

MULTIMEDIA INTERVENTIONS

CHARACTERISTICS OVERVIEW CHART

Verbal Skills	Grade Levels	Cognitive Level	Areas Addressed
<input checked="" type="checkbox"/> Nonverbal	<input checked="" type="checkbox"/> PK	<input checked="" type="checkbox"/> Classic	<input checked="" type="checkbox"/> (Pre)Academic/Cognitive/Academic
<input checked="" type="checkbox"/> Mixed	<input checked="" type="checkbox"/> Elementary	<input checked="" type="checkbox"/> High	<input checked="" type="checkbox"/> Adaptive Behavior/Daily Living
<input checked="" type="checkbox"/> Verbal	<input checked="" type="checkbox"/> Middle/High	Functioning	<input checked="" type="checkbox"/> Behavior
			<input checked="" type="checkbox"/> Communication/Speech
			<input checked="" type="checkbox"/> Social/Emotional

BRIEF INTRODUCTION

An increasing number of studies have shown that the use of computer instruction for students with autism (AU) can produce a variety of positive developments, particularly in communication and socialization.

DESCRIPTION

Multimedia programs, including software programs such as the Cambridge Mindreading Face-Voice Battery for Children, allow users to improve their ability to identify the facial expressions and emotions of others. In one case study, the use of a personal digital assistant (PDA) improved a student's ability to record homework more successfully. Reasons for the effectiveness of multimedia programs for students with autism include (a) they provide predictability, (b) they offer repeated practice, and (c) they are considered to be highly motivating for students with autism.

RESEARCH TABLE

Number of Studies	Ages (year)	Sample Size	Area(s) Addressed	Outcome
66*	3-21	366	Virtual reality, PDAs, computer software, mindreading, emotion recognition, symbolic play, language development, spelling, daily living	+

*Note: Includes studies reported in reviews by Kagohara, (2010) & Pennington, (2010).

STUDIES CITED IN RESEARCH TABLE

1. Cihak, D.F., Wright, R., Ayres, K.M. (2010). Use of self-modeling static-picture prompts via a handheld computer to facilitate self-monitoring in the general education classroom. *Education and Training in Autism and Developmental Disabilities, 45(1)*, 136-149.
The study evaluated the effect of providing picture prompts via a handheld computer on the in-class engagement levels of three fully integrated middle school boys with ASD. Using a multiple-probe-across-settings design with an embedded reversal in each setting, the experimenters demonstrated that all three boys had clearly increased rates of engagement and reduced numbers of teacher-provided prompts to stay on task only when the picture prompts were provided.
2. Gentry, T., Wallace, J., Kvarfordt, C., Lynch, K.B. (2010). Personal digital assistants as cognitive aids for high school students with autism: Results of a community-based trial. *Journal of Vocational Rehabilitation, 32*, 101-107.
This study evaluated the effect of providing training in PDA use to 22 high school students with ASD on their overall organization and use of the PDA to schedule appointments and reminders. 8-weeks following intervention, all 22 participants reported significantly higher scores on a measure of organizational skills and satisfaction scales about the PDA and their ability to manage events. The PDAs all showed evidence of having been used (appointments in calendar, etc.) regularly during the 8 weeks following training in their use, and 18 of the 22 participants could still program their PDAs with no assistance.
3. Golan, O., Ashwin, E., Granader, Y., McClintock, S., Day, K., Leggett, V., Baron-Cohen, S. (2010). Enhancing emotion recognition in children with autism spectrum conditions: An intervention using animated vehicles with real emotional faces. *Journal of Autism and other Developmental Disorders, 40*, 269-279.
The purpose of this study was to evaluate the effect of a cartoon designed to teach emotion recognition to children with ASD (The Transporters) on the understanding and recognition of emotions of 20 higher functioning children with ASD as compared to a matched non-treatment control group with ASD with 19 children, and a matched typically-developing control group of 18 participants. Results showed that the children with ASD who were

regularly exposed to the cartoon for 4-wks performed better than the ASD control group and equivalently to the non-ASD control group on emotion recognition tasks at follow-up.

