

OVERVIEW ON PREPARING TEACHERS TO UNDERSTAND TWICE-EXCEPTIONAL STUDENTS

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***ABSTRACT_** Twice-exceptional students are a sub-population of students that are unrecognized inside school systems. Generally, teachers and educators are unaware of the existence of this type of students in classrooms, and not familiar with the major characteristics of these students. The lack of awareness by many teachers in school system about twice-exceptional students make this special population of students unidentified, unsupported, and unserved. The main purpose of this research is to provide overview for general education teachers, gifted education teachers, and special education teachers to understand twice-exceptional students better. These students often display behaviors and characteristics associated with both sides of giftedness and disabilities, which make them have different learning patterns. It is important for teachers to understand this special population of gifted students because these students have a right, like any other student, to receive an appropriate education. The meta-analysis method has been used in order to collect data and find information about educating twice-exceptional students in general education classrooms. This paper is addressing only the gifted with learning disabilities, but not a gifted student with other types of disabilities such as ADD, ADHD, Autism, Behavior Disorders, and Physical disabilities. The main aspects discussed in this paper are: characteristics, social and emotional needs, and teaching practices. The final aspect provides in depth information about the most important guidelines of programs, services, intervention, and instructional strategies. This paper provides the teachers with overall insight and needed information both of which are related to teaching twice-exceptional students within general education settings.*

***KEYWORDS:** teacher preparation, twice-exceptional students, special populations, characteristics, social needs, emotional needs, programming, services, instructional strategies, intervention.*

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I. INTRODUCTION

Generally, students come to school with a great range of abilities that increases educators' responsibility and requires them to work harder to meet the different needs of all students. The learners at schools are often classified into three main categories depending on their learning abilities; these are gifted students, general education students, and students with special needs. Even though the difference between gifted students and students with special needs in their intellectual abilities and potential is significant, there is a special population of gifted students who have one or more types of disabilities, and they are labeled as twice-exceptional students. Those students seem to be a mystery because of the extreme difference in their abilities. Thus, the twice-exceptional students can present special challenges to teachers.

According to The National Education Association [1], there are different types of twice-exceptional students according to the different types of disabilities. These types are: gifted students with physical disabilities, gifted students with sensory disabilities, gifted students with Asperger Syndrome, gifted students with emotional and/or behavioral disorders, gifted students with attention-deficit/hyperactivity disorder, and gifted students with learning disabilities. Gifted students with learning disabilities form the largest group of twice-exceptional students. Because of that, this paper discusses the main issues of this group of twice-exceptional students.

Owing to the fact that twice-exceptional students are typically gifted but have learning disabilities, there are some educators who label them as "gifted" and treat them based on this basis; whereas there are some educators who label them as "disabled" because they believe that they need help and support in their areas of challenge more than areas of giftedness. Therefore, There is a need to review the separate definitions of gifted students and Specific Learning Disabilities in order to get a clear vision about the two exceptionalities that students have. The federal definition of gifted students that was developed by U.S. Department of Education in 1993 is:

[C]hildren and youth with outstanding talent who perform or show the potential for performing at remarkably high levels of accomplishment when compared with others of their age, experience, or environment. These children and youth exhibit high performance capability in intellectual, creative, and/or artistic areas, possess an unusual leadership capacity, or excel in specific academic fields. They require services or activities not ordinarily provided by the schools. Outstanding talents are present in children and youth from all cultural groups across all economic strata, and in all areas of human endeavor [2].

The Association for Children and Adults with Learning Disabilities (ACLD) defined Specific Learning Disabilities as:

[A] chronic condition of presumed neurological origin which selectively interferes with the development, integration, and/or demonstration of verbal and/or non-verbal abilities. Specific Learning Disabilities exists as a distinct handicapping condition in the presence of average to superior intelligence, adequate sensory and motor systems, and adequate learning opportunities. The condition varies in its manifestations and degree of severity. Throughout life, the condition can affect self-esteem, education, vocation, socialization, and/or daily living activities [3].

After reviewing these definitions of gifted students and Specific Learning Disabilities we can come to the conclusion that it is possible that the gifted student might have learning disabilities, because the learning disability does not affect the intellectual abilities and skills of students. On the other hand, using both definitions of gifted and disabled individuals leads to an inadequate understanding of what twice-exceptional students may look like [4].

In fact, there is no federal definition for twice-exceptional students, and that is the most important reason of having difficulty in identifying and recognizing them [2,4]. In addition, it leads the educators to make the twice-exceptional eligible to be serviced only by either gifted education programs or special education programs [2]. Trail [2] identified them as:

[L]earners [who] have the characteristics of gifted students and students with learning disabilities. They have the potential for exceptional performance in one or more areas of expression, which includes general areas such as creativity and leadership or specific areas such as math, science, and music. These students have an accompanying disability in one or more of categories defined by IDEA [2].

In fact, there is no federal agency or educational organization that has accurate statistics about how many twice-exceptional students are in schools. However, according to The National Education Association there were almost three million gifted students in grades K-12 attending schools in 2006 in the United States, and they formed around six percent of the total school population [1]. Because of this number of gifted students, it is likely that most teachers will at some point have at least one student who is both gifted and disabled. Furthermore, the twice-exceptional children form only 2% to 7% of the total special education population (Chamberlin, Buchanan, & Vercimak, [5]; McCallum et al., [6] and "Clark [7] estimated [them as] at least 300,000 individuals" [5]. Chamberlin et al. [5] have suggested that even though there is a low incidence of this population, this "does not diminish the importance of identifying and serving them" [5]

This paper is written to provide teachers with the information and recommendations that help them educate

twice-exceptional students within general education settings in a more effective manner. The three main aspects of these students' issues that are addressed through this paper are: characteristics, social and emotional needs, and best practices for teaching. The first aspect clarifies how these students might appear, behave, and perform in classrooms and the importance of having knowledge about their characteristics. The second aspect presents information on how teachers can be trained to recognize the social and emotional needs and how they can be addressed. The final aspect is related to the academic side of educating this special population of gifted students. It discusses the essential qualities of programs and services, most effective instructional strategies inside the classroom, and the principles of a successful intervention. Finally, it is concluded with a brief discussion about the three main aspects and what teachers need to understand while teaching twice-exceptional students.

