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The Effects of the Self-Determined Learning Model of Instruction on Academic Performance of Students with High-Incidence Disabilities

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《 Abstract 》

This study examined the impact of the Self-Determined Learning Model of Instruction (SDLMI) in promoting student academic performance in science class for three middle school students with high-incidence disabilities. Using the SDLMI, the students set their goals, developed action plans, implemented and adjusted their plans, and evaluated their progress. This study used a multiple baseline across participants design and the entire study took 12 weeks to complete using one-to-one instruction, with each intervention session ranging from 15 to 25 minutes. The results indicated that all students achieved self-selected goals to mastery levels. Also, most stakeholders indicated positive opinions about implementing the SDLMI. Implications and future directions for research and practice are discussed.

Key Words : Self-determined learning model of instruction, academic performance, students with disabilities

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Ⅰ. Introduction

A growing number of researchers and studies have suggested that promoting self-determination is an important means to enhance student access to and involvement in the general education curriculum (Lee, Wehmeyer, Palmer, Soukup, & Little, 2008; Wehmeyer & Field, 2007; Wehmeyer, Field, Doren, Jones, & Mason, 2004). The reason that enhancing students' self-determination is highlighted as a way to promote access to the general education curriculum is, in part, because standards and benchmarks in most states involve "objectives pertaining to skills such as goal setting, problem solving, decision making, and choice making, and all of these are component elements of self-determined behavior" (Agran, Wehmeyer, Cavin, & Palmer, 2008, p. 107). In addition, instruction specifically designed to teach component elements of self-determined behavior plays a key role in providing curriculum modifications, including both curriculum adaptations (i.e., modifying content representation or presentation) and curriculum augmen tations (i.e., providing additional strategies), which promote students' involvement and, presumably, progress in the general education curriculum (Wehmeyer et al., 2004). Palmer, Wehmeyer, Gipson, and Agran (2004) have suggested that curriculum augmen tations contribute to students' access to the general education curriculum by teaching them "learning-to-learn, self-regulation, or other strategies that enable them to succeed" (p. 430).

The Self-Determined Learning Model of Instruction is an evidence-based teaching model to teach students self-directed learning strategies (SDLMI; Wehmeyer, Abery, Mithaug, & Stancliffe, 2003). The SDLMI supports students with and without disabilities to set goals, create action plans to achieve those goals, adjust their goals or action plans to meet their goals and, ultimately, to maximally direct their own learning (Wehmeyer, Palmer, Agran, Mithaug, & Martin, 2000). The SDLMI's efficacy is not constrained by a particular kind of education goal, content area, learning context, or disability category, because the model is based on a universal problem-solving strategy and reflects students' preferences, educational needs, and self-selected goals (Agran et al., 2008).

There have been multiple studies in recent years that examined the

effects of the SDLMI using both quasi-experimental and single subject design studies. These studies examined the effects of the SDLMI on students' educational goal achievement (Lee et al., 2008; Palmer et al., 2004; Palmer & Wehmeyer, 2003; Wehmeyer et al., 2000). Recently, Wehmeyer et al. (2012) used a group-randomized, modified equivalent control group design to evaluate the causal relationship between the SDLMI and students' levels of self-determination. Analysis using structural equation modeling (SEM) found that students who received the SDLMI in the treatment group in the first year of the longitudinal study indicated a significantly more positive increase in self-determination scores than the students in the control group, providing evidence of the impact of the SDLMI on students' self-determination. During the second year of the study, members of the previous year's control group were introduced to the SDLMI; the treatment results demonstrated a similar impact on self-determination as was experienced by the treatment group in the first year.

Importantly in terms of this study, a related study provided evidence of the causal relationship between receiving instruction using the SDLMI and students' academic and transition goal attainment and their access to the general education curriculum. Shogren, Palmer, Wehmeyer, Williams-Diehm, and Little (2012), using a cluster or group-randomized trial control group design and multi-level modeling analysis, found that instruction using the SDLMI had a significant and positive impact on students' goal attainment scores depending on students' disability categories. That is, students with learning disabilities (LD) had greater attainment of academic goals whereas students with intellectual disability demonstrated greater attainment of transition-related goals. The study also found that students with disabilities who received instruction using the SDLMI had significantly more positive increases in scores pertaining to access to the general education curriculum using a classroom-based eco-behavioral observation system.

Recent single-subject design studies have documented the functional relationship between the SDLMI and students' educational goal attainment. The students' goal areas examined in these studies include (a) transition and job performance (Agran, Blanchard, & Wehmeyer, 2000; McGlashing-Johnson, Agran, Sitlington, Cavin, & Wehmeyer, 2003); (b) social skills (Agran, Blanchard, Wehmeyer, & Hughes, 2002); (c) knowledge of the

SDLMI and problem behaviors (Mazzotti, Test, & Wood, 2013; Mazzotti, Wood, Test, & Fowler, 2012); and (d) academic skills (Agran et al., 2002; Agran, Cavin, Wehmeyer, & Palmer, 2006; Agran et al., 2008; Agran, Wehmeyer, Cavin, & Palmer, 2010). All participants in these studies who completed the SDLMI process demonstrated improved outcomes and maintained positive outcomes during the maintenance phase.

These single subject studies included students with cognitive disabilities, including students with intellectual disability. A total of 43 participants was included in these eight single-subject studies. Among them, more than 60% of the total participants (n=26) were identified with cognitive disabilities. However, less than 5% of total participants (n=2) received special education services under the category of learning disabilities. In addition, it was not until 2012 that studies started to include students with emotional/behavioral disorders (EBD) to examine the effects of the SDLMI on students' educationally relevant goal attainment (Mazzotti et al., 2012; Mazzotti et al., 2013). This situation is consistent with findings of a meta-analysis study conducted by Algozzine, Browder, Karvonen, Test, and Wood (2001). Algozzine et al. (2001) indicated that single subject studies examining the impact of interventions leading to students' enhanced self-determination primarily involved students with intellectual disability and suggested the need to investigate the impact of such interventions with students with higher-incidence disabilities. Considering that the SDLMI is designed to enable a broad range of students to become "causal agents" in their learning process across various content areas, learning environments, and ages (Wehmeyer, Agran, Palmer, Mithaug, & Blanchard, 1998, p. 7), further research examining the effects of this instructional model for students with high-incidence disabilities is clearly warranted. Therefore, the purpose of this study was to examine the impact of the SDLMI on the academic performance of three middle school students with high-incidence disabilities who were included in the general education curriculum. Specifically, the study examined the following research questions:

Research Question 1: Are there effects of the self-determined learning model of instruction on specified academic performance of three middle school students with high-incidence disabilities?

