Autism Spectrum Disorders and Implications for Teachers

Crystal Echaniz, M.A.
Harmony School of Innovation, El Paso, Texas.

Kathleen A. Cronin, Ph.D.
New Mexico State University

Abstract

This paper reviews characteristics of autism spectrum disorders (ASD), possible causes of ASD, current demographic information, the effects on the individual with ASD and the family, as well as diversity and multicultural issues related to autism. Additionally, the paper provides pertinent information about students with ASD for both general education and special education teachers including a review of special education laws, pedagogical strategies, the individual education plan (IEP), the use of behavior plans, accommodations and modifications appropriate for students on the autism spectrum, assistive technology, and professional development.

Definition of Autism

The modern concept of autism was first introduced as "autistic disturbances of affective contact" in 1943 by Leo Kanner (Kanner, 1943, p. 217). He suggested that children with autism live in a world of their own, cut off from normal social interactions due to a failure to develop motivation, rather than a regression of social interaction. Kanner discussed eleven children who were described as rigid, inflexible, reacting negatively to any change in environment or routine, and a lack of ability to psychologically perceive the social world and make it part of themselves. He also suggested that autism could be influenced and caused by inappropriate parenting (Kanner, 1943).

In 1944 Hans Asperger published a paper in Germany in which he described a syndrome he referred to as "autistic psychopathy" (Wing, 1981). He identified four boys who had lack of empathy, little ability to form friendships, clumsy movements, and one-sided conversations which were of specific interest to them. The boys had relatively advanced grammar and vocabulary, but there was something unusual about their ability to have a typical conversation. Asperger also suggested that the disorder is a life-long and stable personality type (Attwood, 2007).

Autism, also known as Pervasive Development Disorder (PDD) or autism spectrum disorder (ASD), is a complex developmental disability which typically affects a person's ability to communicate and interact with others. It is a spectrum disorder that affects each individual differently and can range from very mild to severe. Symptoms of ASD may include: not pointing at objects or showing interest, not being able to pretend play, avoiding eye contact or wanting to be alone, having delayed speech or language skills, repeating words or phrases over and over (echolalia), obsessive interests, getting upset by minor changes, having trouble understanding

others or own feelings, or stereotyped mannerisms including hand flapping, body rocking, or spinning in circles (Centers for Disease Control and Prevention (CDC), 2012a). Autism is a triad of impairments that typically emerge by the age of three and last throughout a person's life, although symptoms may improve over time with treatment. The triad consists of impairments in social relationships, social language and communication skills, and restrictive behaviors, interests, and activities (Witwer & Lecavalier, 2008).

Autism was considered a form of schizophrenia until the 1970's, when further research proved that children with autism suffer in many other areas of development, and their behavior is very different from the typical schizophrenic (Goldstein & Ozonoff, 2009). Currently, there are five different subgroups that fall under the umbrella of PDD or ASD. They are: autistic disorder, Rett's disorder, childhood disintegrative disorder, Pervasive Developmental Disorder- Not Otherwise Specified (PDD-NOS), and Asperger's disorder (Goldstein & Ozonoff, 2009). With the adoption of the Diagnostic and Statistical Manual 5 (2013), there will be one diagnosis of autism spectrum disorder and the five disorders currently under the ASD umbrella will not exist. There is no cure for autism, but with early detection and intervention you can greatly improve the quality of life of an individual with autism.

Diagnosis of Autism

Goldstein and Ozonoff (2009) paraphrase the DSM-IV-TR criteria for diagnosis of autistic disorder:

> To qualify for the diagnosis, a child first must present at least six symptoms, with at least two from the first set of criteria and at least one from each of the second and third sets. The first set of criteria features qualitative impairment in social interaction, as manifested by (1) impairment of nonverbal behaviors, including eye contact, facial expression, body postures, and gestures of social interaction; (2) failure to develop peer relationships appropriate to the child's developmental level; (3) markedly impaired sharing of emotional states or interests with others; and/or (4) absence of social or emotional reciprocity. The second set of criteria refers to qualitative impairment in communication, as manifested by (1) a delay or complete absence of the development of spoken language, without efforts to compensate through gestures; (2) obvious impairment in the ability to initiate or sustain conversation, despite adequate speech; (3) repetitive or stereotyped use of language, or idiosyncratic language; and/or (4) lack of varied, spontaneous make-believe play or social imitative play appropriate for the child's developmental level. The third set of criteria involves repetitive and stereotypic patterns of behavior, interests, or activities, including (1) preoccupation with a certain pattern of behavior that is abnormal in focus or intensity; compulsive adherence to specific nonfunctional routines or rituals; repetitive motor mannerisms (self-stimulatory behavior); and/or persistent preoccupation with parts of objects" (p. 7).

A screening instrument is a tool used to identify infants and children who may be at risk of developmental delays compared to other children of the same age and cultural background. Most screening tools are designed to measure a broad range of developmental delays, but some are sensitive enough to identify a child who may have an autism spectrum disorder (Hall, 2009).

Different screening instruments include Checklist for Autism in Toddlers (CHAT), Social Communication Questionnaire (SCQ), Vineland Social-Emotional Early Childhood Scales (SEEC), and Temperament and Atypical Behavior Scale (TABS).

