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# The Effects of Two Direct Instruction Teaching Procedures to Basic Skills to Two Students with Disabilities

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# The Effects of Two Direct Instruction Teaching Procedures to Basic Skills to Two Students with Disabilities

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**Abstract**

The purpose of this research was to determine the effectiveness of Direct Instruction (DI) flashcard procedure at improving skills in pre-reading and language arts. Two different measures were taken in each study. The first study employed a first grade female student diagnosed with learning disabilities. This study focused on increasing her ability to identify letters and to write these letters. The research was conducted in a resource room setting located in a public school in a large urban school district. The effects of employing DI flashcards on letter recognition and letter writing were evaluated in a multiple baseline design. Overall the effects of the experiment were positive; the participant improved her accuracy letter identification accuracy and her skills at writing her letters from the alphabet. The time, cost, and effort needed for Experiment I was minimal and the student enjoyed the procedures. A second study was conducted with a first grade boy. We wanted to determine the effectiveness of *Teach Your Child to Read in 100 Easy Lessons* along with a DI flashcard procedure to improve a first grade student's ability to identify sounds and sight words within a public school behavior intervention (BI) classroom setting. Overall the effects of the second experiment were also quite positive. The participant improved his accuracy and ability to say the letter-sounds and target words. Suggestions for future research were made.

**Keywords:** DI flashcards, letter recognition, handwriting, resource room, learning disabilities.


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# Efectos de Dos Procedimentos de Instrucción en Habilidades Básicas con Dos Estudiantes con Discapacidad

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**Resumen**

El objetivo de esta investigación es determinar la efectividad de la Instrucción Directa (ID) procediendo con flashcards con el fin de mejorar habilidades en artes de pre-lectura y lenguaje. Dos medidas diferentes se llevaron a cabo en este estudio. El primero centrado en incrementar su habilidad para identificar letras y para escribirlas. La investigación fue llevada a cabo en una clase adaptada en una escuela pública de un distrito urbano. Los efectos de emplear ID flashcards en el reconocimiento de letras escritas fueron evaluadas a través de un diseño múltiple de base. Los efectos totales del experimento fueron positivos; la participante mejoró su precisión para identificar letras de forma adecuada y sus habilidades en escribir sus letras del alfabeto. El tiempo, coste, y esfuerzo necesario para el experimento I fue mínimo y la alumna disfrutó de los procedimientos. El segundo estudio se llevó a cabo con un chico de primer grado. Queríamos determinar la efectividad de *Teach Your Child to Read in 100 Easy Lessons* con procedimientos de ID flashcards para mejorar la habilidad de un estudiante para identificar sonidos y palabras vistas en una intervención de conducta (BI) en una escuela pública. Los efectos totales del segundo experimento fueron bastante positivos también. El participante mejoró su precisión y habilidad para decir letras sonantes y palabras objetivo. También se hacen sugerencias para futura investigación.

**Palabras clave:** DI flashcards, reconocimiento de letras, escritura, aula adaptada, dificultades de aprendizaje.


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Reading should begin at a young age; ideally, children should be read to by their parents and should be exposed to reading skills before entering school. Around the age of three, children should have the knowledge of letters and letter-sound correspondences (Adams, Foorman, Lundberg, & Beeler, 1997). When a child approaches kindergarten, he or she should have begin to match spoken words with written ones, write the letters of the alphabet, and write some words they use and hear often. When a child reaches age sux, they should be capable of identifying many words and have the ability to decode new words (Adams et al., 1997). Early reading skills enable the student to use pictures and context to figure out unfamiliar words, punctuate and capitalize in writing, self-correct when they make a mistake while reading aloud, and show comprehension of a story through drawings. Beginning to read at a young age provides the student with a proper foundation needed to become a successful reader (Cunningham & Stanovich, 1997; Good III, Simmons, & Smith, 1998; Kameenui, 1998; Snow, Griffin, & Burns, 2005).

Children who do not receive the needed exposure to reading prior to starting school are at risk of having difficulty learning to read. Students who struggle with reading are at a great risk of falling behind in many different areas of academics because the ability to read is required for other subjects (Gersten, Keating, & Becker, 1988). The more a student falls behind the more difficult it is for them to catch back up to grade level. Students who have difficulty reading are also more likely to drop out of school than those who have the proper reading skills (Shapiro, 2011).

Reading is not only important for school, but is essential for everyday functioning in society, such as being able to read signs, read directions or instructions, and most jobs require literate individuals (Kuder, 1991).