Research Question 2: Is improved academic performance maintained when the intervention is not provided?

Research Question 3: Does improved academic performance generalize to another context?

Ⅱ. Method

1. Participants

Participants (pseudonyms are used throughout) were three middle school students with high-incidence disabilities. The students who met the following criteria participated in this study: (a) student had a diagnosis of high-incidence disabilities (e.g., learning disability, emotional/behavioral disorders, and other health impairment), (b) student received instruction in general education classrooms, (c) student maintained minimum attendance requirements necessary to attain core academic credits during the current semester, and (d) a parent/guardian and the student showed interest in participating in this study through signing consent and assent forms. <Table 1> provides more specific demographic information of each student.

1) John

John was a 14-year-old (8^{th} grade) Caucasian boy receiving special education services under the categorical area of learning disabilities. John was included in the general education curriculum, including social studies, science, and gym activities three to five hours a day. He was also receiving support from resource room sessions one to three hours a day. John needed examination accommodations to support his access to the general education curriculum. The special education teacher reported that John did not have any goal-setting experience before; however, he recently obtained a new job in the community.

2) David

David was a 14-year-old (8th grade) Caucasian boy with Attention Deficit Hyperactivity Disorder (ADHD) and LD. David was included in general education coursework, including social studies, science, and art, three to five hours a day. He also received support from resource room sessions one to three hours a day. David wanted to have a general diploma and needed examination accommodations to support his learning. David had some goal-setting experiences in the past, but he expressed a desire to be an architect in the future.

3) Kimberly

Kimberly was a 12-year-old (6th grade) Caucasian girl receiving special education services under the category of learning disabilities. Kimberly was included in general education coursework, including social studies, gym activity, and science, three to five hours a day. She was also receiving support from resource room sessions one to three hours a day. Kimberly needed assistive technology (e.g., screen readers) and examination accommodations to support her involvement and progress in the general education curriculum. She also had some goal-setting experiences and expressed a desire to be a performer in the future.

<Table 1> Characteristics of the Participants

Participant	Grade /Age	Ethnicity	Gender	Disability Category	Goal Setting Experience	Subject
John	8th/14	Caucasian	Male	LD	No Experience	Science
David	8th/14	Caucasian	Male	ADHD & LD	Some Experience	Science
Kimberly	6th/12	Caucasian	Female	LD	Some Experience	Science

2. Setting

The study took place in a suburban school district in the mid-western region of the United States. After obtaining approval from the Institutional

Review Board (IRB) of the university, the research team initially contacted secondary special education coordinators of school districts for permission to conduct the study. After one of the school districts approved the research, the study was conducted in the Spring of 2012. The intervention was implemented in the school library media center during an open study hall or resource room hour as one-to-one instruction, depending on students' preferences and school schedules. Each intervention session lasted 15 to 25 minutes. The entire study was completed over 12 weeks with an average of 28 sessions for all participants.

3. Experimental Design and Intervention Procedures

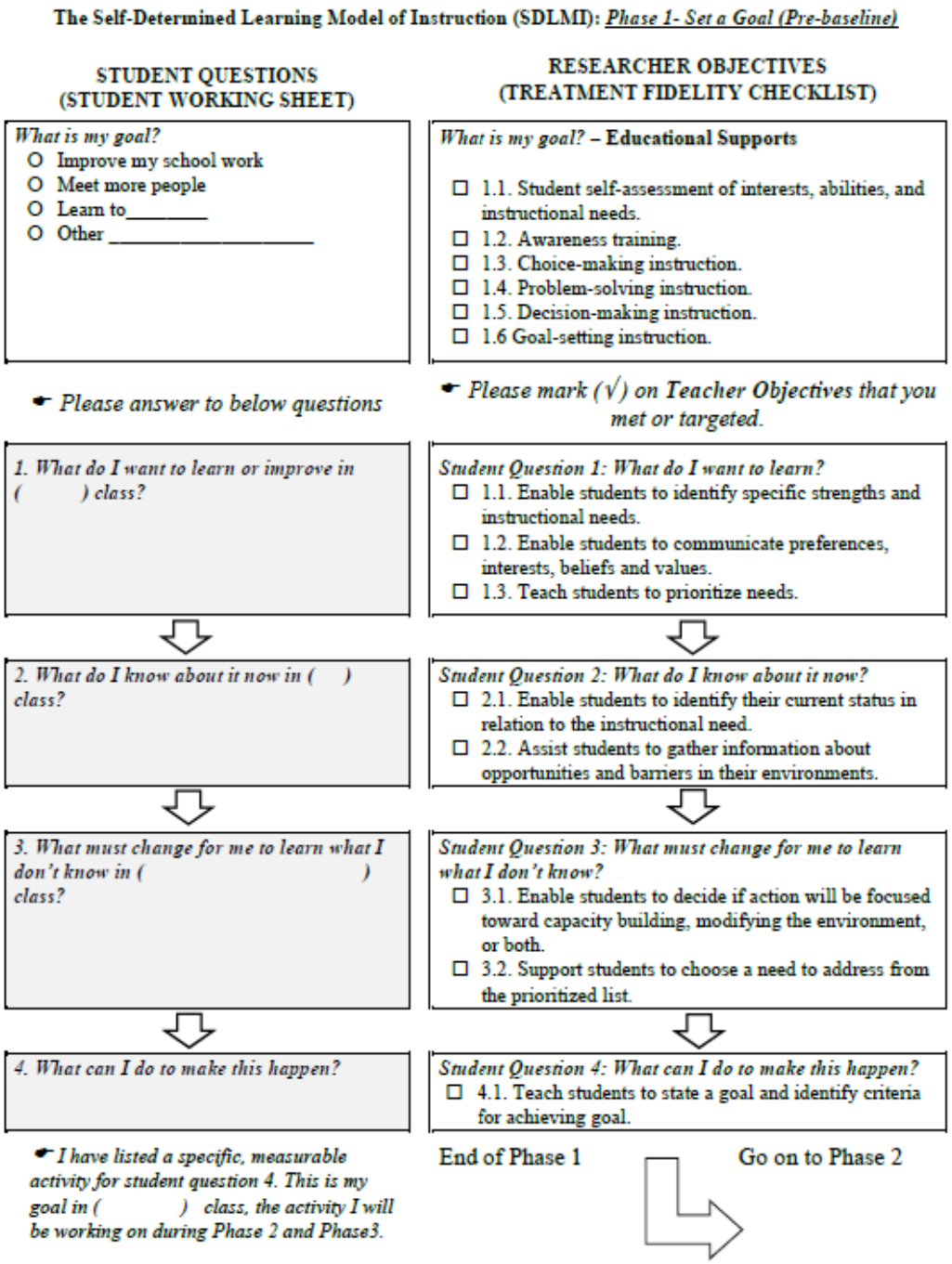
In this study, the functional relationship between the SDLMI and each student's academic performance in science content was examined. A multiple baseline across participants design was employed because learning and behavior with the SDLMI cannot be reversed (Kennedy, 2005). The experimental design included five experimental conditions: pre-baseline, baseline, intervention, maintenance, and generalization.