After screening tools identify children at risk, a parent or pediatrician will recommend that child for diagnostic assessment. Obtaining multiple sources, using multiple forms of measurement is considered best practice in the diagnostic process (Hall, 2009). The assessment process generally includes family interviews, observations of a child's behavior during structured and unstructured activities, and the clinical judgment of a psychologist or psychiatrist who is in charge of the diagnostic process. The instruments used in the diagnostic process may include: Childhood Autism Rating Scale (CARS), Gilliam Autism Rating Scale (GARS), Diagnostic Interview for Social and Communication Disorders (DISCO), Autism Diagnostic Interview-Revised (ADI-R), and Autism Diagnostic Observation Schedule (ADOS). There is still an urgent need for valid and reliable diagnostic instruments that diagnose other disorders under the ASD spectrum such as Asperger disorder and PDD-NOS, which may remain unresolved until there is a consensus on how to define these disorders (Hall, 2009).

Educators and related service providers such as speech/language pathologists have a number of different assessments they can choose from to plan educational and intervention strategies to help a child learn social, behavioral, communication, and educational aspects they will need to have a better quality of life. They include: Autism Screening Instrument for Educational Planning (ASIEP-2), Psychoeducational Profile (PEP), Adolescent and Adult Psychoeducational Profile (AAPEP), Functional Emotional Assessment Scale (FEAS), The McGill Action Planning System, Hawaii Early Learning Profile (HELP), Assessment, Evaluation, and Programming System (AEPS), Carolina Curriculum for Infants and Toddlers with Special Needs, Carolina Curriculum for Preschoolers with Special Needs, Creative curriculum, and Assessment of basic Language and Learning Skills (ABLLS). It is always important to continually monitor and assess children to make sure that the intervention and teaching techniques being used are working, and the student is continually making adequate progress.

Causes of Autism

There is no one single known cause of autism, but there are many likely causes for multiple types of ASD. Many people believe it is caused by genetics, others believe it is caused by environmental factors, and some think it is caused by a combination of the two. One cause that is generally accepted by most is atypical brain function or development (Autism Society, 2012a; Kaufmann & Silverman, 2010). Children with autism have abnormal timing in the growth of their brains. Studies have shown accelerated growth from birth to 12 months, from an average of 13% smaller at birth, to an average of 10% larger at one year of age, compared to a typically developing child (Vaccarino, Grigorenko, Smith, & Stevens, 2009). The cerebellum, in the lower back of the brain, which controls movements and motor function, and plays a role in actions of behavior, cognition, and emotion also tends to be enlarged (Kaufmann & Silverman, 2010).

Genetic mutations can also be associated with autism. In some cases spontaneous, or "de novo," mutations arise in a sperm, egg, or very early in embryonic development, possibly altering early brain development (Gilman et al., 2011; Levy et al., 2011; Sanders et al., 2011). Because it is a

mutation in the egg, sperm, or embryo, they are not present in the genetic makeup of either parent. Genetic mutations are known as copy number variants (CNVs), which can range from a small deletion in the genetic code to extra copies of a large DNA sequence. These non-inherited mutations affect genes or gene networks involved in brain development (Gilman et al., 2011; Levy et al., 2011; Sanders et al., 2011). Individuals with genetic and chromosomal disorders such as Fragile X syndrome, tuberous sclerosis, Prader-Willi syndrome, and Down's syndrome have a higher risk of developing an ASD, with around 10% of the ASD population identified with a genetic or chromosomal disorder (CDC, 2012a).

Many things can affect an embryo during the gestational period which may lead to risk factors for autism. A recent study by Schmidt and colleagues (2011) shows that mothers who took prenatal vitamins before, during, and after pregnancy were about half as likely to have a child with an ASD, in particular if the mother or child carries genes that increase susceptibility to autism, compared to women who did not. By analyzing the DNA of mothers and children, researchers found that women who had either one of two gene variants associated with folate regulations had five times the risk of having a child with autism if the mother did not take prenatal vitamins. Children who had one of the gene variants had seven times the normal risk of developing ASD if the mother did not take prenatal vitamins, compared to two times the normal risk if she did. This study is part of a larger project Childhood Autism Risks from Genetics and the Environment (CHARGE) which aims to increase understanding of the causes and contributing factors that lead to ASD (Schmidt et al., 2011).

The largest study to directly assess twins with autism revealed an autism concordance between identical twins at 70 percent, significantly lower than the 90 percent rate previously suggested, and around a 35 percent rate in fraternal twins, with previous studies showing little to no overlap (Hallmayer et al., 2011). This study suggests that environmental risk factors in the womb play a large role in the development of autism, but further research is needed to support that claim. Another study done by Ozonoff et al. (2011), the largest study of infants with one or older siblings with ASD found that the younger siblings have around a 20 percent chance of developing an ASD, with a higher rate of around 25 percent among baby brothers compared to 11 percent among baby sisters. These findings highlight a need for close monitoring and screening among infants with an older sibling with ASD.

The age of both mothers and fathers may also play a role in the development of risk factors associated with ASD. A study by Shelton, Tancredi, and Hertz-Picciotto (2010) shows that women over the age of 40 are 77 percent more likely than women under the age of 25 to have a child with autism, and 51 percent more likely than women aged 25-29. A study by Lundstrom et al. (2010) found that fathers under 25 and over 50 had around a 50 percent chance of having a child with ASD. Parner et al. (2012) found that for mothers under 35 the risk of having a child with ASD increased with the father's age increasing, and for fathers under 35 there was an increased risk with mother's increasing age.

