

Effect of Intervention With the Self-Determined Learning Model of Instruction on Access and Goal Attainment

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Abstract

Promoting self-determination has been identified as best practice in special education and transition services and as a means to promote goal attainment and access to the general education curriculum for students with disabilities. There have been, however, limited evaluations of the effects of interventions to promote self-determination on outcomes related to access to the general education curriculum. This article reports findings from a cluster or group-randomized trial control group study examining the impact of intervention using the Self-Determined Learning Model of Instruction on students' academic and transition goal attainment and on access to the general education curriculum for students with intellectual disability and learning disabilities. Findings support the efficacy of the model for both goal attainment and access to the general education curriculum, though students varied in the patterns of goal attainment as a function of type of disability.

Keywords

self-determination, access to the general education curriculum, goal attainment

Promoting students' self-determination has been identified as best practice in special education and transition services (Test et al., 2009). Research has established that students with a wide range of disabilities can be taught the skills associated with self-determination (Algozzine, Browder, Karvonen, Test, & Wood, 2001). Enhanced self-determination has been linked with positive transition outcomes, including higher levels of employment and independent living (Wehmeyer & Palmer, 2003; Wehmeyer & Schwartz, 1997), increased community participation (McGuire & McDonnell, 2008), success in postsecondary education (Anctil, Ishikawa, & Scott, 2008; Getzel & Thoma, 2008), and increased quality of life (Lachapelle et al., 2005).

Teaching the skills associated with self-determination has been identified as a way to augment the general education curriculum, promoting increased academic skills (Konrad, Fowler, Walker, Test, & Wood, 2007), attainment of academic and transition goals (Agran, Blanchard, & Wehmeyer, 2000; McGlashing-Johnson, Agran, Sitlington, Cavin, & Wehmeyer, 2003; Wehmeyer, Palmer, Agran, Mithaug, & Martin, 2000), and access to the general education curriculum (Lee, Wehmeyer, Palmer, Soukup, & Little, 2008). Teaching self-determination skills, such as for problem solving, goal setting, and self-management augments the curriculum by providing students with strategies to set

goals related to academic and transition content, to solve problems encountered in the process of working toward those goals, and to monitor and evaluate progress toward goals (Wehmeyer, Lance, & Bashinski, 2002). Research, however, has suggested limited use of curriculum augmentations for students with disabilities, particularly students with cognitive disabilities (Lee, Soukup, Little, & Wehmeyer, 2009; Soukup, Wehmeyer, Bashinski, & Bovaird, 2007; Wehmeyer, Lattin, Lapp-Rincker, & Agran, 2003). Researchers have conducted observational studies of the use of curriculum modifications with students with disabilities across elementary (Soukup et al., 2007), middle (Wehmeyer et al., 2003), and high (Lee et al., 2009) school settings, and have consistently found that students were not being provided with augmentations. This is troubling given emerging evidence that augmenting the curriculum by teaching students to direct their learning can lead to

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enhanced self-determination (Wehmeyer, Palmer, Shogren, Williams-Diehm, & Soukup, in press) and goal attainment (Agran & Alper, 2000; Agran, Cavin, Wehmeyer, & Palmer, 2006; Wehmeyer, Palmer, et al., 2000).

The Self-Determined Learning Model of Instruction (SDLMI) is a model of instruction based on the principles of self-determination that enables teachers to teach students to use self-regulated problem-solving strategies to achieve self-selected goals. The SDLMI is a model of instruction, not a stand-alone curriculum, so the SDLMI enables teachers to overlay self-determination instruction with ongoing curricular activities across curricular domains (e.g., reading, math, transition, vocational). Wehmeyer, Palmer, and colleagues (2000), in a field test of the SDLMI with 40 students with intellectual and learning disability, found that 55% of students met or exceeded expectations in attaining academic and transition goals set using the SDLMI. Additional studies using single-subject research methodology have also suggested that students who receive instruction using the SDLMI meet or exceed teacher expectations for goal attainment (Agran et al., 2006; McGlashing et al., 2003). Lee et al. (2008) using a randomized control group design also established a relationship between the SDLMI and academic goals but inconclusive results on the impact of the SDLMI on access to the general education curriculum.

