

Introduction

Assistive Technology

Assistive technology (AT) refers to any item, piece of equipment, or product system that is used to increase, maintain, or improve the functional capabilities of an individual (Read & Bowser, 2005).

For individuals with learning disabilities (LD), AT includes computer programs that provide speech-to-text, text-to-speech, graphic organizers, and word prediction capabilities.



Why use Assistive Technology?

AT can remediate the reading, writing, and spelling deficits of children with LD (Fasting, & Halaas Lyster, 2005; Hall, Hughes, & Filbert, 2000; Hetzroni, & Shrieber, 2004; Lange, McPhillips, Mulhern, & Wylie, 2006).

When students can build on their strengths and compensate for their weaknesses increased motivation, higher rates of learning, and improved achievement may ensue (Forgrave, 2002).

Self-Concept

Students with LD have lower self-concepts than their non-disabled peers (Humphrey, 2000; Kloomok, & Cosden, 1994; Valas, 1999).

81 percent of students with LD experience decrements in self-concept which occur by grade three and remain fairly stable through high school (Chapman, 1988).

Low self-concepts can be attributed to: (a) repeated school failures; (b) awareness of being different from peers; and (c) problems surrounding social acceptance (Raviv & Stone, 1991).

School Motivation

School motivation refers to students' energy and drive to learn, work effectively, and achieve to their potential (Martin, 2009).

Students with LD have lower levels of school motivation than their non-disabled peers (Sideridis, Morgan, Botsas, Padellaju, & Fuchs, 2009).

They may be less motivated to complete class assignments as they expect to do poorly (Bender & Wall, 1994; McNulty, 2003).

Rationale for the Demonstration School

The demonstration school provides: (a) specialized educational programs for students with LD; (b) students with up-to-date training on the use of AT; and (c) educators that are trained on the use and implementation of AT.

Research Question

Using mixed-methods, this study follows students as they transition from a two-year elementary demonstration school and are re-integrated into high school. This exploratory study examines the impact of assistive technology, and the degree to which attending a demonstration school impacts students' self-concept and school motivation.

Methods

Participants

Twelve former demonstration school students with severe LDs and their parents consented to participate. These students (4 females and 8 males) were between 14 and 16 years of age ($M = 15$).

Measures and Procedure

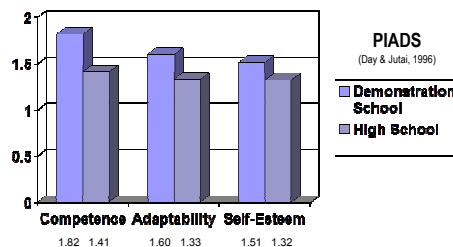
	Students	Parents
Sept. 2007	Start of demonstration school program. Self-Perception Profile for LD Students	
May 2008	End of first year at demonstration school. Self-Perception Profile for LD Students	
May 2009	End of demonstration school program. Self-Perception Profile for LD Students	
Jan. 2009	End of first semester in high school. Semi-structured interviews with students. Motivation and Engagement Scale Psychosocial Impact of Assistive Devices Scale	Semi-structured interviews with parents.
June 2010	End of second semester in high school. Semi-structured interviews with students. Motivation and Engagement Scale Psychosocial Impact of Assistive Devices Scale Self-Perception Profile for LD Students	Semi-structured interviews with parents.

Results

Assistive Technology

Paired-samples *t*-tests were conducted with data from the Psychosocial Impact of Assistive Devices Scale (Day & Jutai, 1996).

No significant differences were found in students' perceived impact of the AT at the demonstration school and at high school.



"I feel way better knowing that I can get the same grades as the other kids, knowing that I'm just learning differently."

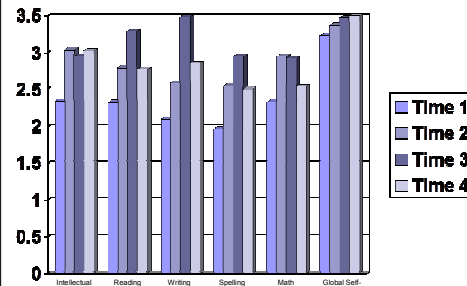
"Before he didn't want to go to school. He now wants to be there because he knows he can do the work – that's all part of the technology."



Results

Self-Concept

A one-way repeated measures analysis of variance was conducted with data from the Self-Perception Profile for LD Students (Renick & Harter, 1988).



General intellectual ability differed significantly

Wilks' Lambda = .33, $F(3, 9) = 6.10$, $p < .05$, partial eta squared = .67.

Reading competence differed significantly

Wilks' Lambda = .28, $F(3, 9) = 7.80$, $p < .05$, partial eta squared = .72.

Writing competence differed significantly

Wilks' Lambda = .26, $F(3, 9) = 8.71$, $p < .05$, partial eta squared = .74.

Spelling competence differed significantly

Wilks' Lambda = .13, $F(3, 9) = 20.05$, $p < .05$, partial eta squared = .87.