Review of the Literature

The twice-exceptional students are classified into three main subgroups. The first subgroup contains the students who are identified as gifted and placed in gifted classroom without identifying their disabilities. These students have difficulties in their learning because of their disabilities and may be labeled as underachievers within gifted education settings [1]. The second subgroup is made up of the students who are identified as disabled and placed in special education classroom without identifying their gifted abilities. The teachers with this group often focus only on improving their areas of disabilities without nurturing their areas of giftedness. The third group, which is the largest group, has the students who are not identified as gifted or disabled and placed in general education classrooms, because they balance their two exceptionalities and their gifts and disabilities mask each other [1,7].

Leggett, Shea, and [8] have discussed the main challenges that might influence the twice-exceptional students' success in school. They have divided these challenges into two main categories; the first category is the challenges inherent in the school system, whereas the second category is the challenges faced individually. The educators within the educational system face many challenges that consequently influence twice-exceptional students in receiving an appropriate education. These difficulties revolve around three main points: identifying twice-exceptional students and their unique needs, meeting their different needs in an individual manner, and providing the appropriate programs and services to combat the challenges of the particular student. For the individual challenges, most of the twice-exceptional students have social, emotional, and behavioral problems as a result of experiencing both exceptionalities at the same time. In addition, they may be labeled as underachievers because either they have difficulties in learning or their strength is ignored because their weakness demands more attention; therefore the instruction is directed towards remediating their weaknesses rather than developing their strengths. Moreover, the twice-exceptional students have a misunderstanding and poor self-concept about their strengths and giftedness which makes them unable to reach their fullest potential [8].

Twice-Exceptional Students' Characteristics.

Perreles, Omdal, and Baldwin [9] have discussed the importance of labeling twice-exceptional students based on their behaviors and characteristics rather than labeling them as gifted or disabled. The reason behind this belief is that these students display behaviors and characteristics associated with both sides of giftedness and disabilities. Thus, identifying twice-exceptional students' characteristics according to this principle helps educators to develop and provide appropriate educational programs and services to meet the individual and unique needs of these students as well as promote their strengths, interests, and abilities [9].

The characteristics of twice-exceptional students, especially those with learning disabilities, were observed by numerous researchers who studied this special population of gifted students. Nielsen and Higgins [10] and Trail [2] have classified the characteristics of twice-exceptional students into two main categories: the areas of strength and the areas of challenge. The areas of strength come from the students' giftedness, while the areas of challenge come from the students' learning disabilities. The students' areas of strength are associated with their academic skills such as performance IQ, superior vocabulary, creativity, imagination, and critical thinking. On the other hand, the students' areas of challenge are often associated with the necessary skills for school success such as spelling skills, reading skills, visual and auditory processing, organization and study skills, and peer interaction [2,3,10]. Therefore, the twice-exceptional students have a unique academic pattern since they have both high intellectual ability as well as disability.

According to the National Education Association [1] and Trail [2], many twice-exceptional students struggle with basic skills and experience reading problems because of having difficulties in cognitive processing. In addition, even though these students show superior verbal ability, they face challenges in written and expressive language which makes them unable to use language in appropriate times and ways. The twice-exceptional students often possess strong abilities in areas of observation, leadership, problem-solving, critical-thinking, decision-making, imagination, and inquisitiveness. Nevertheless, they may have difficulties with memory skills, organization skills, auditory and visual processing, and social skills. In addition, some suffer from attention deficit problems during their tasks; however, they can pay attention and focus for long times in areas of interest. Also, these students show a lack of desire to take risks in academic areas, whereas they show a willingness to take risks in non-academic areas without thought of potential consequences. Most researchers have come to an agreement that the twice-exceptional students have a wide range of interests and high levels of energy, but their disabilities prevent them from pursuing these interests [1].

Because of the unique mix of characteristics and the gap between the ability and disability, the twice-exceptional students have different social and emotional characteristics than their peers. The twice-exceptional students may experience extreme frustration when they cannot meet their own and their teachers' expectations. In addition, these students tend to use humor and make fun of their peers in order to divert attention from school failure or to avoid trouble. Also, when they face difficulties in learning, they may refuse to do a task or express their

feelings using anger and withdrawal, this kind of expression makes them seem immature. Thus, they need frequent support and feedback from their teacher in areas of difficulties. Sometimes, they may seem stubborn, opinionated, argumentative, inflexible, and highly sensitive in learning situations. In addition, they show low self-efficacy and poor self-esteem. Because twice-exceptional students do not always fit with gifted or learning disabled students, they may feel unaccepted or isolated by other learners. This is one of the main reasons these students are unable to develop their social skills and possibly become the target of peer bullying [1,2]. The discrepancy in the abilities of twice-exceptional students makes them have social and emotional needs during their school experience, and these needs will be discussed in the next section.

Social and Emotional Needs of Twice-Exceptional Students

In fact, twice-exceptional students face challenges through their school experience as a result of feeling that they are a part of two completely different categories: that of the gifted and then learned disabled. The extreme difference between their high abilities and disabilities makes it challenging for these students to cope with this incongruity, therefore they often have low self-concepts at the beginning of the school year. King [11] mentioned that there are two types of self-concept. The first is global self-concept and it is defined as “general evaluation of one’s self-worth as a person” [11]. whereas the second type is academic self-concept and it is defined as “individuals’ knowledge and perceptions about themselves in achievement situations” [11]. Both types of self-concept affect the achievement of students with learning disabilities in the classroom. Usually, twice-exceptional students have lower self-concepts compared to their achieving peers, because they face additional challenges in their learning more than their disabled peers. In addition, some of these students reported that they feel they are less intelligent than their gifted peers. Furthermore, twice-exceptional students predominantly have conflicting thoughts regarding their abilities and how they perform in the classroom. This discrepancy causes these students to have low self-concepts [11].