The SDLMI involves three phases: What is my goal? (Phase I); What is my plan? (Phase II); and What have I learned? (Phase III) This intervention is implemented with three sets of four *Student Questions* that support students to determine, modify, and work toward self-selected goals. The questions are not the same between phases, but each phase represents identical steps in the problem solving sequence. That is, (a) identifying the problem; (b) identifying potential solutions to the problem; (c) identifying barriers to solving the problem; and (d) identifying consequences of the identified solutions (Wehmeyer et al., 1998). Students complete progress sheets during each phase and indicate their responses to each question. Each phase of the SDLMI takes place in different conditions: phase I takes place in the pre-baseline condition; phase II is performed at the beginning of the baseline condition; and phase III is implemented during the intervention condition. These phase changes are inevitable in implementing the SDLMI within the context of a single subject design; however, these alterations do not mean that the experimental conditions are changed

(Agran et al., 2008).

1) Pre-baseline

Each student was supported to answer questions in Phase I of the SDLMI during the pre-baseline condition. The researcher had conversations with participants, guiding the process and purpose of the intervention and asking the four Phase I questions to enable students to determine educational goals. As seen in <Figure 1>, the four questions included (a) What do I want to learn?; (b) What do I know about it now?; (c) What must change for me to learn what I don't know?; and (d) What can I do to make it happen? To answer these four questions, students were required to identify their own strengths, preferences, interests, current status, and environmental barriers and opportunities. The researcher also conducted short interviews with each student's general and special education teachers to support students to determine educational goals that were most beneficial to their academic achievement. Data were not collected during the pre-baseline condition. During this condition, the researcher supported the student to set specific, measurable, and attainable academic goals. All students wanted to understand science vocabularies so that they could be more meaningfully engaged in science class. John and David selected journaling key vocabulary terms and memorizing those terms in order to prepare for tests. Similarly, Kimberly selected vocabulary terms in the textbook that she did not understand. Then she searched for and memorized the definition best suited for that particular context.



〈Figure 1〉 Student questions and researcher objectives at Phase I of the SDLMI. Adapted from Wehmeyer et al. (1998)

2) Baseline

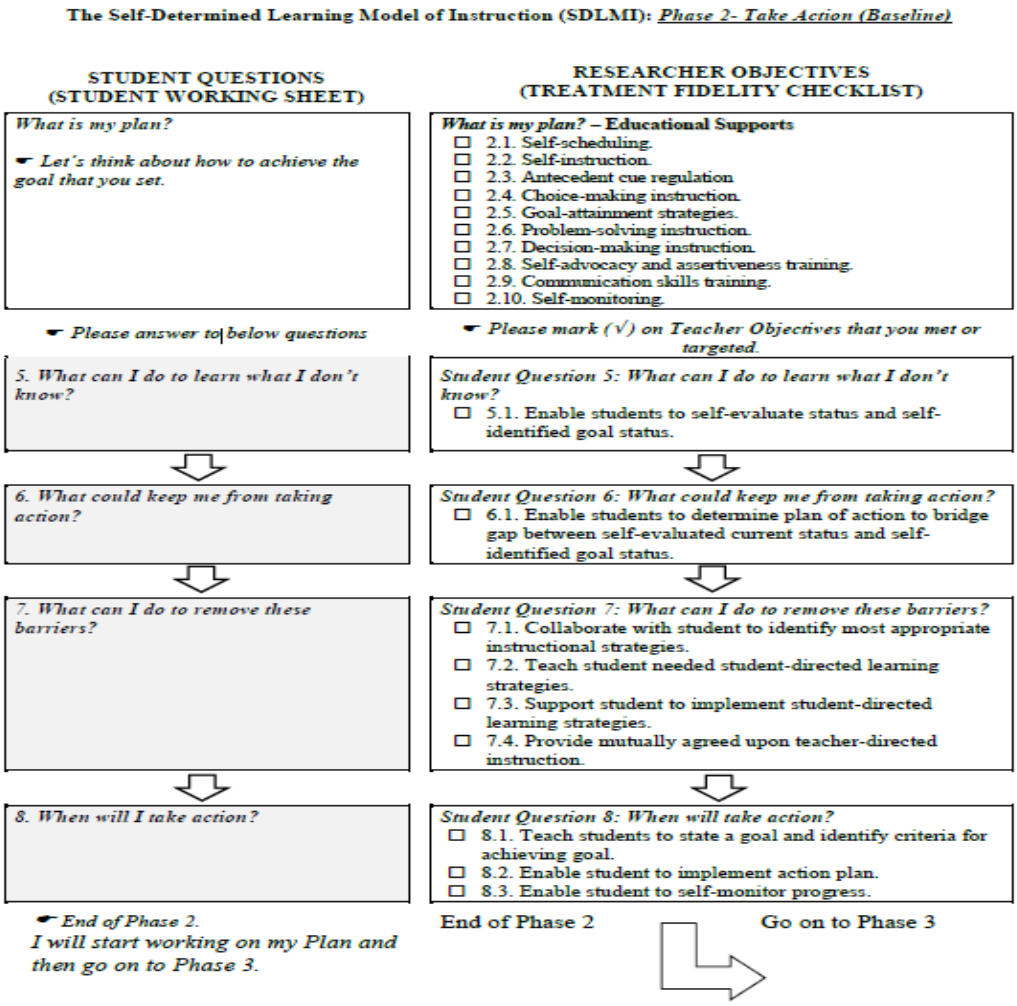
All students started the baseline condition concurrently. The researcher told each student that they would be observed during one-to-one instruction, but did not tell the reason. No feedback, reinforcement, or prompts were provided during the baseline condition. The second phase of the SDLMI was performed at the beginning of the baseline to (a) create students' action plans to bridge the gap between self-evaluated current status and self-selected goals and (b) select students' own instructional strategies.

