

An Overview of The Autism Curriculum Encyclopedia, Rethink Autism, and Autism Apps

Lauren Anderson

Summer, 2016

Superheroes social skills training, Rethink Autism internet intervention, parent training, evidence-based practices classroom training, functional behavior assessment: An autism spectrum disorder, evidence-based practices training track for school psychologists

US Office of Education Personnel Preparation Grant H325K12306

Principal Investigators:

William R. Jenson, PhD

Elaine Clark, PhD

John Davis, PhD

Grant Director:

Julia Hood, PhD

University of Utah
Department of Educational Psychology
School Psychology Program

Introduction

The purpose of this monograph is to provide an overview of two web-based services available for individuals with autism spectrum disorder (ASD). The programs discussed in this monograph include the Autism Curriculum Encyclopedia (ACE®) and Rethink Autism. The description of these systems will include an overview of both curriculums, evidence-based components, parental involvement, effectiveness, and cost. There are no published outcome studies on either program; therefore, components of each program will be discussed in regards to the appropriateness of their application in teaching individuals with ASD. Additionally, this monograph will include a brief description of Autism Apps and its features.

Autism Spectrum Disorder

According to The Centers for Disease Control and Prevention (2016), autism spectrum disorder (ASD) is a neurodevelopmental disability that affects 1 in 68 children and is 4-5 times more common in boys than girls. The causes of ASD are complex. Causes include genetic predisposition, environmental factors, and other unknown factors. Some of the features of ASD include difficulty with social skills, communication, and restricted/repetitive behaviors and interests. Autism is a spectrum disorder meaning that symptoms range from mild to severe.

Children can be diagnosed with ASD as early as 2 years of age. It is important to intervene as early as possible in order to gain skills and achieve better outcomes. In a study examining the outcome of community-based early behavioral interventions for children with autism, Smith, Klorman & Mruzek (2015) stated, “multiple systematic reviews and meta-analyses have concluded that cognitive and academic growth in some of these children is accelerated by early intensive behavioral intervention (EIBI)” (Klorman et al., 2015; Reichow 2012, p. 1271). In a meta-analytic study conducted by Peters-Scheffer, Didden, Korzilius, &

Sturney (2010) it was found that “experimental groups who received EIBI outperformed the control groups on IQ, non-verbal IQ, expressive and receptive language and adaptive behavior” (p.1). Results of these studies support the use of early intervention programs for children with ASD.

Autism Programs

There are a number of early intervention, ABA based programs available, but some can be very costly. The Centers for Disease Control and Prevention (2016) state, “In addition to medical costs, intensive behavioral interventions for children with ASD cost \$40,000 to \$60,000 per child per year”. This can place a financial burden on parents in their attempt to provide services for their child. However, some web-based programs can be a cost effective way to provide intensive behavioral interventions for children with ASD. They can provide accessibility to research-based curriculum, support from trained individuals, and resources for parents. In addition, programs for children with ASD should include components that accelerate their learning. Librera, Bryant, Gantwer, & Tkach (2004) describe five characteristics that should be included in these programs. They include the following: (1) a minimum of 25 hours a week and an extended year program (2) low student to teacher ratios (3) individualized program content and locations (4) appropriate educational activities (5) and a documentation system that includes progress monitoring.

Applied Behavioral Analysis

Applied Behavioral Analysis (ABA) is the most commonly used approach for teaching individuals with ASD. Many studies have examined the effectiveness of ABA and its use with a variety of populations (Steege et al., 2007). Mohammadzaheri, Koegel, Rezaee, and Rafiee (2014) describe ABA as a systematic approach to “define discrete intervention targets, which are

addressed through massed trials of antecedent-behavior-consequence chains” (p.2).

Mohammadzaheri and colleagues (2014) also note that ABA is often used in many comprehensive ASD programs. Skills are typically taught individually through discrete trials. Although discrete trial training (DTT) has been shown to be an effective way to teach skills to individuals with ASD, there has been some criticism regarding the sole use of DTT. Vismara and Rogers (2010) note the following three criticisms of DTT: (1) it is mostly adult-directed (2) it is conducted in a highly structured environment with little generalization support and (3) DTT implementation fidelity is not always adequate.

It is suggested that ABA programs include a variety of techniques to teach individuals with ASD. Steege and colleagues (2007) state, “Comprehensive ABA programs use a wide range of assessments and interventions that are aimed at developing a broad range of cognitive, social, academic, leisure, and functional living skills needed for success at school, at home, and in the community”(p. 98). In a ten-month study conducted by Osborne and Corness (2007), they examined early intervention approaches including ABA, special nursery placement, and portage. Portage is often used in the United Kingdom and is defined as “a home-based, parent-administered early intervention for developmental disabilities” (Osborne et al., p. 418, 2007). The main findings of the study suggested that ABA was the best approach. The children in the ABA condition (ages 2-4) made greater intellectual and educational gains than in the other two conditions. The study’s main limitation, however, was that the children were not randomly selected for each of the conditions due to availability of services in their area.