King [11] in his article (Addressing the Social and Emotional Needs of Twice-Exceptional Students), discussed the emotional and social concerns of gifted students with learning disabilities. According to King, many twice-exceptional students “are internally motivated and have strong beliefs in their abilities, much like gifted students, yet they repeatedly fail at certain tasks, similar to children with LD” [11]. Therefore, these students are similar to the gifted in having high expectations about their performance, but as a matter of fact they experience failure more than expected which develops frustration and the fear of failure with future tasks. In addition, the frequent experience of failure makes the twice-exceptional students wonder about the causes of failure, and they begin to recognize the gap between their intellectual skills and limitations. The twice-exceptional student uses strategies in order to deal with or avoid the frustration. These strategies include trying to prove their intelligence, focusing on completing tasks regardless of the quality of work, or avoiding accomplishing the difficult tasks. Despite this, these students can accomplish the difficult

tasks successfully when they are being supported and encouraged in a classroom environment [11].

Most of the social problems that twice-exceptional students face revolve around three main issues, which are having difficulty in using social skills, having difficulty in making solutions for social problems, and having difficulty in interpreting social cues. In fact, the gifted students with learning disabilities are at risk in their social and emotional life more than their peers who only have disabilities. “Because [they] seem to possess characteristics of both giftedness and LD, they often struggle with perceptions of being different and feeling isolated” [11]. Furthermore, the extreme difference between their abilities influences them socially and emotionally as well as their relationships with their peers. In one study that was conducted, twice-exceptional students reported that they have knowledge about how to make and keep relationships with friends, but they are unable to use this knowledge in real social situations. In addition, they reported that they feel frustrated about their peer relationships, and have better relationships with adults more than their peers [11]. Because of that, twice-exceptional students do not always fit in with their peers, and they may feel isolated and rejected by peers. Also, they may be unable to share what they find interesting with other students.

King [11] and Yssel et al. [12] have emphasized that the fundamental element in addressing the social and emotional needs of twice-exceptional students is focusing on these students’ strengths while remediating their weaknesses. In addition, King in his research cited that the self-concept and self-esteem of twice-exceptional students who receive gifted services was higher than those who receive the services from a special education program only [11]. Thus, to create an appropriate emotional climate, teachers must focus on providing these students with rich learning opportunities rather than focus on increasing self-esteem by using traditional ways only such as praising students or encouraging them to participate without focusing on the correctness of the answer [12].

Providing the twice-exceptional students with social and emotional support is an important step in helping these students overcome their unbalanced abilities. King [11] collected and suggested a list of strategies that will assist teachers in addressing and meeting the social and emotional needs of twice-exceptional students in the classroom. The first offered suggestion is that the teacher should promote students’ understanding about their abilities and disabilities as well as their areas of strengths and weaknesses. When twice-exceptional students have a clear understanding about those aspects, they will be able to control their own learning and lives. The other suggestion is that the teachers and parents should provide the emotional and social support on the basis of success, this means that these students should be encouraged to succeed in learning. To keep students motivated toward learning, teachers need to set accurate expectations, accept students’ limitations, and give them rewards when they achieve well. In addition, they should teach twice-exceptional students how to overcome challenges when they become frustrated or face difficult tasks. King [11] also suggested that the teacher must deal with twice-exceptional students not because they are gifted, or because they are disabled, but on the basis of having

individual needs. Thus, when the teacher thinks more about those students' individual needs, they will be able to know the reasons behind their inability to complete tasks and assignments. They can also offer multiple ways to help students demonstrate their knowledge, reward students for their effort, and support their unique needs while nurturing their strengths and giftedness. To address those students socially, King [11] suggested that the twice-exceptional students' social relationships should be supported by several ways. The first way is establishing an organized learning environment that enhances students' relations with their peers. The other way is planning for the activities that enable these students to improve their social skills. Also, when the students prove to be excellent in a specific area, it is preferable to assign them to be a leader for their peers in the tasks of this area. One of these suggestions is letting twice-exceptional students discuss their experiences with students who are experiencing the same difficulties and frustrations. Yssel, Prater and Smith [12] after conducting their own research on twice-exceptional students, came to the same conclusion that the twice-exceptional students enjoy spending time with their peers, and talking with them about topics that are interesting. In order to support and encourage students to reach their full potential to succeed, the final suggestion was to establish a partnership with students' parents and adults who experienced the same situation.

According to Foley Nicpon, Allmon, Sieck, and Stinson [4], twice-exceptional students have "adaptive coping mechanisms to deal with the significant stressors and frustrations they face in school" [4]. In addition, King [11] emphasized that identifying and supporting the social and emotional needs of twice-exceptional students is necessary in order to support them during learning activities. He also believed that addressing their social and emotional needs is equally important compared to addressing their academic needs. Therefore, the educators' role is identifying and addressing those students' social and emotional needs in order to improve their academic achievement as well as maximize their potential of success inside and outside the classroom [11].

Teaching Practices:

Program and services. As discussed earlier, the twice-exceptional students will not be fully successful when they are labeled and treated as only gifted or students with learning disabilities, because they have a specific pattern that combines the characteristics of talented and disabled students at the same time. Therefore, both sides of giftedness and disability need to be addressed when teachers deal with twice-exceptional students. In addition, these students must be viewed as gifted first and as having learning disabilities second in order to improve their attitudes toward school [5,13]. When these students are placed in gifted education classrooms, they will not receive the special education services and their weaknesses, or the areas of challenges, will not be remedied or addressed. In addition, the gifted education teachers often do not have enough knowledge about disabilities or the best strategies for teaching students with learning disabilities. On the other hand, when those students are placed in special education settings, the teachers will usually focus only on their disabilities at the expense of nurturing their gifted and talented abilities. Thus, because twice-exceptional students have both gifted

and special education needs, they need to receive support and services from both gifted and special education programs [7,13].