First, students developed their action plans with the support of the researcher. Students worked on progress sheets, answering each of the four questions designed to support students in developing an action plan to achieve their goals. As shown in <Figure 2>, the four questions in Phase II are: (a) What can I do to learn what I don't know?; (b) What could keep me from taking action?; (c) What can I do to remove these barriers?; and (d) When will I take action? Among the three participants, Kimberly adjusted a part of her action plan while working on progress sheets. This adjustment was based on the flexible nature of the SDLMI that reflects the ongoing process modifying students' goals or action plans to meet their goals, when necessary. The element that Kimberly adjusted was matching an unknown word to the vocabulary strip that has the definition of that vocabulary term instead of matching an unknown word to the picture. The whole series of Kimberly's task analyses were the same except for this change.

Next, students selected their own learning strategies. Based on the "Teacher's Guide to Implementing the Self-Determined Learning Model of Instruction Adolescent Version" (Wehmeyer et al., 1998), the researcher narrowed down three frequently used self-directed learning strategies that were particularly suited for Phase II: self-instruction, antecedent cue regulation, and self-monitoring. Then, the researcher explained these three self-directed learning strategies to the students and asked them to choose one or two that they wanted to use during the intervention. To support students to choose, the researcher verbally explained each strategy and provided them with a visual model of how this strategy functions.

John selected self-monitoring (i.e., checking steps of task analysis

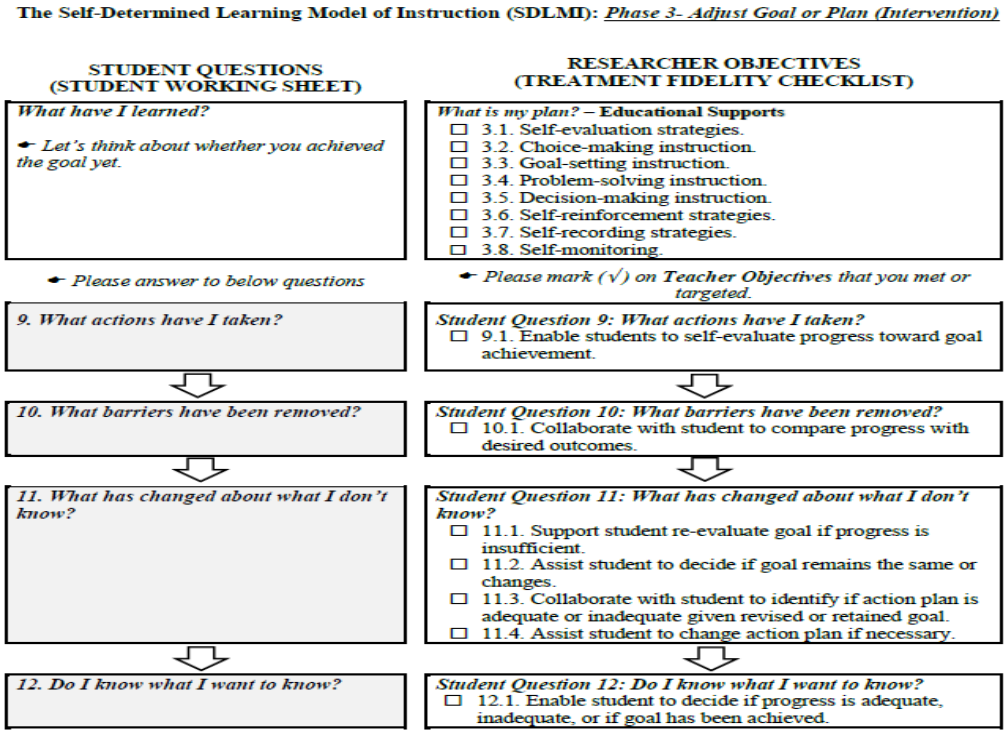
completed by him) as a self-directed learning strategy to achieve his goal. David chose two-tiered self-monitoring strategies: checking steps of the task analysis completed by him and graphing his performance at the end of the intervention session. Kimberly wanted to use both antecedent cue regulation and self-monitoring. Once a stable baseline trend of at least three consecutive sessions had been established for the academic performance of each student, the next condition began.



<Figure 2> Student questions and researcher objectives at Phase II of the SDLMI. Adapted from Wehmeyer et al. (1998)

3) Intervention

Phase III of the SDLMI was completed during the intervention condition. The purpose of Phase III was to guide students in evaluating their progress to accomplish their own goals. As shown in <Figure 3>, students answered the following questions: (a) What actions have I taken?; (b) What barriers to success have I removed?; (c) What has changed about what I don't know?; and (d) Do I know what I want to know? Students answered these questions, self-evaluated the effectiveness of their actions, and monitored their progress during the entire intervention process with the self-selected instructional strategies identified in the Phase II. After demonstrating an 80% success rate for reaching their academic performance for three consecutive sessions based on the researcher's observation data, the students proceeded to the maintenance condition of the study.



<Figure 3> Student questions and researcher objectives at Phase III of the SDLMI. Adapted from Wehmeyer et al. (1998)

4) Maintenance

Maintenance data was collected on students' academic performance in science content right after the entire intervention was completed. The equivalent procedures to those used during the baseline and intervention phases were used. However, specific praise, feedback, and prompts were not provided. The data for maintenance was collected for four to five sessions, which lasted approximately two weeks.

