1-1-2012

Data-Based Decisions Guidelines for Teachers of Students with Severe Intellectual and Developmental Disabilities

Bree A. Jimenez
University of North Carolina at Greensboro

Pamela J. Mims
East Tennessee State University, mimspj@etsu.edu

Diane M. Browder
University of North Carolina at Charlotte

Citation Information

Jimenez, Bree A.; Mims, Pamela J.; and Browder, Diane M.. 2012. Data-Based Decisions Guidelines for Teachers of Students with Severe Intellectual and Developmental Disabilities. *Education and Training in Autism and Developmental Disabilities*. Vol.47(4). 407-413. http://www.daddcec.org/portals/0/cec/autism_disabilities/research/publications/education_training_development_disabilities/2011v47_journals/etadd_47_4_407-413.pdf ISSN: 2154-1647

Data-Based Decisions Guidelines for Teachers of Students with Severe Intellectual and Developmental Disabilities

Education and Training in Autism and Developmental Disabilities, 2012, 47(4), 407–413

Data-Based Decisions Guidelines for Teachers of Students with Severe Intellectual and Developmental Disabilities

Bree A. Jimenez
University of North Carolina at Greensboro

Pamela J. Mims
East Tennessee State University

Diane M. Browder
University of North Carolina at Charlotte

Abstract: Effective practices in student data collection and implementation of data-based instructional decisions are needed for all educators, but are especially important when students have severe intellectual and developmental disabilities. Although research in the area of data-based instructional decisions for students with severe disabilities shows benefits for using data, there is limited research to demonstrate teachers in applied settings can acquire the decision-making skills required. The purpose of this research was to demonstrate how teachers from five states acquired a set of data-based decisions implementation guidelines through online professional development. Recommendations for practice and future research are included.

Although one of the most important issues in today's schools is to promote student achievement to meet expectations for either progress on the IEP or state accountability, teachers of students with severe disabilities often lack the tools needed to determine if students are on track for meeting expectations. Teachers may have exposure to methods of data collection, but not know how to use data systematically to make data-based decisions. Data-based decisions can be defined as the use of student performance data to make instructional decisions (Farlow & Snell, 1989). Prior research has shown that students make more progress when teachers follow decision-making guidelines for reviewing data (Browder, Demchak, Heller, & King, 1989). By linking this decision-making to data used in an alternate assessment portfolio, Browder, Karvonen, Davis, Fallin, & Courtade-Little (2005) found that data-based decision making skills can improve alternate assessment outcome scores.

Support for this research was provided in part by Grant No. R324AQ080014 from the U.S. Department of Education, Institute of Education Sciences, awarded to the University of North Carolina at Charlotte. The opinions expressed do not necessarily reflect the position or policy of the Department of Education, and no official endorsement should be inferred. Correspondence concerning this article should be addressed to Bree A. Jimenez, University of North Carolina at Greensboro, 421 School of Education Building, PO Box 26170, Greensboro, NC 27402-6170. E-mail: bajimene@uncg.edu

A comprehensive review by Browder, Wakeman, Ahlgrim-Delzell, and Hudson (2010) of the research on data-based decisions by teachers of students with severe disabilities reveals that nearly all studies on this topic were conducted over two decades ago. Although from the 1980s and early 1990s, this literature provides important evidence that (a) data helps teachers identify patterns of progress (Utley, Zigmond, & Strain, 1987); (b) teachers have some confusion about how to review data to make decisions for students with severe disabilities (Grigg, Snell, & Lloyd, 1989); (c) teachers can improve their data review skills with training (Browder et al., 1989), and (d) applying data-based decisions can improve student progress (Browder, Liberty, Heller, & D'Huyvetters, 1986.). For example, Utley et al., (1987) conducted a study to examine the effects of the amount of documentation of student performance on the ability of teachers to accurately analyze the trend in frequency data. Forty undergraduate and graduate students in special education or related fields were randomly assigned to form four groups. Teachers were given an instructional packet that included information on the basic principles of data collection, graphing, and calculation of a six-day line of progress. Teachers applied the training to four types of data: observation only; observation and raw data; observation, raw data, and graphs; observation, raw data, graphs, and the six-day line of progress. Findings indicated that errors on trend analysis were made by teachers regardless of the form of data that was used.