Last, but not least, is the role that vaccines play in autism. Thimerisol, a mercury-containing preservative, was used in some pediatric vaccines from the 1930's until 2003, primarily in the DTP, HepB, and Hib vaccines. Oller and Oller (2010) show a direct correlation between the

rising use of these vaccines and the rising rate of autism in the United States. Some vaccines, such as influenza, and other vaccines for older children and adults still use trace amounts of Thimerisol, which the CDC claims is safe (CDC, 2012b). The measles, mumps, and rubella (MMR) vaccine has also been an area of controversy, especially after a study by Wakefield et al. (1998) claimed the MMR vaccine caused autism in nine out of twelve children involved. The article has since been retracted and Wakefield's license was revoked due to falsification of data. Further studies, including one by Uchiyama, Kurososawa, and Inaba (2007), have shown no significant link between the MMR vaccine and the cause of autism.

Demographics and Effects of Autism

Autism awareness has risen in the United States in the past decade through the hard work of parents, autism groups such as Autism Speaks and the Autism Society, celebrities, autism awareness month, autism events and fund raisers, and increased media attention. The Autism and Developmental Disabilities Monitoring (ADDM) Network is a surveillance system that looks at information obtained from eight year olds living within 14 ADDM sites in the United States, evaluates their records to determine the presence of ASD symptoms, and estimates the prevalence of ASD (CDC, 2012c). In 2012 the CDC estimated the prevalence of autism at 1 in 88, an increase of 23% when compared to the 2006 data, and 78% when compared to the 2002 data. They also estimated approximately one in 54 boys, and one in 252 girls has ASD.

Autism is a disorder which affects the lives of the family, as well as the individual who has it. In a world where most communication is done by listening and talking, deficits in verbal communication and auditory processing can cause an individual with an ASD to be disadvantaged in school, home, and work settings. Difficulties predicting what others are likely to do or think, and what might happen in a given situation, puts an individual with autism in a position where they constantly need direction and input from others (Aspy & Grossman, 2008). Difficulties with communication and social skills can also make it hard for a person with autism to obtain a job. Aspects such as job interviews, team work, social conventions such as personal space, and communicating and understanding of work related information all can pose a risk for obtaining and retaining employment (Attwood, 2007). The student's disability can cause them anxiety, stress, and depression, which can further hinder their social and communicative interactions with teachers, family members, service providers, and coworkers (Bevan-Brown, Carroll-Lind, Kearney, Sperl, & Sutherland, 2008; VanBergeijk, Klim, & Volkmar, 2008). It has been hypothesized by Groden and colleagues that "persons with autism may be even more vulnerable to the effects of stress because they may lack a repertoire of appropriate coping mechanisms" (as cited in Bevan-Brown et al., 2008, p. 23). This proves there is a great need to teach individuals with autism different ways to cope and handle their stress and anxiety.

Parents of children with autism also deal with high stress levels. In a study done by Pisula (2007) results showed that mothers worry about their children having to depend on others, the child's future and the permanency of autism, aggressive and challenging behaviors, lack of communication, and the lack of support for their children and themselves. Parents also feel frustration having to repeatedly explain their children's autism to others (Bevan-Brown, 2010). Bevan-Brown (2010) teamed up with parents to create a DVD to educate the public about children with autism and their families, and these were predominate messages parents want

others to know: ASD is not an illness that can be cured; children with ASD think and act differently, people need to accept and accommodate these differences, and include and treat children with ASD and their families with dignity and respect.

All parents want their children to be accepted by peers and to have friends to play with. Children with autism have a hard time forming friendships, and their parents know that behaviors their children have can scare off potential friends. Through education and a greater understanding of ASD, and the help of teachers and related personnel, it may be possible for children with autism to form friendships, and reduce the amount of stress on them and their family (Bevan-Brown, 2010).

Siblings of individual's with autism are also affected. There are conflicting studies as whether having a sibling with autism negatively or positively affects non-disabled siblings, with some reports showing a higher risk for poor adjustment, and others finding that siblings of children with autism being more likely to be well adjusted (as cited in Macks and Reeve, 2007). A study done by Macks and Reeve (2007) showed that siblings of children with autism have a more positive self-concept; they were more likely to have a positive view of their behavior, intelligence, scholastic performance, and anxiety; and a more positive view of their overall personal characteristics. This could be due to comparing themselves to the sibling with autism, or to a higher maturity level. The same study reported that mothers viewed siblings' social and emotional adjustment more negatively, perhaps due to the fact that because they encounter high stress levels, they assume their other children do as well, or the fact that they spend so much time attending to the needs of the child with autism that they do not have an accurate view of their other children's social and emotional functioning (Macks and Reeve, 2007).