5) Generalization

The generalization data was also collected on students' academic performance, which was measured by the same problem solving process that each student set. However, the research team changed the subject from science to social studies in this generalization condition since all participants were included in social studies. Generalization data were taken for each participant two weeks after the completion of the maintenance. The data collection took place over one week for one to three sessions depending on students' schedules. David and Kimberly completed three sessions, whereas John only did one session due to his participation in job orientation.

4. Role of the Researcher

The roles of the researcher included two main tasks. First, the researcher implemented the SDLMI, ensuring the treatment fidelity. Second, the researcher communicated with both general and special education teachers to take care of scheduling and discussed students' academic performance and other considerations to facilitate the intervention and maximize students' success.

5. Dependent Measures and Recording

1) Dependent Variables

The primary dependent variable for each student was the problem-solving process in order to understand science vocabulary. The problem solving processes vary across students, depending on students' goals and action plans identified at Phase I and Phase II of the SDLMI, respectively. Each dependent variable was measured according to the problem solving process by measuring each step on a task analysis. Then, the total score was recorded as the percentage of correct performance.

2) Inter-observer agreement

The primary researcher was assisted by a second observer who was well-trained in observing students' academic performances to obtain the inter-observer agreement. Observer training was conducted after the action plans were designed based on students' self-selected goals during Phase II of the SDLMI. The primary researcher explained students' education goals and provided the second observer with the observation checklists for students' task analyses. Then, both observers observed and recorded students' performance with three initial baseline sessions for each student as practice.

Inter-observer agreement scores were collected throughout approximately 25% of the sessions (i.e., John—7 sessions, David—7 sessions, and Kimberly's 7 sessions that were collected using the adjusted action plan). The second observer independently observed the digitally recorded files and scored participants' academic performance. According to Artman, Wolery, and Yoder (2012), both graphed data and summary percentages of inter-observer agreement are recommended to demonstrate transparency and to avoid "observer drift," so that readers can make better judgments about the study results (p. 73). <Figure 4> displays the percentage of correct academic performance, along with the inter-observer agreement distribution. In addition, the percentage of inter-observer agreement was computed as agreements divided by agreements plus disagreements. The mean of inter-observer agreement was 98.94% with a range from 95.31% to 100%.

3) Treatment Fidelity

Treatment fidelity protocols for each phase, driven from the SDLMI

teacher guide manual (Wehmeyer et al., 1998), were used to ensure the treatment fidelity. Treatment fidelity protocols are presented in figures 1, 2, and 3. The primary researcher checked treatment fidelity protocols during or after each session,

4) Social Validity

According to Kennedy (2005), social validity is the "estimation of the importance, effectiveness, appropriateness, and/or satisfaction various people experience in relation to a particular intervention" (p. 219). At the end of the generalization condition, the researcher conducted brief surveys to students, general education teachers, and special education teachers to ask questions about effectiveness, appropriateness, and satisfaction of the SDLMI. The social validity questionnaires included seven questions for students and five questions for teachers, using a five-point Likert scale (i.e., 1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, 5 = *strongly agree*).

Ⅲ. Results

1. Students' Academic Performance

Results of each student are included in <Figure 4> Data for each student's performance is displayed as percentage. To analyze the functional relationship between the SDLMI and students' performance, each student's academic performance was interpreted based on the following four elements: (a) change in level, (b) immediacy/latency of change, (c) variability, and (d) change in trend (Kennedy, 2005; Riley-Tillman & Burns, 2009). With regard to the change in level, means of the academic performance percentage and its range between phases were reported. Second, the immediacy/latency of change was identified to determine how quickly a change in the data pattern was generated after the introduction of the intervention. Third, variability was identified as *percent of nonoverlapping data* (PND) to compute the effect size. PND, a conventional effect size for single subject design

studies, was calculated by determining the percentage of data points in the intervention condition that do not overlap with the most desirable baseline data point. Last, the trend of the data was identified to evaluate if the stream of outcome data was increasing, decreasing, or remaining stable over time. The reported percentages in this section were determined by conversations between two observers when inter-observer disagreements occurred.

1) John

Mean levels of John's academic performance on the SDLMI were identified in each experimental condition. During baseline, percentages of academic performance ranged from 11.76% to 29.41%, with a mean of 17.64%. During the intervention, John showed an increasing trend ranging from 61.76% to 100%, with a mean of 85.81%. Maintenance data for John remained at high levels, ranging from 85.29% to 94.12% with a mean of 90.44%. Since John had to participate in the new job orientation, only one piece of data was collected for the generalization condition. His score for the generalization condition was 91.18%, which was higher than the mean level of maintenance data. Second, in terms of immediacy/latency of change, there was the large change (55.89%) in the level of John's academic performance between baseline and intervention conditions, which indicated an immediate impact after the introduction of Phase III of the SDLMI. Third, the simple manner of expressing variability of data was reported as a high-low range when indicating the mean values. In addition, it turned out that John had 100% of PND, which is a large effect size. Last, John showed an increasing trend during the intervention and remained stable over the maintenance condition, which showed a complete overlap with those of the intervention condition.