Purpose of the Study

Despite the oft-cited promise of promoting self-determination as a curriculum augmentation, research suggests that instruction using strategies such as the SDLMI is rarely implemented in practice. For teachers to devote their limited instructional time to promoting self-determination using the SDLMI, there needs to be a clear evidence base to suggest the intended outcomes will result. The efficacy of the SDLMI must—as Wehmeyer, Palmer, and colleagues (2000) emphasized in reporting a field test of the model—be judged based on the impact of instruction using the model on academic achievement and, in the context of academic reform, on issues pertaining to involvement with and progress in the general education curriculum. Although research exists that links the SDLMI with students' attainment of academic and transition-related goals and access to the general education curriculum, those studies used single-subject, correlational, or quasi-experimental designs. The purpose of this study was to build on previous research and attempt to establish a causal relationship between instruction using the SDLMI and student (a) attainment of academic and transition-related goals and (b) access to the general education curriculum. We were also interested in exploring differences based on student disability label (i.e., intellectual or learning disability).

Table 1. Demographic Characteristics of the Treatment and Control Groups

Characteristic	Treatment group (n = 173)	Control group (n = 139)
Gender		
Male	97 (56)	78 (56)
Female	76 (44)	61 (44)
Age, M (SD)	16.3 (1.4)	16.6 (1.34)
Disability		
Intellectual disability	50 (29)	44 (32)
Learning disability	123 (71)	95 (68)
Race/ethnicity		
Caucasian	69 (40)	104 (75)
Hispanic	47 (27)	21 (15)
African American	49 (28)	12 (9)
Other	2 (1)	2 (1)
Missing	6 (4)	0
Free or reduced-price lunch status		
Eligible	87 (50)	46 (33)
Not eligible	47 (27)	39 (28)
Unknown	33 (19)	47 (34)
Missing	6 (4)	7 (5)
Educational support need, M (SD)	3.3 (1.0)	3.5 (1.1)
Percentage of time outside general education		
<20%	31 (18)	55 (40)
21%–60%	82 (47)	44 (32)
>60%	55 (32)	40 (29)
Missing	5 (3)	0

Note. Values are *n* (%) unless indicated otherwise.

Method

Participants

Study participants were 312 high school students with disabilities receiving special education services under the categorical label of intellectual (30%) or learning disability (70%). Participants were recruited from three states (Kansas, Missouri, and Texas) and 20 school districts. Current information from standardized intelligence tests was not available for most students, but teachers were asked to rate on a Likert-type scale the educational support needed by students during the school day ranging from 1 (*no support needed*) to 5 (*total support needed*). The mean educational support need rating for students was 3.4 ($SD = 1.1$). Students were served in a variety of educational settings. The primary setting for 38% of students was the general education classroom, for 31% of students a resource-type setting, and for 31% a self-contained setting. Table 1 provides additional

demographic information on the sample, broken down by assignment to treatment or control group (described below). Preliminary analyses (chi-square tests for categorical variables and *t* tests for continuous variables) indicated differences between the treatment and control group with respect to race/ethnicity, $\chi^2(4, 306) = 41.25, p < .05$, with the control group having more Caucasian participants and the treatment group having more African American and Hispanic participants. Therefore, race/ethnicity was controlled for in the analyses. No additional differences were found between the control and treatment group.

Design and Procedures

Participants were recruited to participate in a two-year study examining the impact of the SDLMI on academic and transition-related goal attainment, access to the general education curriculum, and self-determination. This study used a cluster or group-randomized trial control group design with switching replication (Murray, 1998). That is, during the first year of the study, students were randomly assigned, by campus, to a control or treatment group. The treatment group received instruction using the SDLMI, but the control group did not. During the second year of the study, students in the treatment group continued to receive instruction using the SDLMI and students in the control group began to receive instruction using the SDLMI. This design was implemented to minimize attrition from the control group. As such, the only year for which there is a truly randomized control group design is the first year. We hypothesized, in fact, that there would be no real difference in access and goal attainment scores between groups in Year 2 because all students were receiving the intervention.

