Evidence-Based Practices in Educating Children with Autism

The Exceptional Children Division is committed to assisting each local educational agency (LEA) in its efforts to provide training and ongoing support to school personnel responsible for the education of students with autistic spectrum disorders (ASD). The objective of this document is to identify evidence-based practices that may serve as a framework for the training of school personnel. Individuals with autism spectrum disorders require individually designed interventions that meet their needs. In fact, no one intervention has been universally identified as being effective for all children with ASD. It is important, however, that parents and school professionals work together as a team to select empirically valid techniques (National Research Council, 2001; Olley, 1999).

“To say that a methodology is grounded in scientifically-based research means there is reliable, independent evidence that a given program or practice is effective for some individuals on the autism spectrum” (KATC, 2008). The National Professional Development Center on ASD has developed the following definition of evidence-based practices. To be considered an evidence-based practice for individuals with ASD, a practice must be supported by research studies published in peer-reviewed scientific journals that use:

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

It is important to note that the National Research Council emphasized the similarities between various treatment approaches. “Overall, effective programs are more similar than different in terms of levels of organization, staffing, ongoing monitoring, and the use of certain techniques, such as discrete trials, incidental teaching and structured teaching periods (NRC,2001, page 6). Good teaching requires knowledge and application of multiple methodologies, not just one specific model or method.

Instructional Practices

The National Professional Development Center on ASD has identified the following interventions as meeting the criteria for evidence-based practices.

Prompting- a behaviorally-based teaching strategy in which learners are assisted in some way to complete a task or activity. There are different kinds or levels of prompting that vary in the amount and type of assistance that are provided. Physical prompts, for example, may be provided by touching learners (usually on the hand) and physically guiding them. Verbal prompts may be provided by giving learners extra verbal instructions. For example, when a learner is directed to “Throw the tissue in the trash,” he or she might be verbally prompted by an adult for each step of the task, e.g., “Stand up, pick up the tissue,

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walk to the trash can, and put the tissue in the trash can.” Not all prompts are verbal. For instance, gesture prompts (e.g., pointing) provide nonverbal cues to learners regarding what they are to do next.

**Time Delay**- a process for either fading prompt use or for preventing learners from becoming prompt dependent. When implementing time delay, the teacher waits for a pre-determined period of time (typically between 5-10 seconds) after the instruction is given before the answer is prompted. For example, with a learner who is dependent on verbal prompts to identify planets, a time delay procedure might be added with the instructor waiting several seconds after the instruction before they prompt the child to point.

**Reinforcement**- a core behavioral principle and includes anything that a person does or says that increases the likelihood of a behavior happening again. In other words, when people are reinforced, they are more likely to repeat the same behavior. For example, if a learner performs a skill (let’s say tying his/her shoe) and someone says “Great job, you are so grown up!” and the learner continues to work on tying the shoe, we can assume that the verbal praise was reinforcing.

**Task Analysis and Chaining**- a teaching technique that consists of breaking a task down into small steps (i.e., task analysis) and then teaching each step until the learner can do the complete task. This technique is especially useful with skills that are physical or routine (e.g., self-care, work tasks). Chaining can be taught as either forward (i.e., start to finish) or backward (i.e., beginning at the last step of the task and then teaching the steps in reverse order). The decision to use forward or backward chaining depends on the type of task and characteristics of learners.

**Shaping**- involves the reinforcement of successive approximations of a desired behavior to assist learners in reaching a more appropriate level of skill attainment. Shaping is a strategy used naturally by parents of typically developing children. For example, when children first begin to use utensils to eat, parents praise them for utensil use, even when much of the food ends up on the child, the parent, or their surroundings. Over time, parents praise the child only for actually getting the food to his or her mouth. Shaping is often used for promoting speech development. When children begin to speak, adults reinforce vocalizations and word approximations and then encourage children to say the word correctly. For example, a child may say, “Nana.” The adult caregiver acknowledges and replies, “Nana. That’s right, say, Banana.” Shaping is especially useful with learners who give up easily or who have a long way to go from initial skill use to actual skill proficiency.

**Computer-Assisted Instruction (CAI)**- includes the use of computers to teach. Research in this area has shown an evidence-base for the use of CAI in teaching language/communication, reading (including spelling and vocabulary), and math.

**Differential Reinforcement of Other/Alternative Behaviors (DRO, DRA, DRI)**- reinforcement is provided for desired behaviors while inappropriate behaviors are ignored. Reinforcement can be provided when the learner is not engaging in the targeted inappropriate behavior (DRO), when the learner is engaging in a specific desired behavior other than the inappropriate behavior (DRA), or when the learner is engaging in a behavior that is physically impossible to do while exhibiting the inappropriate behavior (DRI).