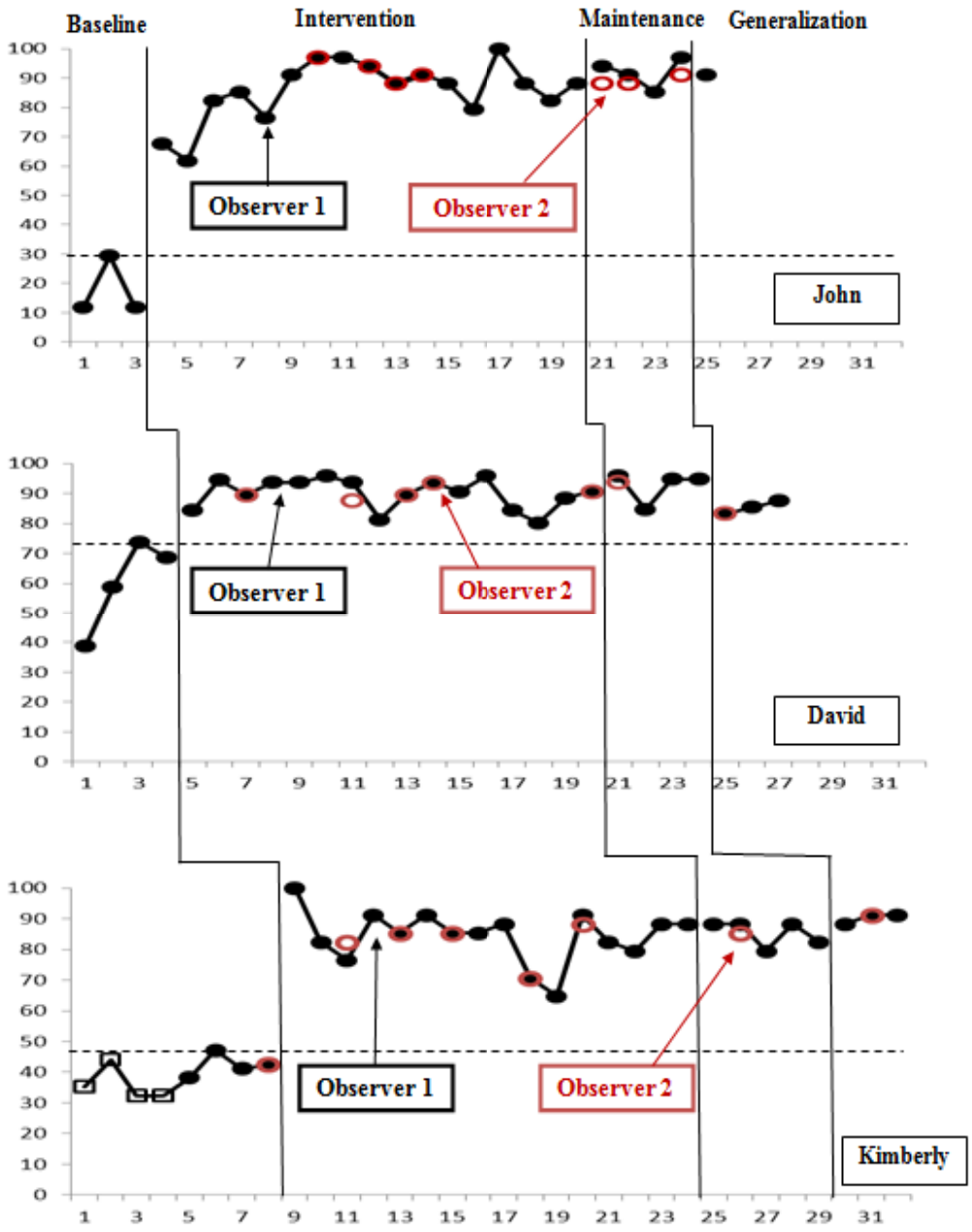
2) David

David's academic performance over baseline ranged from 38.89% to 73.75%, with a mean of 60.04%. During the intervention, David's mean score increased up to 90.01%, with the range from 80.21% to 95.83%. The increased performance was maintained during the maintenance and generalization conditions, with the mean levels of 92.49% and 85.42% and ranges from

84.58% to 95.83% and from 83.33% to 87.5%, respectively. Second, in terms of immediacy/latency of change, there was a change (15.63%) in the level of academic performance between baseline and intervention conditions. Third, the PND for David was 100%, which indicates a large effect size. Last, David demonstrated a slightly upward trend during intervention and remained above the mastery criterion (80%) during both maintenance and generalization conditions.

3) Kimberly

As mentioned earlier, Kimberly adjusted her task analysis during the baseline. The four pieces of data that were collected before adjusting her task analysis were also displayed in <Figure 4> as indicated by empty squares on the graph. Kimberly displayed stable baseline performance with a mean of 39.13% and range from 32.35% to 47.06%. During the intervention, the mean score of Kimberly's performances was 84.38% (range, 64.71% to 100%). Maintenance data for Kimberly ranged from 79.41% to 88.24% with a mean of 84.71%, and generalization data ranged from 88.24% to 91.18% with a mean level of 90.20%. Second, in terms of immediacy/latency of change, there was a drastic immediate effect on Kimberly's level of academic performance (57.72%) between baseline and intervention conditions. Third, the PND for Kimberly was also 100%, showing that there was no overlap data with baseline during the intervention condition. Last, there was an increasing trend in general even though the data distribution fluctuated compared to those of other students. However, the data variability between the 13^{th} and 16^{th} sessions mainly stemmed from Kimberly's poor health condition. During both maintenance condition and generalization condition, the data remained stable at the mastery level.



〈Figure 4〉 Percentage of correct academic performance shown by three participants. This figure displays the inter-observer agreement distribution between two observers. The squared symbols in Kimberly's graph display data prior to adjusting her action plan

2. Treatment Fidelity

The percentage of treatment fidelity was computed by (the number of objectives completed/the number of objectives listed in the treatment fidelity protocols)*100. Treatment fidelity was 100%.

3. Social Validity

As shown in <Table 2>, students, general education teachers, and special education teachers scored relatively high scores on the SDLMI social validity surveys. The mean responses ranged from 3 to 4 for students, 4 to 5 for general education teachers, and 2 to 4 for special education teachers.

<Table 2> Social Validity Responses

	#	Question Items	John	David	Kimberly	Mean
S	1	I achieved my goal.	5	3	5	4
	2	The training was easy to follow.	3	4	5	4
	3	The lessons of the SDLMI were adequately challenging for me.	3	4	3	3
	4	I will continue to set goals, make action plans, and evaluate what I did in the future.	4	4	4	4
	5	This intervention helped me study in the general education classrooms.	2	5	5	4
	6	I enjoyed this instruction.	4	4	5	4
	7	I would recommend this intervention to my friends.	4	3	3	3
GE	1	The intervention is appropriate and important for my student	5	5	5	5
	2	I feel that I can implement the SDLMI with the provided written notes regarding the intervention for my student in the future.	3	3	4	4
	3	The intervention was helpful for my student to set goals, use self-regulation skills, and promote the access to general education curriculum.	5	5	5	5
	4	Overall, my student enjoyed participating in the intervention.	5	5	4	5
	5	Overall, I am satisfied with this intervention.	5	5	5	5

<Table 2> Social Validity Responses (Continue)

	#	Question Items	John	David	Kimberly	Mean
SP	1	The intervention is appropriate and important for my student	3	3	5	4
	2	I feel that I can implement the SDLMI with the provided written notes regarding the intervention for my student in the future.	2	2	.	2
	3	The intervention was helpful for my student to set goals, use self-regulation skills, and promote the access to general education curriculum.	2	4	4	3
	4	Overall, my student enjoyed participating in the intervention.	2	4	4	3
	5	Overall, I am satisfied with this intervention.	3	4	4	4

Note. S = student, Ge = General Education teacher, and SP = special education teacher

Ⅳ. Discussion

This study examined the effect of instruction using the SDLMI on the academic performance of three middle school students with high-incidence disabilities. The SDLMI was used as a curriculum augmentation strategy that supported each student's involvement and progress in the general education curriculum. As indicated in the results section, visual analysis of graphed data indicated a functional relationship between the SDLMI and increased academic performance demonstrated by all students. The discussion section includes (a) limitations of the study and (b) summary of the findings.