Project personnel contacted school districts and districts that agreed to participate ($n = 20$) identified high school campuses ($n = 39$) and special education teachers ($n = 54$) to participate. One to two teachers participated on each campus. Teachers were recommended for participation by the district and were selected if they were willing to integrate the SDLMI into instruction and had direct teaching responsibility for students with intellectual and learning disability. We selected teachers at each campus that supported students with intellectual and learning disability to access general education and transition-related content. Because we had multiple teachers at several campuses, each campus was assigned to be a "treatment" or "control" campus. Random assignment occurred at the campus level (rather than the teacher or student level) because of the nature of special education services in secondary transition. Teachers often work collaboratively and students typically interact with multiple teachers, introducing potential issues with carryover. Each teacher worked with project staff to identify students on his or her caseload who met the project criteria, which included (a) receiving special education

services under the categorical label of intellectual or learning disability, (b) actively working on both academic and transition-related goals, and (c) could benefit from instruction in self-determination. Each teacher worked with between 1 and 10 students, with the average teacher working with 6 students. Informed consent was obtained for each participant, as well as assent from the student. After consent and assent were obtained, baseline data were collected.

Because of the intensive nature of the data collection procedures for access to the general education curriculum (described subsequently), a subset of the sample was selected to participate. Using power analysis, we determined that it was necessary to collect data for 20% of our participating campuses ($n = 8$, four treatment and four control) to achieve a power of .80 to detect an effect ($p < .05$). These eight campuses represented 68 students (22% of the total sample). Chi-square tests for categorical variables and *t* tests for continuous variables were used to determine if there were any systematic differences between student characteristics in the access sample and total sample. No significant differences were found. For the subset of access data collection campuses, data on access to the general education curriculum was collected in a general education classroom that each participating student regularly participated in. For the total sample, goal attainment data were collected at the end of the school year.

Treatment group. In the treatment group, special education teachers received training on the SDLMI (Wehmeyer, Palmer, et al., 2000). The SDLMI is a model of teaching designed to enable teachers to teach students to set and attain goals in multiple content areas, from academic to functional. Implementation of the SDLMI consists of a three-phase instructional process: Set a Goal (Phase 1), Take Action (Phase 2), and Adjust Goal or Plan (Phase 3). Each instructional phase presents a problem to be solved by students. Students solve the problem by posing and answering a series of four *Student Questions* per phase that students learn, modify to make their own, and apply to self-selected goals. Each question is linked to a set of *Teacher Objectives* and a list of *Educational Supports* that teachers can use to enable students to self-direct learning. For more information on the SDLMI, see Mithaug, Wehmeyer, Agran, Martin, and Palmer (1998) and Wehmeyer, Palmer, et al. (2000). Following training and baseline data collection, teachers in the treatment group implemented the SDLMI. Teachers supported students to work through each phase of the model within the context of ongoing academic and transition-related instruction. After a goal was achieved, teachers supported students to work through the *Student Questions* again to focus on additional goals. Direct instruction on the *Student Questions* was delivered by the special education teacher, typically within the context of one-to-one or small group instructional time in a special education class, such as a resource class. Another key aspect of the model is the

development of educational supports (e.g., self-monitoring strategies) that students can use to monitor their progress toward goals in diverse settings. These supports were individualized based on the goal selection process and each student's support needs.

Fidelity of implementation. Fidelity of implementation was monitored using three forms of fidelity measurement (Fixen, Naoom, Blasé, Friedman, & Wallace, 2005). Context fidelity involved ensuring that the necessary precursors to high-level performance were in place. To ensure high context fidelity, all special education teachers received the same training from the same group of trainers on the SDLMI. Compliance fidelity focused on ensuring the core intervention components and their implementation by practitioners was clearly described. All teachers were provided with detailed information and examples of the steps to implement the SDLMI; they also received follow-up visits and coaching as well as regular email notices about the stages of implementation. Competence fidelity focused on how well the practitioner was performing the core intervention components. We collected and reviewed worksheets and written materials completed by participating students in relation to the SDLMI.

