Evidence-Based Practice for Teaching Academics and Pre-Academics to Autistic Learners (ages 6-22)

What is evidence-based practice (EBP)?

An intervention is an evidence-based practice when there is scientific evidence to support its claims. Evidence-based practices should be selected for implementation based on sound professional judgment, coupled with the careful review of available data, input from individuals and family members, and an honest evaluation of the educators' capacity to implement the interventions accurately.

Why is it important to identify evidence-based practices?

The long-term outcomes for autistic students and adults are greatly impacted by the types of interventions that they receive. Intervening early and with efficacy can make a difference in the academic, cognitive, social, behavioral, communicative, and self-help outcomes for autistic individuals. For this reason, extra time and resources are rarely available to invest in unproven or inconsistently effective practices. Educators, caregivers, and practitioners who serve autistic students are empowered when they can select strategies that are likely to have a maximal positive impact and will be acceptable and feasible.

TN-TAN
TENNESSEE TECHNICAL ASSISTANCE NETWORK
TN Department of Education

VANDERBILT KENNEDY CENTER
Treatment and Research Institute for Autism Spectrum Disorders

EBPs with Positive Effects in Academics and Pre-Academics

What evidence-based practices have been identified for teaching academics or pre-academics to autistic students?

The National Clearinghouse on Autism Evidence and Practice Review Team identified and published a list of 28 evidence-based practices that have positive effects on children and youth. Of the 28 practices, 21 were identified as having positive effects for academic and pre-academic development of autistic children ages 6-22. The chart below contains an explanation of EBPs with positive effects in the areas of academics and pre-academics.

Practice	Explanation
Antecedent-Based Interventions (ABI)	Arrangement of events that precede an activity to increase the likelihood that the desired behavior occurs again Examples: Providing a visual schedule for academic activities; providing a student with choices of which academic activity to complete first
Augmentative and Alternative Communication (AAC)	Interventions using and/or teaching the use of a system of communication that is not verbal or vocal Example: Using picture cards related to the content of a read aloud lesson so that students with communication challenges can hold up or point to a card to respond to questions about the story
Ayres Sensory Integration® (ASI)	Interventions that teach integrating sensory information from both the body and environment (visual, auditory, tactile, proprioceptive, and vestibular) *Ayres Sensory Integration® requires specialized training with a certified provider to implement with fidelity.*
Behavior Momentum Intervention (BMI)	Organizing activities and events in a sequence where easier or "high probability" activities or expectations are presented first, followed by increasingly more challenging activities, helping students to increase persistence with more challenging activities Example: Organizing reading center activities in a way that the student completes the easiest, most preferred activity first, followed by the next easiest/most preferred, concluding with the most challenging/least preferred activity
Cognitive-Behavioral Instructional Strategies (CBIS)	Step-by-step strategies taught to learners to help them increase self-awareness that can lead to changes in emotional states, behavior, and actions Example: Practicing progressive muscle relaxation with a student before taking a reading test

Explanation of EBPs

<table>
<tr><th>Practice</th><th>Explanation</th></tr>
<tr><td>Differential Reinforcement (DR) of Alternative (DRA), Incompatible (DRI), or Other Behavior (DRO)*</td><td>Systematically providing reinforcement to a student for either demonstrating a desired behavior rather than an undesired behavior, a desired behavior that makes it impossible to demonstrate the undesired behavior, or not engaging in the undesirable behavior

Example: Undesired behavior—touching other students during instruction</td></tr>
<tr><td colspan="2">* Differential Reinforcement of Alternative Behavior: Providing tokens for answering questions during instruction
Differential Reinforcement of Incompatible Behavior: Providing tokens for holding a pencil or other item during instruction
Differential Reinforcement of Other Behavior: Providing tokens for every 5-minute interval that passes without the student touching other during instruction</td></tr>
<tr><td>Direct Instruction (DI)</td><td>A systematic approach to teaching using carefully sequenced lessons, gradual release of responsibility, frequent opportunities for student responses, and frequent affirmative or corrective feedback