Fortunately, for students who struggle with reading, there are effective programs and interventions to help develop the skills that are lacking (Daly, Chafouleas, & Skinner, 2005). These range from large scale curricula changes such as employing Direct Instruction (Marchand-Martella, Slocum, & Martella, 2004), to reading strategies such as assisted reading (Dowd, Vickers, Rosario, Peterson-Peck, & McLaughlin, 2013; Gilbert, Williams, & McLaughlin, 1996), repeated reading (Herberg, McLaughlin, Derby, & Weber, 2012; Morgan, McLaughlin, Neyman, & Bolich, 2013), classwide peer tutoring (Greenwood, 1996).

DI flashcard procedures focus on repetition to promote mastery of the academic skills (Brasch et al., 2008; Silbert, Carnine, & Stein, 1981). DI flashcard procedure for reading focuses on a specific area within reading such as sounds, sight words, vocabulary, spelling, and various other memorization skills. Direct Instruction flashcard procedure involves a set flashcards with a basic target letter on each card (e.g. a). The material placed on flashcards are typically determined through a pretest. Both correct as well as errors are placed on flashcards (Brasch et al., 2008). These flashcards are then placed into sets or stacks. The teacher presents the card and the student has to say what is on the flashcard within 3 to 5 seconds. IF the child answers the letter correctly, that flashcard is placed at the bottom of the stack and the next flashcard presented. If the student made an error, a model, lead, and test procedure (Marchand-Martella et al., 2004) was carried out. This required that the instructor to say the correct response to the flashcard presented, the student and teacher then said the correct answer together, and finally, the flashcard is presented again to the student. If the student made correct response, this card was placed from three to five cards from the top of the stack so additional opportunities to practice their errors correctly (Silbert et al., 1981). This procedure was developed to teach basic math facts. However, since that time it has received attention in the peer-reviewed literature to students with and without disabilities. The skills

taught have included sight words (Romjue, McLaughlin, & Derby, 2011), letter names or sounds (Bulkley, McLaughlin, Derby, & Carosella, 2012; Fitting, McLaughlin, Derby, & Blecher, 2012; Ruwe, McLaughlin, Derby, & Johnson, 2011) basic math facts (Glover, McLaughlin, Derby, & Gower, 2010), pre-academic skills such as numeral identification, basic color naming, and letters in a child's name (Mangundayo, McLaughlin, Williams, & Toone, 2013). DI flashcards have also been successfully employed across a wide age range of students as well as disability designations. These have ranged from elementary students with autism (Crowley, McLaughlin, & Kahn, 2013), preschool students with developmental delays (Fitting et al., 2012; Mangundayo et al., 2013), middle school students with intellectual disabilities (Ruwe et al., 2011), and high school students with severe behavior disorders (Brasch et al., 2007; Pierce, McLaughlin, Neyman, & King, 2012) or intellectual disabilities (Hayter, Scott, Weber, & McLaughlin, 2007).

Direct Instruction flashcard procedure focuses on repetition to promote mastery of the desired skill (Silbert et al., 1981). DI flashcard procedure for reading focuses on a specific area within reading such as sounds, sight words, vocabulary, spelling, and various other memorization skills. The DI flashcard procedure involved creating a set flashcards with a basic target letter on each card (e.g. a). Previous studies found this procedure to be extremely effective in improving various specific skills (Crowley et al., 2013; Mangundayo et al., 2013; Skarr et al., 2014).

## Experiment I

The purpose of Experiment I was to determine if the use of DI flashcard procedure could improve a first grade girl's ability to identify and write letters. A second purpose was to provide an additional replication of employing DI flashcards to teach basic reading skills and provide a

replication of Bulkley et al. (2012). A final purpose was to examine the effectiveness of DI flashcards could improve the handwriting skills with a primary student with learning disabilities.

## Method

### Participant and Setting

The participant for the study was six-year-old female enrolled in a general education first grade classroom. She qualified for special education services in math and reading. She received these special education services in a resource room setting. She had difficulty completing grade level math problems such as simple addition. She was significantly behind in her reading skills, and she was unable to identify the letters of the alphabet by letter name and sound. She was classified in her IEP as developmentally delayed. Although she was behind in math and reading, she was excited about school and eager to learn. She was proud of her successes in school and understood that she needed to work harder in certain areas. Our participant was cooperative; she completed her work with ease and rarely was off task.