Instrumentation

Goal attainment scaling. Goal Attainment Scaling (GAS) was used to collect data on student progress on academic and transition-related goals. Each student worked on up to two academic and two transition-related goals during the year. GAS "involves establishing goals and specifying a range of outcomes or behaviors that would indicate progress toward achieving those goals" (Carr, 1979, p. 89). In terms of establishing goals, students in the treatment group set goals as a function of their participation in the SDLMI intervention. Thus, it was not possible to collect baseline GAS scores; GAS scores were collected at the end of the academic year. For students in the control group, IEP goals were selected, in collaboration with participating teachers, and used to collect GAS scores. IEP goals were selected because it was assumed that such goals would focus on key academic and transition-related content, the same domains in which SDLMI instruction occurred. After goals were selected for the control and treatment group, possible outcomes for each goal were identified by teachers, with support from project staff. Goal outcomes are individually determined, but are objective and measurable. Outcomes are rated on a 5-point scale of -2 (*least favorable*) to 2 (*most favorable*), with 0 being acceptable. The specific outcomes and ratings of less favorable, acceptable, and more favorable depend on students and the goals they are completing. After GAS ratings are made, GAS scores are converted to standardized T scores, with a mean of 50 and a standard deviation of 10 (Kiresuk, Smith, & Cardillo, 1994). Standard

scores of 50 represent acceptable outcomes, and standard scores of less than 40 indicate outcomes teachers found less favorable than expected.

Access to the general education curriculum. To collect data on student access to the general education curriculum, a Windows PC-based data collection system called Access Version of the Code for Instructional Structure and Student Academic Response (Access CISSAR) was used. Access CISSAR is an expanded version of the MainStream Version of the Code for Instructional Structure and Student Academic Response (MS-CISSAR; Carta, Greenwood, Schulte, Arreaga-Mayer, & Terry, 1988) a component of the Eco Behavioral Assessment System Software (EBASS; Greenwood, Carta, Kamps, Terry, & Delquardi, 1994). The MS-CISSAR focuses on an individual student and collects data using a momentary time sampling methodology on 105 individual codes in 13 categories of variables, across three conceptual groupings: classroom ecology (5 categories), teacher behavior (5 categories), and student behavior (3 categories). For more information see Greenwood et al. (1994).

The Access CISSAR was designed to collect additional data specific to when and how opportunities are made available to students to access the general education curriculum. The Access CISSAR has additional categories to code for (a) whether a target student (i.e., the student with a disability being observed) is engaged in a task that could be linked to any general education standard or grade-level standard, (b) whether a target student's peers are engaged in a task that could be linked to any general education standard or grade-level standard, (c) whether a target student is engaged in a task that could be linked to his or her IEP goals and objectives, (d) whether accommodations or curriculum augmentations or adaptations are in place to enable the student to perform more effectively in the task or activity. Data on the Access CISSAR were collected by project staff trained by a master trainer on the MS-CISSAR and Access CISSAR. After receiving an overall reliability rating of at least 95% agreement with the master trainer for three in-school training sessions, the observers were determined to have met the mastery criteria.

To quantify student access, an overall student access score can be calculated from the Access CISSAR data as shown in the equation below.

$$Access = \begin{cases} (1 * F4) + (1 * F7) + (3 * F8) + (3 * F9) & \text{if } F4 = 1 \\ (3 * F5) + (1 * F7) + (3 * F8) + (3 * F9) & \text{if } F5 = 1 \\ 0 & \text{if } F4 = F5 = 0 \end{cases} \quad (1)$$

This access score was developed by Soukup et al. (2007) to calculate the degree to which students with disabilities access the general curriculum during observed sequences. During each observation, each minute the F4 toggle (any general education standard) was activated counted as 1 point. If the F5 toggle (grade-level general education standard)

was activated, 3 points were tallied for the total access score. When any F7 toggle (accommodation) was coded during an observation intervention concurrently with either F4 or F5 toggles, 1 point was added to the total access score. In any interval in which an F8 toggle (augmentation) or F9 toggle (adaption) were coded concurrently with F4 or F5 toggles, 3 points were added to the total access score. Access scores for any interval can range between 0 and 10. See Soukup et al. (2007) for additional information on the theoretical basis for the access score. The subset of students in the access sample was observed for a total of 60 min, 30 min at baseline, and 30 min at the end of the school year. Students were observed in a general education classroom that they regularly participated in during typical academic activities. We worked with teachers to ensure comparability in opportunities to access the general education curriculum across observations.

Analytic Plan

Multilevel modeling (MLM, Singer, 1998; Snijders & Bosker, 1999) served as our primary analytic strategy. MLM was chosen because of the nested nature of our data (e.g., observations nested within students, students nested within campuses) and the detrimental effects of traditional analyses (e.g., ANOVA) when the data are not independent (Singer, 1998). In the MLM framework, the initial model, called the unconditional means model, specifies a fixed effect for the dependent variable (e.g., access or GAS scores) that does not vary across individuals and random or variance components that vary randomly within or between students (e.g., variation between students' scores, variation within student scores, variation between observations). The specific application of MLM to each dependent variable is described below.

