed that spatial aptitude is not a unidimensional trait, but rather that there are different spatial skills that should be assessed, and the STB reflects this by including a number of subtests. Talent search students (as a group) tend to be more open to new experiences and learning, tend to prefer looking for patterns and possibilities rather than concentrating on facts and details in their academic studies and like to play with new ideas. Research found that the talent search group expressed greater preferences for intuition. Talent search students also tend to be higher on achievement motivation and lower on interpersonal and social concerns. Among the talent search students a larger number of talent search females than expected preferred thinking rather than feeling in evaluating information and making decisions. Thinking types prefer making decisions through rational analysis and objective facts. Talent search females look more like young men, in this way, than do females in general. Gifted students who are high on both verbal and mathematical ability have the strongest preference for introversion and intuition. On the other hand, the mathematically talented students with the lowest verbal scores tend to prefer impersonal, logical analysis with an emphasis on facts; they tend to be practical and matter-of-fact. Today the population of students referred to as 'twice exceptional' is getting considerable much-needed attention from researchers and educators. Program recommendations and accommodations have been identified to help gifted students with learning disabilities achieve their full potential. Research has also shown that under-represented minority students have academic aspirations and self-concepts similar to other program participants. Under-represented students report that summer programs through talent search helped them to gain maturity and independence, improved their thinking skills, helped them to see more possibilities for their future, helped them to become more open minded and gave them the opportunity to meet other very bright students from diverse backgrounds. Numerous studies show that the majority of talent search participants come from fairly advantaged homes, with well-educated parents. Talent search students have positive feelings about their families and feel supported in their goals. Their parents are not pressuring them to achieve at exceptionally high levels.

These studies have contributed to our understanding of the characteristics and needs of gifted learners. As talent searches continue to develop new ways to serve the needs of advanced learners, it is important that they continue to embrace the legacy that all of their efforts should be research base. [16]

Altun&Yazici(2010) conducted a survey in Turkey. The aim of this study was to determine learning styles of gifted students in this country. Learning is described as permanent changes in behavior occurring as a result of repetition or experience. Learning style is considered as a combination of cognitive, emotional and physiological features. As the number of learning styles increases, the number of teaching methods increases too. Learning style theorists consider gifted students' basic characteristics of commitment, high motivation and having internal control as fundamental variables affecting learning. They have their own learning style, as it is widely known, and their complex potential and special abilities should be thoroughly investigated. The sample of this study consists of 386 gifted and 410 non-gifted primary-second phase students. The Learning Style Scale developed by Sever and Data Collection Form developed by the researchers were used as data gathering tools. According to the analysis of data, significant differences were found between the gifted students' learning styles and non-gifted students' learning styles. The gifted students' scores are higher than the non-gifted students' scores.

visual learning styles. They also had higher scores in kinesthetic learning styles. Finally, the female gifted children preferred the auditory learning style than the male. [17]

Plunkett & Kronborg (2011) examined the opinion that teachers of the gifted children had formulated about them. In Australia, most teachers enter the profession without having completed any dedicated studies pertaining to gifted education, yet many go on to teach gifted students. This article reports on research conducted with 332 of those participants, using Gagné and Nadeau's (1985) Opinionnaire and a reflective journal. Findings illustrate a strong positive growth in opinions relating to gifted education, particularly in regard to social justice. Respondents' reflections suggest that access to research and literature on giftedness had been instrumental in assisting pre-service teachers to challenge their previous opinions, many of which they now regarded as uninformed misconceptions. Particularly, while participants agreed that gifted students were often bored in school, there were some indecision and lower levels of agreement about how this was occurring as the regular program was not generally seen as being a waste of time or too intellectually stifling for gifted students. Interestingly, participants were in agreement that gifted students' needs often get ignored and that they require support at a school level, but were less certain about the impact at a societal level, with some indecision around whether developing talents is necessary to the progression of society. In addition, so respondents in general did resist the objections that are raised against providing specifically for gifted students. Yet by the end of the semester, respondents' opinions had been changed. Apart from that, fairness and equity of providing services and provisions to gifted students tended to relate to social justice issues. Moreover, while there was a strong acknowledgement of the value of gifted people, this did not spillover into the idea of them providing tomorrow's future leaders. Furthermore, they mentioned that gifted children have more difficulty in making friends, and they admitted that some teachers feel their authority threatened by gifted and that others reject them because of envy. Teachers also changed their point of view and said that inclusive education would be beneficial for all the students. Finally, acceleration was possibly the least understood in this unit. [18]

Maker et al. (2015) designed and proposed a model called REAPS. REAPS is a model based on the research base and comprehensiveness. The three models that make up REAPS complement each other because they all develop problem solving in different ways, which is the main emphasis of the REAPS model. Discovering Intellectual Strengths and Capabilities while Observing Varied Ethnic Responses (DISCOVER) provides a wide array of problem types that can be used to guide students' thinking and development of content understanding throughout a unit or lesson. Teachers choose problems from their local, regional, or national context, and as students become more sophisticated, from international contexts. These problems should be real, not contrived, and so, they are complex, with multiple factors to consider and multiple methods that are appropriate for solving them. Thinking Actively in a Social Context (TASC) provides the structure, sequence, and organization for creating solutions to problems in both group and individual settings, especially those that are open-ended. Finally, Problem Based Learning (PBL) offers a way of integrating content in practical and real-life applications. Content principles that characterize this intervention are: abstractness, which means that big ideas or macro concepts are taught, complexity and variety of the tasks, organization around macro concepts, discovery (students are facilitated to explore, teachers do not just transmit their knowledge) and evidence of reasoning (pupils have to explain their reasons for their answers). Process principles are: higher level of thinking, focus is given on using the information rather than remembering it, open-endedness (asking open-ended questions and designing open-ended problems), freedom of choice, group interaction, variety and pacing (giving information at appropriate speeds and allowing in-depth investigations). Product principles are: result from real and not contrived problems, address to real audience who are appropriate for developmental levels, transformation (products are original to the student and synthesized, not compiled, variety, self-selected format and appropriate evaluation based on clear and identified criteria. Learning environment principles are: learner center environment, design in a way that encourages students to become independent learners, openness (open to new ideas, varied processes and new information), accepting of varied perspectives and all students' ideas, including varied and complex resources and multiple tools,



varied groupings made by choice, flexibility of timing, grouping and methods and high mobility (students move in and out of the classroom and within the classroom). [19]

#### 4. 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 [94-138] 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.

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