Nielsen and Higgins [10] have emphasized that the twice-exceptional students must be provided with appropriate programs and services that are intended to respond to both their giftedness and their areas of challenge as well as address their needs. Nielsen and Higgins have identified four components that may affect the empathic understanding of program and service providers. These four components are competence, choice, connections, and compassion. Most of those students succumb to frustration and disappointing ideas as a result of their inability to excel like talented students. Therefore, it is very important for educators who work with twice-exceptional students to have the ability to help those students discover the gifted and talented aspects in their personalities, thus building their sense of competence. Nielsen and Higgins, quoting Robert Brooks, stated that in order to assist students developing their self-esteem, it is very significant to focus on their strengths as well as weaknesses. Determining and promoting each individual's strengths, what so-called 'islands of competence', is what educators need to learn to make their students motivated toward facing and confronting challenging tasks.

Furthermore, allowing twice-exceptional students to choose from a variety of learning options will enable them to take control on their own learning as well as use their areas of strength rather than areas of challenges. The third component is connections. Connection means that educators and program planners should design a program that enables the gifted students with learning disabilities to connect their areas of giftedness with the areas of disabilities to be more well-adjusted learners. Trail [2] emphasized that teachers should help twice-exceptional students to gain deep knowledge about their strengths, weaknesses, and learning styles in order to be able to develop their strengths and improve their deficit skills by their own efforts. The final component which is compassion means that the educators must show respect, sympathy, compassion, and be willing to help those students when they work with them [10].

In addition, Nielsen and Higgins [10] have highlighted four essential elements that must be presented in such programs for twice-exceptional students to be more successful and beneficial. These elements are "(a) implementation of an overarching program model, (b) use of interdisciplinary curricula, (c) intensive support for social, emotional, and behavioral needs, and (d) use of gifted education and special education strategies" [10]. The overarching program model refers to a program that is designed to provide continual services and options for twice-exceptional students within general education settings with consultative support provided by both gifted and special education teachers. This kind of program enables the teachers to make sure that the provided services are "well designed, integrated between special education and gifted education, and consistent from year to year" [10].

The second element which should be presented while serving twice-exceptional students and designing programs for them is interdisciplinary curriculums. According to Nielsen and Higgins [10], a wide range of educational professionals and specialists recommended

that the gifted students with learning disabilities should be taught a complex interdisciplinary curriculum on a daily basis. Because of the twice-exceptional students usually have the high abilities in areas of problem-solving, critical-thinking, and reasoning like gifted students, therefore, when they are provided with complex interdisciplinary curricula they will be “encouraged to use their giftedness to examine complex issues and ideas while acquisition of basic academic and social skills are gently addressed with the process” [10]

Social, emotional and behavioral support is given as the third element. The programs and services that are offered for twice-exceptional students must address, on a daily basis, their social and emotional issues and different needs that might reduce the chances of success. As mentioned before, these students experience frustration, repeated failures as well as feelings of isolation in their school lives. Therefore, they need to learn and interact with their peers in a safe classroom environment. In addition, they need to understand themselves and others in order to be able to use their strengths in improving their social skills and create successful relationships with others [10].

The final element is that these programs and services should be designed and offered according to the collaborative work between special education teachers and gifted education teachers. Nielsen and Higgins [10] have proposed that the most effective form of collaboration is providing twice-exceptional students with an individualized program that aims at nurturing their abilities of giftedness while receiving services and intervention from special education specialists. Those students in this case will have access to all necessary materials and resources from both gifted and special programs. In addition, when they receive services from gifted education programs, they will be able to overcome their disabilities and reduce their negative impacts in their learning skills [7,10].

The twice-exceptional students’ needs cannot always be met inside general education classrooms [1]; this requires teachers to think about additional activities and services that can be practiced and provided outside of the classroom or after school. According to Trail [14] there is a wide range of opportunities in the community that contributes in developing and supporting the gifted potential of students. Thus, teachers can design and plan many kinds of activities by using community resources such as involvement in church activities, volunteering, museum trips, and summer camping. In addition, they can help twice-exceptional students in developing their strengths by allowing them to participate in their preferred activities or online classes that are offered by universities or educational organizations in different topics and fields. The other kind of service that can be offered for twice-exceptional students is tutoring, since some of these students need intensive lessons in the areas of challenge such as: spelling, writing, and reading [15]. When students receive outside services and practice extra-curricular activities, they will be able to promote their areas of strength, overcome their areas of challenge, and have more confidence in their abilities.

Instructional strategies. The twice-exceptional students often are inconsistent in their achievements, sometimes they excel whereas sometimes they struggle in their

learning. This kind of learning pattern confuses teachers and makes them try to find the best strategies that are suitable for their learning style. Most researchers have come to an agreement that the instructional strategies that must be used with twice-exceptional students should focus on maximizing their strengths and potential of success, addressing their needs, and remedying their weaknesses.

According to Coleman [16] The National Research Council in 2005 identified three key principles that must be taken into consideration during teaching all students in general. The first principle is related to the prior knowledge of a student. Usually, the students come to the classroom with a knowledge that is acquired from their previous experiences. Therefore, when the teachers instruct, they must engage the prior knowledge of students with what is currently taught in order to strengthen the students’ understanding as well as enabling them to use and apply the new concept outside the classroom. The second principle stipulates that students must have a strong and deep factual knowledge and be able to understand the ideas and facts based on a conceptual framework. This kind of teaching method encourages students to dig deeper and inquire about additional information. In addition, it enables them to organize their knowledge that facilitates retrieving and applying them in new situations. The third principle is that teachers should use metacognitive strategies in order to “help students learn to take control of their own learning by defining learning goals and monitoring their progress in achieving them” [16]. All three principles assist teachers to make the information that is taught inside the classroom beneficial, meaningful, and lasting. According to the three key principles, when teachers instruct twice-exceptional students, they must stimulate those students’ prior knowledge. In addition, they must help gifted students with learning disabilities to build a conceptual framework on their own in order to organize and add new and fragmented ideas into a more understandable way. Moreover, these students need to develop their ability to self-regulate so that these students can control and direct their own learning, feelings, thoughts, as well as behaviors during instructional activities [16].