Special Education Laws

School structures, classroom structures, and how teachers deliver education are all influenced and governed by law. The Education for All Handicapped Children Act (EAHCA), which allowed for federal regulation of free public education for all children with disabilities was introduced in 1975, amended in 1983 and 1986, renamed to the Individuals with Disabilities Education Act (IDEA) in 1990, and was again amended in 1992 and 1997 (McLeskey, Rosenberg, & Westling, 2010; Yen & Mao, 2011). IDEA was amended again in 2004 and renamed the Individuals with Disabilities Education Improvement Act (IDEIA). Court cases such as *Board of Education of Hendrick Henson School District v. Rowley (1982), Burlington Sch. Committee v. Mass. Bd. of Ed. (1985),* and *Honig v. Doe (1988)* have helped to improve the special education laws by leading to some of the updates and amendments which strengthened the role of parents, encouraged non legal resolution of disputes, and required students with disabilities to participate in the general education curriculum and state and district-wide assessments (McLeskey et al., 2010; Yen & Mao, 2011). Autism was added as a disability under IDEA in 1990 (Moores-Abdool, 2010).

Under IDEIA all students with disabilities must be provided with free and appropriate public education (FAPE) which provides appropriate education and related services at no cost to the student or their families, with a zero reject policy, occurring in the least restrictive environment (LRE) (McLeskey et al., 2010). In a LRE students with disabilities should receive services at a

location as close as possible to their home, in a classroom with nondisabled peers, with access to the general education curriculum and extracurricular activities, and removal from the general education classroom occurring only when the severity of the disability precludes the satisfactory delivery of education and related services (McLeskey et al., 2010). An individualized education program (IEP) is a document that sets the guidelines for the delivery of instruction and what related services the student is eligible for, and is also required by IDEIA. Parents or guardians have the opportunity to participate in IEP meetings and all decisions regarding assessment, identification, placement, and related services for their child. IDEIA requires the student's records to be confidential, with only those involved with the student knowing pertinent facts, and parental rights to inspect and review all information on their child (McLeskey et al., 2010).

The oldest law that protects the rights of individuals based on their disability is the Rehabilitation Act of 1973, which was renamed as the Americans with Disabilities Act (ADA) in 1990 (VanBergeijk et al., 2008; Yen & Mao, 2011). Section 504 of that act demands federally funded organizations and employers to treat disabled and non disabled persons equally. It gives access, without the threat of being denied, to rehabilitation and training for disabled individuals, and benefits a child with autism by providing special accommodations in school such as extra teacher assistance in class, or specific study areas (McLeskey et al., 2010; VanBergeijk et al., 2008; Yen & Mao, 2011).

The No Child Left Behind Act (NCLB) was introduced in 2001, and requires compliance to high standards and holds states and schools who do not meet the criteria accountable (McLeskey et al., 2010). Besides strong accountability for inadequate results, NCLB gives expanded flexibility and local control of schools, urges the use of teaching methods based on scientific research, options for parents to transfer students out of low-performing schools with occasional options for supplemental activities, and requirements for teachers to be highly qualified (McLeskey et al., 2010). With the combination of NCLB and IDEIA, general education teachers are required to adapt their instructional strategies to accommodate students with disabilities (Moores-Abdool, 2010).

Diversity in Individuals with Autism

Autism affects individuals from every walk of life, every part of the world, every language, and every culture. Culturally and linguistically diverse (CLD) children face many difficulties when it comes to the understanding and diagnosis of autism. According to Rodriguez (2009):

> Special educators face a critical need to address and document issues related to family involvement, effective intervention, and personnel preparation, in order to ensure that all individuals with autism, including CLD students with autism, may gain an education and improve their quality of life (p. 313).

ADDM estimates that prevalence among non-Hispanic white children is higher than among non-Hispanic black children and Hispanic children (CDC, 2012c). CLD students may have a late age diagnosis, or no diagnosis at all due to different points of view regarding ASD symptomology, and what resources are available to them (Morrier, Hess, & Heflin, 2008; Ravindran & Myers, 2012).

The word autism, or a disability in general, has different meanings and implications across different cultures, and cultural beliefs about cause can influence decisions about what treatments to use and what outcomes to expect (Ravindran & Myers, 2012). Ravindran and Myers (2012) state that "for the best course of care, professionals need to understand and respect families' views on autism and work toward mutually agreeable treatments that may involve a combination of biomedical and cultural practices" (p. 311). An open teamwork, family-focused model which aims to acknowledge the culture of the child, considers the child's and family's strengths and limitations, and develops an appropriate, sustainable, and sensitive intervention is regarded as best practice, but may take some explanation and convincing of families from different cultures (Ravindran & Myers, 2012). Different cultures have different beliefs about autism; some think it is curable, some cultures try acupuncture, vitamin diets, or complementary and alternative medicines. Others believe that autism is caused by sins the mother or child have committed, or by a curse put on the family, and some believe the individual with autism is a teacher who is here to bring special messages, and they may choose not to treat the symptoms because that would interfere with the delivery of that message (Ravindran & Myers, 2012). Asking parents with different cultural backgrounds what they believe caused their child's autism could help in understanding their choice of treatments and what they believe the outcome will be.

Collaboration of School Teams

With the high demands for achievement and accountability measures that have been created by IDEIA and NCLB, along with the increasing diversity of students in schools, it is more important than ever to have effective collaboration between principals, teachers, parents, and other professionals that work with students with autism. McLeskey et al., (2010) define collaboration as "teachers and other professionals working together to achieve common goals" (p. 442). There are several forms of collaboration including collaborative teams, a team of professionals who work together to address a range of different types of issues and concerns; co-teaching, a general and special education teacher working together to share the responsibility for instructing a diverse group of students in a single classroom; and collaborative consultation, two or more professionals working together to seek solutions to a mutually agreed-upon problem or issue (McLeskey et al., 2010). Professionals working together need to be flexible and develop trust and respect.