4. Kagohara, D.M. (2010). Is video-based instruction effective in the rehabilitation of children with autism spectrum disorders? *Developmental Rehabilitation, 13(2)*, 129-140.
44 studies about the use of video-based instruction that included 49 experiments and 131 participants with ASD were reviewed. The most common skills taught were social and communication skills in a school setting. While the authors reported that many of the studies reported favorable results, procedures were not uniformly effective for all participants, and conclusions must be tentative based on the small number of rigorous experimental designs utilized.
5. Kagohara, D.M., van der Meer, L., Achmadi, D., Green, V.A., O'Reilly, M.F., Mulloy, A., Lancioni, G.E., Lang, R., Sigafoos, J. (2010). Behavioral intervention promotes successful use of an iPod-based communication device by an adolescent with autism. *Clinical Case Studies, 9(5)*, 328-338.
This article reports on the successful use of differential reinforcement and delayed prompting procedure to teach a 17-yr old male with ASD to activate the speech output feature of his iPod.
6. Lacava, P.G., Rankin, A., Mahlios, E., Cook, K., Simpson, R.L. (2010). A single case design evaluation of a software and tutor intervention addressing emotion recognition and social interaction for four boys with autism. *Autism, 14(3)*, 161-178.
This study investigated the effect of a software and tutor intervention package on the emotion recognition skills and positive social interactions of 4 boys with ASD between 7-11 yrs old. Tutors helped each boy navigate the Mind Reading software program. Following 7-10 wks of using the software all four participants showed increased ability to recognize emotions in basic tasks. None of the four participants showed any increase in positive social interactions with peers.
7. Pennington, R.C. (2010). Computer-Assisted instruction for teaching academic skills to students with autism spectrum disorders: A review of literature. *Focus on Autism and Other Developmental Disabilities, 25(4)*, 239-248.
15 articles about teaching academic skills using computer-based interventions were reviewed. All the articles utilized experimental or quasi-experimental designs and included a total of 52 participants. While all studies reported an increase in academic skills, the conclusion that CBI is a best practice must be tentative at this time based on the small number of studies and participants.

8. Tanaka, J.W., Wolf, J.M., Klaiman, C., Koenig, K., Cockburn, J., Herlihy, L., Brown, C., Stahl, S., Kaiser, M.D., Schultz, R.T. (2010). Using computerized games to teach face recognition skills to children with autism spectrum disorder: The Let's Face It! Program. *The Journal of Child Psychology and Psychiatry, 51(8)*, 944-952.
This study reports the results of a RCT of the effects of a computer-based game to teach facial recognition skills to children with ASD. Compared to a no treatment control group (n = 37), children in the treatment group (n=42) improved significantly in their ability to mouth and eye features in faces following 20 hours of interaction with the software.
9. Whalen, C., Moss, D., Ilan, A.B., Vaupel, M., Fielding, P., MacDonald, K., Cernich, S., Symon, J. (2010). Efficacy of TeachTown: Basics computer-assisted intervention for intensive comprehensive autism program in Los Angeles Unified School District. *Autism, 14(3)*, 179-197.
This study reports the results of an RCT of the effects of a computer-based teaching intervention on the academic skills of 22 children with ASD aged 3-6 as compared to the performance of a group of 25 control children with ASD who did not receive the computer-based instruction package. Students in the treatment condition received 20 minutes of computer-based instruction and 20 minutes of related small group based instruction each school day for three months. Following intervention, the treatment group performed better on standardized assessments than the control group, and also showed more learning the longer they used the program.
10. Mechling, L. C., Gast, D. L., & Seid, N. H. (2009). Using a personal digital assistant to increase independent task completion by students with autism spectrum disorder. *Journal of Autism Developmental Disorders, 39*, 1420-1434.
A PDA with picture, auditory, and video prompts with voice over was evaluated as a portable self-prompting device for three students with autism (ages 16 to 17). The system was tested for its effectiveness in increasing independent performance across multiple step tasks. Results indicated that the students with autism were able to maintain their ability to use the device to independently complete recipes over time.
11. Herrera, G., Alcantud, F., Jordan, R., Blanquer, A., Labajo, G., & De Pablo, C. (2008). Development of symbolic play through the use of virtual reality tools in children with autistic spectrum disorders: Two case studies. *Autism, 12*, 143-157.
Two participants, ages 8 and 15, were allowed to use virtual reality software in an effort to improve their functional and symbolic use of objects as well as understanding of imagination. Both participants showed positive results for each of these areas.
12. LaCava, P., Golan, O., Baron-Cohen, S., & Myles, B. S. (2007). Using technology to teach emotion recognition to students with Asperger Syndrome: A pilot study. *Remedial and Special Education, 28*, 174-182.
Eight children with AS, 8-11 years old, used Mind Reading software for 10 weeks. At the end of the trial period, all had made significant progress recognizing the feelings and emotions of others.

