Impact of the Self-Determined Learning Model of Instruction on Self-Determination and Goal Attainment in Adolescents with Intellectual Disability

Karrie A. Shogren

Kathryn M. Burke

Anthony Antosh

Michael L. Wehmeyer

Terri LaPlante

Leslie A. Shaw

Sheida Raley

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Abstract

The Self-Determined Learning Model of Instruction (SDLMI) is an evidence-based practice designed to enable teachers to teach students to self-regulate problem solving to set and attain educationally-relevant goals. This study reports on findings and outcomes of the first year of a statewide implementation of the SDLMI by teachers working with students with intellectual disability to promote skills, knowledge, and beliefs that will lead to opportunities for meaningful, integrated employment. Data are reported on teacher fidelity of implementation of the SDLMI, student and teacher ratings of self-determination, student ratings of transition empowerment, and teacher ratings of student goal attainment. Data from the first year of the longitudinal implementation suggest that teachers can implement the SDLMI with fidelity, that students attain educationally relevant goals, and that teachers report changes in aspects of student self-determination, and that the SDLMI can be implemented statewide with school, district, and state-level supports. Recommendations for future research and policy-related implications for scaling up efforts to promote self-determination are provided.

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Goal Attainment in Adolescents with Intellectual Disability

There is a critical need for the implementation and evaluation of evidence-based transition practices to enhance the postschool employment outcomes of youth with intellectual disability. National surveys suggest a community-based employment rate of around 10% for adults with intellectual and developmental disabilities (Anderson, Larson, & Wuorio, 2011; Butterworth, Hiersteiner, Engler, Bershadsky, & Bradley, 2015), significantly below that of other disability groups. A major factor contributing to these poor outcomes is the lack of focus on integrated employment options during the transition from school to adult life and in adult service systems. For example, Domin and Butterworth (2013) found little change over the past decade in the rates of integrated employment for adults with intellectual disability despite policy focused on increasing integrated, competitive employment options and supports.

Nord et al. (2015) stated that a common set of values is emerging from recent policy related to employment for people with intellectual disability that has the potential to promote systemic change. The Workforce Innovation and Opportunities Act of 2014, the 2011 Centers for Medicare and Medicaid Services guidance on integrated employment, and the U.S. Department of Justice's enforcement of Title II of the Americans with Disabilities Act (ADA) as interpreted by the U.S Supreme Court in *Olmstead vs. L.C* (1999) in the context of employment supports all indicate a growing focus on the right of people with intellectual and developmental disabilities to receive employment supports in the community. For example, the U.S. District Court – District of Rhode Island found that the State was in violation of Title II of the ADA due to its "unnecessary over-reliance upon segregated sheltered workshops and facility-based day programs (p. 2)" A Consent Decree (United States of America v. State of Rhode Island, 2014b) was entered into, requiring that

employment services be provided in the most integrated setting appropriate to meet the goal of community integration for all people. Of note in the Rhode Island Consent Decree was that transition-age youth with intellectual disability were named as a target population, and changes in the secondary school-based transition planning process were mandated. The inclusion of transition services in the Consent Decree emerged from the Complaint filed in the case (2014a) that stated that "only approximately 5% of transition-age youth with intellectual disability who transitioned from Rhode Island secondary schools between 2010 and 2012 transitioned into jobs in integrated settings (p. 13)."

One area of intervention focus shown to result in more positive employment outcomes, particularly in the context of transition services, is promoting self-determination (Shogren, Wehmeyer, Palmer, Rifenbark, & Little, 2015). Shogren et al. (2015), in a study of 779 students with disabilities, found the self-determination status of students with intellectual disability and learning disabilities when exiting school predicts more positive adult employment and community participation outcomes at one and two years postschool. Further, researchers have established that self-determination can be enhanced in secondary school, when teachers are trained to support students to develop skills associated with self-determination (Wehmeyer et al., 2012). However, despite this evidence, researchers have found that schools and state systems rarely implement practices to support self-determination in the context of job selection and career development (Mazzotti, Rowe, Cameto, Test, & Morningstar, 2013; Winsor & Butterworth, 2008; Winsor, Butterworth, & Boone, 2011). For example, recent data suggest that people with intellectual disability report a preference for integrated employment (Butterworth et al., 2015), but that these expressed preferences are not used to guide the provision of employment supports. All too often program-related factors, such as the presence of a sheltered workshop where people with

intellectual disability have traditionally been relegated, guide employment options and supports, including goals set in the context of transition planning.

In response to the Consent Decree in Rhode Island, systemic efforts were undertaken to enhance the transition supports and services provided to students with intellectual disability in public schools across the state. One aspect was to provide training for middle and high school teachers on the use of the *Self-Determined Learning Model of Instruction* (SDLMI; Shogren, Wehmeyer, Burke, & Palmer, 2017; Wehmeyer, Palmer, Agran, Mithaug, & Martin, 2000), an evidence-based practice to promote self-determination. Training began in the 2015-2016 school year with the goal of providing additional and ongoing training over the ten years of the Consent Decree. The SDLMI is a teaching model designed to enable educators to teach students to self-regulate problem solving to set and achieve educationally valued goals and to enhance self-determination. The SDLMI is derived from theory in self-determination (Shogren, Wehmeyer, Palmer, Forber-Pratt, et al., 2015), the process of self-regulated problem solving, and research on student-directed learning. It enables teachers to engage students in goal setting and problem solving in any educationally-relevant area—though for the purposes of this project, we focused on the area of transition to employment—by increasing opportunities for students to self-direct learning. Implementation of the SDLMI consists of a three-phase instructional process. Each instructional phase presents a problem to be solved by the student (What is my goal? What is my plan? What have I learned?). The student solves this problem by posing and answering a series of four *Student Questions* per phase that they learn, modify to make their own, and apply to reach self-set goals. Each question is linked to a set of *Teacher Objectives* that direct teachers in the outcomes they are supporting by enabling students to answer each question. Each phase includes a list of *Educational Supports* that teachers use to enable students to self-direct learning.

