



Research Studies

Study 1: Exploring EPSS as an Assistive Technology

Participants in the Study

Two special education teachers and four high school students implemented tools for one semester. Three students were identified with behavior disorders and exhibited difficulties complying with directions, managing aggression, and solving problems appropriately. One student was identified with Asperger's Syndrome and had difficulties interacting socially and responding appropriately to teacher direction and student initiations

Methods

A special education teacher taught the students the tool strategies and assisted them in making and using tools in this and a second classroom setting. The Participants were interviewed at the end of the semester and responses were analyzed inductively for themes related to benefits, concerns, and usability.

Findings

Two students indicated in the interviews that the tools completed under the solving personal problems category had assisted them in recognizing and managing their behaviors. For example, one student noted that completing the problem-solving card served as an alternative behavior for him that replaced his more typical verbal or physical lashing out when another student made him angry. Using the tool, he spent a few minutes typing in the responses in the card about what was bothering him and what he should do instead. When asked how it helped, he said, "after I calmed down and read everything that I wrote, [I] thought I made some pretty good decisions towards what I did."

With regards to transition planning, these tools facilitated more active engagement in the Individualized Education Plan (IEP) process in special education. One student said, "They were useful especially for my IEP. I typed out my career thing for it and then I printed it and I took it to my IEP and my mom read it and everything, so it was a help...She [mom] thought that I did a good job of what I wanted to do for a career and how much I've already thought out about it." Students also suggested that the tools would be useful for all students in schools.

Students identified some concerns with using the tools. Although the instructor felt that a behavior commitment card was a good way for students to take responsibility for their behaviors, the students indicated in their interviews that they were embarrassed taking these forms up to the teachers for signing and wished that the teacher review of student performance could be completed via email to prevent the student being singled out in the classroom. One student explained, "Well, if people saw it they'll know like you're in like special classes and like special needs stuff. It sort of ruins your reputation of like how cool you are and everything and like if they see that you have a check sheet or something like that then they start picking on you and everything."

Reference

Mitchem, K., Kight, J., Fitzgerald, G., & Koury, K. (2007). Electronic performance support systems: An assistive technology for secondary students with mild disabilities. *Journal of Special Education Technology, 22*(2), 1-14.

Study 2: EPSS Tools to Enhance Success in School of Secondary Students

Participants the Study

Seven high school teachers and 35 students with mild learning and behavior disabilities utilized the tools over a six-month duration.

Methods

Students received instruction, support, and guided practice with use of tools to meet individualized behavioral and instructional objectives and then used tools in a non-supported generalization setting.

Students were divided into two groups with a first intervention group and a second replication group. There were 22 students in the first group and 13 students in the replication group.

Acquisition, fluency, and generalization of tool usage were scored using Goal Attainment Scale (GAS) rubrics applied to tool usage.

Behavioral data were collected on the students in this study by trained observers using a standardized behavior coding procedure. Students were observed in the classroom where training and support were provided on the use of tools, and in a second classroom where training and support on use of the tools were not provided. Peers were also observed in one of these settings to establish behavioral “norms” for the student being observed.

Student and teacher ratings were gathered and analyzed on the social competence of students using the Social Skills Rating System (Gresham & Elliott, 1990).

Findings

Acquisition and Use of Tools:

Results indicated that students were successful in learning and using tools at or near expected levels on the Goal Attainment Scales. Their success exceeded expectations when they generalized tool usage to new goals or to new settings. There were no significant performance differences between treatment and replication groups.

Observed Change in Behavior:

Students demonstrated a significant level of behavioral improvement in the training setting from baseline to the end of the independent use phase. In comparison, the levels of positive behavior remained stable in the second classroom setting for the treatment students and for peers in the selected settings. Whereas behavior levels were comparable to peers in the training setting at baseline, these students showed significant levels of improvement compared to peers in the independent use phase.

Improved Perceptions of Social Competency:

Students demonstrated a significant improvement in social competence based on teacher and student ratings on the SSRS. Similarly, students rated themselves as having a significant level of improvement from the baseline phase to the end of the independent use phase.

References

Mitchem, K., Fitzgerald, G., Koury, K., Cepel, C., & Boonseng, T. (2009). Electronic performance support system (EPSS) tools to enhance success in school for secondary students with special needs. In Leo Tan Wee Hin & R. Subramaniam (Ed.) *Handbook of Research on New Media Literacy at the K-12 Level: Issues and Challenges*. Hershey, PA: Information Science Reference.

Study 3: EPSS for Improving Educational Outcomes of Secondary Students

Participants in the Study

Participants included 22 students with mild behavioral disorders and/or learning disabilities, 11 special education teachers, and 30 general education teachers from high schools in three school districts. Eleven students were 9th graders and 11 were 12th graders.

Methods

A series of multiple baseline designs was used to examine the effectiveness of tool usage across 9th grade and 12th grade students as well as to investigate tool usage across settings (training, academic, and transition) for each individual student. The primary methodology included single subject research using multiple replications across students (primary design) and multiple phases across subjects (secondary design) using behavioral target data and curriculum-based measures of change. Pre and post quantitative measures were used to assess tool impact in academic and behavioral areas and transition planning. Acquisition, fluency, and generalization of tool usage were evaluated using Goal Attainment Goal Attainment Scale (GAS) rubrics applied to tool usage. Qualitative analyses included interviews with teachers and students and researcher field notes on contextual variables and implementation procedures.

Students advanced from an initial training setting to academic and transition settings based on visual analysis of curriculum-based measures, Goal Attainment scores, and correctness of student-made tools.