The study took place in a middle-income elementary school located in a large urban school district in the Pacific Northwest. This specific classroom has been employed in a number of single case studies, which have appeared in the peer-literature (Erbey, McLaughlin, Derby, & Everson, 2011; Mann, McLaughlin, Derby, & Everson, 2013; Pfaff, McLaughlin, Neyman, & Everson, 2013). When our participant was in the resource room, there were only two other students in the classroom. These students were second graders so they received instruction from the instructional aide. Our participant received individual instruction the course of the day, 35 different students from the first through sixth grade were provided specialized instruction. The resource room had two teachers, two instructional assistants, and the first author. Most of the students were diagnosed as having intellectual disabilities, communication disorders, autism spectrum disorders

(ASD), behavioral disorders, developmental delays/disabilities, Hearing Impaired/Deaf, or at risk (environmentally/ biologically). The study took place mornings on Mondays, Wednesdays, and some Fridays for approximately 1 hour each week. The first author worked individually with the participant at a desk in the corner of the resource room. The first author was completing an endorsement to meet the requirements for a Masters in Initial Teaching as well as an endorsement in special education from a local private university.

## Materials

DI flashcards was constructed, along with worksheets for the written letters. The combination of flashcards for orally stating the letter along with the handwriting component was designed to promote mastery in identifying all of the letters of the alphabet. Five sets of white, 2x4 flashcards were employed. Each flashcard contained one letter per card. The first four sets consisted of five letters and the fifth set had six letters. This comprised the 26 letters of the alphabet. The letter was typed in large black font on the center of each flashcard. For the handwriting portion of intervention; the first author designed a worksheet that contained the letters of the set that the student was currently working. To complete the worksheet, the participant was required to first trace the letter; second, she had to connect the dots that were used to comprise the letter. Third, she was required to independently write the letter three times.

### Dependent Variables

The first author used a data collection sheet to track the progress of our participant on each of the target letters. For each correctly stated letter and written letter, the first author recorded a plus (+) and for each missed letter the first author recorded a minus (-) on the data collection sheet.

The first dependent variable was the number of correct letters. A correct letter was scored when the student correctly stated the letter that appeared on the flashcard. She was given three seconds to respond. If she did not respond, took longer than three seconds, or responded with a different letter, it was scored as an error. The second dependent variable for handwriting was the number of letters Mary correctly reproduced when asked to write the letter from a verbal cue. An example consisted of. "Write the letter b." A written error was defined as Mary writing a different letter than requested or not writing a letter. The letter had to be judged as representing the letter to be scored as a correct.

**Experimental Design and Conditions**

A single-subject, multiple baseline experimental design (Kazdin, 2011, McLaughlin, 1983) was used to evaluate the effects of DI flashcard system and handwriting worksheets across five sets.

Our participant completed a pretest to evaluate her knowledge of letter name identification and ability to write the letter from an oral prompt. The study was designed to teach the student all 26 letters of the alphabet. The pretest allowed the first author to see what letters the student had not yet mastered. The student only knew 13 letter names and was able to write 10 letters in baseline. This was designed for repetition and to promote mastery.

Mastery for a set of letter names was defined as stating all letters of the set correctly, for three consecutive sessions. Mastery for a set of written letters was defined as correctly writing 80% of the letters correct, three sessions in a row. After achieving mastery of Set 1, our participant was allowed work with Set 2. Set 2 included five new letters. To promote maintenance and mastery of sounds the student continued to be tested on Set 1. The same procedure was followed until mastery of Set 2. This was repeated across all sets until all five sets were taught.

**Baseline.** During baseline, the first author tested Mary on letter names by presenting the card and asking "what letter?" For written letters, the first

author tested Mary by verbally asking her to write the given letter. No praise or feedback was given, however was praised for appropriately participating. The baseline data for the words was used to create five sets of target letters for the intervention. The number of sessions in baseline ranged from 3 to 13 sessions.

**DI flashcards.** DI flashcard procedure was used to promote letter name recognition and writing skills and to achieve mastery with the participant. The first author worked through each lesson with Mary. The first author would present a card and prompt the student to say the letter. If the student correctly stated the item within three seconds the first author praised the participant, such as saying "Good job" and reinforcing the correct letter by repeating it orally to the student. The correctly stated card was placed at the back of the deck. If the participant missed the item, the first author modeled the letter and then placed the card 2-3 cards back and the child was required to correctly repeat that card three times before placing that card in the back of the deck. The first author then gave the student a worksheet to complete writing the letters of the desired set. After completion of practicing the letter on the worksheet, the first author would test the student on her ability to write the given letter with only a verbal prompt. If the student missed the written letter, the first author would model and ask the student to write the letter again. The number of sessions using DI flashcards or handwriting sheets ranged from 5 to 15 sessions.