Goal attainment. The data on student's goal attainment had a hierarchical structure; goals (Level 1) were nested within students (Level 2, each student worked on up to four academic or transition-related goals), and students were nested within campuses (Level 3). To determine the impact of this nesting on the data, we calculated intraclass correlation (ICC) coefficients. Our ICC values suggested that there was a fair amount of clustering of both academic ($\rho = .31$) and transition GAS scores ($\rho = .18$) within students; but limited clustering of students' average academic ($\rho = .004$) and transition ($\rho = .01$) GAS scores within campuses. Based on these ICCs, we constructed two-level MLMs for academic and transition GAS scores using SAS PROC MIXED. After fitting the unconditional means model, we went on to add student-level (Level 2) predictors to the model for academic and transition GAS scores. We added two continuous student-level variables that were hypothesized to potentially affect goal attainment scores (i.e., previous goal-setting experience and level of educational support need). Then, to

address our primary research question—does exposure to the SDLMI impact GAS scores—we added treatment group as a dummy-coded classification variable. This variable provides a test of the significance of the fixed effect of classification into the treatment or control group on academic or transition GAS means (while still accounting for the nested structure of the data). We also added disability group (i.e., intellectual or learning disability) and the intervention-by-disability group interaction as an additional classification variable to examine if student's disability label impacted mean GAS scores.

Access to the general education curriculum. The data on student's access to the general education curriculum had the following hierarchical structure. Data from each of the 30 observation intervals (Level 1) were nested within each observation time (first and second observation; Level 2); the observation times were nested within each of the students (Level 3), who were nested within campuses (Level 4). To determine the impact of this nesting on the data, we calculated intraclass correlation (ICC) coefficients. As would be expected, there was significant clustering within observation times ($\rho = .51$) and within students ($\rho = .36$), but limited clustering within campuses ($\rho = .002$). Based on these ICCs, we used SAS PROC MIXED to specify a three-level MLM. After specifying the unconditional means model, we added three variables as dummy-coded classification variables, observation time (baseline vs. end of the school year), treatment status (treatment vs. control group), and disability label (intellectual vs. learning disability). The observation time variable provided information on the change from baseline to end of the year measurement, or the slope. Of specific interest was the treatment-by-observation-by-disability interaction, which provided information on the degree to which there were changes over time based on assignment to treatment or control group and disability label.

Results

Goal Attainment

Table 2 provides the parameter estimates for the fixed and random components of the multilevel models for academic and transition GAS scores. As shown in Table 2, there were significant random effects both within and across student scores for academic and transition goals, indicating that GAS scores varied significantly within and across students. Neither of the continuous predictors (previous goal-setting experience or level of educational support) significantly predicted goal attainment scores for academic and transition goals. However there were significant effects of categorical variables. For academic GAS scores, there was a significant fixed effect of treatment, $F(1, 185) = 4.33, p = .04$, and disability by treatment, $F(1, 185) = 3.71, p = .05$.

Table 2. Parameter Estimates From Multilevel Models for Academic and Transition GAS Scores

	Academic GAS Scores		Transition GAS Scores	
	Estimate	SE	Estimate	SE
Fixed effect				
Intercept	45.65*	3.78	47.39*	4.06
Educational support	0.60	0.70	0.89	0.78
Goal-setting experience	0.54	1.40	-0.08	1.41
Treatment group	4.30*	1.55	8.99*	1.70
Disability group	2.20	2.00	4.19	2.19
Treatment × Disability	5.75*	2.94	6.67*	3.07
Random effects				
Variance intercept student	33.87*	8.30	16.45*	11.15
Residual variance	74.51*	7.49	107.22*	12.94
-2LL	2766.9		2220.2	
AIC	2770.9		2224.2	

Note. GAS = Goal Attainment Scaling; LL = log likelihood; AIC = Akaike's information criterion.
* $p < .05$