Individualized modifications can be made to the SDLMI to make it appropriate for students with a wide range of support needs. For example, picture-based and augmentative and alternative communication (AAC) supports have been used to enable students to answer the student questions in the SDLMI.

The SDLMI was selected for use in Rhode Island as researchers have found, in large randomized-control studies that have included adolescents with intellectual disability, that the SDLMI leads to enhanced self-determination (Wehmeyer et al., 2012) and transition goal attainment (Shogren, Palmer, Wehmeyer, Williams-Diehm, & Little, 2012), as well as more positive postschool employment outcomes (Shogren, Wehmeyer, Palmer, Rifenbark, et al., 2015). However, prior to this study, the focus of research has been on tightly-controlled efficacy trials (Shogren et al., 2012; Wehmeyer et al., 2012). The present analysis was designed to provide further details on the impacts of scaling-up, providing critically needed information on implementation in naturally occurring contexts, with the majority of supports provided by state and school district systems. The purpose of the present study was to analyze the outcomes of the first year of implementation of the SDLMI. The following research questions were addressed:

1. Did teachers implement the SDLMI with fidelity after training and ongoing coaching, and are there differences in teacher and coach perceptions of fidelity of implementation?

2. To what degree did students achieve goals set through the SDLMI over the course of the year?

3. Was there a change from baseline to end of the year in transition empowerment and self-determination, from the student and teacher perspective?

Method

Sample

The sample included 184 youth with mild to severe/profound intellectual disability and approximately 40 special education teachers across 21 school districts in Rhode Island. The Consent Decree specifically targeted students served under intellectual disability classification, which included students ranging from having mild intellectual impairments to profound intellectual impairments. Rhode Island adopts the Individuals with Disabilities Education Act (IDEA; 2004) definition of intellectual disability as "significantly subaverage general intellectual functioning, existing concurrently with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a child's educational performance" (34 C.F.R. § 300.8[c]).

Limited demographic information was available about the student and teacher participants, as during this initial year of implementation collection of standard demographic information had not been integrated across data collection systems. The focus in the first year was on state-wide implementation and scaling-up with data systems being built for future years of implementation to allow for the analysis of long-term impacts and outcomes. However, based on available information, the average age of youth participating during Year 1 was 16.14 ($\sigma =$ 1.81) with a range from 13 to 20 years. The majority of student participants were White, and a large proportion of the sample had additional disability classifications in addition to intellectual disability. Further details on the student characteristics, including amounts of missing demographic data, are provided in Table 1.

Intervention Procedures

Training. During the first year of implementation, special education teachers of students with intellectual disability received a one-and-one-half day training that provided a broad overview of self-determination and its importance to the education of students with disabilities,

as well as hands-on, intensive training on the SDLMI and its implementation. At the training, teachers were provided standardized information on the implementation of the SDLMI, examples of appropriate individualized modifications for students with mild, moderate, and severe/profound intellectual impairments, and the model's use in the context of transition planning and setting goals for employment for students with intellectual disability. The SDLMI was designed to be used repeatedly over the course of the year. The target in Rhode Island was for teachers to use the SDLMI to support students to set and work toward at least two goals with the SDLMI during the first year of implementation. Teachers were also introduced to outcome measures that would be used (described below) to evaluate the impact of implementation in the classroom. After training, but prior to implementation, teachers completed pre-intervention or baseline measures of self-determination and transition empowerment with students, and then began to use the SDLMI. The outcome measures were repeated at the end of the year to provide an indication of student progress toward self-determination outcomes. Teachers also collected Goal Attainment Scaling (GAS; Kiresuk, Smith, & Cardillo, 1994) data whenever students completed a goal with the SDLMI.

Coaching. University of Kansas researchers worked with the Conversion Institute to identify coaches at each school or at a consortium of schools in smaller districts. Coaches were teachers, transition coordinators, or special education administrators whose role was to provide support for teachers in implementing the SDLMI, conduct fidelity observations and provide feedback to the teachers, and participate in monthly, in-person problem solving meetings and SDLMI professional development meetings, organized by the Conversion Institute and intended to enhance their skills in providing support for ongoing implementation. Data were collected on teacher fidelity of implementation using teacher self-report as well as observations by SDLMI

coaches. This allowed for analysis of teachers' perceptions of their implementation as well as that of coaches. Although the initial plan was for quarterly fidelity data to be collected, because of challenges in timing and data collection, fidelity data was collected only at two time points by coaches for the majority of teachers, once in the fall and once in the spring of the implementation year.

Implementation. Teachers implemented the SDLMI to support students to set individualized goals for learning leading to employment outcomes. Teachers implemented the core components of the intervention consistent with implementation protocols (Shogren, Wehmeyer, Burke, et al., 2017). That is, teachers supported students to work through the three phases of the SDLMI to set a goal, develop and implement an action plan, and evaluate progress to set and go after at least two goals during the course of the implementation year. To achieve this, teachers provided instruction using the SDLMI at least two times a week and engaged in ongoing activities embedded in other curricular activities to support students to take steps toward achieving or modifying their goals. Specific details on the three phase instructional process and the implementation of the SDLMI can be found in Shogren, Wehmeyer, Burke, et al. (2017) and at self-determination.org.