13. Myles, B.S., Ferguson, H., & Hagiwara, T. (2007). Using a personal digital assistant to improve the recording of homework assignments by an adolescent with Asperger Syndrome. *Focus on Autism and Other Developmental Disabilities, 22*, 96-99.
One 17-year-old student participated in this study to determine whether the use of a PDA would increase his ability to accurately record homework assignments. Over 25 sessions, results showed an increase in independent recording of homework assignments using the PDA.
14. Gnanathusharan, R., & Mitchell, P. (2006). Text chat as a tool for referential questioning in Asperger Syndrome. *Journal of Speech, Language, and Hearing Research, 49*, 102-112.
Eleven individuals with AS ranging in age from 14-19 (3 were adult) were tested on their ability to follow directions geographically using telephones to text or talk to someone. They were given three one-hour lessons. Results showed that talking on the telephone was more effective than texting.
15. Massaro, D. W., & Bosseler, A. (2006). Read my lips: The importance of the face in a computer-animated tutor for vocabulary learning by children with autism. *Autism, 10*, 495-510.
A computer-animated tutor, Baldi, was assessed to what extent the "tutors" face facilitated this learning process relative to the voice alone. Five children with autism (ages 8 to 13 years) continuously learned to criterion sets of words with and without the face. The rate of learning was significantly faster and the retention was better with the face.
16. Hetzroni, O. E., & Shalem, U. (2005). From logos to orthographic symbols: A multilevel fading computer program for teaching nonverbal children with autism. *Focus on Autism and Other Developmental Disabilities, 20*, 201-212.
The study investigated the use of a computer-based intervention for teaching orthographic symbols to children with autism. Six children were taught to identify words from commercial logos depicting food items through a structured seven-step fading procedure. The acquired knowledge was then tested for generalization into the classroom. Results indicated that after exposure to the fading procedure, all children were able to identify the orthographic symbols and maintain the knowledge over time. Further, most of the children were able to transfer the knowledge and generalize to daily activities within the classroom.
17. Hetzroni, O., & Tannous, J. (2004). Effects of a computer-based intervention program on the communicative functions of children with autism. *Journal of Autism and Developmental Disorders, 34*, 95-115.
In this study, five children with autism, ages 7-15, used computer-based language development programs in an effort to stimulate relevant language and the use of complete sentences and to reduce the number of echolalic responses. Over 23 sessions, all participants showed positive results.

18. Kimball, J. W., Kinney, E. M., Taylor, B. A., & Stromer, R. (2004). Video enhanced activity schedules for children with autism: A promising package for teaching social skills. *Education and Treatment of Children, 27*, 280-298.

This study overviewed a case study of a preschool student with autism who was successfully taught to use multimedia activity schedules to initiate play with peers.

19. Bosseler, A., & Massaro, D. W. (2003). Development and evaluation of a computer-animated tutor for vocabulary and language learning in children with autism. *Journal of Autism and Developmental Disorders, 33*, 653-672.