National Standards Project Phase 2

The National Autism Center produced the second phase of National Standards Project in 2015 that includes updated information about evidence-based interventions for individuals with

ASD. Interventions are classified as established, emerging, and unestablished. Comprehensive Behavioral Treatment for Young Children (CBTYC) was found to be an established intervention method. These interventions employ ABA techniques to teach children with ASD different skills. The National Standards Project (2015) provides a description of what these interventions should entail:

1. Intensive service delivery (typically 25-40 hours per week for 2-3 years) based on the principles of applied behavior analysis (ABA)
2. Data-based decision making that targets the defining symptoms of ASD
3. Typical interventions include the use of discrete trial teaching, incidental teaching, errorless learning, behavioral momentum, shaping, modeling and other interventions derived from ABA
4. Individualized instruction in various settings (e.g., home, community, inclusive, and self-contained classrooms) and small group instruction (p. 47).

The Autism Curriculum Encyclopedia (ACE)

Background and Mission

The ACE was developed by staff at The New England Center for Children (NECC), a non-profit organization devoted to serving individuals with ASD. The NECC has been helping individuals with ASD since 1975. Their mission is as follows (www.acenec.org):

“Our mission is to provide you with the very best in online ABA software and curriculum. We want to ensure you have the latest tools to help you maximize the effectiveness of your programs for learners with autism.”

The goal of the NECC is to educate parents and teachers about ASD and teaching strategies that the NECC uses with its clients. The NECC also seeks to be on the cutting edge of research. They use their research and their colleagues' contributions to promote the use of technology. This helps them streamline ABA teaching strategies that are used in their comprehensive program to meet the needs of many individuals with ASD.

The NECC helps promote generalization of skills by using ABA to teach students at school, home, and in the community. They also offer a parent education series to help educate parents on how to best care and advocate for their child with ASD. They not only provide services at the NECC school but also workshops, Board Certified Behavior Analyst (BCBA) consultation services, and more. Their Partner Program provides school districts a full-time certified special educator, weekly consultation from a BCBA, initial and ongoing professional development for school paraprofessionals affiliated with the classroom, and full complement of educational programming through the ACE including assessments, curriculum, and progress monitoring tools (The New England Center for Children, 2016). Their goal is to reach as many individuals with ASD and their families as possible to facilitate learning and growth. The NECC also emphasizes the importance of early intervention for children with ASD in order to gain skills as early as possible. Some of the highlights of the NECC include serving over 550 students, giving over 1818 presentation, publishing 241 research articles, having more than 1100 employees, and using ABA methodologies in their program.

The ACE curriculum was developed by NECC employees who wanted to use the curriculum in other settings. The goal was to create an online system to decrease the time looking for materials and re-designing lesson plans. The ACE addressed these needs by providing a comprehensive software program with thousands of lesson plans, materials, and

other features in an easy to use, accessible format. The curriculum is based on empirically established and scientifically reviewed evidence with over 2,000 customizable lesson plans. Currently, the ACE is used by over 4,000 students in various schools and agencies including the NECC.

Researchers/Clinicians and Customer Team

The ACE includes Top Researchers and Clinicians as well as an ACE Customer Team. Briefly, the top researchers and clinicians include Richard B. Graff (Ph.D., BCBA-D), Rebecca MacDonald (Ph.D., BCBA, Program Director), William H. Ahearn (Ph.D., BCBA-D, Director of Research), Eileen Roscoe (Ph.D., BCBA-D, Assistant Director of Research), Chata A. Dickson (Ph.D., BCBA-D, Assistant Director of Research, ACE), and Jason Bourret (Ph.D., BCBA-D, Assistant Director, Organizational Behavior Management).

The ACE Customer team is comprised of individuals who assist in training and on-going support, as well as developing curricula and fulfilling other duties. These individuals include Kim Walter (MS, BCBA, LABA, ACE Training and Implementation Specialist), Alyssa Freeze, MEd, BCBA, ACE Coordinator), Kelly McConnell (Ph.D., BCBA-D, LABA, ACE Training and Implementation Specialist), Jacquelyn MacDonald (Ph.D., BCBA-D, LABA, ACE Training and Implementation Specialist), Cara Grieco (MS, BCBA, ACE Curriculum Specialist), and Maureen Cary, M.Ed., BCBA, Assistant Director of Public School Services- New York Region). The research interests and expertise of the researchers, clinicians, and customer team are extensive. They complement the development and ongoing support of ACE curriculum and allow users to have expert assistance as well as evidence based program components.