Besides needing data to identify patterns of progress, teachers also need guidelines for making decisions. Grigg, Snell, and Lloyd (1989) interviewed teachers of students with severe disabilities on the topic of instructional decisions, and found that despite their training in data collection, the teachers did not consistently apply strategies to interpret student data. The teachers reported that at times they used "intuition" to make decisions, and felt that the data collected and graphed did not always represent their students' performance. However, Fuchs and Fuchs (1986) found that teachers and other educators are more effective and efficient when applying strategies for data-based decisions to influence instructional decisions for students with disabilities. Teachers may not find data useful if they have not received training in a methodology to analyze student progress.

The research on data-based decisions from two decades ago also reveals that teachers can master a system for reviewing data and making instructional decisions. For example, Browder, et al., (1986) taught three teachers of students with severe disabilities to use a data review checklist to match instructional decisions to data trends (e.g., when progress was too slow, teachers improved prompt fading). The teachers also self-monitored whether they adhered to the guidelines. With teacher's self-monitoring and concurrent use of the guidelines, consistent student progress was noted. Belfiore and Browder (1992) found similar outcomes for instructors working with adults with severe disabilities.

The most recent textbooks in severe disabilities continue to promote the importance of data collection and review (e.g., Browder & Spooner, 2011; Collins, 2007; Snell & Brown, 2010; Westling & Fox, 2004.) All provide similar models for data collection based on principles of applied behavior analysis such as task analysis, frequency counts, and discrete trial data. In contrast, most do not offer a specific system of guidance for summarizing and reviewing data and make instructional decisions based on data patterns. The early research on data-based decision making suggests that such specificity may be needed. In 1989, Munger, Snell, and Lloyd completed a study in which they explored teachers' decisions based on frequency of data collection and different trends on graphs. The study also examined whether teachers' judgments based on different data collection frequency varied with the trend of the student performance data. When data was variable or showed a decrease or no change, teacher's judgments differed. Data collected more than once per week indicated a more consistent and accurate data-based decision from teachers. Both results suggest teachers need some "rules" for how often to take data and how to interpret data patterns. Similarly, Farlow, and Snell (1989) investigated the decision-making practices of 57 special education teachers of students with severe disabilities, who took student progress data on a regular basis. Although respondents collected ongoing data, they lacked consistent guidelines to evaluate data to make instructional decisions.

Browder, Spooner, and Jimenez (2011) describe a specific data-based decision model that is derived from research showing student progress improved when teachers followed the guidelines (Browder et al., 1986; Browder et al., 1989; Browder et al., 2005; Belfiore & Browder, 1992). In this model, teachers collect data at least three times per week and graph it daily using a form that superimposes the graph on the data sheet for ease of data review. The teacher sets minimum criteria for adequate progress every two weeks. At the end of two weeks, the data are reviewed to determine if it meets one of five data patterns including mastery, adequate progress, no progress, slow progress, or inconsistent. If mastery has occurred, the teacher plans the next target for instruction and if progress is adequate, no change is needed. For no progress, the teacher receives a list of guidelines for how to simplify and shape responding. For slow progress, the teacher receives a list of ideas to improve antecedents such as using more systematic prompt fading. When students have shown that they can perform the skill but do not do so consistently or have regressed, teachers follow guidelines to improve motivation for students to perform at criteria.

Although some evidence exists that this system can promote student progress, with the exception of Browder et al., (2005), all participants in prior research were teachers in university-affiliated programs (e.g., Browder et al., 1989). Browder et al., (2005) found evidence of teacher's ability to use the system across a large urban school system with support provided by a university liaison. The purpose of the current study was to determine if teachers across states could master the data-based decision system in the context of online professional development.

Method

Participants and Format

Teachers. Thirty-one teachers of students with moderate to profound intellectual disability or autism participated in the study. The teachers' years of experience ranged from 2–23 years with an average of 7.4 years of experience. All had their current state licensure in special education and 62% had a Master's degree in special education. All teachers taught in self-contained special education classrooms and 54% were located in urban school systems. The thirty-one participants represented five different states (10 from western state A, 3 from western state B, 9 from southeastern state C, 3 from south eastern state D, and 8 from a southwestern state E). State directors of alternate assessment were given information to invite the teachers to participate in the professional development. Teachers also received training on how to teach state standards to students with severe disabilities on a separate professional development day with larger groups of participants. To be eligible to attend the training, teachers needed to be serving 3rd through 11th grade students classified as having moderate, severe, or profound developmental disability or autism and serving students participating in their states' accountability system by taking alternate assessments based on alternate achievement standards (sometimes called the "1%").

Trainers. A total of three trainings were conducted (two states joined together for two of the trainings). The trainings were delivered by members of a university research team. Two of the trainers were fulltime PhD level research staff and the third was a doctoral student in special education. All were licensed special education teachers with extensive classroom experience with students with severe disabilities. Trainers also had used the data-based decision model in their own classroom experiences. All three also had extensive experience providing state and national professional development.