Measures

Self-Determination. The pilot versions of the *Self-Determination Inventory: Student-Report* (SDI-SR; Shogren, Wehmeyer, et al., 2014a) and *Self-Determination Inventory: Parent/Teacher Report* (SDI-PTRShogren, Wehmeyer, et al., 2014b) were used to collect data on student self-determination. The SDI:SR is a self-report, norm-referenced measure of self-determination, and the SDI:PTR is a parent or teacher report version of the same measure. Both were developed to be aligned with Causal Agency Theory (Shogren, Wehmeyer, Palmer, Forber-

Pratt, et al., 2015), and to provide valid and reliable information on self-determination that could be used to guide classroom instruction as well as to evaluate change over time as a result of intervention. Analysis of pilot data suggested satisfactory reliability indices (i.e., Cronbach Alpha, Omega) for youth aged 13 to 22 with and without disabilities and factorial validity across students with and without disabilities using the subscales included in the present analysis (Shogren, Wehmeyer, Palmer, et al., 2017). Ongoing work to further validate and standardize the scale suggests that the tool has strong psychometric properties for youth with intellectual disability (Shogren et al., in press). A total self-determination score, as well as scores for the three essential characteristics of self-determined action defined by Causal Agency Theory – volitional action, agentic action, and action-control beliefs (see Shogren, Wehmeyer, Palmer, Forber-Pratt, et al., 2015 for more information) – can be calculated. The SDI:SR and SDI:PTR were designed to allow for analysis of change in student-level outcomes as a function of intervention to promote self-determination, enabling use by researchers as well as by teachers to evaluate progress and changes in outcomes.

For some students with intellectual disability, particularly students with extensive support needs, providing responses on the SDI:SR (which uses self-report items on a rating scale) is not appropriate. For those reasons, as well as to provide complementary information from teachers or parents when students are able to respond on the SDI:SR, the SDI:PTR was developed. It includes the same set of items and the same scoring system as the SDI:SR but is completed by parents or teachers. In the present study, the SDI:PTR was completed by teachers for all students. No data were collected from parents, which is a limitation and area to be addressed in future research. The SDI:SR was completed with students able to engage with self-report items

with or without modifications (e.g., pictures used to supplement the scale, consistent with

SDI:SR administration guidelines).

Transition Empowerment. Transition empowerment was measured using the

Transition Empowerment Scale (TES; Powers, Turner, et al., 2001), a measure of youth

empowerment within the context of the transition planning process. The measure is an

adaptation of the *Family Empowerment Scale* (FES; Koren, DeChillo, & Friesen, 1992),

originally developed to enable parents of children with emotional and behavioral disorders to

report on their family empowerment. In adapting the FES, the questions were modified to enable

adolescents with disabilities to self-report on the extent to which they could "manage their own

day-to-day circumstances, services, and advocate for other youth" (Powers, Turner, et al., 2001,

p. 94). The TES consists of 31 questions rated on a scale of 0 (*Not True at All*) to 4 (*Very True)*.

Research on the TES has suggested adequate reliability (Cronbach Alpha > .8) and validity in the

measurement of adolescent empowerment (Powers, Ellison, et al., 2001; Powers, Turner, et al.,

2001). Students who were able to complete the SDI:SR also completed the TES; no teacher or

parent report version of the TES was available.

Goal Attainment Scaling. GAS (Kiresuk et al., 1994) was used to provide objective

data on student progress on transition to employment goals. GAS was originally used to measure

goal attainment in the mental health field (Kiresuk & Sherman, 1968) and has been extended to

special education (Carr, 1979). Goal outcomes are individually determined and can be described

in quantifiable (e.g., percent correct attempts) or in less quantified (e.g., is engaged in class)

terms. Each point on the five-point scale is assigned a value, beginning with -2 for the least

favorable, -1 for the less (not least) favorable, 0 points for acceptable, +1 for favorable and +2

for the most favorable. GAS scores are compiled for each student and converted to standardized

T-scores (Kiresuk & Lund, 1976) with a mean of 50 and a standard deviation of 10. The

transformation of raw scores to a standardized score allows comparisons across goal areas and

students independent of the goal area, and the mean of 50 reflects that the person achieved the

expected level of goal attainment, with lower scores reflecting less than expected goal attainment

and higher scores more than expected.

Fidelity. Two types of fidelity data were collected on the implementation of the SDLMI

at two time points during the year. The first type was a checklist developed by the research team

to be completed by teachers where they self-reported their completion (yes/no) of the specific

objectives aligned to the core intervention components of each of the three instructional phases

of the SDLMI (What is my goal? What is my plan? What have I learned?; (see Shogren,

Wehmeyer, Burke, et al., 2017). Second, coaches provided ratings based on observations of each

teacher implementing instruction for all three phases in the classroom. Coaches rated teachers'

implementation in three areas (was the instruction student- or teacher-directed, level of student

engagement, and efficacy of implementation) for each of the three phases of the SDLMI.

Coaches rated instruction in each of the three areas from 1 to 5 with 5 being the highest rating.

Ratings for each objective within a phase were averaged to calculate an average quality of

implementation per phase score.