The ACE Curriculum

The ACE curriculum is based on ABA principles including DTT, incidental teaching (IT), and task analysis (TA) with lesson plans that are appropriate for individuals with ASD ages 3-22. Using a combination of teaching strategies is one of the best methods for educating individuals with ASD (Steege et al., 2007). The skills taught in the curriculum range from basic to complex skills with a variety of lessons in between. The ACE software program includes all the necessary teaching materials that were developed to be easy to read and follow. The ACE places an emphasis on consistency across classrooms, which is attainable with their streamlined program. The lesson plans can also be individualized to fit the needs of each student.

Discrete Trial Training

As mentioned above, the ACE uses a variety of teaching strategies to help facilitate learning and growth in individuals with ASD. One of the methods they use is DTT defined as “a structured ABA technique that breaks down skills into small, “discrete” components” (Autism Speaks, 2016). An adult typically leads this approach and correct responses are reinforced. There are typically a number of trials to complete across sessions until the mastery criteria are met. For example, if a child is learning how to discriminate between a lion and a tiger, the teacher may ask them to point to the lion and then reinforce the student for a correct response. If the mastery criteria were set at 80% accuracy across two sessions, the child would be expected to select a correct answer 8 out of 10 times in both sessions.

Incidental Teaching

Incidental teaching (IT) is a more naturalistic intervention approach. It is defined as “a systematic protocol of instruction that is delivered in the context of natural stimulus conditions of everyday environments...Specifically, incidental teaching requires that the environment be arranged to attract children to desired toys and activities” (McGee, Daly, & Jacobs, 1999; Hart &

Risley, 1968, p. 136). It is intended to increase initiation of activities by the child by eliciting communication (Contemporary ABA, 2012). For example, if a child with ASD is working on making requests, the therapist might set up the room so that an object of interest is out of reach. This may encourage the child to request the item. If the appropriate request is made, the child receives the item and is reinforced by being able to play with the requested item.

Task Analysis

Simple tasks can be difficult for individuals with ASD (Task Analysis and Chaining, 2016). Task analysis is defined as “the process of breaking a skill down into smaller, more manageable components” (Szidon, p. 1, 2009). Szidon (2009) provides 6 implementation steps when using task analysis: (1) identifying the target skill (2) identifying the prerequisite skills of the learner and the materials needed to teach the task (3) breaking the skill into components (4) confirming that the task is completely analyzed (5) determining how the skill will be taught (6) implementing intervention and monitoring progress (p. 1-6).

Lesson Format

The ACE includes a variety of domain areas, which have been researched by staff at the NECC. These domain areas include discrimination, communication, social skills, academics, self-help, health and safety, recreation and physical education, community, vocational, and transition to adulthood. Each domain has a variety of lessons that teach different skills relating to each area, which contributes to ACE’s comprehensive approach to educating individuals with ASDs.

Lesson plans are easy to use and follow. Teaching procedure and target skills vary, but each lesson follows a similar format. For example, a Task Analysis (TA) lesson format typically includes instructions that contain the objective statement, suggested prerequisites, materials

needed for the lesson, and any additional information that may be helpful. The next section includes data collection procedures such as how to collect baseline, what the training and previously mastered steps are, along with generalization and maintenance procedures. The criteria is also provided, such as when to use a less or more restrictive prompt, if a step needs to be retrained or another step needs to be added. Finally, the lesson plan also contains the teaching procedures including prompt steps, error correction procedures, appropriate reinforcement strategies, and a breakdown of the skill (Autism Curriculum Encyclopedia, 2015).

Training

Individuals who implement ACE curriculum are required to be a Board Certified Behavior Analyst (BCBA), which requires a high level of training prior to using the curriculum. Access to ACE includes video based lessons, which allows individuals to see what the lesson should look like as they prepare to administer it. There is also a Blackboard video feature that addresses different topics related to ASD and can be used for professional development purposes. The ACE can also be used in university clinics with graduate students implementing ACE lesson plans. This allows them to gain experience in the teaching strategies ACE uses and allows for feedback about the program. When an agency becomes a client, there is also a BCBA level clinician assigned to assist with the implementation of the program.

Assessments

The ACE has two main assessments. The Core Skills Assessment targets 52 skills that are necessary for higher-level learning and independent functioning (Autism Curriculum Encyclopedia, 2012). This assessment is administered yearly allowing users to look at the progress a student has made. The materials are provided when a client signs up for ACE and are prepared by students in the vocational department at the NECC. The assessment takes about five

hours to administer, and can be used for children who are not easily assessed with standardized measures.

The second assessment is The ACE Skills Assessment, which is an indirect measure that can be used to develop other skills in addition to foundation skills. It assesses skills from the entire curriculum and helps identify skill deficits. When users fill out the assessment, they are asked a number of questions to which they can respond ‘Yes’, ‘No’, or ‘Emerging’ and can also type a comment about the question. Recommendations are provided for possible lesson plans after the assessment is completed. This allows for specific skills to be targeted that need the most improvement. Lessons can then be added and finalized in the teaching plan.