Coleman developed four variables that can facilitate the success of gifted students with learning disabilities. These variables are time, structure, support, and complexity, all of which are completely related and derived from the three key principles of learning. Each one of these variables works “like a rheostat, with individual students requiring differing levels of intensity for each variable to enable them to be successful” [16]. For the first variable which is time, twice-exceptional students differ in the amount of time they need to complete the work successfully depending on the task and topic. In this case, the teachers need to know how to use the available time flexibly in order to provide more time for students who need it while allowing others to progress in accomplishing tasks more quickly. Differentiated instruction is the most effective way teachers can use time efficiently, because it enables them to know where the students are in their learning progress through identifying three main things. These things are what students know, what students do not know, and in which area they have misconceptions. Coleman called this type of instruction “dynamic assessments”. This kind of assessment is not to be done by

traditional ways of assessment, but teachers can do it through observing these students when they are involved in classroom activities as well as designing multi-level assignments. By using dynamic assessments the teachers will be able to associate the instruction with students' academic needs because they will give some students additional time to master basics (what they do not know) while giving other students more challenging activities to enrich their learning (what they know). In addition, it enables the teachers to create specific activities that help students understand more and correct their thinking in the areas of misconceptions. For most students without a learning disability, additional time is not necessary because they process information very effortlessly compared to the gifted students with learning disabilities. Coleman stated, "In fact, some students actually do worse when given extended time because they go back and change their initial answers" [16].

The second variable that can facilitate students' success in learning is structure. The concept of structure in this variable consists of three areas: the structure of curriculum, the structure of teachers' pedagogy, and the structure of the classroom. Using each area can help teachers to develop the learning abilities of twice-exceptional students. The first aspect, structure of curriculum and content, requires teachers to determine the big and main idea that students should pay attention to and focus on. Coleman [16] mentioned that this way of teaching is summarized in the words of Alfred North Whitehead (1929) as he stated that the main ideas that are implicated into a curriculum should be few and important, as the student should realize how these principles can be applied in the actual life.

The second area of structure is associated with how teachers present the learning tasks. The students with learning disabilities often forget the prior fundamental information and ideas after completing their tests because they want to offer more space in their mind for new information. Coleman advised teachers to use the graphic organizer strategy in order to help their students to connect their prior knowledge with what they will learn. She stated "[t]he use of graphic organizers to explicitly show relationships across ideas is central to helping students make the connections needed to build conceptual understanding and to facilitate retrieval of information and, thus, learning" [16]. In addition, using the graphic organizers is the best strategy to help these students to understand the big picture. Also, it helps them overcome the difficulties that are associated with their poor organizational skills [1]. The final aspect is the structure of the learning environment. Coleman stated that teachers should organize a classroom to be a supportive and responsive environment for students' needs [16]. According to Clark [7], creating a responsive environment for students is a basis of good education for all students without exception. She believed "all students benefit from an environment that is cognitively, physically, socially and emotionally responsive to them" [7]. She described this environment as flexibly organized to provide students with an integrated learning organization that corresponds with their own achievement level, optimizes and facilitates their learning, allows them to learn at their own pace and style, and offers appropriate learning opportunities and experiences for each individual [7]. In addition, Trail

[2], Baum and Owen [3] have stated that is extremely important for twice-exceptional students to be provided with the supportive environment that values and respects the individual differences among students as well as focuses on developing their strengths, intellectual capabilities, and interests rather than their disabilities.

The third and fourth variables are support and complexity. Coleman [16] concluded that emotional support, external scaffolding, and advocacy are the main three aspects of the variable of support. The teachers must support the twice-exceptional students emotionally by creating an appropriate climate in order to nurture their strengths and abilities. In addition, they should minimize the effects of their disabilities by offering external scaffolding and assistance in the classroom such as using direct instruction, technological modifications, tutorials in areas of need, and remediation in the areas of weakness. Moreover, they should encourage the twice-exceptional students to be self-advocates by teaching them how to know their strengths and needs in order to foster their abilities toward success as well as build their self-confidence. For the complexity variable, Coleman [16] identified it as the sophisticated level of thinking that students experience occurs as a result of teaching dense information at any subject. It is an exploration process that educators involve with their students to ensure that students think deeper and understand stronger.

According to Coleman, most teachers who work with students with learning disabilities avoid or reduce the complexity in order to make the task or content much easier. In the case of twice-exceptional students, she believed that teachers must keep the complexity at a high level as much as possible while modifying the other three variables (time, structure, and support) in order to encourage students to think deeply and use what they learn in new situations. The main strategy that can be used to keep the complexity at a high level is questioning. Teachers can use the taxonomies of Bloom and Marzano to make different questions that promote and develop students' thinking [16].