Similarly, for transition GAS scores, there was a significant fixed effect of treatment, $F(1, 162) = 14.03, p < .001$, and disability by treatment, $F(1, 162) = 4.73, p = .03$. The fixed effect for disability alone was not significant in either model. These findings indicate there were significant differences in academic and transition GAS scores based on assignment to treatment and control group, but that disability label (e.g., intellectual or learning disability) interacted with these differences. To further examine the impact of disability label on academic and transition GAS scores, we conducted a series of post hoc analyses. Specifically, we conducted paired contrasts of the means of our four groups (intellectual disability–control; intellectual disability–treatment; learning disability–control; learning disability–treatment) to identify the specific pattern of differences in academic and transition GAS scores. As shown in Table 3, for academic GAS scores, the only significant difference was students with learning disability in the control and treatment group, $F(1, 185) = 5.58, p = .02$. For transition GAS scores, the only significant difference was between students with intellectual disability in the control and treatment group, $F(1, 176) = 31.97, p < .001$. These findings indicate that students with learning disabilities in the treatment group had significantly higher goal attainment on academic goals but not on transition goals. Students with intellectual disability in the treatment group had significantly higher goal attainment on transition goals but not academic goals.

Access to the General Education Curriculum

Table 4 provides the parameter estimates for the fixed and random components of the multilevel models for student

Table 3. Least Square Means for Disability × Treatment Groups for Academic and Transition GAS Scores

	Academic GAS scores		Transition GAS scores	
	M	SE	M	SE
LD–control	44.78	1.79	45.03	1.87
LD–treatment	50.51*	1.63	46.15	1.65
ID–control	48.07	0.98	40.98	1.12
ID–treatment	48.30	1.15	50.44**	1.24

Note. GAS = Goal Attainment Scaling; LD = learning disability; ID = intellectual disability.
*Post hoc contrasts indicate that the LD treatment group differs significantly from the LD control at the $p < .05$ level.
**Post hoc contrasts indicate that the ID treatment group differs significantly from the ID control at the $p < .05$ level.

Table 4. Parameter Estimates From Multilevel Models for Access Scores

	Access scores	
	Estimate	SE
Fixed effect		
Intercept	3.37*	0.37
Slope (observation time)	1.47*	0.38
Treatment group	0.25	0.17
Disability group	0.75*	0.64
Observation × Treatment	1.41*	0.21
Observation × Disability	0.63*	0.21
Observation × Treatment × Disability	2.02*	0.81
Random effects		
Intercept student	1.48*	0.42
Observation student	0.10*	0.24
Residual variance	1.31*	0.04
-2LL	6147.7	
AIC	6143.7	

Note. LL = log likelihood; AIC = Akaike's information criterion.
* $p < .05$.

access scores. As shown in Table 4, there were significant random effects for both the intercept and observation time (slope), indicating that initial access scores and well as the change in access scores over time varied significantly across students. The fixed effects for observation time, $F(1, 29) = 7.91, p < .001$, and disability, $F(1, 44) = 9.93, p = .0024$, were significant, but the fixed effect for treatment group was not significant, $F(1, 44) = 3.46, p = .07$. This finding indicates that all students significantly increased their access scores over time (i.e., significant observation time parameter); however, there were initial differences in the participants based on disability status (i.e., students with learning disability had higher initial scores than students with intellectual disability) but not based on assignment

Table 5. Estimates for Access Score Intercept and Slopes for the Disability and Treatment Groups

Group	Access score at the beginning of the year (SE)	Access score at the end of the year (SE)
Control		
Intellectual disability	2.2 (.44)	3.3 (.49)†
Learning disability	3.3 (.24)*	3.4 (.26)
Treatment		
Intellectual disability	2.5 (.51)	4.6 (.52)†
Learning disability	3.6 (.35)*	5.1 (.37)*†

*Indicates significance at the $p < .05$ level in across disability group comparison (treatment group and observation time held constant); students with intellectual disability served as comparison group.

†Indicates significance at the $p < .05$ level in across observation time comparisons (treatment group and disability held constant); students with baseline access scores served as the comparison group.

to treatment group. However, when examining the interaction between treatment, observation, and disability, we discovered a complex pattern of differences in the scores between baseline and the end-of-the-year base on disability label and assignment to treatment or control group. To explore these differences, we conducted follow-up paired contrasts of the means of the eight cells created by crossing observation time, treatment status, and disability label. As shown in Table 5, students with intellectual and learning disability in the control and treatment group significantly differed from each other at the beginning of the year, with students with learning disability having higher access scores; at the end of the year, students with intellectual and learning disability still differed in the treatment group but not in the control group. When looking at the pattern of differences over time (i.e., changes in scores from the beginning to the end of the year), students with intellectual disability made significant gains in both the control and treatment group; however, the differences in the treatment group were significantly larger than in the control group, $F(1, 44) = 8.33, p = .001$. Students with learning disability did not show significant gains in the control group, but they did in the treatment group.