Data Entry and Reports

The ACE can be used on computers, tablets, and mobile devices. There are also paper-based options for teaching programs, which enables users to print out lesson plans and record data by hand if they prefer that option. ACE users can enter data on their devices as they teach the lesson and the program will automatically graph the data, with a different graph for each lesson format (DTT, IT, and TA). The dashboards are also customizable and can be organized according to user’s needs. The program also allows users to enter challenging behavior data while they’re teaching a lesson. Challenging behavior can also be videoed while it occurs. There are also a variety of reports available to view and/or print out on The ACE including curriculum, session, progress, challenging behavior, Core Skills Assessment, and Skills Assessment reports. These reports allow individuals who use The ACE as well as parents to see the progress their students are making as well as what areas need improvement.

Settings and Pricing

The ACE can be used in private schools, public schools, clinics, universities, hospitals, and by consultants. However, it can only be implemented by BCBA's. A school that does not have BCBA's available to provide the services would not necessarily be able to provide The ACE. The program is not available for parents/caregivers to use at home with their children because of this requirement. In the next version of The ACE, a Parent Portal will be available for parents to check on their child's progress in the program, but will not allow them to use the curriculum at home. Although having BCBA's implement the program can be beneficial in some ways, it is also useful to educate and train parents in using ABA methods to help their children at home allowing for generalizability of skills and extra practice. In a study, replicating parameters by Lovaas (1987), Anderson, Avery, DiPietro, Edwards, & Christian (1987) found that,

“systematic use of behavioral teaching techniques and treatment procedures, intensive training conducted in the child's natural home, and extensive parent training resulted in most of the 14, 18- to 64-month-old participants, demonstrating significant gains in language, self-care, and social and academic development” (p. 2).

Although not all students will make these types of gains when parents are trained in ABA methods, the research shows that it can be beneficial in a variety of areas.

The ACE has three program options that can be purchased: The ACE Basic, ACE Advantage, and ACE complete package. Each package includes certain components of the program, from the very basics up to everything ACE has to offer. There are a variety of pricing options available according to how many students will be on the program and which package is purchased. Prices range from \$15 per student each month all the way up to \$180,000 per year for an unlimited number of students.

Effectiveness, Testimonials, and Awards

Although there is limited research on ABA web-based programs as a whole, the ACE has many evidence-based components of the program, such as the use of DTT, IT, and TA. The methods used in the ACE have also been researched by the NECC over the past 40 years. There are also a number of anecdotal reports available to view on The ACE website from ACE users describing the curriculum as easy to use and effective in educating individuals with ASD. The ACE also won an Innovation Award for ACE Application from Small Business Association of New England (SBANE) in 2015. Although there is anecdotal support along with evidence-based components, large research trials need to be published to determine the effectiveness of the program overall.

Rethink Autism

Mission, Leadership, and Scientific Board

Rethink is another comprehensive, web-based, ABA program used to teach individuals with ASD, as well as to educate parents, administrators, and teachers on how to use ABA methods with their children and students. Rethink's mission is as follows

(www.rethinkfirst.com):

“Rethink aims to place evidence-based treatment solutions in the hands of every educator, clinician or parent working with a child with special needs. We are unique in our footprint, leveraging the power of technology to provide clinical support, best-practice tools, and research-based content to all market segments, reaching more children with special needs than any other solution.”

Rethink's Leadership includes experts in education, clinical, and business who are devoted to helping individuals with special needs. The individuals in leadership positions include, Daniel

Etra (CEO), Eran Rosenthal (President & COO), Patty Mah (CFO), Jamie Pagliaro (Executive VP & Chief Learning Officer), Mike Civello (VP of Employee Benefits), Patricia Wright (Vice President of Professional Services), Lin Chong, (Vice President of Curriculum), and Brian Sharp (EVP Education Division). The Scientific Board is comprised of experts in the field who help ensure components of Rethink are evidence based and effective in educating children with special needs, particularly with ASD. The Scientific Board includes the following individuals: Bridget A. Taylor (Psy.D, BCBA-D), Peter F. Gerhardt (Ed.D.), Catherine E. Lord (Ph.D), Louis A. Vismara (M.D), Patricia Wright (Ph.D., MPH), Maurice Feldman (Ph.D., C. Psych., BCBA-D), Nicolette Bainbridge (Ph.D), William R. Jenson (Ph.D), and Jamie Pagliaro. Information about the Leadership and Scientific Board including their background and experience is available on Rethink's website.

Curriculum

Rethink has a comprehensive, customizable curriculum with over 1,500 video-based lessons that can be used with a variety of students at different levels of functioning. Rethink's curriculum also addresses Common Core and state standards and shows what those are in each lesson. It also helps in making IEP goals and objectives and assists in making progress towards those goals. Rethink places an emphasis on core developmental skills, inclusive practices, transition planning, and behavior (Rethink First, n.d.).