Analysis

Rescaled responses and missing data. Because of the different rating scales used for

students with varying support needs across the SDI:SR and TES, responses were rescaled to be

on the same rating scale for analysis, consistent with best practice recommendations in the field

(McDonald, 2011). Rescaling allows for the lowest and highest responses to be retained to have

the same meaning across the rating scales. For example, the TES with 3 answer choices (1 = *Not*

True, 2 = *Somewhat True*, 3 = *Very True*) was rescaled to 5 answer choices (1 = *Not True at All*, 2 = *Mostly Not True*, 3 = *Somewhat True*, 4 = *Mostly True*, 5 = *Very True*) such that 1 mapped to 1, 2 mapped to 3, and 3 mapped to 5. Such rescaling allowed for data to be analyzed for all students, regardless of the rating scale used, so long as the anchors are aligned. There was missing data on the outcome measures (i.e., SDI:SR, SDI:PTR, TES, and GAS) for a subset of the sample. There were diverse combinations of missing data (e.g., SDI:PTR may be missing for student, but SDI:SR was available, or SDI:SR was completed, but not TES), that likely resulted from teachers still working out data collection practices and entry systems. However, there was a general decline in the number of responses from baseline to end of the year data collection due to student and teacher movement, as expected in any longitudinal data collection. Table 3 shows the number of respondents for each measure at baseline and end of the year data collection.

To retain the maximum number of cases, best practices in handling missing data were utilized (Enders, 2010). Specifically, multiple imputation was used on the SDI:SR, SDI:PTR, TES, and GAS with student characteristics; items rather than composite scores were imputed with composite scores calculated after imputation, prior to analysis. Available demographic information was used in the imputation process as a predictor of missingness (but demographic data itself was not imputed), as was information about student ability to respond independently or with support on the measures. The multiple imputation by chained equations (*mice*) package, version 2.30 (van Buuren & Groothuis-Oudshoorn, 2011), which implements the fully conditional specification, was implemented via R 3.4.0 (R Core Team, 2017). A total of 100 data sets were imputed using 30 iterations. Pooling of standard errors, a measure of variability around each parameter estimate, incorporated uncertainty due to missingness and the large

number of imputations served to provide sufficient power to detect an effect if present in the data (Enders, 2010).

Research Question 1 – Fidelity. To gain an understanding of the fidelity of implementation, and to guide future implementation and scaling-up activities, descriptive statistics – primarily counts, means, and standard deviation – were calculated for teacher and coach ratings and evaluation of implementation. Tables and figures of fidelity data were created to analyze for general patterns; list-wise deletion was the default missing data handling method. After exploring the descriptive data, we examined differences in fidelity ratings over time to determine if there were significant changes in implementation.

Research Question 2 – Goal Attainment. Similarly, for goal attainment descriptive statistics, means and confidence intervals, were calculated. We also explored the degree to which there was significant change in goal attainment over time based on attainment scores for the first or second goal. This provided information on the degree to which teachers were able to work through two or more goals with students, and the level of goal attainment students achieved using the SDLMI.

Research Question 3 – Change in Self-Determination and Transition Empowerment. To explore change from baseline to the end of one year of implementation in student self-determination and transition empowerment outcomes, the data were analyzed using separate multilevel models for the SDI:SR, SDI:PTR and TES, and results pooled with the *lme4* package, version 1.1-13 (Bates, Maechler, Bolker, & Walker, 2015). School identifier was included as a random intercept in all models. A test that used baseline outcomes as a predictor of end of year outcomes would have violated the assumption of independence between predictors and random effects in a multilevel model (Raudenbush & Byrk, 2002). Instead, a difference

score was calculated for each outcome variable and included in the model to mimic a paired *t*-test. In order to control for multiple tests required to test hypotheses, Bonferroni corrections were applied to α of .05. A Bonferroni correction was also selected because of its overly conservative characteristics. Teacher information could not be explicitly captured in the model, because of the lack of teacher demographic data, and variance of the missing middle level in this multilevel structure was expected to influence estimates at both the student and school level. At the student level, standard errors were expected to be smaller than they should have been which in turn would influence the probability of obtaining the *t* statistic. So, by using a conservative method to adjust α, we also attempted to control for the influence of teachers in the results.

Results

Research Question 1 – Fidelity

Fidelity information was collected for all three phases of the SDLMI implementation (What is my goal? What is my plan? What have I learned?). In terms of teachers' ratings of meeting objective indicators of implementation, self-reported implementation ranged from 75.1% to 94.5% with data collected from the most teachers on Phase 1. In Phase 1 ('What is my goal?') fidelity objectives were met 79.6% of the time. The percent of objectives met when implementing Phase 2 and Phase 3 ('What is my plan?' and 'What have I learned?') was 82.2% and 75.1% respectively. Coaches' ratings of quality of implementation varied slightly across phases, although did not differ statistically. Interestingly, however, when looking at the raw numbers, teachers rated their implementation in Phase 1 as having the highest levels of fidelity, and coaches tended to rate the quality of Phase 1 implementation lowest, with increases in student direction, engagement, and efficacy of implementation over the phases (see Figure 1).

Research Question 2 – Goal Attainment

GAS data were directly linked to implementation of the SDLMI as GAS data are collected after Phase 3 of the model, providing another indicator of fidelity (i.e., the completion of the model) as an outcome measure. GAS data were collected for 123 students for the first goal set with the SDLMI, and for 83 students with a second goal. Data were also available for 47 students on a third and with four students for a fourth goal. This indicated that the large majority of participants was supported to work through a goal via the SDLMI at least one time, over half to work through a goal via the SDLMI at least two times (the target of the first year of implementation), and smaller numbers of students worked through goals three and four times over the school year. As shown in Table 2, results for the first and second goal were approximately at expected level of goal attainment with mean and confidence intervals that contained 50, per scoring of the GAS (see Method).