Findings

Acquisition and Use of Tools:

Results indicated that students were successful in learning and using tools at or near expected levels on the Goal Attainment Scales and generalizing their use to academic and transition settings. On the GAS, a score of 3 represents the expected level of attainment. Scores on the scales were: acquisition: 3.13; fluency: 3.19; generalization: 3.2; and maintenance: 3.33.

Student Outcomes

Half the students demonstrated successful outcomes related to tool use on their curriculum-based measures and half the students did not make adequate progress to meet the requirements of the single case design. Differences were not found to relate to grade level or fidelity of implementation provided by teachers. Qualitative data indicated that differences were primarily site related: one school had successful outcomes, one school had mixed outcomes, and the third school failed to produce student outcomes. Effective implementation was related to administrative support, teacher and student buy-in, and levels of researcher oversight.

Overall, quantitative data demonstrated significant improvement in general information on the Peabody Individual Achievement Test (PIAT), significant improvement of teacher perceptions of students' self-determination on the AIR Self-Determination Scale, and significant improvement on a combination of transition-related variables on the Transition Planning Inventory (TPI) for self-determination, communication and employment, further education/training, and interpersonal relations. There were no significant differences on these measures between the two groups: 9th and 12th graders.

Student Satisfaction with StrategyTools

- 94-100% of students liked exploring StrategyTools, creating their own tools, the content of the tools, and the available examples embedded within the tools.
- 95-100% of students liked using the tools they created and felt the tools were beneficial academically.
- 84% of students felt the tools helped them prepare for the future.
- 78% of students felt the tools would help them outside of school.
- 53% of students felt the tools helped them behaviorally (many did not use the tools for behavior)
- 100% of students would have teachers use the tools with other students in other classes. Narrative comments suggested the tools be used class-wide.
- 45% of students responded they would use the tools presently or in the future. The response was given following the close of the school year.

Challenges to Tool Implementation Identified from Teacher Interviews

- **Time for Implementation:** Teachers indicated student and teacher absences and school scheduling issues and closing were barriers to consistent implementation of StrategyTools. A focus on covering the curriculum made some teachers reluctant to take classroom time to teach and support tool use.
- **Instructional Leadership:** Administrative support and district goals influenced tool usage. District initiatives that focused on school improvement and test scores took priority over teacher efforts for additional classroom innovations.
- **Motivation of Teachers and Students:** Teacher and student buy-in was related to student success. When motivation to succeed was lacking, implementation with fidelity was unlikely to occur.
- **Technology Challenges:** Many teachers had difficulty in gaining adequate access to computers within their classrooms or be allowed lab time. Idiosyncratic school security network issues created issues for printing and records management.

Data-supported Recommendations for Tool Use

- Demonstrate that time spent teaching and supporting strategies improves student learning/behavior to gain district commitment.
- Engage teachers at the building level in a commitment to school-wide strategy use and adoption across content areas.
- Model and guide tool use with students and provide opportunities for expanded use, leading toward independent use.
- Implement tool use class-wide to avoid singling out students and improve motivation for use.
- Involve district technical support to address idiosyncratic network and equipment problems.

Funding

Fitzgerald, G., Mitchem, K., Miller, K., & Hollingsead, C. (2008-1010). Electronic performance support systems as assistive technologies to improve outcomes for secondary students. Washington, D.C.: Institute of Education Sciences: Project #R324B707176.

References

Fitzgerald, G., Mitchem, K., Miller, K., & Hollingsead, C. (2010). Electronic Performance Support Tools for Adolescents. University of Missouri.



References: Electronic Performance Support Systems

- Fitzgerald, G. (2004). Using technologies to meet the unique needs of students with emotional/behavioral disorders: Findings and directions. In Edyburn, Higgins, & Boone (Eds.) *The Handbook of Special Education Technology Research and Practice*, 335-354.
- Fitzgerald, G., Koury, K., Mitchem, K., Boonseng, T. (2007). EPSS for secondary students with special needs: The StrategyTools Support System. In Proceedings of Ed-Media 2007 World Conference on Educational Multimedia, Hypermedia, and Telecommunications, Vancouver, Canada.
- Gery, G. (1991). *Electronic performance support systems*. Cambridge, MA: Ziff Institute.
- Gustafson, K. (2000). Designing technology-based performance support. *Educational Technology*, 40(1), 38-44.
- Miller, K., Fitzgerald, G., Koury, K., Mitchem, K., & Hollingsead, C. (2007). KidTools: Self-management, problem solving, organizational and planning tools for children and teachers. *Intervention in School and Clinic*, 43(1), 12-19.
- Miller, K., Koury, K., Mitchem, K., Fitzgerald, G., & Hollingsead, C. (2007). KidTools: Self-management, Problem-solving, organizational & planning tools for children and teachers. *Interventions in School and Clinic*.
- Mitchem, K., Fitzgerald, G., Koury, K., Cepel, C., & Boonseng, T. (2009). Electronic performance support system (EPSS) tools to enhance success in school for secondary students with special needs. In Leo Tan Wee Hin & R. Subramaniam (Ed.) *Handbook of Research on New Media Literacy at the K-12 Level: Issues and Challenges*. Hershey, PA: Information Science Reference. [Refereed Book Chapter]
- Mitchem, K., Kight, J., Fitzgerald, G., & Koury, K. (2007). Electronic performance support systems: An assistive technology for secondary students with mild disabilities. *Journal of Special Education Technology*, 22(2), 1-1.