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Discrete Trial Teaching (DTT)- a one-to-one instructional approach that teaches skills in a planned, controlled, and systematic manner. DTT is used when a learner needs to learn a skill best taught in small repeated steps. Each trial or teaching opportunity has a definite beginning and end, thus the descriptor discrete trial. Within DTT the use of antecedents and consequences are carefully planned and implemented. Positive praise, sometimes with tangible rewards, is applied to reinforce desired skills or behaviors. Data collection is an important part of DTT and supports decision-making by providing the teacher with information about the learner’s beginning skill level, progress and problems, skill acquisition and maintenance, and generalization of learned skills or behaviors.

Extinction- a strategy based on applied behavior analysis and is used to reduce or eliminate unwanted behavior. Extinction involves abruptly withdrawing or terminating the positive reinforcer that maintains an inappropriate target behavior. This abrupt withdrawal results in the stopping or extinction of behavior. The target behavior is likely to increase in frequency and intensity before it is extinguished as the learner seeks to elicit the reinforcers previously provided. Extinction is often used with differential reinforcement to increase a learner’s use of appropriate behaviors while discouraging their use of inappropriate behaviors.

Functional Behavioral Assessment (FBA)- a systematic way of determining the underlying function or purpose of a behavior so that an effective intervention plan can be developed. FBA consists of describing the interfering or problem behavior, identifying antecedent or consequent events that control the behavior, developing a hypothesis of the behavior, and testing the hypothesis. Data collection is an important part of the FBA process.

Functional Communication Training (FCT)- emerged in the mid 1980s from the literature on functional behavioral analysis (FBA) as a systematic practice to replace inappropriate or ineffective behavior serving a communicative function with a more appropriate or effective behavior or skills. It is widely used and promoted in the literature related to positive behavioral support (PBS). Within FCT, the targeted behavior is analyzed to determine its communicative function and then an alternative behavior is taught to replace it. In addition, the associated FBA identifies contingencies in the natural setting(s) that may be maintaining the undesired behavior.

Independent Work Systems- promote independence by organizing tasks and activities in ways that are comprehensible to individuals with ASD. Specifically, work systems are visually structured sequences that provide opportunities to practice previously taught skills, concepts, or activities. These systems clearly communicate which activities to complete; how many activities to complete; how to know when the work is finished; and what happens after the work is completed.

Naturalistic Interventions- include techniques that closely resemble typical interactions and occur in naturally occurring settings, routines and activities. Naturalistic strategies are considered learner-centered, in that the learner plays an active role in determining multiple aspects of the instructional interaction (e.g., choice of location, materials, persons involved).

Parent Training- Parents are often in a position to be the most effective teachers of their children with ASD. Many of the studies in the evidence-base for other types of instructional practices include parents as

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facilitators. There are some common guidelines for supporting parents to implement evidence-based practices outside of school settings.

Peer-Mediated Instruction/Intervention (PMII) - designed to increase the social engagement of children and youth with autism spectrum disorders (ASD) by teaching their peers to initiate and maintain interactions with children with autism. Specifically, the goals of PMII are to teach peers ways in which they can talk and interact with children and youth with ASD, increase the frequency with which children and youth with ASD interact with typically developing peers, extend peers' social initiations and focal children's interaction across activities in the classroom, minimize teachers'/adults' support (i.e., prompts and reinforcement), and promote interactions between typically developing peers and children and youth with ASD that are positive and natural in quality.

Picture Exchange Communication System (PECS)- PECS has been used to help children and youth with ASD develop a system for communicating with teachers, parents, and peers. PECS was initially developed at the Delaware Autistic Program by Andrew Bondy and Lori Frost as an alternative communication system and has since been demonstrated in the research literature to promote speech development and production. There are six phases of PECS instruction, with each phase building on the last. The phases are: 1) Teaching the physically assisted exchange; 2) Expanding spontaneity; 3) Simultaneous discrimination of pictures; 4) Building sentence structure; 5) Responding to, “What do you want?” and 6) Commenting in response to a question.

Pivotal Response Training (PRT) - an approach that teaches the student to respond to naturally occurring learning opportunities and to seek out such opportunities. PRT builds on children’s initiative and their own interests, and it is particularly effective for developing communication, language, play, and social behaviors. PRT was developed to create a more efficient and effective intervention by enhancing four pivotal learning variables: motivation, responsivity to multiple cues, social initiations, and self-regulation.

Positive Behavioral Intervention and Support (PBIS)- a tiered prevention and intervention approach that uses a variety of evidence-based practices to increase positive behaviors and reduce interfering behaviors. PBIS is based on the principles of ABA and focuses on identifying specific conditions in the environment that trigger interfering behaviors as well as those that support appropriate behavior.

Response Interruption & Redirection- the physical prevention (e.g., blocking) of a learner’s presentation of an interfering behavior and immediate redirection to another, more appropriate activity.

Self-Management- a method by which learners are taught to monitor and take data on their own behavior. This method is typically used with older, high-functioning learners who are capable of reflecting on their actions. Learners can be taught to self-monitor a variety of things such as alertness, activity level, concentration, and problematic behaviors.