Rethink has a number of domain areas, including pre-academic, academic, social/emotional, daily living, motor, play/leisure, expressive language, and receptive language. There are a variety of lesson plans under each domain area that target different skills relating to the domain. The lesson plans are easy to follow and include instructions for each portion. They are also customizable according to the needs of the student. Teachers and parents can also create

their own lesson plan if necessary. Lessons include a goal statement, necessary supplies, objectives, teaching steps/task analysis, generalization techniques, troubleshooting strategies, as well as other helpful tips. Each lesson follows a similar format allowing for consistency in administration and ease of use.

Assessments

Rethink contains three different assessments (Abilities, Inclusion, and Transition) that can be completed when an individual signs up for Rethink. After filling out some information such as the student's age, grade, and other questions related to their current level of functioning, Rethink asks the user to fill out these assessments in order to select appropriate lesson plans. The Abilities assessment is recommended for all children. The questions on this assessment target different skills such as being able to remain in a chair when asked. The Inclusion assessment is recommended for children who attend school. It asks questions about behaviors such as if a child is able to raise their hand and ask questions in class. The Transition assessment is recommended for children over age 9 and asks questions such as if the child can dress appropriately for the weather.

Training

Rethink uses video-modeling videos to train individuals who use its curriculum. In a study conducted by Pollard, Higbee, Akers, and Brodhead (2014) it was found that using interactive computer training such as video modeling can be an effective method of teaching ABA strategies such as discrete trial instruction (DTI). In Rethink's curriculum, both parents and educators receive the same kind of video-based training, with 11 training videos that contain several examples on how to use DTT in a variety of way, as well as educate them on different

topics relating to ASD. This is a cost effective and efficient way to train a variety of individuals and eliminates the needs to bring in other professionals to provide training (Pollard et al., 2014).

Rethink also provides access to upcoming webinars on topics related to helping students with disabilities as well as information covered in past webinars available on their website. The topics covered can support educators and parents in using evidence-based methods in schools and at home. Rethink also has a blog containing tips for parents such as how to use rewards during bedtime to encourage appropriate behavior. The blog also provides information on how to use the web-based curriculum more efficiently and effectively. Along with helpful tips for both parents and educators, the blog spotlights different teachers and their accomplishments. Both the webinars and the blog can be accessed without a Rethink membership. Additionally, Rethink's website includes a section for educators with videos discussing the resources they have access to on Rethink, how to have a successful school year, information about autism, and behavior support tools. Printable materials are also available to help with lessons, behavior plans, and visual aids in classrooms. Parents and educators can also visit Rethink's Peer Support area to discuss different topics with other parents and teachers.

Data Collection and Procedures

Rethink provides an easy to use data collection system for both educators and parents. The data can be used to evaluate IEP progress and inform parents on their child's progress on different lessons. Data can be collected on a variety of devices on Rethink's website, app, or on paper if necessary. Data is recorded as a positive or negative with the mastery criteria set at 80%. Once the data is entered, the website automatically graphs it and shows which target the student worked on. Each session is graphed allowing educators and parents to see the progress

their student is making. The graphs are easy to read and interpret, making data collection less tedious for individuals who may be less familiar with the task (Lee, Vostal, Lylo, & Hua, 2011).

Educator Behavior Support

The behavior component of Rethink has tools to help teachers decrease problem behavior. It can be used district wide for behavior supports. One of the resources on Rethink's website includes a section that allows educators to watch, read, and explore different topics related to behavior. It includes how to define a behavior, determine the function, antecedent and consequence strategies, how to track the effectiveness of an intervention, and evaluate the plan. In addition, Rethink's Admin Dashboard can be used to track and compare staff utilization such as completed trainings, use of data collection procedures, and amount of log-ins. Student progress can also be easily accessed on the graphs and reports that are available.

Rethink also provides an Activity Center that can be used by educators, parents, and students. There are customizable activities for students to engage in with built-in prompts and feedback. Student activity is tracked and graphed for educators and parents to review.

Parent Access

One of the highlights of Rethink's program is that parents can use it at home. In a study examining collaboration between parents and educators in using DTT with children with autism, Devlin & Harber (2004) found that "the combined interventions of discrete trial training, collaboration, and extended school year produced a meaningful increase in desired skills" (p. 299). Using DTT across settings also promotes generalization of skills making it important to use these strategies at home (Devlin et al., 2004). With the purchase of a Rethink membership, parents can access the entire curriculum including lesson plans, problem behavior strategies, data collection procedures, web-based training, activities, teleconsultation, and the option to email

Rethink therapists for assistance. Prior to signing up for a membership, parents can learn a lot about Rethink simply by going to their website. It provides videos about the lessons, what ABA is, and information about the Scientific Board. They can also learn about how Rethink works and are provided with problem behavior strategies. They also have access to sample lessons to see if Rethink would be a good fit for their child. A one-week free trial is also available for parents to use.