Discussion

The results of this study suggest that implementing the SDLMI led to significant changes in the goal attainment and access to the general education curriculum of students with intellectual and learning disability, although there were differential impacts of the intervention for these two groups. In the following sections, we discuss the implications of the results for our two primary dependent variables as well as describe limitations to the study and implications for practice.

Impact of the SDLMI on Goal Attainment

The SDLMI intervention had a significant impact on the goal attainment of students with intellectual and learning disability; however, the impact differed significantly. For students with learning disabilities, those in the treatment group showed significantly higher attainment of academic goals at the end of the intervention year, but no differences in their attainment of transition-related goals. The opposite pattern was seen for students with intellectual disability. A possible reason may be a differential focus for teachers of students with these two disability labels on academic versus transition-related skills. Perhaps, at this stage in their education, transition-related goals were more meaningful for students with intellectual disability and academic goals more meaningful for students with learning disabilities. However, it is also possible that teacher's perceptions of possible adult outcomes for students with intellectual and learning disability affected the goals that were emphasized. Research has suggested that teachers of students with intellectual disability do not believe access to the general education curriculum is as important as it is for students with high-incidence disabilities (Agran, Alper, & Wehmeyer, 2002). Research has also suggested that teachers of students with learning disabilities may emphasize academic content to the exclusion of meaningful, transition-related skills (Wehman, 2001). Further research is needed to replicate and explore the results.

Interestingly, level of educational support need and previous goal-setting experience did not predict student's attainment of academic or transition-related goals. However, the lack of relationship with these variables may be more related to the nature of their assessment. Teachers made a rating of level of educational support need and previous goal-setting experience, and these ratings may not have adequately captured the constructs we were attempting to measure. Future research should explore ways to quantify educational support need and previous goal-setting experience in a more meaningful way.

Access to the General Education Curriculum

With regard to access to the general education curriculum, at the beginning of the school year students with intellectual and learning disability in both the control and treatment group had relatively low access scores, with students with intellectual disability having significantly lower scores. These findings are congruent with other researchers who have found low levels of access for students with diverse disability labels (Lee et al., 2008; Soukup et al., 2007; Wehmeyer et al., 2003). When analyzing the access score formula presented in the Method section, it is clear that with access scores in the range of 2 to 4 points (see baseline access scores in Table 4), students were unlikely to be

working on grade-level standards (an activated F5 toggle leads automatically to a score of 3 points), and if they were working on such a standard, unlikely to have curriculum adaptations and augmentations in place that would support them in working on the standard.

In the control group, students with intellectual disability showed an increase in their access score over the course of the school year of slightly more than 1 point. This is a positive finding, suggesting that over the course of the year, students were likely to be, for example, provided with an accommodation in class (an accommodation is worth 1 point in the access equation). However, as a whole, students were not likely to be receiving additional augmentations or adaptations over the course of the year (as this is worth 3 points in the access equation). Students with learning disabilities in the control group did not show any change over the course of the year, suggesting the degree to which they were provided with accommodations, adaptations, and augmentations remained consistent over the year. Perhaps over the course of the year, teachers became more comfortable with individualizing instruction for students with intellectual disability, particularly as research has suggested this is not an area in which teachers report sufficient skills (Agran et al., 2002).

When students received access to the SDLMI, both students with intellectual and with learning disability showed significant increases in their access scores. Furthermore, the increase for students with intellectual disability was significantly higher than the increase demonstrated by students with intellectual disability in the control group. This suggests that the implementation of the SDLMI had a significant impact on access, increasing scores by about 2 points in each group. This suggests that when students are taught the skills associated with self-determination, they are more likely to be working on a general education standard and/or receiving accommodations, adaptations, or augmentations. This could result from students' having additional self-determination skills that enable them to progress in the general education curriculum, increasing the probability that they are working on a general curriculum standard. It could also be that students learned important skills to advocate for or effectively access and utilize accommodations, adaptations, and augmentations, or it could be that teachers see changes in students' ability to participate in general education curriculum content and provide more access and support for that access (Soukup et al., 2007). Further research is needed to decompose the factors that contribute to students' increased access after receiving instruction using the SDLMI.

