DEPARTMENT OF SPECIAL EDUCATION AND APPLIED BEHAVIOR ANALYSIS

Using Technology To Teach Academics To Students with Moderate to Profound Disabilities: A Literature Review

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INTRODUCTION

Students with moderate to profound intellectual and developmental disabilities are most at risk for poor outcomes after they leave school (Newman, Wagner, Cameto, & Knokey, 2009). Many leave school without the prerequisite skills to allow them to live independently. The National Longitudinal Transitional Study (Newman et al., 2009) found that students with moderate to profound disabilities are employed less than their non-disabled or mildly disabled counterparts. Ensuring that this population has learned basic academic skills, in addition to vocational and daily living skills, will increase their opportunities.

Previous research on the use of video-based technology for teaching has largely focused on vocational and daily living skills. For example, Bellini and Akullian (2007) conducted a meta-analysis of video modeling but excluded academics. They found video modeling to be a beneficial practice. Linda Mechling (2011) examined the use of portable electronic devices for teaching learners with moderate intellectual disabilities. Her focus was on the devices used rather than the subjects being taught. She did state that because handheld devices are ubiquitous, they can be a non-stigmatizing way to teach.

Knight, McKissick, and Saunders (2013) reviewed 25 studies that used technology to teach academics. Results showed that while there is a small body of research on teaching academics, much of it focuses on reading skills. Because they focused primarily on the quality of the studies, description of the effects from the interventions were not specified.

This review addresses a gap in the research regarding the use of video-based instruction for teaching academics.

RESEARCH QUESTIONS

This study aimed to determine the extent to which video-based technology was being used to teach academic skills in the classroom. Based on this idea, four research questions were generated.

1. To what extent do research studies examine using video-based technology to teach academic skills?
2. What video-based technology is being used to teach academic skills?
3. How effective are methods using video-based technology in teaching academic skills?
4. What are recommendations for future research based on the results of the review?

METHODS

Using a 38-term Boolean search string, an EBSCOHost search was conducted, resulting in 409 relevant studies. Multiple screenings were done to eliminate studies that did not meet criteria.

Inclusion criteria included:

1. Include the use of video technology.
2. Teaching academics as a dependent variable.
3. A majority of participants needed to be labeled as having a moderate to severe disability.
4. Single subject design
5. Report results of student participants on the academic measures.

Literature reviews and qualitative studies were excluded, as were group designs.

Forty-three studies met criteria for coding, or approximately 10% of studies returned from the initial search.
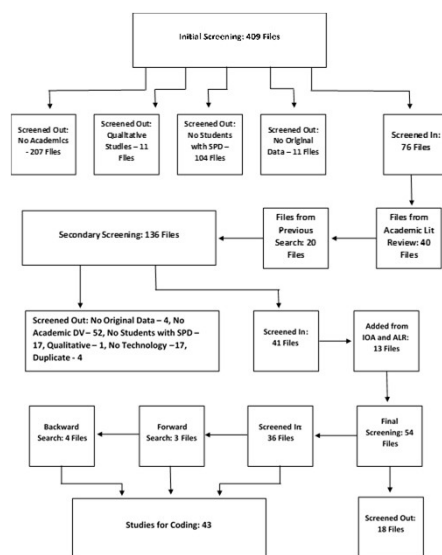

Figure 1. *Flowchart of search decision-making process.*

RESULTS

All 43 included studies were coded across 20 main categories with subcategories that brought the total array to 88. A descriptive analysis was run using SPSS, version 24.0. Of the 136 included participants, 64.71% were described with moderate to profound disabilities. Intellectual disability was the diagnosis for 56.65% of the participants with Autism accounting for 39.71%. One quarter of the participants were diagnosed with multiple disabilities.

Reading was the most studied academic subject, followed distantly by math.

Computer-based interventions used either a desktop or laptop computer and accounted for 51.16% of interventions. Technology-aided interventions used some form of handheld device and was the second most used intervention at 46.51%. Most studies utilized multiple components in the intervention, including prompting and reinforcement.

Breakdown of Targeted Academic Skills

Academic Skill	Number Reported	Percentage
Reading	25	58.14%
Writing	4	9.30%
Math	7	16.28%
Science	1	2.33%
Social Studies	2	4.65%
Multiple Subjects	4	9.30%

Figure 2. *Academic subjects targeted in studies.*

Breakdown of Intervention Strategies Used

Intervention Strategy	Used in Studies	Percentage
Computer-Based Intervention	22	51.16%
Discrete Trail Training	0	0.00%
Modeling	11	25.58%
Prompting	26	60.47%
Least-to-Most Prompting	8	18.60%
Graduated Guidance	2	4.65%
Reinforcement	27	62.79%
Scripting	3	6.98%
Technology-Aided Instruction	20	46.51%
Time Delay	17	39.53%
Video Game	0	0.00%
Video Modeling	5	11.63%
Video Prompting	1	2.33%
Visual Support	10	23.26%

Figure 3. *Interventions used to teach academics.*

The interventions described in the studies were successful in teaching the skills. In the 43 studies, there were 316 total opportunities to demonstrate an effect. The learners demonstrated a learning effect 294 time, or 93% of opportunities.

In addition, a similar success rate was seen in maintenance of learned skills. In three quarters of cases, the skill generalized to different settings, materials, or people.

Effects for intervention, maintenance, and generalization

	Sum	Success Percentage
Opportunities for Effect	316	93.04%
Effects Shown	294	
Opportunities for Generalization	127	74.80%
Generalization Effects	95	
Opportunities for Maintenance	206	94.17%
Maintenance Effects	194	

Figure 4. *Effects for academic interventions.*

CONCLUSIONS

The studies included in this review showed that video technology can be effectively used to teach academic skills. Although 58% of the studies targeted reading, the success rate of teaching indicates that, when targeted, other subjects can be taught to students with moderate to profound disabilities.

Future studies targeting academic subjects other than reading are recommended.

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