Secondarily, we explored if the change in GAS scores from the first goal to the second goal was significant, perhaps indicating growth in goal attainment skills, but the results suggested that the change in goal attainment scores was not significantly different from zero given the confidence interval contained 0, $\Delta\mu = 4.53$, 99.4% CI[-15.75, 24.81]. The range in difference scores was large, partly due to the large number of missing observations in the original data. Because of the smaller number of students that completed three and four goals, we did not analyze for differences based on these goals, but the student outcomes continued to remain around the expected level of goal attainment.

Research Question 3 – Change in Self-Determination and Transition Empowerment

Mean and 95% confidence intervals were calculated for the SDI:SR and SDI:PTR overall and subscale scores and overall score for the TES and are provided in Table 3. The confidence interval was obtained from multilevel modeling output to automatically adjust for clustering in

schools. The listed sample size is based on respondents who answered one or more questions on the subscale or measure. Seven questions in the SDI:PTR action-control beliefs scale were missing from most (> 95%) hardcopies of the measures, an undetected copying error that resulted in data missing completely at random. Only 4% of respondents completed the measure, so the imputation process could not successfully recover the information on that subscale. Although descriptive statistics were calculated, this subscale was omitted from further comparative analysis.

Difference scores were used to test whether there was a change from baseline to end of year. The first analysis tested the difference score to determine if it was different from zero, similar to a paired *t*-test. Results in Table 4 show that two scores showed a change from baseline to end of year: SDI:PTR volitional action and SDI:PTR agentic action. Specifically, teacher ratings of students' volitional action increased ($\Delta\mu = 1.27$, 99.3% CI [0.20, 2.34]), as did their ratings of students' agentic action ($\Delta\mu = 1.63$, 99.3% CI [0.15, 3.11]).

Discussion

The purpose of the present study was to explore the impact of implementation of the SDLMI with students with intellectual disability and their teachers in Rhode Island over a one-year period. This initiative was undertaken as part of systemic efforts in the state to enhance secondary special education for students with intellectual disability with the goal of more integrated, postschool employment outcomes, consistent with a Consent Decree entered into by the state. The SDLMI has been evaluated in large randomized control studies and identified as an evidence-based practice in secondary special education and transition; however, the implementation and outcomes in real-world contexts with limited developer support have not been systematically explored or evaluated. Thus, our purpose was threefold – to examine fidelity

of implementation of the SDLMI in this context, to examine goal attainment as a function of using the SDLMI, and to examine changes from baseline to the end of the year in self-determination and transition empowerment. This study differs from previous, tightly-controlled efficacy studies in that the focus was on implementation and outcomes within one group of students and their teachers over the course of a year. There was not the use of a control group to examine efficacy; instead we were focused on examining if scaling-up the SDLMI could be achieved with high fidelity of implementation, expected goal attainment, and changes in self-determination over a one-year period. Future research will be needed to explore sustainability, impact on longer-term outcomes such as postschool employment, and comparisons to matched-controls who are not a part of state-wide implementation.

Fidelity

One of our research questions focused on whether or not, with limited developer support and under the auspices of a Consent Decree, implementation would be possible. We collected multiple sources of information to inform fidelity, including teacher report of their implementation of each of the teacher objectives associated with each phase of the SDLMI, coaches' ratings of teachers' implementation of core components of the SDLMI (student- vs. teacher-directed, student engagement, and efficacy of supports provided), and information on the number of goals completed based on GAS data. Through these diverse sources of information, we were able to capture information on multiple aspects of fidelity, namely adherence, exposure, quality and responsiveness of delivery (Fixsen, Blase, Duda, Naoom, & Van Dyke, 2010). We explored descriptive statistics using data collected from teachers and coaches on implementation.

Overall, we found that teachers rated their implementation of each of the teacher objectives associated with the SDLMI relatively high, although slightly lower in Phase 2 and 3,

compared to Phase 1. The teacher objectives and primary educational supports shift across each phase, with Phase 1 focused on problem solving and goal setting, Phase 2 on goal attainment and self-management, and Phase 3 on self-evaluation and decision-making. The slightly decreasing trend in teacher reports of fidelity suggests that additional supports for later stages of the model may be needed in practice, perhaps through specific coaching (Snyder, Hemmeter, & Fox, 2015) or ongoing professional development activities (Hargreaves, Martin, Kragler, Quatroche, & Bauserman, 2014). In contrast, coaches rated the implementation quality and responsiveness of students to the SDLMI as increasing slightly over time, suggesting that practice and fluency with the intervention may be important to enhance teachers' ability to shift their instruction from teacher-directed to student-directed and promote high levels of student engagement. Further research is needed, however, to get a more nuanced understanding of implementation, as well as examining varying types and forms of ongoing implementation support to enable teachers to feel skilled in meeting the SDLMI teacher objectives. However, in policy and practice, the findings suggest that scaling-up the SDLMI is possible, but that ongoing supports – and research examining the most effective supports for sustaining teacher implementation and student outcomes - will be necessary.