However, although the significant increase in access scores is promising, students still had low access scores, overall, even after intervention. Further research is needed to explore strategies for supporting students with intellectual and learning disability to access the general education

curriculum. Clearly, these students are, on average, not routinely working on grade-level standards, nor are accommodations, adaptations, and augmentations being provided with sufficient frequency to promote this access and progress. Furthermore, because of the size of our sample, we were unable to explore additional predictors of access to the general education curriculum and their impact on access scores. Further research with larger samples will be necessary to explore the combined influence of interventions like the SDLMI and other individual and ecological predictors.

Implications for Practice

Promoting valued adult outcomes for students with disabilities necessitates a focus on promoting student self-determination as well as providing students with the highest quality education that emphasizes academic and transition goals. This study suggests that providing instruction in self-determination using the SDLMI has the potential to increase goal attainment and to promote access to the general education curriculum for students with disabilities. Teachers can overlay instruction using the SDLMI on ongoing curricular activities across curricular domains. This creates opportunities for the generalization of self-determination skills as well as opportunities for systematically, yet creatively, incorporating instruction on self-determination across multiple areas of instruction. In addition, because the SDLMI is overlaid on ongoing instruction, it requires less time than traditional, stand-alone curricula.

Work is needed to support in-service teachers to access information on strategies, such as the SDLMI, to promote self-determination and to create opportunities for professional development regarding incorporating such instruction, particularly as teachers report a lack of knowledge of self-determination interventions, as well as difficulty with integrating this content into their instruction (Carter, Lane, Pierson, & Stang, 2008; Stang, Carter, Lane, & Pierson, 2009; Wehmeyer, Agran, & Hughes, 2000). Self-determination must also be integrated into special education teacher preparation programs to enable teachers to effectively use these augmentations in practice; models for doing so exist (Thoma, Baker, & Saddler, 2002) and must be further evaluated and adopted.

In addition, the findings suggest that teachers may be differentially emphasizing academic and transition goals for students with intellectual and learning disability. Given the increased focus on promoting access to the general education curriculum for all students, including those with intellectual disability, and the emphasis in the Individuals with Disabilities Education Act on academic and functional goals for all students, it is necessary that we develop strategies for emphasizing both academic and transition-related content for all students. By adopting the SDLMI, teachers

can focus on content in both areas, while also promoting students' self-determination. Furthermore, they can directly involve students in identifying and prioritizing the goals that are most important to them in both domains. Systems are needed in schools that enable teachers to emphasize skills that enhance academic and transition-related outcomes as well as promote self-determination.

Limitations of the Study

In interpreting the findings of this study, there are several limitations that must be considered. First, we relied on teacher report of students' disability label and specific data on intelligence and achievement scores were not collected. Because of confidentiality requirements that limited the amount of information many of the participating schools could release, admission to special education and categorical information on eligibility for special education was used to assign students to disability groups. Although it can be assumed that this information represents true disability status, there was no way to confirm that students included in this study were assigned to the appropriate group. Second, multiple factors contribute to access to the general education curriculum and attainment of academic and transition-related goals. We were unable to explore all of these factors in our analyses as our primary intent was to explore the degree to which the implementation of the SDLMI by teachers impacted students' outcomes in these domains. More work is needed to systematically explore these factors. Despite these limitations, however, this study provided preliminary evidence that the SDLMI has efficacy for promoting increased attainment of academic goals for students with learning disabilities, transition goals for students with intellectual disability, and increased access to the general education curriculum for both groups of students.

Conclusion

Teaching the skills associated with self-determination has been identified in the literature as a curriculum augmentation that can promote access to the general education curriculum and goal attainment for students with disabilities; however, research documenting a causal relationship has been lacking. This study extended the current literature by empirically demonstrating that augmenting the curriculum with the SDLMI promoted greater access to the general education curriculum and greater attainment of academic goals in students with learning disabilities and transition-related goals in students with intellectual disability. These findings suggest that the SDLMI is an effective model of instruction that can be implemented by teachers to promote valued student outcomes in academic and transition-related domains.

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