**Reliability of Measurement**

Interobserver agreement was conducted four times throughout the study. It took place once during baseline and three times during intervention. These data were taken by having the classroom teacher take a simultaneous but independent count for both corrects and errors. An agreement between the researcher and classroom teacher was determined if both wrote a plus sign for a correctly stated letter and written letter, or both observers wrote a

minus sign for an incorrect letter. A disagreement was found if one gave a plus sign for the student correctly stating or writing the letter and the other gave a minus sign for that letter. The total number of agreements were divided by the number of agreements plus disagreements to yield the percent reliability for each measure. The mean reliability for verbal letter recognition was found to be 91% (range 85%-98%). The mean reliability for written letters was found to be 98% (range 97%-99%).

## Results

### Oral Letter Names

The number of correct letter names during baseline and during the intervention procedures across five sets of letters is shown in Figure 1. The mean number correct for Set 1 letters during baseline was 1.33 out of 5. This increased to a mean of 4.64 out of 5 letters (range: 1-5 letters) during DI flashcard procedure. The mean number correct for Set 2 letters during baseline was 1.6 letters. This increased to a mean of 4.47 (range: 3-5 letters) during DI flashcards. The mean number correct for Set 3 letters during baseline was 1.56. This increased to a mean of 4.1 letters (range: 2-5 letters) during DI flashcards. The mean number correct for Set 4 letters during baseline was 1.75. This improved to a mean of 3.63 (range: 1-5) during DI flashcards. The mean number correct for Set 5 letters during baseline was 1.8 letters. This improved to a mean of 3 (range: 3-3).

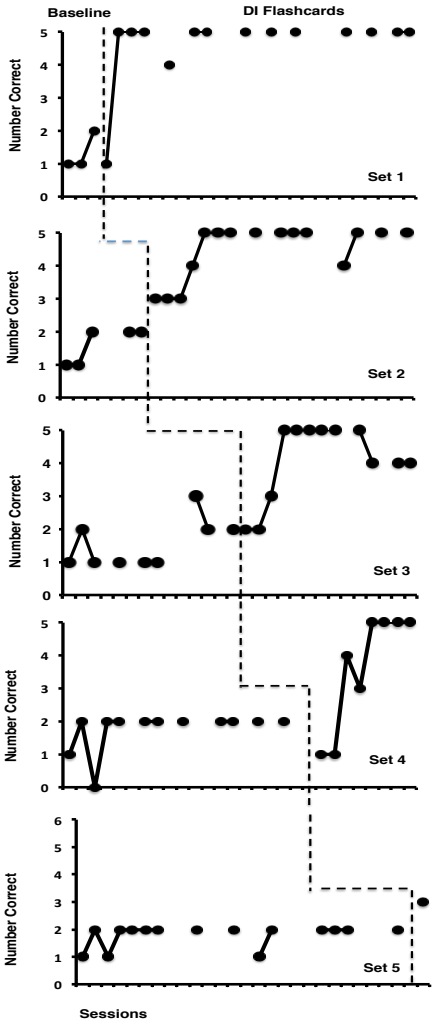


*Figure 1.* The number of letters correct in baseline and DI flashcards.

**Written Letters Correct**

The number of correct written letters during baseline and during the handwriting worksheet procedure across five sets of letters can be seen in Figure 2. The mean number correct for Set 1 written letters during baseline was 2.67. This increased to a mean of 4.33 letters (range: 3-5) during the handwriting worksheet with DI flashcards. The mean number of written letters correct for Set 2 for baseline was 1.75. This increased to a mean of 3.78 letters correct (range: 3-5) when DI flashcards and the handwriting worksheet were in effect. The mean number letters correctly written for Set 3 in baseline was low ($M$ = 0.06). This improved during DI flashcards to a mean of 3.23 (range: 1-5 letters). The mean number of written letters correct for Set 4 during baseline was 0.92. This increased to a mean of 2.91 (range: 2-5 written letters) when DI flashcards along with a handwriting worksheet were employed. The mean number of letters written correctly for Set 5 in baseline was 1.58. This increased to a mean of 3.2 (range: 2-4) when DI flashcards and handwriting worksheets were employed.

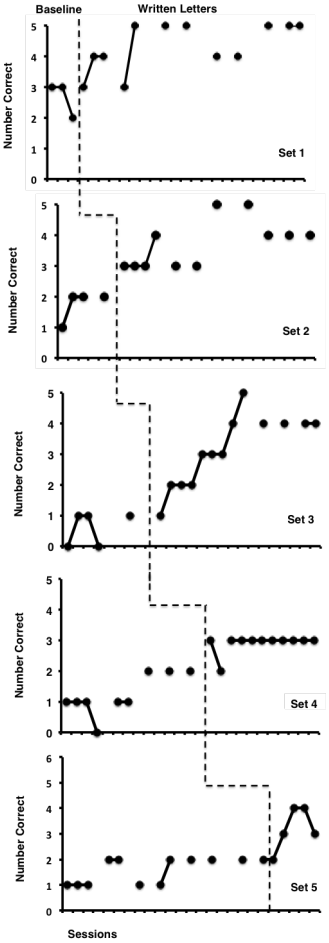


*Figure 2.* The number of written letters correct in baseline and DI flashcards.