Goal Attainment

As mentioned previously, *Goal Attainment Scaling* (GAS) data served as an indicator of fidelity, as to report GAS data teachers needed to have worked with students to set a goal in Phase 1 and to have evaluated the attainment of the goal after students completed Phase 3 as well as an indicator of student achievement of goals set through the SDLMI. Therefore, the available GAS data tell us that working through one goal with the SDLMI during the first year of implementation was feasible for the majority of participants, and a large majority was able to

work through two goals. Smaller numbers of students completed three or four goals. Previous

research (Shogren et al., 2012) has found significant variability in the number of goals students

worked through using the SDLMI that is likely influenced by personal characteristics of students,

teachers, and classrooms such as support needs of students, teachers' previous experience, and

classroom curricular demands. Ongoing research is needed to better understand the factors that

influence the appropriate number of goals to target with the SDLMI and the factors that

influence instruction in this area so that more effective professional development supports can be

provided. Such research can inform practice by providing critical information on the number of

goals that lead to increases in self-determination and employment outcomes over time.

In addition to indicating that teachers and students were able to work through the SDLMI

to set goals, the GAS data suggest that students were achieving close to expected levels of goal

attainment for goals selected using the SDLMI, scored by teachers using the GAS rubric. The

GAS rubric is set up so that scores of 50 reflect expected levels of attainment, and lower scores

less than expected and higher greater than expected. The average GAS score hovered around 50

for all goals and did not significantly differ between the first and second goal set. Past research

has suggested that levels of goal attainment tend to be higher when students are taught using the

SDLMI (Shogren et al., 2012), and the present findings add to that body of experimental work,

suggesting that when implementation is scaled-up, students with intellectual disability can be

supported using the SDLMI to set and attain goals related to postschool employment. This adds

to previous literature that has suggested the impact of the SDLMI on transition-related goals,

generally for students with intellectual disability (Shogren et al., 2012), as well as the impact that

learning goal setting skills in the context of critical life domains, such as employment, can have

on self-determination (Sheppard & Unsworth, 2011). Further research is needed, however, that

examines the type and quality of goals set, and the linkage between goals set and the long-term outcomes targeted, specifically integrated, community-based employment. Additionally, the rigor of the expectations set by teachers using GAS, and the congruence of ratings made by teachers, students, and outside observers should be further examined particularly in ongoing effectiveness research, where conditions are not tightly-controlled and contextual factors may play a role in expectations for goal attainment.

Self-Determination and Transition Empowerment Outcomes

As was described, the only significant change in self-determination and transition empowerment outcomes after a year of implementation was on teacher ratings of students' volitional and agentic action. The findings that there were not changes in students' self-reported self-determination and transition empowerment were not completely unexpected as other studies have found that it may take longer-term, repeated exposure to self-regulated problem solving instruction to set and work toward goals for students to begin to report changes in themselves, particularly for students with intellectual disability (Wehmeyer et al., 2012). Further research is needed on shorter-term change indicators, and ways to determine what factors may influence student self-reported change. This work will be particularly important to provide guidance for educators, administrators, and policy makers in identifying outcomes to target in the short- and long-term to document change and progress toward the goal of integrated employment outcomes, postschool, for students with disabilities.

Unlike student self-report indicators, however, teacher reports on student self-determination did suggest change. Significant differences in teachers' reports of student volitional and agentic action were found, and if not for the copying errors that led to not being able to analyze the action control beliefs scale, this area and overall self-determination may have

differed significantly as well. This is consistent with other research that has suggested large changes in teacher perceptions of student self-determination as a function of teacher implementation of the SDLMI (Shogren, Plotner, Palmer, Wehmeyer, & Paek, 2014). Further research is needed to explore if teachers are perceiving actual changes in student skills and actions, or if their expectations for and experiences with students' capacity for self-determination have changed. If so, this suggests the importance of raising teacher awareness of student capacity for self-determination and perhaps leveraging this awareness to lead to change in teacher behavior (De Naeghel et al., 2014) particularly during efforts to scale-up interventions and study effectiveness and the contextual factors that impact effectiveness. Overall, more research is needed on teachers' roles in understanding and supporting environments that are supportive of self-determination (Rogat, Witham, & Chinn, 2014; Vansteenkiste et al., 2012), and how this relates to change in teachers' instructional practices and perceptions of students and their capacity for self-determination and future integrated employment.   Future work should continue to focus on implementation and scaling-up of practices to promote self-determination in secondary schools to lead to positive postschool outcomes.

Limitations and Future Direction

In considering the findings, a number of limitations must be considered. Several of the limitations emerged from rapid implementation in a real-world context, with limited opportunities to plan for and ensure that data collection systems were in place. However, these limitations also provided opportunities to gather meaningful data on implementation and to identify necessary implementation supports that should be developed and studied in future efficacy and effectiveness trials. The findings suggest the importance of ensuring that, in school-based contexts, tools are available to enable data collection on self-determination and related

skills and outcomes to ensure that teachers, administrators, and policy makers can track and be

aware of changes that are (or are not) occurring as a result of implementation. Additional

research is needed to better understand the student, classroom, teacher, and school factors that

influence the implementation of interventions to promote self-determination, and the most

effective ways to engage teachers, administrators, and policy makers is collecting,

understanding, and using data on short- and long-term outcomes to influence policy and practice.