1. Limitations of the study

Several limitations of this study are noted in the following. First, time constraints at the end of the school year impeded gathering maintenance data over a longer period of time, and the time between maintenance and generalization conditions was only two weeks. In addition, John had only

one piece of generalization data due to his job orientation. Future studies should be designed to allocate enough time for collecting solid generalization data. Second, the study findings would have been strengthened if the treatment fidelity checklist was completed by a third person. Third, each student's academic performance was observed during the one-to-one session rather than in the general curriculum setting. Although general education teachers reported that positive student academic performance was observed in class, future efforts should be made to observe students' academic performance in general education classrooms.

2. Summary of the Findings

This study has extended our understanding of the efficacy of the SDLMI to promote students' academic goal attainment and access to the general education curriculum. As described in the introduction section, the SDLMI has a broad range of adaptability enabling students to set various academic goals, develop action plans to achieve goals, and evaluate their progress as support to academic skill instruction. However, there is only limited information regarding how single subject design studies are addressing the SDLMI with content-specific academic goals. The majority of studies investigating the effects of the SDLMI on students' academic skills was focused on students' classroom participation skills, such as following directions, contributing to class, and speaking in public (Agran et al., 2002; Agran et al., 2008; Agran et al., 2010). Given that only one study has examined content-specific goals, namely, engagement in content tasks and activities (Agran et al., 2006), this study provides important contributions to the literature by applying the SDLMI to achieve students' content-specific academic goals within the context of single-subject design. More future studies that address effects of the SDLMI on content-specific academic goals are needed.

Furthermore, instruction using the SDLMI enabled students with disabilities to become self-directed learners; by doing so, it increased students' opportunities to more effectively direct their own learning. Agran, King-Sears, Wehmeyer, and Copeland (2003) emphasized that student- directed learning implies

that "the teacher is working in partnership with the student to identify every aspect of the task in which the student can engage independently or with minimal supports, and even when the student cannot independently perform a behavior, that action is performed based on the student's preferences and input" (p. 4). Discussion with students, which enabled them to work through the *Student Questions* and to perform the academic task independently by using self-directed learning strategies, supported students to be equal partners in their learning process. It is worth noting that one of the suggestions to help students with disabilities experience more positive transition outcomes is teaching students self-directed learning before they enter high school (Rusch, Hughes, Agran, Martin, & Johnson, 2009).

In a review examining interventions leading to students' enhanced self-determination and academic skills, Konrad, Fowler, Walker, Test, and Wood (2007) indicated that students with LD and ADHD demonstrated higher levels of academic performance when self-directed learning strategies were combined (e.g., interventions that combined self-management with goal setting). Their findings provide an explanation for the effects of the SDLMI, because this model involves a set of problem-solving processes of goal setting, independent performance using self-management or student- directed learning strategies, self-evaluation, and adjustment (Wehmeyer et al., 2000). In addition to effects of the SDLMI on students' academic achievement, numerous studies have documented the efficacy of the SDLMI on students' self-determination, goal attainment, and access to the general education curriculum (Agran et al., 2003; Lee et al., 2008; Shogren et al., 2012; Wehmeyer et al., 2013; Wehmeyer, Palmer, Shogren, Williams-Diehm, & Soukup, 2010). In particular, Lee et al. (2008) and Shogren et al. (2012) stated that providing instruction using the SDLMI increased students' goal attainment and promoted the general education curriculum, providing evidence that the SDLMI can be utilized in the context of general education classrooms across content areas. Given that the SDLMI is designed to help educators teach students to become self-directed learners as a teaching model, the implication for future practice is straightforward. More training and support is needed so that teachers have more chances to implement the SDLMI during their lessons. As this is accomplished, it will aid schools in meeting the accountability requirements that Individuals with Disabilities Education

Act (IDEA, 2004) and No Child Left Behind (NCLB, 2001) have imposed on schools.

In summary, participants in the present study demonstrated effects of the SDMLI on their academic performance and stakeholders were satisfied with the implementation of this model. These results add more evidence to the established base of SDLMI studies, suggesting that implementing the SDLMI results in better educational outcomes for students with disabilities.

References

Agran, M., Blanchard, C., & Wehmeyer, M. (2000). Promoting transition goals and self-directed learning model of instruction. *Education and Training in Mental Retardation and Developmental Disabilities, 35,* 351-364.

Agran, M., Blanchard, C., Wehmeyer, M., & Hughes, C. (2002). Increasing the problem-solving skills of students with severe disabilities participating in general education. *Remedial and Special Education, 23,* 279-288.

Agran, M., Cavin, M., Wehmeyer, M., & Palmer, S. (2006). Participation of students with moderate to severe disabilities in the general curriculum: The effects of the Self-Determined Learning Model of Instruction. *Research and Practice for Persons with Severe Disabilities, 31*(3), 230-241.

Agran, M., King-Sears, M. E., Wehmeyer, M. L., & Copeland, S. R. (2003). *Teachers' guides to inclusive practices: Student-directed learning.* Baltimore, Maryland: Paul H. Brookes Publishing.

Agran, M., Wehmeyer, M., Cavin, M., & Palmer, S. (2008). Promoting student active classroom participation skills through instruction to promote self-regulated learning and self-determination. *Career Development for Exceptional Individuals, 31*(2), 106-114.

Agran, M., Wehmeyer, M., Cavin, M., & Palmer, S. (2010). Promoting active engagement in the general education classroom and access to the general education curriculum for students with cognitive disabilities. *Education and Training in Autism and Developmental Disabilities, 45*(2), 163-174.