Intervention. The main purpose of creating and applying intervention plans is to help twice-exceptional students overcome their learning problems. Baum and Owen [3] have developed an Individual Educational Program (IEP) for gifted students with learning disabilities that are unlike other programs which focus only on the disabilities regardless of the giftedness and talent of these students. One of the most important components of the IEP is classroom intervention strategies. Baum and Owen emphasized that the teachers must have a deep understanding and knowledge about the duality of students' needs and abilities. In addition, the teachers should differentiate the curriculum and instruction to be more suitable for their unique learning needs. Moreover, Baum and Owen have mentioned that the twice-exceptional students must develop their self-regulatory skills and become aware of how they learn best, this will make them able to use their own compensation strategies as long as they are still learning. Furthermore, the classroom teacher, special education specialists, gifted education specialists, as well as the G/LD student must work cooperatively to fulfill the goals and targets of intervention programs [3]

Pereles, Omdal, and Baldwin [9] have discussed the Response to Intervention model (RtI) which is one of the most effective intervention models in the educational field. They have cited that The National Association of State Directors of Special Education (NASDSE) defined RtI as a “practice of providing high-quality instruction and interventions matched to student need, monitoring progress frequently to make decisions about changes in instruction or goals and applying child response data to important educational decisions” [9]. On the other hand, The Colorado Department of Education (CDE) has a broader and inclusive definition of RtI; it defined it as “a framework that promotes a well-integrated system connecting general, compensatory, gifted, and special education in providing high quality, standards-based instruction and intervention that is matched to students’ academic, social-emotional, and behavioral needs” [9]. Pereles et al. have preferred the definition of the CDE, because it allows educators to apply the intervention strategies based on the core principles for all students, particularly twice-exceptional learners, to address their complex needs. Additionally, Pereles et al. have discussed the importance of labeling twice-exceptional students based on their behaviors, strengths, weaknesses, and needs. They have considered this issue as one of the most important steps before designing or applying the intervention plan, because it allows educators to develop an effective educational plan and provide appropriate services for twice-exceptional students [9].

According to Pereles, Omdal, and Baldwin there are a number of different intervention models in the educational field in addition to RtI. Generally, to design a successful plan, there is a fundamental set of core principles that guide educators to practice intervention strategies in an effective manner including RtI. These core principles are: all students can learn, early intervention, tiered interventions, use of data, collaboration, and family engagement. These were developed and adapted by The Colorado Department of Education based on “a review of the literature on RtI, as well as practical application of these principles” [9]. For the first principle, it is important for educators to believe that all students can learn and achieve if they are provided with “a rigorous, standards-based curriculum and research-based instruction” [9]. Pereles et al. have mentioned that inquiry-based instructional strategies are very useful for twice-exceptional students because these strategies meet the needs of gifted students in all educational settings. In addition, twice-exceptional students will be provided with clear expectations, clear guidance, and appropriate learning opportunities when teachers use inquiry-based instruction [9].

The second principle relates to when the plan must be applied. In fact, the intervention must be provided for students at the earliest sign of need or problem. The problem in this principle refers to an educational need for acceleration, enrichment, and remediation. According to Foley Nicpon, Allmon, Sieck, and Stinson [4], when twice-exceptional students are “being faced with frustration and misunderstanding from the onset of school [it] could be devastating to a young learner and might prevent him or her from gaining confidence, self-efficacy, motivation, and excitement about learning” [4]. Because of this, early intervention is crucial. Usually, the twice-

exceptional students mask their diverse needs at the beginning of the school year. This action makes the teachers unable to identify their talent and disability which is essential to provide an appropriate education for them. “If caught early enough, remediation for a disability can make a significant difference for a twice-exceptional child and change the school experience to a more positive one” [9].

The third principle is based on providing the intervention in a tiered manner. According to Pereles et al. [9] and Trail [2], there are three tiers of intervention. They are universal intervention, targeted intervention, and intensive intervention. The first tier is focusing on providing high-quality education and curriculum for approximately 80% of the students. This kind of intervention is accomplished by the classroom teacher. The second tier, which is targeted intervention, is provided by an educational team that includes the classroom teacher, a gifted education specialist, and a special education specialist to address the needs of 10-15% of the students. Targeted intervention is provided for students when they are not progressing in the regular classroom, need additional challenges, face difficulties in learning, or have social and emotional needs. The third kind of intervention is intensive intervention which is more useful for twice-exceptional students than other tiers. This tier is provided by a collaborative team which consists of the classroom teacher, a gifted education specialist, a special education specialist, school counselor, parents, and the student. The main functions within this tier are collecting qualitative and quantitative data of the student’s progress; making instructional and intervention decisions based on collected information; and identifying students’ strengths, weaknesses, and the variables that may affect his/her achievement [2]. Pereles et al. [9] have deemed that this multi-tiered system has significant advantages for twice-exceptional students, because each twice-exceptional student has not only characteristics of giftedness, but also has characteristics in one or more areas of disability and exceptionality. This unique mix of characteristics and abilities make addressing the multiple and diverse educational needs a difficult process [9].

The fourth principle is related to how the collected information can be used efficiently and its effects on students’ achievement. According to Pereles, Omdal, and Baldwin [9], the effective use of data in a RtI model is important to assist educators in making instructional decisions through the different tiers of intervention. The fifth principle is the collaboration among educators, parents, and community. This principle is essential during applying or designing intervention strategies, because the purpose of creating a collaborative team is to apply instructional decisions that are based on data, to monitor the student’s achievement and progress, to ensure that strategies are applied correctly, and to examine and evaluate the effectiveness of the plan. Pereles et al. have mentioned that “[t]he effectiveness of the problem-solving process is increased when collaborative consultation is added” [9]. The final principle is the importance of family engagement in the intervention process. Pereles et al. have mentioned that several researchers proved that there is a positive relationship between family engagement and student achievement. In the case of twice-exceptional students, they are at risk for failure and underachievement

more than regular students; also, some of them seem different at home than in a school environment as a result of feeling more supported at home. Thus, fulfilling the main purpose of the intervention, which is improving student outcomes, will be much easier and more effective when families are involved actively through RtI and other intervention models.

Foley Nicpon, Allmon, Sieck, and Stinson [4] in their article, "Twice-Exceptional Learners: Who Needs to Know What?" have discussed the effects of intervention on twice-exceptional students and how it can contribute in improving students' outcomes and their social and emotional lives. They have found that there are many students who possess a higher than average intellectual capability and were identified as students with learning disabilities. Consequently, labeling these students as special students prevents them from receiving services for their strengths as well as for their areas of weakness. In addition, the researchers who examined the effective interventions for gifted students with learning disabilities found that "participation in yearlong interventions aimed at building strengths while addressing weaknesses showed a significant improvement in attitude toward school and self-concept" [4].