Format. The 1.5 hour training was conducted online through an interactive format called WIMBA. WIMBA is a synchronized format delivered online that provides a means of delivering content live with an opportunity to interact with the presenters. The training was offered on three occasions by one member of the research team. The number of participants from the various states ranged from 3 to 10 teachers per on line session.

Materials

A PowerPoint was developed that contained information on reasons to collect data, the steps for data collection and summary, and the guidelines for data-based decisions. The power points also included multiple examples of student data showing each of the five types of patterns (no progress, mastery, adequate progress, slow progress, and inconsistent). The resources provided to the teachers included a data based decision table, sample data based decision graphs, blank data sheets and graphs for the teachers to use in their own classrooms, as well as sample graphs and data sheets to correspond with the scenarios provided in the PowerPoint. See Table 1 for an abbreviated version of the data based decision table.

Dependent Measure

The dependent measure was a pretest and a posttest that was developed for the training. The pre- and posttest measures included five data sheets that showed a variety of data patterns for a variety of instructional objectives (e.g., sight words, science concepts, task anal-

TABLE 1

Data-based Decision System for Students with Severe Disabilities

Data Pattern	*Change Needed*	*Examples of Options*
Mastery	Introduce new skill	Introduce new science terms; Target a new daily living skill
Adequate Progress	Make no changes	–
No Progress	Simplify/shape Responding	Use assistive technology; Teach a subset of the skill
Slow Progress	Improve Antecedents	Use time delay to fade prompts; Use/fade stimulus cues
Inconsistent	Improve Motivation	Vary reinforcers; Offer choice of materials Have student self-monitor

ysis of a math procedure, daily living skill). The participants had to identify the data trend (i.e., mastery, slow progress, no progress, steady progress, and inconsistent) and based on the data trend, then identify what changes to make to instruction. The pre- and posttest contained different data sheets reflecting different instructional objectives, but each reflected all five data patterns.

One week prior to the online WIMBA training, each participant was emailed the pretest that included the five data sheets and instructions for how to list the data pattern and instructional decision on each sheet. The participants returned the pretest before the on line training. The posttest measure was administered after completion of the online training and was also delivered via email to each teacher to be returned within one week after the training. Teachers received a resource for their classroom (Barnes & Nobles gift card) after they completed both tests.

The research team scored each test by assigning a score of 1 for each correct data trend and a score of a 1 for each instructional decision that matched the data trend for a total possible score of 10 points per test. Each participant score was entered into a spreadsheet and calculated into a percent correct. Interobserver agreement data were collected on scoring of the participants pretest and posttests by a graduate research assistant. Agreement was calculated by using the item by item method (e.g., both agreed data pattern identified correctly) in which the number of observer agreements was divided by the number of agreements plus disagreements multiplied by 100. Mean IOA was 98% (range of 95% to 100%), with IOA completed on 33% of the pre/posttests.

On Line Professional Development Procedure

The content was delivered via a 1.5 hour online WIMBA training with a PowerPoint presentation, sample data sheets, guided practice with feedback, discussion, and independent practice. Specifically, the presentation started with a slide on why to collect data. Next, the presentation discussed the steps to making informed data based decisions. The first step included the following guidelines: (a) collect data at least three times per week, (b) analyze data every two weeks, (c) graph the data and plot an aim line on a graph, and (d) identify the trend of the data (i.e., mastery, no progress, slow progress, inconsistent, or steady progress). The next step of the training provided information on decisions to make based on the trend of the data. Specifically, teachers were trained in the following guidelines for each data trend: (a) mastery—develop a new plan to extend performance and work on maintenance of the current skill, (b) no progress—simplify and shape the skill (e.g., incorporate assistive technology for response mode), (c) slow progress—improve antecedents (e.g., use systematic prompt fading strategy), (d) inconsistent—improve motivation (e.g., use varied reinforcers or offer choice of materials), and (e) adequate progress (above aim line)—do not make any changes to instruction. Additionally for each of these five data based decisions, the teachers were provided a table with examples of decisions for each data pattern (see Browder, Spooner, & Jimenez, 2011, p. 84.) The next step of the training focused on a discussion of how to implement the decision and track additional data. During this part of the training, several mock student descriptions were presented and participants were guided through practicing the implementation of data based decisions. For example, the teachers considered what assistive technology might simplify a skill for a student with physical challenges. The next part of the training focused on the exceptions, when data-based decisions may not apply (e.g., when regression is due to illness; when student has not received consistent instruction). In the final part of the presentation, the presenter emailed the teachers data sheets while they were on line, had them make the decisions, and then review their decisions with all participants. To accompany the training, participants were emailed the data-based decision table, as well as a set of blank data sheets that could be used for a variety of types of skills (e.g., task analysis, duration, cumulative, repeated trial, repeated opportunity, frequency).