A child with autism has many needs and several professionals are involved in meeting those needs including, but not limited to, general education teachers, special education teachers, speech-language pathologists (SLP), physical therapists (PT), occupational therapists (OT), psychologists, and of course the parents, who know the child best. All of these people need to work together to create successful learning opportunities and interventions to help the student learn, grow, and succeed. Lamont (2008) suggests for a collaborative team to be successful there should be an established equality between all team members; a shared language base for all discussions, so all team members understand what is being discussed; disciplined listening which involves no one team member immediately responding with suggestions on how to solve a problem, rather a discussion involving questions and suggestions from all team members, which allows a climate of trust and mutual respect; removing barriers to engagement; and creating a shared responsibility for problem solving.

Pedagogical Strategies

There are many different techniques an educator can use to effectively integrate and educate a student with PDD-NOS or another ASD. First and foremost it is important to get to know your student, and gain their trust and respect. Teachers will have a difficult time gaining trust and respect from their students and their families if they talk negatively about their students, whether in a public, private, or school setting, it is wrong to cross that ethical boundary. By getting to know students, an educator has a better understanding of their strengths and weaknesses, and will be able to better teach them (McLeskey et al., 2010).

Drama can be used as a learning medium in which a student can explore social and moral issues, and engage in investigative problem-solving (Peter, 2009). Drama can teach students with autism to use narrative form, and in a social context it provides a way to evaluate and engage with cultural meanings. Using narrative form can teach a child with autism a form of social play, or role play, which can provide a way to explore human experiences, different perspectives, motivations, and intentions and consequences (Peter, 2009).

Involving the whole class in rules, routines, lessons, and programs is good for everyone, but is especially beneficial for a student with autism (Bevan-Brown, 2010). The class as a whole can learn skills such as being a friend, being respectful, resilience, the basic give and take of communication, homework and study strategies, and organization strategies, all without the student with autism being singled out, and possibly looked down upon. These routines and structure, and the lessons themselves can help to make the class as a whole run more efficiently and organized.

Social narratives can also be used in the classroom to help students with an ASD acquire and use appropriate social skills. They are stories represented visually that describe social situations and appropriate behaviors, and responses to the situations (Autism Internet Modules [AIM], 2012a). Social narratives can be written by parents or educators, with or without the student, and are designed to promote social understanding. They should be written at the student's language and learning levels, and use visuals to promote understanding of the content. Social narratives must be taught through direct instruction, and can be used after a social error has occurred, before a transition or a new experience, and as an intervention to reduce existing, unwanted, recurring behaviors (AIM, 2012a). Social narratives can be used to teach students an appropriate way to complete assignments and keep track of materials.

Social narratives are considered an evidence-based practice (EBP) by The National Professional Development Center (NPDC) on ASD (2102a). To be considered an evidence-based practice for individuals with ASD, efficacy must be established through peer-reviewed research in scientific journals using:

- Randomized or quasi-experimental design studies. Two high quality experimental or quasi-experimental design studies
- Single-subject design studies. Three different investigators or research groups must have conducted five high quality single subject design studies, or
- Combination of evidence. One high quality randomized or quasi-experimental group design study and three high quality single subject designs studies conducted by at least

three different investigators or research groups (across the group and single subject design studies) (Retrieved from http://autismpdc.fpg.unc.edu/content/evidence-based-practices).

NPDC on ASD has used rigorous criteria to identify twenty-four EBPs, which include video modeling, discrete trial training, functional behavior assessment, peer-mediated instruction and intervention, social skills groups, pivotal response training, and picture exchange communication system (PECS) to name a few (NPDC on ASD, 2012a).

Peer-Mediated Instruction and Intervention (PMII) teaches typically developing peers strategies to interact with, and help individuals with an ASD gain desired social skills by increasing social opportunities within natural environments, using both teacher-directed and learner-initiated activities (NPDC on ASD, 2012b). PMII targeted social skills include responding to peers, understanding peers, reciprocity, and interacting with peers. A PMII could be used when students are transitioning to a new classroom or a different school to help peers in the new setting become familiar and comfortable with the student, and to get him/her familiar and comfortable with them, as well as teach appropriate social skills and techniques.

It is important for a student with autism to have structure and routines in lessons and learning environments. Educators can achieve this by preparing students for new content by sending home unit and lesson summaries before they start, using visual organizers, using nonverbal cues to prompt attention to important information, and step by step modeling of behaviors or activities such as completing assignments, just to name a few (McLeskey et al., 2010). Other strategies that are good to use with children with autism are: incorporating interests; providing breaks to avoid over stimulation; informing peers and supporting, encouraging, and fostering social relationships; preparing for transitions; focus on using strengths; and proactive crisis support planning (Bevan-Brown, 2010).

Behavior Intervention Plans

Behavior difficulties can have widespread impact for a student with autism, and can also negatively affect people who care for them including family and educational support members (Grossman and Aspy, 2011). A functional behavior assessment (FBA) is a careful analysis of the antecedents, the events before a specific behavior, the behavior itself, and the consequences or what happened as a result of the behavior (the ABCs), which all provide insight into the function or the purpose of the behavior. An operational definition of the behavior is the first step in an FBA; this is an agreed upon definition of the behavior in observable and measurable terms (Grossman and Aspy, 2011). Once you have an operational definition, information can be collected through observation and interviews, or other techniques to determine what is triggering the behavior, and what function it serves. Some functions of behavior could include: escape or avoidance, seeking attention, sensory stimulation, access to materials or rewards, or access to a preferred activity.