Further, one of the goals of this project was to understand implementation with students

with a range of support needs. The SDLMI was implemented with students with mild to

severe/profound deficits in intellectual functioning, with individualized modifications for

students. Use of the SDI:PTR enables evaluation of change in self-determination for students

with more significant support needs. Further work is needed with larger samples to enable

exploration of the impact of the SDLMI for students with varying levels of intellectual deficits as

well as comparisons of outcomes based on whether students were able to self-report on the

SDI:SR. The role of AAC and other communication-based supports to enable students to

develop self-determination is critical for students with extensive support needs. In

implementation, we found that teachers were able to provide individualized adaptations to the

SDLMI, but more examination and documentation of the most effective strategies to make these

adaptations and modifications is needed.

Future research is also needed on the most effective ways to capture meaningful

information on implementation. Our fidelity measures provided information on adherence,

exposure, quality, and responsiveness, but using additional tools and even outside observers for

implementation evaluation could have led to more robust information to guide future

implementation. For example, we did not have access to information on how implementation

occurred in the classroom that could have been used to explore differences based on whether the SDLMI was delivered in small group or one-on-one instruction. We also had limited information on specific modifications that were provided. For students with extensive support needs, this information would have been useful to ensure the SDLMI components were implemented as intended, and to address ongoing needs for modifications for students with extensive support needs. Further, we had very little information on the program differentiation aspect of fidelity, specifically was this a change in teaching practices and behaviors from the previous year, prior to the SDLMI? Anecdotally, teachers and coaches reported that using the SDLMI was a major shift in their practice, particularly enabling students to self-direct goal setting instruction, but without a control group or more formal analysis of change in classrooms we could not systematically explore the change in classroom practices. Additionally, we did not collect data on family perspectives of changes in self-determination, only teacher perceptions. Family perspectives and experience can be an important element of understanding self-determination and postschool goals (Donelly et al., 2010; Field & Hoffman, 1999). Each of these factors should be explored in future research, with specific focus on the tenets of implementation science (Fixsen et al., 2010) and their integration into scaling-up use of the SDLMI and other transition practices.

Finally, we had no data available on the targeted outcome of interest under the Consent Decree – integrated employment opportunities, postschool. Training on the SDLMI focused on using the model to set goals related to moving toward postschool, integrated employment outcomes; however, at present we only had data available on youth experiences in school during one year of implementation. Further, we did not directly analyze the quality of goals set under the SDLMI in relation to the goal of leading to integrated employment outcomes. While these

initial contributions emerging from the first year of implementation are novel, more work is needed to explore the degree to which the SDLMI impacts postschool integrated employment, including analyzing goals and their relationship to employment, as well as actual postschool employment when youth transition from school. We are working to set up data collection systems in Rhode Island to allow for this ongoing tracking and ensuring that complete data is collected as well as information on other factors that can impact employment outcomes – community factors, economic factors, skill-based factors, etc. – will be important, as will policy structures that enable the supports necessary for implementation.

Conclusion

Overall, the present study adds to the literature providing information on the process and outcomes of scaling-up the SDLMI in a state facing mandates for change. The findings suggest that teachers are able to implement the SDLMI with training and coaching with limited university support and that after one-year teachers perceive changes in students' self-determination, namely students' use of volitional and agentic action. Further research is needed to better understand factors that influence implementation to allow for more effective training and implementation supports. Further research is also needed to better examine the role of the family-, school-, and policy-level supports to enhance students' postschool transition outcomes, particularly in the domain of integrated employment. However, the findings suggest that the promotion of self-determination is an important element of enabling teachers to prepare youth to identify and go after goals they set for postschool employment. Ultimately, however, additional, longitudinal research is needed to examine if school-based interventions lead to targeted changes in postschool, integrated employment outcomes.

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Table 1

Student demographic counts and percents (N = 184)

Demographic Characteristic	n	%
Gender		
Male	63	34.24
Female	30	16.30
Missing	91	49.46
Race/Ethnicity		
Black/African American	12	6.52
White	42	22.83
Hispanic/Latino	21	11.41
American Indian or Alaska Native	2	1.09
Asian	1	0.54
Two or more races	1	0.54
Other	1	0.54
Missing	163	88.59
Additional Disability Label (when data available)		
Learning disability	5	2.72
Autism	25	13.59
Emotional/Behavioral disorder	1	0.54
Other health impairment	2	1.09
Other	2	1.09
Multiple Disability	11	5.98

Note. Total of percentages for each category may not be 100% due to rounding.

Table 2

Average scores for Goal Attainment Scaling

Score	*M*	95% CI	n
Goal 1	47.40	[43.53, 51.26]	123
Goal 2	51.20	[48.68, 53.73]	83
Goal 3	49.54	[43.37, 55.71]	47
Goal 4	47.50	[40.00, 59.20]	4

Table 3

Mean and confidence interval of student outcome measures

Measure	Baseline			End of year		
	μ	95% CI	n	μ	95% CI	n
Student						
SDI:SR - Overall score	13.68	[13.19, 14.17]	101	13.72	[13.16, 14.28]	80
SDI:SR - Volitional action	13.15	[12.18, 14.11]	105	13.32	[12.20, 14.44]	80
SDI:SR - Agentic action	12.65	[11.77, 13.54]	101	13.23	[12.21, 14.24]	80
SDI:SR - Action-control beliefs	14.85	[14.22, 15.48]	104	14.51	[13.72, 15.30]	80
Transition Empowerment Scale	3.54	[3.33, 3.74]	104	3.58	[3.31, 3.86]	71
Teacher						
SDI:PTR - Overall score	9.41	[8.44, 10.38]	161	11.25	[4.92, 17.59]	97
SDI:PTR - Volitional action	10.13	[9.18, 11.09]	164	11.29	[9.93, 12.65]	97
SDI:PTR - Agentic action	8.31	[7.05, 9.56]	163	9.80	[8.89, 10.70]	97
SDI:PTR - Action-control beliefs	10.12	[8.91, 11.32]	161	12.21	[10.95, 13.46]	97

Note. Sample size n indicates if any one item on the scale was answered.