Example: Teaching subtracting within 20 using a number line by modeling the skill step-by-step while students observe, providing shared and guided practice with prompting, followed by unprompted practice where the teacher provides affirmative or corrective feedback as needed

Direct Instruction is a structured instructional model that involves a variety of lesson design and delivery strategies. Educators interested in learning more about DI can access TRIAD's related resources referenced at the end of this tip sheet.</td></tr>
<tr><td>Discrete Trial Training (DTT)</td><td>A structured, sequenced teaching method that breaks down complex skills into small, manageable steps that are taught individually with repetition, massed and/or concentrated practice, and immediate reinforcement for correct responses

Example: Teaching color recognition of blue, yellow, and red using flashcards that show the color, laying out a card on the table and having a systematic and planned prompt, reinforcement, or correction procedure

<table>
<tr><th>Teacher</th><th>Student</th><th>Teacher</th></tr>
<tr><td>"What color is this?" (yellow)</td><td>"Yellow"</td><td>"Yes!"</td></tr>
<tr><td>"What color is this?" (yellow)</td><td>"Blue"</td><td>"No. This is yellow," while pointing to the yellow card</td></tr>
<tr><td>"What color is this?" (yellow)</td><td>No response, student not attending</td><td>Teacher prompts the student by moving the card closer and saying, "This is yellow."</td></tr>
</table>

Discrete Trial Training is a structured instructional strategy that has many steps for teachers to implement with fidelity. Educators interested in learning more can investigate the Autism Focused Intervention Resources & Modules (AFIRM) module for DTT referenced at the end of this tip sheet.</td></tr>
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Explanation of EBPs

Practice	Explanation
Modeling (MD)	Demonstrating the desired target behavior by the instructor that leads to acquisition of the target behavior by the learner Example: When working on segmenting a segmenting a consonant-vowel-consonant (CVC) word orally, showing the student how (e.g., "When I break apart the word cat, I say /c/, /a/, /t/.")
Peer-Based Instruction and Intervention (PBII)	Instruction and intervention where peers without disabilities engage autistic learners in positive and meaningful social interactions or activities related to other learning goals Example: Training peers without disabilities to provide prompts and support when playing a vocabulary matching game with science content vocabulary
Prompting (PP)	Visual, gestural, or physical assistance given to learners to support them in acquiring or engaging in a target behavior or skill Example: Asking students to name the next step to solve a math problem, while gesturing to an anchor chart that lists the steps
Reinforcement (R)	A response following a learner's use of a desired skill or behavior that increases the likelihood that the behavior will occur again Example: Providing verbal praise and a token for a student's token chart when they complete an answer on a worksheet correctly
Response Interruption/ Redirection (RIR)	The use of prompts, comments, or other distractions when a student demonstrates an interfering behavior to shift the student's focus away from that behavior, ultimately leading to its decrease Example: Sitting down next to a student who puts their head down when presented with independent work and calmly saying their name (response interruption), and then prompting the student to do the first problem or part of the task together (redirection)
Self-Management (SM)	Instruction that helps students monitor and record their own behaviors, reflecting upon their behavior and rewarding themselves for demonstrating appropriate behavior Example: Providing a student with an answer key to check his or her accuracy on a worksheet once it is complete while having the student give themselves one tally mark for each answer they got correct on the first try

Explanation of EBPs

Practice	Explanation
Social Narratives (SN)	Interventions that describe social situations to highlight relevant features of a target behavior or skill to increase appropriate responding Example: Providing students with a narrative about how to ask for help when they get stuck during independent work
Task Analysis (TA)	Dividing an activity or behavior into small, manageable steps to assess or teach the skill Example: Providing a written list with photos to show the steps to complete a matching activity
Technology-Aided Instruction and Intervention (TAII)	Instruction or intervention based on a computer, tablet, or special app that promotes further practice of a previously introduced skill or behavior Example: Using an app on a tablet for a student to practice letter sounds after they've already been introduced in whole- and small-group instruction
Time Delay (TD)	Systematically fading prompts during instruction using a short delay between the initial instruction and additional prompts Example: In early phases of instruction, giving an instruction followed immediately by the prompt (e.g., "What is 3 + 5?", and then immediately saying, "8"); in later phases, increasing the amount of time between the instruction and the prompt (e.g., "What is 3 + 5?" and then waiting 2 seconds before prompting, "8")
Video Modeling (VM)	Instruction involving recording a model demonstrating a skill or a behavior that shows a learner exactly how to complete the skill accurately and showing the video recording to the student Example: Creating a video example showing a student how to complete a multi-step math problem
Visuals (VS)	A visual display that supports the learner in engaging in a desired behavior independent of additional prompts Example: Providing a student with an anchor chart showing them the steps to writing a complete paragraph with an introduction, details, and a concluding sentence