Pricing and Settings

Rethink provides affordable options for parents and organizations. Memberships can be used at home, in classrooms, campuses, school districts, and clinics. The prices for parents range from \$50-\$89 depending on whether they sign up for an annual, quarterly, or monthly membership. Their membership can be used for up to three children. They also have the option of paying an extra \$25 per month for optional curriculum support. Organizational pricing is dependent on the clientele's needs and size of the organization. Prices can range from \$1,000 too much more depending on what the curriculum is used for. Organizations have the option of using specific pieces of Rethink that best fit their needs. For example, school districts can use the behavior supports portion of Rethink, which offers them numerous resources to create and implement appropriate interventions. This allows them to have access to what they need without being required to purchase the entire curriculum.

Effectiveness, Testimonials, and Awards

Similarly to The ACE, there are limited studies on the effectiveness of Rethink as a whole, but there are research-based components of the curriculum such as the use of inclusion, video modeling, discrete trial training, task analysis, reinforcement strategies, and positive behavior interventions and supports. There is also a large amount of anecdotal support for

Rethink's curriculum, which is important to consider due to the lack of research on web-based ABA programs. Rethink's website includes comments from parents and educators about the progress children have made and its usefulness in schools. Information on the website also notes that 98% of administrators would recommend Rethink.

Rethink has also won a number of awards: The U.S. Chamber of Commerce Dream Big Small Business of the Year Blue Ribbon (2011), Stevies American Business Award Winner (2011), Return on Education (ROE) Innovation Award, IMA Winner (2011), Software and Information Industry (SIIA) CODiE Winner (2011).

Dissertation Support

In addition to supportive testimonials and awards regarding the effectiveness of Rethink, Jennifer Cardinal completed her dissertation in 2011 titled "*Rethink Autism*": *Effectiveness of Web-Based Applied Behavior Video Modeling Program on the Performance of Paraeducators and Students with Autism Spectrum Disorder* (Cardinal, 2011). The purpose of the study was to examine the effectiveness of using Rethink Autism to train paraeducators to use DTT with children with ASD. It also looked at the effectiveness of video modeling on paraeducators' ABA teaching skills. In addition, it examined skills acquisition and student response to Rethink as well as generalization of skills to other curriculums (Cardinal, 2011). A multiple baseline design with generalization probes was used in a public midsized charter school with four paraeducators matched with a student with ASD. The baseline data was collected by teaching Rethink lessons. The paraeducators' used their existing skill set and materials during this time. A pretest was then administered to the student. The intervention employed a staggered, three-phase design using Rethink lessons throughout 12 teaching sessions.

The results indicated that using Rethink Autism was effective in increasing paraeducator DTT skill level. There was also an increase in student performance, high acceptability ratings, treatment integrity, and was found to be cost effective as it is less costly to train paraeducators than special education teachers. Some of the limitations included a wide range of quality of the videos teaching specific skills, a lack of maintenance probes, collaboration, and a small number of participants (n=4).

The ACE and Rethink Autism Comparison

The ACE and Rethink are similar in the following ways:

- Use of an ABA web-based curriculum
- Research based domains and strategies
- User-friendly lesson plans
- Individualization of lessons
- Availability in multiple settings
- Program support
- Online training component

The ACE and Rethink mainly differ in terms of parent access and cost effectiveness. One of the highlights of Rethink is that it offers numerous resources to parents including access to the full curriculum. It also provides online training to parents so that they can use Rethink at home. The ACE encourages parent involvement, but their curriculum is used solely by BCBA's. Individuals who hold their BCBA certification are often highly trained individuals who have knowledge of ABA strategies. The ACE may have this restriction to promote treatment fidelity. However, it is also important for parents to be part of the process in educating their children with ASD. This

can help promote generalization and skill acquisition. The ACE is also more expensive than Rethink. This may be due to the BCBA requirement along with other factors.

Technology Research and Autism Apps

Technology Use and ASD

Mobile technology has become a popular tool for individuals with ASD (Allen & Shane, 2014). It can be used in a variety of ways including assisting individuals with ASD and their parents in learning different skills. In a study conducted by Kurkcuoglu, Bozkurt, and Cuhadar (2015), they noted the need for games for children with ASD due to their limited social interactions. Games are becoming increasingly available in online formats making them easily accessible. It has been suggested that technology should be used for educational purposes as well (Kukcuoglu et al., 2015; Koyama & Wang, 2011). Multiple studies have demonstrated “that computer-assisted instruction is effective in the acquisition, maintenance, and generalization of various skills in individuals with ASD” (Kukcuoglu et al., 2015; Penington, 2010, p. 673). The current study examined the effectiveness of instruction using computer-assisted activity schedules and their acquisition, maintenance, and generalization of on-schedule and role-play skills. It also looked at the options of teachers and families regarding the use of computer-assisted activity schedules. There were four participants between the ages of 4 and 10 with the diagnosis of ASD. The results indicate that “the instruction process provided through computer assisted activity schedules has an effect upon the acquisition, maintenance, and generalization of the on-schedule and role-play skills” (p. 671). Teachers and parents also responded positively to the use of the computer assisted activity schedules. The study suggests that future research focus on using iPads and iPods as tools as well.