## Discussion

The use of DI, along with the handwriting worksheets was effective at increasing accuracy and mastery of the letters of the alphabet with our participant. Plotting and providing feedback to our participant allowed the student to see her improvement and to feel more confident in her new knowledge. Finally, the general education classroom teacher noticed the student's significant improvement and was quite excited to see the success that had occurred.

The present research provides a replication of two recent studies (Bechtoldt, McLaughlin, Derby, & Blecher, in press; Buckley et al., 2012) where DI flashcards procedures were employed and evaluated to teach letter sounds. In the present research, we were able to extend the DI flashcard procedure with a younger student saying the letters presented orally. The efficacy of employing DI flashcards and a handwriting worksheet was demonstrated across six different sets of letter sounds and letters. These outcomes replicate much of our prior research in teaching pre-reading or math skills (Mangundayo et al., 2013), sight words (Crowley et al., 2013; Romjue et al., 2011), and spelling (Skarr, McLaughlin, Derby, Meade, & Williams, 2012).

Our participant improved her skills as each set was taught using DI flashcards and a handwriting worksheet. Also, her eagerness to learn and cooperation assisted her in her learning. The first author was able to get the student to work on whatever the desired task was with ease and compliance.

Creating our sets did not require a great deal of time. Using the pretest administered at the beginning allowed us to determine which letters the student had knew and which letters were in needing instruction. Using the DI flashcard procedure with the student would need at least 10-15 minutes every other day. Completion of the written letter worksheet would also take another minimum of 10-15 minutes every other day. The first author of this experiment did not have any difficulties with the Direct Instruction procedure; it was easy to understand and implement for the student.

There were several limitations in the present research. First, only a single student was employed. This was done due to the new state requirement in Washington State that teacher candidates complete the edTPA (Darling-Hammond, 2012). In the past, our students often employed two or more students to document their skills in teaching students (McLaughlin, B. Williams, R. Williams, Peck, Derby, Bjordahl, & Weber, 1999; B. Williams, McLaughlin, R. Williams, Marchand Martella, 1993). The next semester, the edTPA will become high stakes in the state and additional time will be required by our candidates to complete this new requirement. This will also makes it quite difficult for our preservice candidates to employ more than one participant which detracts from the strength of employing single case research designs (Horner, Carr, Halle, McGee, Odom, & Wolery, 2005). In recent studies (Bechtoldt et al., in press; Buckley et al., 2012; Crowley et al., 2013; Mangundayo et al., 2013; Skarr et al., 2014; we have employed three participants to help meet the criteria suggested by Horner et al. (2005). This appears to be more difficult in the future. The contribution of have our participant engage in the handwriting aspect of the research is unknown. Additional research will have to be carried out where the handwriting component is added and then withdrawn to help determine its efficacy in producing such outcomes. The limitations of this research included the lack of an immediate change for some sets whether the participant had to say or write her letters. This delayed outcome has been noted elsewhere when math facts were being taught (Pierce et al., 2012). Clearly, the delayed nature of improvement needs further analysis. Also, there were sets in which the number of data points that overlapped with those in baseline was found. This also warrants further analysis. These two points were noted whether letters were answered orally or in writing.

Using the DI flashcard system and the written worksheets was a simple, yet extremely effective. On the last day of intervention, our participant was given the flashcards and extra blank worksheets in order to maintain mastery of the letters and encourage continuation of practicing letters. In the present

study, the use of DI flashcards as well as a handwriting sheet produced positive effects in a relatively short period of time. Teachers should give a DI flashcard procedure consideration when they have students who struggle with their basic skills. This can be of assistance for both pre as well as specific skills in reading or math.

The limitations of this research included the lack of an immediate change for some sets whether the participant had to say or write her letters. This delayed outcome has been noted elsewhere when math facts were being taught (Pierce et al., 2012). Clearly, the delayed nature of improvement needs further analysis. Also, there were sets in which the number of data points that overlapped with those in baseline was found. This also warrants further analysis. These two points were noted whether letters were answered orally or in writing.

## Experiment II

The purpose of Experiment II was to evaluate the effects of *Teach Your Child to Read in 100 Easy Lessons* (Engelmann, Haddox & Bruner, 1987). In addition, we wanted to extend and replicate of McCullough, Weber, Derby, and McLaughlin (2008). They employed the text, to improve the pre-reading skills of a primary student with ADHD/PI.