Steinbrenner, J. R., Hume, K., Odom, S. L., Morin, K. L., Nowell, S. W., Tomaszewski, B., Szendrey, S., McIntyre, N. S., Yücesoy-Özkan, S., & Savage, M. N. (2020). *Evidence-based practices for children, youth, and young adults with Autism*. The University of North Carolina at Chapel Hill, Frank Porter Graham Child Development Institute, National Clearinghouse on Autism Evidence and Practice Review Team.

Considerations

What are some considerations for educators when choosing EBPs to teach academics and pre-academics?

Selecting evidence-based practices for teaching academics or pre-academics to students should be individualized. Staff members should consider the following points:

- research and evidence about the EBP, its uses, and implementation;
- professional judgment and data-based decision-making;
- family values and preferences;
- school staff's training and comfortability with the EBP; and
- school staff's capacity to implement the EBP with fidelity.

School staff members should also determine if the EBP(s) being considered:

- can be provided in a respectful manner to meet learners where they are developmentally;
- can be provided in a way that focuses on teaching useful skills to students' everyday life; and
- will promote skills that improve students' quality of life.

EBPs for teaching academics and pre-academics are rarely implemented one at a time. Often a combination of two or more EBPs can be used in conjunction to promote student academic progress. For example, when implementing **direct instruction**, teachers likely need to consider **prompting** and **reinforcement** strategies to maximize student success and engagement. When implementing **peer-based intervention and instruction**, staff may need to use **modeling** for both the peers and target student, along **with social narratives** to ensure all students have clear understanding of the procedures and expectations. School staff working to implement multiple EBPs into academic and pre-academic planning and teaching should consider how several EBPs could be used simultaneously or how additional EBPs could be used in conjunction with district-approved core or intervention curriculum.

Resources

TRIAD Resources

TRIAD is a proud member of the Tennessee Technical Assistance Network (TN-TAN) through the Tennessee Department of Education. Through this network, we provide interactive training and consultation for administrators, teachers, paraeducators, school psychologists, and other professionals serving Tennessee students, including autistic students, in K-12 school settings. Email triad.doe@vumc.org with any questions. triad.vumc.org/schools

- ❏ TRIAD offers Brief Online Training Sessions (BOTS) and archived webinars to provide information on evidence-based practices for autistic individuals. Check the online learning portal to access these free trainings and resources. To access, users must first register for an account at triad.vkclearning.org.

  To directly access TRIAD's modules about the EBP direct instruction, log in and launch at https://bit.ly/3F9WEYB.

- ❏ TRIAD offers live workshops and webinars that engage participants in interactive learning opportunities. The webinars include a variety of topics that enhance professional knowledge in serving autistic students in the K-12 setting. vkc.vumc.org/vkc/triad/autismtrainings/

Other Resources

- ❏ National Autism Center's "An Educator's Manual to Evidence-Based Practice and Autism, 2nd Edition" (must create a free account to access) nationalautismcenter.org/resource-library/for-educators/

- ❏ 2020 EBP Report from the National Clearinghouse on Autism Evidence and Practice ncaep.fpg.unc.edu/research-and-resources

- ❏ Autism Focused Intervention Resources & Modules (AFIRM) (must create a free account to access) afirm.fpg.unc.edu/afirm-modules
  - » Direct Instruction: afirm.fpg.unc.edu/direct-instruction
  - » Discrete Trial Training: afirm.fpg.unc.edu/discrete-trial-training