Background and Developers

Autism Apps is a comprehensive app that includes a variety of options for individuals with ASD, Down syndrome, and other special needs (Autism Apps, 2016). The app was created by Jenny W. Krones, M.A., BCBA and her husband Tom W. Krones who has a degree in mechatronic engineering (Developer). Jenny W. Krones has many years of experience in working with children with special needs in different settings. She has also presented at ABA conferences and conducted workshops for parents and teachers. The Krones created the app as a way to reinforce individuals with special needs. It also helps parents find apps quickly and easily for their children as well as provides a fun way to learn and practice skills.

App Overview

The Autism App contains over 30 categories with different apps to choose from in each category. The categories include the following: ABA, Alphabet, Art, Assessments, Behavior and Social Skills, Books, By Touch Autism, Cause and Effect, Choice-Making Apps, Colors, Communication (AAC), Creative Play, Data Collection, Fine Motor and Writing Skills, Flashcards, Fun and Games, Geography, IEP, Literacy, Math, Medical and Health, Music, Numbers, Professionals, Puzzles, Reference, Reward Systems, Self-Care, Sensory, Social Stories, Speech and Language, Text to Speech, Time, Visual Schedules, Visual Timers, and Vocabulary. The apps found in these categories can be useful for young children, parents, therapists, and teachers. Each app contains links to information about its use prior to downloading the app as well as reviews by other users. The Autism App can be used on iPads, iPhones, and iPods and is available in the app store. Some of the other features include a list of new apps, apps created by the Krones, and an option to submit an app to include in the list.

Autism Speaks App Ratings

Autism Speaks (2016), a website devoted to advocating for individuals with ASD, funding research, increasing awareness, and providing useful tips for families includes a list of apps available to download on different devices. Similarly to Autism Apps, individuals can email Autism Speaks if they'd like an app to be added to their list. Along with this information, their website provides research ratings for each app. The research ratings are as follows:

1. Anecdotal: No specific or related scientific studies for this type of app.
2. Research: There are some related scientific studies, but no direct research support for this type of app or technology.
3. Evidence: There is solid or specific evidence that this type of app or technology is helpful.

If an app has an "Evidence" rating, Autism Speaks provides a description of a study with supporting research, along with a link to the study. This allows parents and caregivers to determine if the app would be useful in helping their child practice a certain skill.

Conclusion

Early intervention for children with ASD is critical in gaining important skills. Research has shown that "the functional potential of children with autism can be increased following intensive programs" (Erba, 2000; Rogers, 1996, p. 82). Using appropriate intervention strategies such as ABA can assist in the development of skills. When evaluating different programs, parents should consider characteristics of each program to determine if it is a good fit for their child. They should also consider the level of evidence-based interventions used in different schools, agencies, and web-based programs. Programs that employ ABA strategies can be expensive and time consuming, but treatment is necessary in order for children with ASD to

develop the appropriate skills. Web-based ABA programs can be used to cut costs and maintain program integrity. They can also help educate parents and allow them to use the curriculum at home. ACE and Rethink are both comprehensive programs developed for individuals ages 3-22. The ACE can be implemented by BCBA's while Rethink may be used by a variety of individuals including parents. Both programs include a range of evidence-based components, although further research is needed to determine the effectiveness of these programs as a whole.

Technology use is becoming increasingly popular in educating and providing entertainment for individuals with ASD. Autism Apps (2016) is available for parents and educators as a tool to educate themselves and their children/students. Additionally, Autism Speaks (2016) includes research ratings for apps listed on their website. More research needs to be conducted to determine the range of use of technology and its effectiveness in educational settings for children with ASD.

References

- A. (2012). Autism Curriculum Encyclopedia® (ACE®) - Assessment. Retrieved from <https://www.youtube.com/watch?v=4cuAlm8Vj58>
- A. (2015). ACE Minute - Task Analysis Lesson Plans. Retrieved from <https://www.youtube.com/watch?v=kPYsC7VnHQg>
- ACE NECC - ABA Software System. (n.d.). Retrieved from <http://acenecc.org/>
- Allen, A. A., & Shane, H. C. (2014). Autism spectrum disorders in the era of mobile technologies: Impact on caregivers. *Developmental Neurorehabilitation*, 17(2), 110-114. doi:10.3109/17518423.2014.882425
- Anderson, S. R., Avery, D.L., DiPietro, E. K., Edwards, G.L., & Christian, W.P. (1987). Intensive home-based early intervention with autistic children. *Education and Treatment Children*, 10, 353-366.
- Applied Behavior Analysis: The Role of Task Analysis and ... (n.d.). Retrieved from <https://www.iidc.indiana.edu/pages/Applied-Behavior-Analysis>
- Autism Apps - Touch Autism. (2016). Retrieved from <http://touchautism.com/app/autism-apps/>
- Autism Apps. (2016). Retrieved from <https://www.autismspeaks.org/autism-apps>
- Cardinal, J. (2011). Rethink Autism: Effectiveness of web- based applied behavior video modeling program on the performance of para-educators and students with autism spectrum disorder. Dissertation submitted to the Department of Educational Psychology, School Psychology.
- Contemporary Applied Behavior Analysis Approaches. (2012). Retrieved from <http://autismnow.org/articles/contemporary-applied-behavior-analysis-approaches/>
- Data & Statistics. (2016). Retrieved from <http://www.cdc.gov/ncbddd/autism/data.html>