An FBA can provide a more precise road map for the design and implementation of a behavior intervention plan (BIP). McLeskey et al., (2010) characterize a successful BIP by: (1) the simultaneous strengthening and reducing of targeted behaviors through the application of

behavioral techniques, (2) direct teaching of social skills, (3) emphasis on self-management and self-control, and (4) goals of student independence (p. 368). Proactive interventions also address the underlying needs of a student, and not just the surface behaviors seen. Interventions can occur at all three points of the ABCs.

The Intervention Ziggurat (IZ) is a model which facilitates the development of an individualized comprehensive intervention plan to address specific behavioral needs and global interventions (Aspy and Grossman, 2008). The IZ incorporates five critical levels, structured in a hierarchy: Sensory Differences and Biological Needs (addresses basic internal factors that impact all functioning), Reinforcement address the motivational needs required for skill development; Structures and Visual/Tactile Supports, draws on the strength of visual processing and addresses the need for order and routine that is fundamental to individuals with autism; Task Demands, understanding expectations in light of the characteristics of individuals with autism; and Skills to Teach, which targets appropriate skills to develop. An intervention plan is considered to be comprehensive or complete when intervention occurs (a) on all of the five levels described above, (b) addresses underlying characteristics, and (c) includes antecedent, behavior, and consequence strategies (Aspy and Grossman, 2008).

Communication and Language

As stated in the DSM-IV-TR (2000) one of the core deficits in autism is impaired communication, both verbal and non verbal, with levels of severity varying considerably. This shows that children with an ASD may have difficulty in acquiring speech and language, as well as difficulty understanding and using nonverbal behavior in communication interactions. Language impairments can range from a failure to develop any type of functional speech, to having idiosyncratic and spontaneous speech and language (National Research Council (NRC), 2001). Joint attention and symbol use are two core communication deficits in individuals with autism.

Joint attention is more complex than two or more people looking at the same object; it includes synchronization and understanding between the participants by coordinating attention between an object and each other (Murray, Creaghead, Manning-Courtney, Shear, Bean, & Preneville, 2008). Joint attention typically emerges between 6 and 12 months of age, and is well established by 18 months. It starts by simple gestures such as gazing or pointing, and as the child grows and develops verbal skills, it transforms from gestures to a more verbal establishment of joint attention (Murray, et al., 2008). Individuals with autism have difficulties in joint attention and gaze following, following the head and eye direction of another, and being able to attend to both objects and human cues in the environment.

There is a relationship between the initiation of joint attention and both receptive and expressive language, and without the ability to realize the attention of focus is shared, there cannot be a realization that a communicative exchange is occurring (Murray et al., 2008). For the mapping of word meanings (matching a word to its meaning or concrete object), it is necessary for an individual to have joint attention and gaze monitoring, and the lack of these can have a negative impact on language development. A study conducted by Baron-Cohen, Baldwin, and Crowson (1997) shows that only 29.4% of the children with autism could correctly map a novel word to an

object. Joint attention is impaired early in the development of children with autism, which may have a direct link to language deficiencies.

Functional play skills (e.g., using objects for what they are meant to be used for) and symbolic or make-believe play skills (e.g., using pretend actions with objects) significantly correlate with receptive and expressive language, and children with autism often have a deficit in these play areas, which could lead to deficits in communication (NRC, 2001). Children with autism often perform at same level or above in nonsocial constructive play, combining objects to create a product, as typical developing children, but have lower levels of language comprehension and symbolic play.

For children with autism who develop more advanced language skills, and move past echolalia stages (imitation of speech), problems with the grammatical aspects of language, such as the social rules and the give and take of conversation, often arise. These children may also use challenging behaviors such as self injury and aggression to get attention, and need to be considered relative to the child's ability in verbal and nonverbal communication levels, and may reflect limitations in their symbolic capacity (NRC, 2001).

With deficits in language skills there may also be deficits in reading and writing. Children with ASDs often do well at spelling and decoding, but have difficulty with language and reading comprehension (Whalon, Otaiba, & Delano, 2009). NCLB and IDEIA mandate that all children, including children with ASD, be provided with evidence-based reading instruction that includes five essential components of reading: phonemic awareness, phonics, reading fluency, vocabulary, and comprehension strategies; very little research has been done on interventions focused on these components of reading (Whalon et al., 2009). The National Reading Panel, a national panel convened by congress to assess the effectiveness of different approaches used to teach children to read, suggests grouping these into two broader sets of skills: code-focused skills (phonological awareness, phonics, and fluency; required to accurately and fluently identify words) and meaning-focused skills (vocabulary and comprehension; required for comprehending language in oral and written form).