A computer-animated tutor, Baldi, designed to teach vocabulary and grammar for children with autism. In Experiment 1, eight children were given initial assessment tests, tutorials, and reassessment tests 30 days following mastery of the vocabulary items (7 to 12). All of the students learned a significant number of new words and grammar. A second study with six children (who participated in the first study) documented that the program was responsible for the learning and generalization of new words (7 to 11 years old).

20. Silver, M., & Oakes, P. (2003). Evaluation of a new computer intervention to teach people with autism or Asperger Syndrome to recognize and predict emotions in others. *Autism, 5*, 299-318.

Twenty-two children, ages 10 to 18, with autism or Asperger Syndrome participated in a study using computers to improve their ability to recognize the emotions and facial expressions of others. The group that used computers for 10 thirty-minute sessions during the two-week period made significant progress compared to the group that did not.

21. Moore, M., & Calvert, S. (2000). Brief report: Vocabulary acquisition for children with autism: Teacher or computer instruction. *Journal of Autism and Developmental Disorders, 30*, 359-362.

This study examined the impact of computers on the vocabulary acquisition of 14 young children with autism ages 3 to 6. Children's attention, motivation, and learning of words were compared in a behavioral program and an educational software program. The educational software program was designed to parallel the behavioral program, but it added perceptually salient qualities such as interesting sounds and object movement. Children with autism were more attentive; more motivated, and learned more vocabulary in the computer than in the behavioral program.

22. Hagiwara, T., & Myles, B. S. (1999). A multimedia social story intervention: Teaching skills to children with autism. *Focus on Autism and Other Developmental Disabilities, 14*, 82-95.

Three male students (aged 7-9 years) with autism participated in the study. Social Stories™ were used in a computer-based format for improving social or behavioral problems identified in participants. The intervention increased the skill levels of some of the participants in certain settings.

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RESOURCES AND MATERIALS

- Transported to a World of Emotions:
http://www.iancommunity.org/cs/therapies_treatments/transporters_article
This links the user to an article that discusses the making of the animated film series *The Transporters*.

GENERAL RESOURCES

- Autism Internet Modules (AIM) www.autisminternetmodules.org. The Autism Internet Modules were developed with one aim in mind: to make comprehensive, up-to-date, and usable information on autism accessible and applicable to educators, other professionals, and families who support individuals with autism spectrum disorders (ASD). Written by experts from across the U.S., all online modules are free, and are designed to promote understanding of, respect for, and equality of persons with ASD.
- The Autism Web Course: http://cdd.unm.edu/swan/autism_course/about/index.htm. This web course was developed out of materials from the Interactive Collaborative Autism Network (ICAN). The Autism Programs at the University of New Mexico has updated and added information to this web course.
 - Characteristics
 - Assessment
 - Academic Interventions
 - Behavioral Interventions
 - Communication Interventions
 - Environmental Interventions
 - Social Interventions
 - Family Support Suggestions
- Indiana Resource Center for Autism (IRCA) <http://www.iidc.indiana.edu/irca/fmain1.html>. The Indiana Resource Center for Autism staff's efforts are focused on providing communities, organizations, agencies, and families with the knowledge and skills to support children and adults in typical early intervention, school, community, work, and home settings.
 - IRCA Articles: <http://www.iidc.indiana.edu/index.php?pageId=273>
- Texas Statewide Leadership for Autism www.txautism.net. The Texas Statewide Leadership for Autism in conjunction with the network of Texas Education Service center with a grant from the Texas Education Agency has developed a series of free online courses in autism. Please check the training page, www.txautism.net/training.html, for update lists of courses, course numbers and registration information. Current courses include the following:
 - Asperger Syndrome 101
 - Augmentative and Alternative Communication and the Autism Spectrum

- Autism for the General Education Teacher
- Autism 101: Top Ten Pieces to the Puzzle
- Classroom Organization: The Power of Structure for Individuals with ASD
- Communication: The Power of Communication for Individuals with ASD
- Futures Planning for Students with Autism Spectrum Disorder
- Navigating the Social Maze: Supports and Interventions for Individuals with ASD
- Solving the Behavior Puzzle: Making Connections for Individuals with ASD