### Method

### Participant and Setting

The participant in Experiment II was a 1st grade boy, aged 6. He had been placed in a self-contained BI classroom due to his inability to control and regulate his emotions in the general education classroom. He struggled with day-to-day activities at school, such as sitting in his desk, raising hand, walking down the hallway by himself. His behaviors escalated to more inappropriate and disruptive behavior, in particular, when he was reminded of the expectations. He would shut down when frustrated, either by placing

his head on the desk and ignoring the teachers who tried to talk with him or by expressing loud, disruptive behavior. Along with behavioral disabilities, he had vision problems, however did not wear any corrective eyewear for this problem. As far as academia, he struggled in reading, writing, and spelling. He was noted as needing help in improving reading skills in order to reach grade level by the end of the school year. This student was chosen for the study because his disruptive behavior seems to affect his academics. Although a 1st grader, his reading ability is at approximately a Kindergarten level. He typically performed better when working in a one-on-one instructional session; off-task and disruptive behavior tend to occur more often when surrounded by his peers and other distractions.

The study took place in a behavior intervention classroom at a low-income elementary school in the Pacific Northwest. The classroom enrolled 20 students with severe behavioral issues.. The number of adults included: two classroom teachers, one sign language specialist, and 3 to 4 volunteer assistants. The students enrolled in the behavior intervention classroom were predominantly males, enrolled in kg. to sixth grade. Along with the behavioral issues, many of the students in the classroom struggled with academics and majority failed to maintain at grade level in most subject areas. Although all the students were diagnosed as having behavioral issues, many of the students struggled with other learning deficits such as learning disabilities, communication disorders, autism spectrum disorder, emotional and behavioral disorders, emotional and behavioral disorders, developmental delays/disabilities, hearing impaired/deaf, and at risk (environmentally/ biologically). The study took place mornings on Mondays, Wednesdays, and some Fridays for approximately 2 hours. The first author worked individually with the participant at a desk in the corner of the BI classroom. The first author was completing a course in Direct Instruction Reading at a local private university. This research project was completed to meet the graduate student requirements for this course. This classroom has been employed before to carry out action research by both graduate and

undergraduate preservice special education candidates (Darrow, McLaughlin, Derby, & Johnson, 2012; Makowski, McLaughlin, Johnson. & Beiers, 2013).

## Materials

For the study, the book *Teach Your Child to Read in 100 Easy Lessons* (Engelmann et al., 1987) was used in combination with DI flashcard system to help the Tim master the target sound and word. Two sets of white, 2x4 flashcards were used, containing one sound per card for the first set and word per card for the second set. The sound and word were typed in large black font on the center of each flashcard.

### Data Collection and Measurement

The dependent variable for Experiment II was the number of sounds and words our participant correctly stated. A correctly stated sound was defined as verbally making the sound of the letter on the flashcard, within 3s, and without any error. A sound error was defined as saying the wrong sound, distorting the sound, pausing too long, not holding the sound, or not responding. A correctly stated word was defined as reading the word on the flashcard, within three seconds, and without any errors. An error for a word was defined as pausing, sounding-out, re-reading the word, or taking longer than three seconds to say the word. The first author would either put a plus (+) for a correct response on the target skill or a minus (-) for a missed response on the target skill.

## Experimental Design and Conditions

A single-subject, multiple baseline experimental design (Kazdin, 2011, McLaughlin, 1983) was used to evaluate the effects of *Teach Your Child to*

*Read in 100 Easy Lessons*. The effects of this program were evaluated on the sounds and sight words across three sets.

## Results

### Letter Sounds

For the study, the number of correct sounds during baseline and DI flashcards across three sets of sounds is shown in Figure 3. The mean number correct for Set 1 sounds during baseline was 6.3 out of 15, which increased to a mean of 10.54 out of 15 (range: 9-13) during Direct Instruction Reading flashcard procedure. The mean number correct for Set 2 sounds during baseline was 3.5 out of 15, which increased to a mean of 7.3 (range: 4-12) during intervention. The mean number correct for Set 3 sounds during baseline was 4 out of 14, which increased to a mean of 6.67 (range: 6-7) during intervention.