The biggest problem facing the twice-exceptional students in their academic experiences is the lack of awareness by the staff in the school system about who the twice-exceptional students are, or that students could have both exceptionalities [15]. Foley-Nicpon, Assouline, and Colangelo [13] have discussed in their work titled "Twice-Exceptional Learners: Who Needs to Know What?" the level of familiarity and awareness that teachers have about the different issues of twice-exceptional students. They have found that the special education teachers were more familiar with special education instruction than gifted and general education teachers, whereas the gifted education teachers were more familiar with gifted education instruction than special and general education teachers. In addition, all three groups of teachers seemed familiar with the general concept of twice-exceptionality; however, gifted education teachers were more familiar and "seemingly have the greatest understanding about the twice-exceptionality in general" [13]. As a result, they have concluded that:

[A] though knowledge of twice-exceptionality among the sample appears adequate, there may exist an underlying inadequacy in our educational system to deal with the complexity that twice-exceptional students bring to our schools, and a lack of experience in dealing with specific exceptionalities [13].

Therefore, the teachers who will work with twice-exceptional students must be familiar and have enough knowledge about both gifted and special education instruction because these students need support from both educational programs. In addition, they need training and practice in gifted education in order to be able "see beyond a student's disabilities and recognize his or her gifts and talents" [17]. Foley-Nicpon et al. [13] believed that we as educators "need to do a better job of disseminating information regarding their unique strengths and potential areas for growth. Increased competence regarding twice-exceptional students' needs is the first step toward valid identification and programming for this group of learners" [13].

The lack of familiarity of the twice-exceptional students and their specific learning patterns and needs is not limited to the teachers, but it also includes the schools. Neumeister, Yssel, and Burney [18] have conducted a study on the primary caregivers of twice-exceptional students in order to examine their role in fostering the success of these students. They have found that the schools do not address either exceptionality; neither do they provide them with sufficient learning opportunities. Therefore, most of these students' families assume that their primary responsibility is seeking out additional support from outside schools such as looking for alternative schools or participating in summer programs [18].

II. METHODOLOGY

The main goal of this research is to inform teachers of the issues surrounding twice-exceptional students and to assist them in supporting and instructing this unique set of students. By addressing and understanding the characteristics, social and emotional needs, and teaching practices that are most appropriate for these learners, teachers will be equipped to educate twice-exceptional students successfully within a general classroom setting. Sources are collected via several ways such as published books and published articles in specialized journals, regardless to the quality and with no disregard to any study. When data were collected, there were two inclusion criteria considered in order to support the goal of this research and reach to a conclusion. First criterion, only studies focusing on twice-exceptional students that were published within the last ten years (2003 – 2013) were reviewed. Second criterion, from this body of publications only those discussing gifted students with learning disabilities were examined. Each article and book was reviewed and only pertinent information was compiled. In addition, each source was analyzed in depth to find indisputable information in order to prepare teachers to understand twice-exceptional students. The collected data was then coded according to the three main themes of the research that are: characteristics, social and emotional needs, and teaching practices. Then, the information relating to the practical aspect of educating twice-exceptional students was synthesized. All of the collected sources were analyzed based on the criteria we collected as described above, and conclusion was drawn based on the data analysis in this work.

III. DISCUSSION

It is important for educators to know about twice-exceptional students to develop their high abilities, skills, and potential in general. In addition, some of these students might appear to be regular students or even students who are intellectually challenged in the classroom because their giftedness and disability mask one another. Thus, teachers need to know about their characteristics and learning patterns to educate them appropriately or make them eligible to receive services from both gifted and special education programs. Moreover, because these students are a part of a community, they need to be provided with an appropriate education and experiences that enable them to be noble and active citizens in the future.

Twice-exceptional students possess unique characteristics as a result of sharing the traits of both gifted students and those with learning disabilities. They resemble the gifted

students in having high intellectual abilities and positive attitudes toward learning; however, they are deficient in the necessary areas for school success which make them unable to demonstrate their skills in learning situations. Twice-exceptional students have high abilities in areas of verbal expression, abstract conception, creativity, imagination, critical and analytical thinking, problem solving, reasoning, and superior vocabulary; on the other hand, many of them suffer from a lack of social skills, social isolation, setting unrealistic self-expectations, perfectionist tendencies, distractibility, frustration, low self-esteem, fear of failure, academic underachievement, poor organizational abilities, poor writing and reading skills, difficulty with long term and short term memory, and inflexibility in learning and social situations. As a result, there is a discrepancy in their ability which consequently influences their attitude, behavior, performance, and academic achievement within school life. Therefore, teachers need to understand the characteristics and learning patterns of twice-exceptional students to be able to identify them and their exceptional needs.

Dealing with such a special population of students requires very well trained educators, who can boost students' skills and potentials. Thus, there are certain features that enable teachers to help these students overcome their disabilities, develop their giftedness, and accommodate their strengths and weaknesses to be more successful in school. Moreover, understanding and identifying their areas of strength and areas of challenge is a key element that must be relied on during planning and providing programs, services, instructional activities, and successful intervention.

The discrepancy in the capability of twice-exceptional students is considered the biggest challenge that these students face and this inconsistency also causes social and emotional problems for these students. Also, it complicates the educators' work in providing them with a safe social and emotional environment. As reviewed before, even though twice-exceptional students possess high intellectual abilities, their deficient areas are related to the basic skills that they need to interact socially, accomplish academic assignments successfully, and behave appropriately. They have belief in their abilities and expect that they can do complex tasks easily (as gifted students); however, they fail frequently in accomplishing tasks in real learning situations (as disabled students) because of their lack of skills. Thus, they frequently have low self-concepts and low self-esteem which subsequently causes them to feel frustrated, avoid doing tasks, and have fear of failure with future assignments. Because of that, they tend to hide their feelings of need and frustration in order to protect their gifted identity. Furthermore, because of their lack in social skills, they do not often fit in with their peers in classrooms, they prefer isolation, and have difficulty in interpreting the social cues and finding solutions to their social problems.