Procedural Fidelity

A second member of the research team listened to all trainings and used a checklist to identify if all components of the training were covered including the rationale, guidelines for data collection and summary, types of data patterns, guidelines for instructional decisions, guided practice with sample data sheets, and independent practice with a second set of data sheets (the emailed set). A + was given for each component covered, a – was given if the component of the training was left out. Procedural fidelity was determined by dividing the number of each observed component by the number of total components to the training and multiplied by 100 (Billingsley, White, & Munson, 1980). Mean procedural agreement was 100% for all trainings.

Research Design and Analysis

A one-group, nonrandomized, pre-posttest design was implemented. Differences in scores from pre to posttest were calculated with a nonparametric, related samples test (i.e., Paired Samples *t*-Test). The ESs for significant differences were determined with Cohen's d (Cohen, 1988). Mean values are presented with their standard deviations. The accepted level of confidence was $p < .05$.

Results

A paired sample *t*-test was used to examine the mean differences on the dependent measure. Statistical significance was found between the pretest and posttest scores ($t(30) = 10.9656$, $p < .0001$, $d = 2.313$). Descriptive statistics showed that after the data-based decisions training teachers were able to identify more data patterns and make more data-based decisions on the posttest ($M = 9$, $SD = 1.7$) compared to the pretest ($M = 4.5$, $SD = 2.2$). An overall gain average of 4.5 was found.

Discussion

Nearly two decades ago, researchers studied extensively how teachers of students with severe disabilities use instructional data (Farlow & Snell, 1994). This body of research provided important information that teachers needed data to identify patterns of progress accurately, and could learn a system of guidelines to improve data-based decisions, and through doing so improve student progress (Browder et al., 2011). Although textbooks continued to promote the importance of taking data on student progress in teaching students with severe disabilities (e.g., Collins, 2007), these texts did not always include specific guidelines for how to recognize a data pattern and apply an instructional decision. The promise of data-based decisions was not translated from research to practice.

Interpreting data can be complex and teachers have reported difficulty in knowing how to interpret their data or what to do with it (Grigg et al., 1989). It is feasible that there are multiple systems for data review and analysis that would produce effective outcomes for students with severe disabilities. Although the system developed by Browder and colleagues (Browder et al., 1986; 1989) is simple, it currently is the only one that includes information on the impact on students in real teaching settings. Browder et al., (2005) began to translate this system from research to practice by implementing it in a large urban system to promote gains on the state's alternate assessment. This demonstration provided further promise that these simple guidelines could have an important impact on student learning. What was still missing was evidence that teachers from more diverse regions could learn the system. It also was important to determine if teachers could acquire the method in a time and format more typically available for professional development. Few teachers can receive the one-to-one consultation teachers received in the research by Browder et al. (1989) or the on-site consultation to discuss data patterns that the teachers in Browder et al. (2005) received.

The current study provides evidence that teachers from a wide range of geographic regions who had no ongoing participation in a university-affiliated teaching program could master the data-based decision system. They also did so in only 90 minutes of on line training. There were some notable limitations in this study. In collaborating with the states, we were unable to recruit a control group willing to do the pre and posttests without training in data-based decisions. In future research, it might be possible to use a delayed treatment group who receive the training after the posttest. A second limitation is that there was no measure of application to the participants' own students. In future research, it might be possible to have teachers submit data sheets from their own students a month after training.

Implications for Practice

Farlow and Snell (1994) stated that every day teachers must decide what to teach their students, how to respond and when to change their instruction. Effective decisions are used to improve student performance. As early as 1980, Haring, Liberty, and White found that teachers were more effective when they followed decision rules to change instruction based on data patterns. Practitioners need a set of guidelines that they apply routinely for data review and instructional decision making.