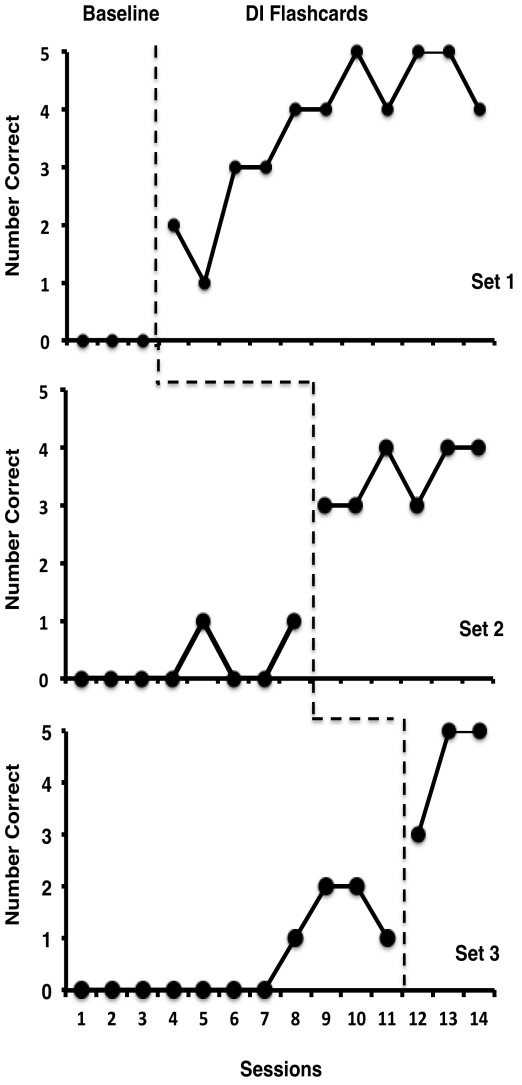


*Figure 3.* The number of correct sounds for baseline and DI flashcards over three sets.

## Sight Words

For the first study, the number of correct words during baseline and during the intervention procedure across the three sets of words is shown in Figure 4. The mean number correct for Set 1 words during baseline was 0.0 out of 5, which increased to a mean of 3.6 out of 5 (range:1-5) during the Direct Instruction Reading flashcard procedure. The mean number correct for Set 2 words during Baseline was 0.25 out of 5 (range: 0-2), which increased to a mean of 3.5 out of 5 (range: 3-4) during intervention. The mean number correct for Set 3 words during baseline was 0.55 out of 5, which increased to a mean of 4.33 (range: 3-5) during intervention.

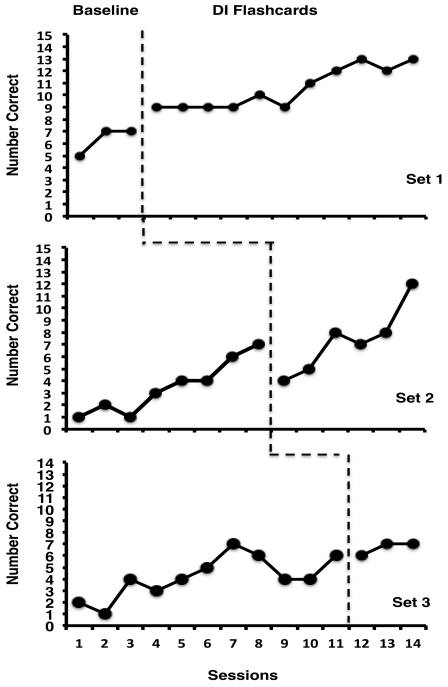


*Figure 4.* Number of correct sight words for baseline and DI flashcards for three sets.

## Discussion

The use of the *Teach Your Child to Read in 100 Easy Lessons* along with the implemented a DI flashcard procedure was effective at increasing accuracy and mastery of the target sounds and words. The graph (see Figures 3 and 4) from the study allowed for the student to see his improvement and to feel more confident in his reading skills. The teacher also noticed the student's improvement and was happy to see the success of the flashcard system.

Although the student showed improvement, there were some challenges that came along with working with this student. It was difficult to get the participant to sit still through the lessons and each session of the flashcards. Even though the lessons were not too long and the flashcard sets did not contain very many cards and was not too time-consuming, he would easily get distracted and attend to other things going on around the classroom. When he got bored with the lesson or flashcards he would either walk over to another student, choose a book he wanted to read, and or talk about something completely off-subject. Due to his lack of attention the researcher provided a chart of his progress to show him. The participant enjoyed seeing how many more sounds words he had learned each session and started to complete the flashcard procedure with much cooperation.

A strength of this research was that the time needed to plan and carry our the study was minimal. At the beginning of the study a pretest was administered to determine which skills the child has mastered and which skills need to be improved on. For the intervention, the individual administering the flashcards would need to spend about ten minutes to make up the flashcards appropriate to what the child needs to learn. The lessons are designed to not take up too much time; depending on the cooperativeness of the student the lessons can range anywhere from 20-60 minutes. The flashcards intervention would need 10 to 15 minutes every-other-day to work through the DI flashcard system. The intervention required purchasing the book *Teach Your Child to Read in 100 Easy Lessons* and flashcards.