Algozzine, B., Browder, D., Karvonen, M., Test, D. W., & Wood, W. M. (2001). Effects of interventions to promote self-determination for individuals with disabilities. *Review of Educational Research, 71*(2), 219-277.

Artman, K., Wolery, M., & Yoder, P. (2012). Embracing our visual inspection and analysis tradition: Graphing interobserver agreement data. *Remedial and Special Education,*

33(2), 71-77.

Individuals with Disabilities Education Act of 2004, P. L. 108-446.

Kennedy, C. H. (2005). *Single-case designs for educational research.* Boston: Allyn and Bacon.

Konrad, M., Fowler, C. H., Walker, A. R., Test, D. W., & Wood, W. M. (2007). Effects of self-determination interventions on the academic skills of students with learning disabilities. *Learning Disabilities Quarterly, 30*(2), 89-113.

Lee, S. H., Wehmeyer, M. L., Palmer, S. B., Soukup, J. H., & Little, T. D. (2008). Self-determination and access to the general education curriculum. *The Journal of Special Education, 42*(2), 91-107.

Mazzotti, V. L., Test, D. W., & Wood, C. L. (2013). Effects of multimedia goal-setting instruction on students' knowledge of the self-determined learning model of instruction and disruptive behavior. *Journal of Positive Behavior Interventions, 15*(2), 90-102.

Mazzotti, V. L., Wood, C. L., Test, D. W., & Fowler, C. H. (2012). Effects of computer-assisted instruction on students' knowledge of the self-determined learning model of instruction and disruptive behavior. *The Journal of Special Education, 45*(4), 216-226.

McGlashing-Johnson, J., Agran, M., Sitlington, P., Cavin, M., & Wehmeyer, M. (2003). Enhancing the job performance of youth with moderate to severe cognitive disabilities using the self-determined learning model of instruction. *Research and Practice for Persons with Severe Disabilities, 28,* 194-204.

No Child Left Behind Act of 2001 (NCLB) (P.L. 107-110).

Palmer, S. B., & Wehmeyer, M. L. (2003). Promoting self-determination in early elementary school. *Remedial and Special Education, 24*(2), 115-126.

Palmer, S. B., Wehmeyer, M. L., Gipson, K., & Agran, M. (2004). Promoting access to the general curriculum by teaching self-determination skills. *Exceptional Children, 70,* 427-439.

Rilley-Tillman, T. C., & Burns, M. K. (2009). *Evaluating educational interventions: Single-case design for measuring response to intervention.* New York, NY: The Guilford Press.

Rusch, F. R., Hughes, C., Agran, M., Martin, J. E., & Johnson, J. R. (2009). Toward self-directed learning, post-high school placement, and coordinated support: Constructing new transition bridges to adult life. *Career Development for Exceptional Individuals, 32*(1), 53-59.

Shogren, K. A., Palmer, S. B., Wehmeyer, M. L., Williams-Diehm, K., & Little, T. D. (2012). Effects of intervention with the self-determined learning model of instruction on access and goal attainment. *Remedial and Special Education, 33*(5), 320-330.

Wehmeyer, M. L., Abery, B., Mithaug, D. E., & Stancliffe, R. (2003). *Theory in self-determination: Foundations for educational practice.* Springfield, IL: Charles C. Thomas.

Wehmeyer, M. L., Agran, M., Palmer, S., Mithaug, D., & Blanchard, C. (1998). *A teacher's guide to the use of The Self-Determined Learning Model of Instruction: Adolescent version.* Arlington, TX: The Arc of the United States.

Wehmeyer, M. L., & Field, S. (2007). *Self-Determination: Instructional and assessment strategies to promote the self-determination of students with disabilities.* Thousand Oaks, CA: Corwin Press.

Wehmeyer, M. L., Field, S., Doren, B., Jones, B., & Mason, C. (2004). Self-determination and student involvement in standards-based reform. *Exceptional Children, 70*(4), 413-425.

Wehmeyer, M. L., Palmer, S. B., Agran, M., Mithaug, D. E., & Martin, J. E. (2000). Promoting causal agency: The self-determination learning model of instruction. *Exceptional Children, 66*(4), 439-453.

Wehmeyer, M. L., Palmer, S. B., Shogren, K. A., Williams-Diehm, K., & Soukup, J. (2013). Establishing a causal relationship between interventions to promote self-determination enhanced student self-determination. *Journal of Special Education, 46*(4), 195-210.

Wehmeyer, M. L., Shogren, K. A., Palmer, S. B., Williams-Diehm, K. L., Little, T. D., & Boulton, A. (2012). The impact of the self-determined learning model of instruction on student self-determination. *Exceptional Children, 78*(2), 135-153.

자기결정교수학습모델 (SDLMI)이 제한된 지원을 필요로 하는 장애학생의 학업수행에 미치는 영향

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<요 약>

본 연구는 미국 중서부에 위치한 한 중학교에서 통합교육을 받는 3명의 장애학생에게 자기결정교수학습모델 (SDLMI)을 활용한 교수적 지원을 제공하여 학생들의 과학 교과 학업 수행에 미치는 영향에 대해서 살펴보았다. 연구에 참여한 학생들은 SDLMI를 활용하여 스스로 학업목표를 설정하고, 목표를 달성하기 위해 만든 계획을 실행에 옮기며, 자기점검 및 평가의 과정을 거치며 문제해결 과정을 습득하였다. 실험은 대상자간 중다기초선 설계방법을 이용하였으며 연구 참여자들의 소속 학교에서 연구자와 일대일 교수로 이루어졌다. 실험 결과, 연구에 참여한 3명의 학생 모두 중재를 시작한 이후 과학교과 어휘를 이해하기 위한 문제 해결 과정이 기초선 구간보다 향상되었으며, 그 행동은 유지 및 일반화가 되었다. 또한, 연구에 직접 혹은 간접적으로 참여한 학생, 특수교사, 일반교사 모두 SDLMI의 효과, 타당성, 만족도를 알아보는 설문에서 대체적으로 긍정적인 의견을 나타내었다. 본 연구 결과는 SDLMI가 교수적 지원 전략으로 적용되었을 때 학생 주도적 학습에 긍정적인 영향을 미친다는 점에서 의의가 있다.

주제어 : 자기결정교수학습모델 (SDLMI), 문제해결능력, 학생 주도적 학습

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