Social Impairments

One of the main impairments of autism is deficits in social skills. The DSM-IV-TR (American Psychiatric Association, 2000) sets the diagnostic criteria for social impairments as follows:

> 1) Qualitative impairment in social interaction, as manifested by at least two of the following:
>
> a) Marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction
>
> b) Failure to develop peer relationships appropriate to developmental level
>
> c) A lack of spontaneous seeking to share enjoyment, interests, or achievements with other people (e.g., by lack of showing, bringing, or pointing out objects of interest)
>
> d) A lack of social or emotional reciprocity (p. 75)

Children with autism often do not have theory of mind (TOM), the ability to impute mental states to oneself and others, have poor executive functions (EF) which are higher order cognitive processes that guide purposeful, goal-directed behavior, such as planning, flexibility, and inhibition, and weak central coherence (CC) where the focus is on individual or local elements rather than the whole, which lead to social impairments (Pellicano, 2010a; Pellicano, 2010b; Yang, Zhou, Yaho, Su, & McWhinnie, 2009). Social narratives, social skills groups, pivotal response training, and video modeling are all good interventions to use to target development of social skills (NPDC on ASD, 2012c).

Accommodations and Modifications

Accommodations are used to help a student with autism facilitate learning, and to achieve and demonstrate the same standards required of their non-disabled peers (McLeskey et al., 2010). A visual support is a stimulus that can help a student comprehend information or demands, and can help children with difficulties in behaviors, attention, organization, sequencing, and auditory processing (Dettmer, Simpson, Myles & Ganz, 2000) . Visual supports can be especially beneficial to students who need extra assistance with organization, communication, social interaction, behavior management, and academic skills, all of which are areas that students with autism have deficits in (Breitfelder, 2008). Visual schedules are accommodations that create positive routines; promote flexibility and adaptability to change; calmly, purposefully, and independently move students through physical spaces, from one activity to the next; provide predictability by clearly showing what activities will occur in what order; and can be individualized and designed to grow with the student (Breitfelder, 2008; Hume & Odom, 2007; Marcus & Schopler, 2007; Webber & Scheuermann, 2008).

A work system is another visual accommodation that can be used with children with autism. A work system is designed to give the student a systematic strategy to approach work that needs to be completed, as well as promotes independence, and enables a student to generalize skills into other environments (Breitfelder, 2008; Hume & Odom, 2007; Marcus & Schopler, 2007; Webber & Scheuermann, 2008). A good work system should answer four questions: How much am I to do? What (and in what order) am I to do? How will I know when I am finished? What happens when I am finished? (Webber & Scheuermann, 2008). The concept of the word "finished" is an organizer, and a key motivator to keep the student on task. Types of work systems include left to right, up/down, matching, and written, which can be manipulated by moving activities, matching symbols to activities, and reading a list of activities (Hume & Odom, 2007; Marcus & Schopler, 2007; Webber & Scheuermann, 2008).

Accommodations in instruction can include listening to audio books, using word processing software with spell checkers, learning and applying learning strategies, using laptops, scribes, or tape recorders for note taking, or having a copy of lecture notes in advance to review and use during class (McLeskey et al., 2010; VanBergeijk et al., 2008). Students with autism often times need help with organizational skills. This can be done by teaching the student to use color coded folders or binders, with each class having a different color, or by using subdivided folders and binders (VanBergeijk et al., 2008). With higher functioning students, organization can also be taught with written instructions paired with picture examples. When doing large assignments, a student with autism would benefit from having the assignment broken down in to smaller

assignments, with dates to remind the student to start sections, and dates when each smaller section is due (VanBergeijk et al, 2008). Testing accommodations can be used for class tests or end-of-class assessments, and can included someone reading the test aloud to the student, providing extra time to take the test, stereo headphones for the student to wear to block out noise distractions, or providing a separate quiet location, free from distractions (McLeskey, et al., 2010; VanBergeijk et al., 2008).

Even with educators providing accommodations it is not always reasonable to expect students with autism to master the same general curriculum objectives as other students, and modifications to the curriculum can be made on an individualized basis (McLeskey et al., 2010). In these cases participation in an alternate-assessment program may be written into a student's IEP, in which "the student will demonstrate skills parallel to those of same-grade peers but qualitatively different in nature" (McLeskey et al., 2010, p. 255). This can be done by linking or aligning the standards for students with autism to the general curriculum, with different requirements for performance that are still based on grade-level standards (McLeskey et al., 2010).

Assistive Technology

McLeskey and colleagues (2010) define assistive technology (AT) as "technology that helps individuals with disabilities function more like those without disabilities by helping to bridge the gap between what a person can do and what he or she may need to do" (p. 441). Under IDEA 2004 all students eligible for special education have a legal right to be considered for an AT device, which is defined as any item, piece of equipment, or product system, whether acquired commercially of the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of a child with a disability and related AT services that directly assists a child with a disability in the selection, acquisition, or use of an assistive technology device, if they will aid the child in reaching their IEP goals (IDEA 2004, Section 602; McLeskey et al., 2010).

There is a wide variety of AT devices that help students with almost anything they need. There are AT devices for specific educational subjects such as reading, writing, spelling, and math; devices to help with deficits in communication; personal digital assistants that help students with various routines such as appointment calendars, reading e-mails, or listening to digital books; devices to help students learn social skills such appropriate greetings and recognizing emotions; and devices that can help with daily living needs such as wheelchairs for mobility, or adaptive eating utensils and toothbrushes (Ash, 2009; McLeskey et al., 2010).