Math competence differed significantly

Wilks' Lambda = .40, $F(3, 9) = 4.58$, $p < .05$, partial eta squared = .60.

Global self-worth did not differ significantly

Wilks' Lambda = .73, $F(3, 9) = 1.11$, $p > .05$.

"I used to think I wasn't that smart in school. But since going to the demonstration school, I know I am smart, I can be one of the top students in my class."

"Before I'd get frustrated and need sports to get me through the day. But now being at the demonstration school, learning different technology, different ways, it's easy."



School Motivation

Paired-samples *t*-tests were conducted with data from the Motivation and Engagement Scale (Martin, 2009).

No significant differences were found in students' level of motivation and engagement at the demonstration school and at high school.

"Before he would just give up. Things didn't get done in class and then he would come home and throw a fit and say, 'I don't understand it.' Now he's more likely to study it and see if he can understand it or ask for help."

"Everything goes back to the technology because it's there, I can go to it whenever I want, and I can always help myself."

Discussion

Students with LD may experience a cycle of failure.

Early failures may lead to a lowered sense of academic competence, which in turn contributes to lowered expectations for future success and reduced achievement efforts, which then contributes to further failure (Durrant, Cunningham, & Voelker, 1990).

When used in a supportive environment, AT enables students to obtain success in reading and writing, thus having a positive impact on students' self-concept, motivation towards school, learning experiences, and chances of succeeding academically and socially (Fasting, & Halaas Lyster, 2005).

AT allows students to compensate for their learning difficulties, provides a means for students to excel in school, and thus has the potential to help students break out of cycles of failure.

References

- Chapman, J. W. (1988). Learning disabled children's self-concepts. *Review of Educational Research*, 58, 347-371.
- Bender, W. N., & Wall, M. E. (1994). Social-emotional development of students with learning disabilities. *Learning Disability Quarterly*, 17, 323-341.
- Day, H. I., & Jutai, J. (1996). *The Psychosocial Impact of Assistive Devices Scale [Manual]*. London: University of Western Ontario.
- Durrant, J.E., Cunningham, C.E., & Voelker, S. (1990). Academic, social, and general self-concepts of behavioral subgroups of learning disabled children. *Journal of Educational Psychology*, 82, 657-663.
- Fasting, R. B., & Halaas Lyster, S. (2005). The effects of computer technology in assisting the development of literacy in young struggling readers and spellers. *European Journal of Special Needs Education*, 20(1), 21-40.
- Forgrave, K. A. (2002). Assistive technology: Empowering students with learning disabilities. *The Clearing House*, 75(3), 122-126.
- Hall, T. E., Hughes, C. A., & Filbert, M. (2000). Computer assisted instruction in reading for students with learning disabilities: A research synthesis. *Education and Treatment of Children*, 23(2), 173-193.
- Hetzroni, O. E., & Shrieber, B. (2004). Word processing as an assistive technology tool for enhancing academic outcomes of students with writing disabilities in the general classroom. *Journal of Learning Disabilities*, 37(2), 143-154.
- Humphrey, M. (2000). Teacher and pupil ratings of self-esteem in developmental dyslexia. *British Journal of Special Education*, 29(1), 29-36.
- Kloomok, S., & Cosden, M. (1994). Self-concept in children with learning disabilities: The relationship between global self-concept, academic 'discounting', nonacademic self-concept, and perceived social support. *Learning Disability Quarterly*, 17, 140-153.
- Lange, A. A., McPhillips, M., Mulhern, G., & Wylie, J. (2006). Assistive software tools for secondary-level students with literacy difficulties. *Journal of Special Education Technology*, 21(3), 13-22.
- Martin, A. J. (2009). *The Motivation and Engagement Scale* (9th Edition). Sydney, Australia: Lifelong Achievement Group (www.lifelongachievement.com).
- McNulty, M. A. (2003). Dyslexia and the life course. *Journal of Learning Disabilities*, 36(4), 363-381.
- Raviv, D., & Stone, C. A. (1991). Individual differences in the self-image of adolescents with learning disabilities: The roles of severity, time of diagnosis, and parental perceptions. *Journal of Learning Disabilities*, 24, 602-611, 623.
- Read, P., & Bowser, G. (2005). Assistive technology and the IEP. In D. Eddyburn, K. Higgins, & R. Boone (Eds.), *Handbook of special education technology and practice*. (pp. 61-77). Whitefish Bay, WI: Knowledge by Design Inc.
- Renick, M. J., & Harter, S. (1988). *Self-Perception Profile for Learning Disabled Students [Manual]*. Denver: University of Denver.
- Sideridis, G. D., Morgan, P. L., Botsas, G., Padellaju, S., & Fuchs, D. (2009). Predicting LD on the basis of motivation, metacognition, and psychopathology: A ROC analysis. *Journal of Learning Disabilities*, 39(3), 215-229.
- Valas, H. (1999). Students with learning disabilities and low-achieving students: Peer acceptance, loneliness, self-esteem and depression. *Social Psychology of Education*, 3, 173-192.

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