Therefore, teachers need to understand that the social and emotional needs of twice-exceptional students should be viewed as individual needs, neither gifted needs nor special needs, and these needs should be met on a daily basis through different activities. Twice-exceptional students need to be taught and provided with the activities that promote their self-concept, self-esteem and self-

advocacy to be able to identify their areas of strength and challenge, respect themselves, and use their gifts to compensate for their deficient areas. In addition, they need to be given complex activities, like those that are given to gifted students, so that they can feel more confident in their ability. Furthermore, these activities should be given with clear instructions in order to enable them to succeed and avoid their fear of failure. In addition, another goal of these activities should be to assist twice-exceptional students to develop their social skills, promote their relationships with peers, practice social interaction, and learn how to think about others. Also, when teachers plan for intervention one of the key goals must be addressing the social and emotional needs of these students. When students are provided with a supportive and responsive environment for their different needs, they will become socially active and emotionally safe within the classroom, school, and thus society.

When teachers educate twice-exceptional students in general education classrooms, they may need to incorporate their teaching practices into a comprehensive plan that enables these students to receive more appropriate education. The teaching practices include three main aspects: programs and services that are provided for students either in or out school, instructional strategies that are used in the classroom, and intervention programs that are designed to improve their outcome.

To achieve desirable outcomes from the plan, general education teachers must train and have knowledge, albeit surface knowledge, about both gifted education and special education in order to identify the strengths and weaknesses of twice-exceptional students. Not only this, but they also need to work within a cooperative team of experts that consists of the general education teacher, the gifted education teacher, the special education teacher, a counselor, parents, and the student. The goal of establishing a cooperative team is to address and support a twice-exceptional student comprehensively. Each team's member has a specific role, general education teacher to delivering content, gifted education teacher for fostering giftedness, special education teacher for teaching compensatory strategies, and counselor for discovering unidentified needs. As reviewed before, the twice-exceptional student has unrealistic self-expectations that influence their goals; because of this the teacher should get the student involved in setting the goals of a plan in order to develop his/her ability to set academic and life goals in the future. The comprehensive plan should be started with collecting accurate information about strengths, weaknesses, as well as the social, emotional, and academic needs of a student in order to design a plan on an individual basis. Then the team must work collaboratively to create and set out needed programs, services, and instructional strategies.

When programs and service are focused on addressing the deficient areas of these students, they will fail to accomplish the desired results and make students have poor self-esteem. Thus, all programs and services that will be provided for twice-exceptional students should aim to offer a responsive environment, to nurture their gifted potential, to support their different needs, to enhance their academic achievement, and to teach them necessary skills of school success. In addition, they should aim to develop the self-awareness and self-concept of twice-exceptional

students that is important for positive and healthy growth by providing them with a wide range of learning opportunities and challenges. As reviewed before, the needs of twice-exceptional students are not always addressed in the classroom or school. In addition, these students have thought that the school is for either success or failure which makes a noticeable discrepancy between their performances in school and out of school as well as frustration and fear of failure during classroom activities. Thus, these students need to receive additional services and participate in extra-curricular activities. This will enable the students to have more confidence in their abilities and recognize that success is not measured only in school. Moreover, offering tutoring classes in the areas of challenge should be taken into consideration in order to help them move toward success in their academic life.

As mentioned before, twice-exceptional students have great potential and high intellectual abilities that enable them to excel on tasks requiring abstract and complex ideas, but their deficient areas often impact their capabilities. Therefore, teachers need to understand that these students need to be taught interdisciplinary curricula and complex topics to enable them to use their skills of advanced knowledge, creativity, reasoning, problem solving, as well as critical and abstract thinking. In addition, the twice-exceptional students are interested in the big picture ideas more than small details, so teachers should focus on generalization and main concepts. Moreover, because these students have difficulty in organizing information which impacts their ability to find out the relation between topics, teachers should use and teach them how to use graphic organizers in order to assist them to build the relationships across ideas and process information smoothly. Furthermore, twice-exceptional students need to be taught how to use the strategies of accommodation and compensation to be able use their strengths to overcome their weaknesses as long as they are still learning. The student's growth and progress should be monitored during the application of the plan by all team members to provide accurate data about a student's progress. Finally, the comprehensive plan should not only be implemented, but also evaluated and followed up to examine the extent of its success and to determine if there is a need to modify the plan or add new suggestions to be more effective.

Indications for Future Research.

At the conclusion of the present research, there are several further questions and methodological tools that should be considered for future research. As mentioned before, parents of twice-exceptional students play a significant role in their children's education. Thus, there are some questions regarding parents that need to be addressed. These questions revolve around the importance of the parents' role in educating twice-exceptional students, and how they can foster twice-exceptional students' success. Another question that needs to be considered in future research is what are the roles and responsibilities of a school principal, school counselor, school psychologists, and local school district in supporting teachers to increase the achievement of twice-exceptional students. As discussed before, the different needs of twice-exceptional students are not always met inside the classroom or school. Also, students perform better when they are involved in non-instructional

activities outside classroom and school. Thus, the question that needs to be considered regarding this matter is how teachers can use the community resources in the best way in order to support the learning of twice-exceptional students. Furthermore, using technology in teaching students with learning disabilities has become important because it enables these students to reach high levels of achievement as well as overcome their disabilities. Therefore, it is suggested that future researchers need to examine how technology can be used to support teaching twice-exceptional students and to enhance their learning. Another area for future research might include conducting interviews with both teachers and twice-exceptional students in order to conclude what the best qualities and strategies for teaching twice-exceptional students are in the general education classroom.

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