The system created by Browder et al., 1986 and applied in this study has several features to consider in creating a data-based decision practice. First, the teachers had a set of data collection sheets that could be applied across a wide variety of skills. This saved time as teachers did not have to create new data collection forms. Second, the graphs of the data were superimposed on the data reducing the number of sheets of paper needed and making it possible to look at individual responses and data patterns simultaneously. Third, the system created a ritual for data collection and review; teachers worked towards having at least six data points every two weeks to have enough data to review progress. Finally, the decision rules were summarized on a simple chart so teachers could consider options "at-a-glance." While the exact change to be made required more thought (e.g., exactly how to simplify a response), knowing the general direction to take helped teachers begin to identify options. While practitioners may choose to individualize their data system to their students and context, these general "habits" of data collection and review may promote ongoing use of a system.

Finally, this study implies the need for training in data-based instructional decisions for teachers of students with severe disabilities. The teachers did not know how to identify the correct data pattern nor make a corresponding instructional decision in the pre-test phase. Online professional development may be one option for building capacity among teachers to use data to improve student progress.

References

Belfiore, P. J., & Browder, D. M. (1992). The effects of self-monitoring on teacher's data-based decisions and on the progress of adults with severe mental retardation. *Education and Training in Mental Retardation, 27,* 60–67.

Billingsley, F. F., White, O. R., & Munson, R. (1980). Procedural reliability: A rationale and an example. *Behavioral Assessment, 2,* 229–241.

Browder, D. M., Demchak, M., Keller, M., & King, D. (1989). An in vivo evaluation of the use of data-based rules to guide instructional decisions. *The Journal of the Association for Persons with Severe Handicaps, 14,* 234–240.

Browder, D. M., Spooner, F. H., & Jimenez, B. (2011). Standards-based invitidualized education plans and progress monitoring. In D.M. Browder and F. Spooner (Eds.). *Teaching students with mod-*

erate and severe disabilities (pp. 42–91). New York: Guilford Press.

Browder, D. M., Karvonen, M., Davis, S., Fallin, K., & Courtade-Little, C. (2005). The impact of teacher training on state alternate assessment scores. *Exceptional Children, 71,* 267–282.

Browder, D., Liberty, K., Heller, M., & D'Huyvetters, K. K. (1986). Self-management by teachers: Improving instructional decision making. *Professional School Psychology, 1,* 165–175.

Browder, D. M., & Spooner, F. (2011). *Teaching students with moderate and severe Disabilities.* New York: Guilford Press.

Browder, D. M., Wakeman, S. Y., Ahlgrim-Delzell, L., & Hudson, M. (2010). *Utilization of formative assessments within educational programs for students with significant cognitive disabilities: current practice, current research, and next steps.* Chief State School Officers: ASES-SCASS on Alternate Assessment.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences.* Second Edition. Hillsdale, NJ: Lawrence Erlbaum Associates, Publishers.

Collins, B. C. (2007). *Moderate and severe disabilities: A foundational approach* (pp. 95–140). Upper Saddle River, NJ: Prentice Hall.

Farlow, L. J., & Snell, M. E. (1989). Teachers use of student performance data to make instructional decisions: Practices in programs for students with moderate to profound disabilities. *The Journal of the Association for Persons with Severe Handicaps, 14,* 13–22.

Farlow, L. J., & Snell, M. E. (1994). Making the most of student performance data. *Innovations, 3.* Washington, DC: American Association on Mental Retardation.

Fuchs, L. S., & Fuchs, D. (1986). Effects of systematic formative evaluation: A meta-analysis. *Exceptional Children, 53,* 199–208.

Grigg, N. C., Snell, M. E., & Lloyd, B. H. (1989). Visual analysis of student evaluation data: A qualitative analysis of teacher decision making. *The Journal of The Association for Persons with Severe Handicaps, 14,* 23–32.

Haring, N., Liberty, K., & White, O. R. (1980). Rules for data-based strategy decisions in instructional programs: Current research and implications. In W. Sailor, B. Wilcox, & L. Brown (Eds.), *Methods of instruction for severely handicapped learners* (pp. 159–162). Baltimore, MD: Brookes.

Munger, G. F., Snell, M. E., & Lloyd, B. H. (1989). A study of the effects of frequency of probe data collection and graph characteristics on teachers' visual analysis. *Research in Developmental Disabilities, 10,* 109–127.

Snell, M. E., & Brown, F. (2006). *Instruction of students with severe disabilities. 6th Ed.* Upper Saddle River, NJ: Pearson. Pp. 210–220.

Utley, B. L., Zigmond, N., & Strain, P. S. (1987). How various forms of data affect teacher analysis of student performance. *Exceptional Children, 53,* 411-42.

Westling, D. L., & Fox, L. (2004). *Teaching students with severe disabilities* (pp. 202–224). *3rd Ed.* Upper Saddle River, NJ: Prentice Hall.