Note. At end of year, more than 96 – 97% of the responses were missing for SDI:PTR items 28 – 34, all questions in the action-control beliefs subscale.

Table 4

Difference scores for outcome measures

Measure	*Δμ*	SE	*t*	df	99.4% Confidence interval of Δμ LL	UL
Student						
SDI:SR - Overall score	-0.01	0.27	-0.04	92.32	-0.68	0.66
SDI:SR - Volitional action	0.10	0.42	0.23	85.09	-1.08	1.27
SDI:SR - Agentic action	0.32	0.42	0.76	82.54	-0.85	1.49
SDI:SR - Action-control beliefs	-0.39	0.29	-1.41	80.44	-1.18	0.39
Transition Empowerment Scale	0.10	0.07	1.36	84.87	-0.11	0.31
Teacher**						
SDI:PTR - Volitional action	1.27*	0.39	3.30	141.93	0.20	2.34
SDI:PTR - Agentic action	1.63*	0.53	3.05	157.18	0.15	3.11

* p < .006, the Bonferroni adjusted statistical significance level for multiple tests

Note. Differences in the action-control beliefs subscale were not tested, nor were overall scores due to missing items on the subscale resulting from data collection error
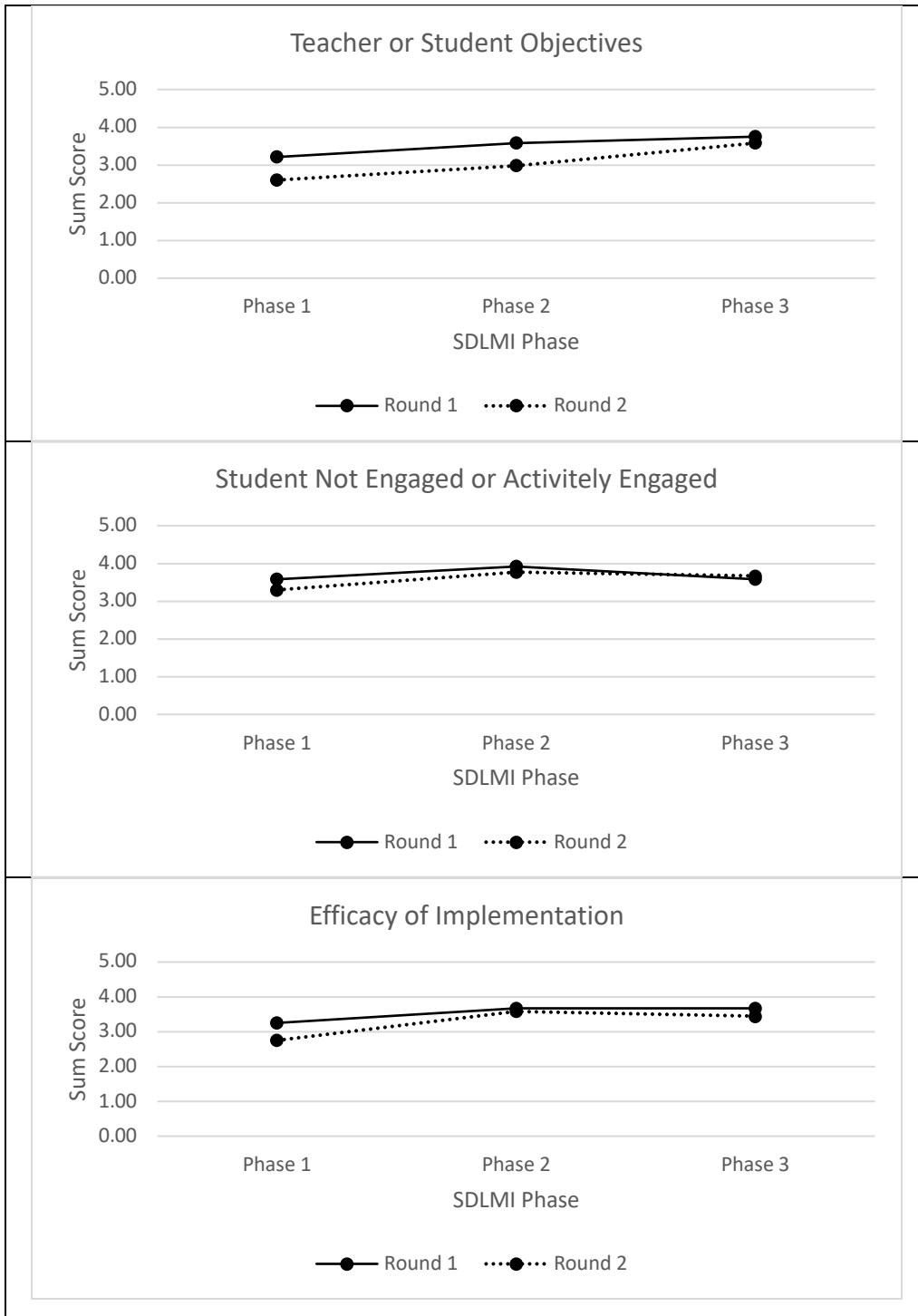
Figure 1. Coach ratings of teacher fidelity by round of SDLMI implementation.