Flashcards can easily be made and be just as successful. Effort needed for this intervention is merely a positive and encouraging attitude in the face of what may be a frustrating experience for the child. The researcher of this experiment did not have any difficulties with the system; it was easy to understand and implement for the students.

Although the Direct Instruction procedures contained minimal problems, for future studies, the researcher recommended more contact time between the researcher and the student in order to increase the effectiveness of the intervention. From this study, the direct instruction procedures generated positive effects over a relatively short period of time. For future studies, this intervention can be replicated and if followed correctly, be successful.
*Teach Your Child to Read in 100 Easy Lessons* and the DI flashcard system was a simple, yet extremely effective procedure. Although the participant was difficult at time, he showed improvement, and was excited at the progress he made throughout the study. On the last day of intervention, he was given the flashcards, to maintain effectiveness and encourage continuation of sounds and sight word mastery.

## General discussion

The use of DI flashcard procedure was successful for both studies. The DI flashcard procedure was used for two different students, targeting two different skills for each student. As shown in both studies, DI flashcards can be used to improve many different skills used for reading.

For the first study, the use of the *Teach Your Child to Read in 100 Easy Lessons* along with the DI flashcards was effective at increasing accuracy and mastery of the target sounds and words. These data (see Figure 1 and 2) from the study allowed for the student to see his improvement and to feel more confident in his reading skills. The teacher also noticed the student's improvement and was happy to see the success that the DI flashcard system

produced. The second study used DI flashcards along with the handwriting worksheets. Both were effective at increasing accuracy and mastery of the letters of the alphabet. Plotting performance and providing feedback to our participant allowed the student to see her improvement and to feel more confident in her ABC's. The general education classroom teacher noticed the student's significant improvement and was quite excited to see the success that had occurred.

Both research studies provided a replication of Buckley et al., (2012) in the teaching of letter sounds. The research also extended the DI flashcard procedure with younger students, the male working on sight words and the female saying the letters presented orally. For the male student, the implementation of DI flashcards for sounds and sight words, greatly improved his reading ability, as shown across three sets. For the female student, the efficacy of employing DI flashcards and a handwriting worksheet was demonstrated across six different sets of letter sounds and letters. The participant improved her skills as each set was taught using DI flashcards and a handwriting worksheet. These outcomes replicate much of our prior research in teaching pre-math and math skills, (Delong, McLaughlin, Neyman & Wolfe, 2013; Mangundayo et al., 2013), sight word vocabulary, (Crowley et al., 2013; Romjue et al., 2011) and beginning school literacy (Bulkley et al., 2012). These outcomes fail to confirm a recent publication where we were unable to verify the efficacy of DI flashcards (Johnson, McLaughlin, Derby, Barretto, & Bucknell, 2014).

Both students demonstrated an eagerness and willingness to learn. They were cooperative which promoted learning. The students could see their progress that was tracked by the author on the daily recording sheet. The first author was able to get both students to work on whatever the desired task with ease and compliance.

Both studies broke down the sets into small numbers of sounds, words, and letters. The time needed to complete the intervention was minimal. Using the pretest administered at the beginning allowed us to determine

which sounds, words, and or letters the student had known and which skills were in needing instruction. Using the DI flashcard procedure with the student would need at least 10-15 minutes every other day. Completion of the written letter worksheet would also take another minimum of 10-15 minutes every other day. The first author of the experiments did not have any difficulties with the Direct Instruction procedure; it was easy to understand and implement for the students.

Using the DI flashcard system along with *Teach Your Child to Read in 100 Easy Lessons* for the first study and the written worksheets was a simple, yet extremely effective. On the last day of intervention, both participants were given the flashcards used for the student. The student of the second study was given extra blank worksheets in order to maintain mastery of the letters and encourage continuation of practicing letters. The studies show the use of DI flashcards combined with *Teach Your Child to Read in 100 Easy Lessons,* in the first study, as well as a handwriting sheet, in the second study, produced positive effects in a relatively short period of time. Teachers should give a DI flashcard procedure consideration when they have students who struggle with their basic skills. This can be of assistance for both pre as well as specific skills in reading or math.

The limitations of this research included the lack of an immediate change for some sets whether the participant had to say his sounds or sight words and say or write her letters. This delayed outcome has been noted elsewhere when math facts were being taught (Pierce et al., 2012). Clearly, the delayed nature of improvement needs further analysis. Also, there were sets in which the number of data points that overlapped with those in baseline was found. This also warrants further analysis. These two points were noted whether letters were answered orally or in writing. Finally, the large number of items in the sets used for the second study may have well contributed to the delayed effects for our data.

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