Social Skills Groups- Social skills are best learned in the context of social situations. Research has shown that teaching skills in a natural setting can lead to improvement in social skills. Teaching and applying social skills in a support group format where opportunities are provided for interacting and practicing social skills is also a successful approach in which participants (disabled and non-disabled) often report.

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that they value the friendships they gain as much, if not more than, the skills learned during such programs.

**Social Stories**- interventions that describe social situations in some detail (highlighting relevant cues and offering examples of appropriate responding) and are aimed at helping the individual adjust to changes in routine, adapt their own behavior based on the social and physical cues of a situation, or to teach specific social skills or behaviors. They are individualized and typically are quite short, perhaps including pictures or other visual aids. Sentence types used in constructing social stories include descriptive, directive, perspective, affirmative, control, and cooperative. Refer to the work of Gray (2005) for specific instructions on creating effective social stories.

**Stimulus Control and/or Environmental Modification**- involves manipulating aspects of the environment that are known to impact a learner’s behavior. For instance, if a learner needs to access reading materials independently, then we place the materials in an obvious location and make sure that the learner has access to them. If we know that a learner is more likely to tantrum in classrooms with fluorescent lights, different lighting should be used.

**Video Modeling**- a teaching method that uses assistive technology (computers, digital cameras, etc.) as the core component of instruction. Video modeling is a growing evidence-based practice for teaching individuals with ASD and other disabilities. Video modeling has been used to teach a wide range of behaviors, including social/emotional skills, adaptive behavior, life skills, academics, and play skills. Video modeling can be applied in several formats, but each involves the following basic components: (a) the individual being taught or other models are videotaped performing some targeted behavior, (b) the video recording is then played back to the learner, and (c) the learner is prompted or asked to perform the behavior. Variations of video modeling include self-modeling, point-of-view modeling, and video prompting.

**Visual Supports**- tools that enable a learner to independently track events and activities. Visual supports may include any tool presented visually that is used to support an individual throughout his or her daily routine. Visual supports include the use of pictures, written words, gestures, objects within the environment, arrangement of the environment or visual boundaries, schedules, maps, labels, organization systems, timelines, and scripts.

**Voice Output Communication Aids (VOCA)/Speech Generating Devices**- sometimes referred to as Speech Generating Devices (SGD), are electronic devices that are portable in nature and can produce either synthetic or digital speech for the user. These devices may be used with graphic symbols, as well as with alphabet keys and are used to teach communication skills to learners with limited verbal ability.

**Administrative Practices**

The Department of Public Instruction has joined in a collaborative effort with the Justice Academy, TEACCH, and the Autism Society of North Carolina to provide clarification and training for Administrators and School Resource Officers (SROs) in the area of Autism and other disabilities. The purpose of the training is to provide information which will lead to more informed decisions on the part of the Administrators, SROs and other school personnel. It is important for all to understand that

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Administrators/SROs are charged with the safety and security of all students and this information in no way changes their authority to make decisions.

1) If the student is at-risk of involvement with the Administrator/SRO, it is recommended that the Individual Education Program (IEP) team seek a release of information from the parent/guardian if the officer is not paid at least in part by the school district. This will allow the school to be proactive in sharing information. Each district has a release of information procedure and this procedure should be followed.

2) If the student is at-risk of involvement with the SRO, parents/guardians are encouraged to introduce the student to the Administrator/SRO and share any concerns.

3) Local Educational Agencies (LEAs) shall train all school personnel regarding permissible use of restraint, seclusion and isolation. Notice, report and document all permissible and prohibitive incidences involving restraint, seclusion and isolation (House Bill 1032).

**Support Provided by the State Education Agency**

The state plan emphasizes the following elements:

1. Provide a series of training programs aimed at the eleven elements noted by the National Professional Development Center on ASD. Train teachers, paraprofessionals, and support service staff to demonstrate and apply skills. Provide multiple exposures and opportunities to practice. Active involvement in learning is essential to develop mastery of skills.

2. Provide opportunities for professionals to network and to share successes and failures through a group consultation model (list serve, regular work groups with agenda, etc.).

3. Promote administrative knowledge of the features of "research-based practice."

Training in the state will aim at three levels. 1) The Exceptional Children Division will support efforts to 'train the trainers' at both a regional and at a local level. 2) The Exceptional Children Division will encourage those trainers to provide ongoing training and support rather than solely providing consultation around difficult situations. 3) Building capacity of school-based teams in addressing the problems that they face. This school-based team training can occur in combination with existing initiatives in different LEAs and in schools. This team training could be part of a local plan that focuses on Safe Schools, the Instructional Consultation Model, Positive Behavior Intervention and Supports, the Problem-Solving Model or other initiatives as deemed appropriate by the LEA and the school.

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