A student with autism can benefit from additional classroom supports which may include sending a study guide home two weeks prior to each test, emailing assignments to the family or placing them on a teacher’s web page, providing books on tape for the student to listen as he/she reads the book, or a daily communication log or calendar. Other assistive technology for students with ASD may include an electronic organizer for the teachers to record voice directions for assignments, as well as using multimedia or PowerPoint lectures to hold their attention during instruction.

The IEP

Once a student has been identified as having a disability an IEP is created to inform educators of that student's disability, strengths and weaknesses, and to guide the delivery of instruction and related services. McLeskey and colleagues (2010) states that according to IDEIA an IEP must include:

> 1. A statement of the student's present level of educational achievement and functional performance, 2. A statement of measurable annual goals and, for students evaluated through alternate assessments, benchmarks, or short-term objectives, 3. A statement of the special education and related services and supplementary aids and services that teachers will provide to the child, 4. An explanation of the extent, if any, to which the child will not participate with nondisabled children in the general education classroom and in other school activities, 5. A statement about the child's participation in state- or district-wide assessments of student achievement, 6. The projected dates for beginning services and modifications, and 7. A statement of how educators will measure the child's progress toward the annual goals described in item 2 and how the child's parents will be regularly informed (p. 249-250).

An IEP team should consist of the parents or guardians; a general education teacher; a special education teacher; a school district representative who knows about available service-delivery options, programs, the general education curriculum, and related-service availability; a specialist who can evaluate and interpret assessments and the instructional implications; other individuals who have knowledge or special expertise about the child including related service providers, lawyers, or advocates; and when appropriate, the student (McLeskey et al., 2010).

Current Issues in ASD

With the rising number of people being diagnosed with ASD, there is a vast amount of research being done to better understand the causes, and to find the best methods of treatment. Along with the increase in diagnosis, there is a demand for qualified teachers and therapists to work with students with autism, and a great push for early diagnosis and intervention. Groups such as the Autism Research Institute, Autism Society, and Autism Speaks are some of the largest donors for autism research, including environmental factors, genetic factors, biomedical advancement, and treatment (Autism Research Institute, 2012; Autism Society, 2012b; Autism Speaks, 2012a).

With advances being made in technology, there are a variety of technologies that can be used in therapy to obtain new skills, or to modify or eliminate behaviors. There are a huge number of people that have access to iPhones, iPads, iPods, and Android phones and tablets, and there are a growing number of apps being created to use on them. Autism Speaks (2012b) has compiled a list of autism apps; it has the name of the app, what device it works on, what category it covers (e.g., communication, language, or organization), and how much it costs.

Social media can also be used to raise autism awareness, and to help parents and families find resources in their area. Right now both Autism Speaks and the Autism Society are using outlets such as Facebook and Twitter to urge elected officials to address the rising prevalence of autism,

how they would support autism research, and include autism in the Affordable Care Act (Autism Society, 2012c; Autism Speaks, 2012c).

Professional Development

With the growing number of students being diagnosed with autism, and the vast amounts of research being done on autism and its causes, new interventions being developed, and current evidence based practices, it is imperative for professionals to keep up to date with all of the new information to successfully teach students with ASD in their classrooms. NCLB requires states to give educators high quality professional development which should be evaluated to ensure mastery of the content and whether it has a positive impact on teacher effectiveness; educators and professionals who lack the necessary training to work with students with autism may struggle to deliver effective instruction or effectively manage behaviors (Bellini, Henry, & Pratt, 2011; Borko, 2004). Successful inclusion requires an educator to prepare for a student with autism before the student enters their class, and many teachers feel that they were inadequately prepared to work with students who have special needs, especially students with autism, so it is even more important for these teachers to have additional professional development (Berger, 2011; Moores-Abdool, 2010). Professional development can come in the form of external workshops or in-service training, and can lead to improvement in instructional practices and student learning (Bellini et al., 2011; Borko, 2004).

Autism Internet Modules (2012b) is an internet site designed to provide professionals and parents up-to-date information needed to help individuals with ASD reach their highest potential. They offer a series of online learning modules that include information on assessment and identification of ASDs, recognizing and understanding of behaviors and characteristics, transition into adulthood, employment, and several evidence-based practices and interventions. All module content has been written by experts in the field of autism from across the United States, has been designed according to research on how adults learn, is presented at a universal reading level, and have interactive activities that reinforce knowledge and teaches how to make current research applicable to real life (AIM, 2012b). A few modules on the list include: antecedent-based interventions, discrete trial training, functional communication training, pivotal response training, structured teaching, and social narratives.

In conclusion, there are many aspects related to educating students with ASD in which professionals need additional knowledge and skills to effectively improve the quality of education they provide to all of their students with ASD. These techniques can also be used with typically developing students. This paper has provided some background information on ASD and instructional strategies that can be used with students with ASD.

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About the Authors

Crystal Echaniz teaches special education at Harmony School of Innovation in El Paso, Texas. She has a MA in Education with a concentration in special education and Autism Spectrum Disorders.

Dr. Kathleen Cronin is an Assistant Professor at New Mexico State University specializing in Autism Spectrum Disorders. She has spent over 30 years in the public education system as a special education and general education teacher, counselor, and site and district office administrator. She has developed, implemented, and supervised programs for children with autism. She has presented at regional and national conferences on programs for children with autism. Her current research interests are in reading skills and social skills of children with autism.