Devlin, S. D., & Harber, M. M. (2004). Collaboration Among Parents and Professionals with Discrete Trial Training in the Treatment for Autism. *Education and Training in Developmental Disabilities, 39*(4), 291-300.

Discrete Trial Training. (n.d.). Retrieved from

<https://www.autismspeaks.org/blog/2012/12/14/discrete-trial-training>

Erba, H.W. (2000). Early intervention programs for children with autism: Conceptual frameworks for implementation. *American Journal of Orthopsychiatry, 70*(1), 82-94.

Kurkcuglu, B.U., Bozkurt, F., & Cuhadar, S. (2015). Effectiveness of instruction performed through computer assisted activity schedules on on-schedule and role-play skills of children with autism spectrum disorder. *Educational Sciences: Theory & Practice, 15*(3), 671-689. doi:10.12738/estp.2015.3.2432

Lee, D. L., Vostal, B., Lylo, B., & Hua, Y. (2011). Collecting behavioral data in general education settings: A primer for behavioral data collection. *Beyond Behavior, 20*(2), 22-30.

Librera, W. L., Bryant, I., Gantwerk, B., & Tkach, B. (2004). Autism Program quality indicators: A self-review and quality improvement guide for programs serving young students with autism spectrum disorders. *New Jersey Department of Education* (PTM No. 1504.65). Trenton, NJ.

Lovaas, O. L. (1987). Behavioral treatment and normal educational and intellectual functioning of young autistic children. *Journal of Consulting and Clinical Psychology, 5*, 3-9.

McGee, G. G., Morrier, M. J., & Daly, T. (1999). An incidental teaching approach to early intervention for toddlers with autism. *Res Prac Pers Severe Dis Research and Practice for Persons with Severe Disabilities, 24*(3), 133-146. doi:10.2511/rpsd.24.3.133

- Mohammadzaheri, F., Koegel, L. K., Rezaee, M., & Rafiee, S. M. (2014). A randomized clinical trial comparison between pivotal response treatment (PRT) and structured applied behavior analysis (ABA) intervention for children with autism. *Journal of Autism and Developmental Disorders*, 44(11), 2769-2777. doi:10.1007/s10803-014-2137-3
- Osborne, L.A., & Corness, M. (2007). The real-world effectiveness of early teaching interventions for children with autism spectrum disorder. *Council for Exceptional Children*, 73(4), 417-433.
- Peters-Scheffer, N., Didden, R., Korzilius, H., & Sturmey, P. (2011). A meta-analytic study on the effectiveness of comprehensive aba-based early intervention programs for children with autism spectrum disorders. *Research in Autism Spectrum Disorders*, 5(1), 60-69.
- Pollard, J. S., Higbee, T. S., Akers, J. S., & Brodhead, M. T. (2014). An evaluation of interactive computer training to teach instructors to implement discrete trials with children with autism. *Journal of Applied Behavior Analysis*, 47(4), 765-776. doi:10.1002/jaba.152
- Smith, T., Klorman, R., & Mruzek, D. W. (2015). Predicting outcome of community-based early intensive behavioral intervention for children with autism. *J Abnorm Child Psychol*, 43(7), 1271-1282. doi:10.1007/s10802-015-0002-2
- Steege, M. W., Mace, F. C., Perry, L., & Longenecker, H. (2007). Applied behavior analysis: Beyond discrete trial teaching. *Psychol. Schs. Psychology in the Schools*, 44(1), 91-99. doi:10.1002/pits.20208
- Szidon, K., & Franzone, E. (2009). Task Analysis. *Madison, WI: National Professional Development Center on Autism Spectrum Disorders, Waisman Center, University of Wisconsin*. Retrieved from http://autismpdc.fpg.unc.edu/sites/autismpdc.fpg.unc.edu/files/TaskAnalysis_Steps_0.pdf

The tools every district needs to design, deliver and monitor evidence-based practices in special education. (n.d.). Retrieved from <http://www.rethinkfirst.com/>

Vismara, L. A., & Rogers, S. J. (2010). Behavioral treatments in autism spectrum disorder: What do we know. *Annu. Rev. Clin. Psychol.*, *6*, 447-468.

doi:10.1146/annurev.clinpsy.121208.131151