Improvement on Distinguishing 'B' and 'D' Letter : Direct Instruction Flashcards Intervention for A Slow Learner

Siti Dwita Anjani*, Farida Kurniawati
Faculty of Psychology, Universitas Indonesia.
*Corresponding Author. Email: sitidwitaanjani.work@gmail.com

Abstract: This research aimed to evaluate the effectiveness of Direct Instruction (DI) Flashcards in helping a slow learner distinguish between the letters 'b' and 'd' using a pretest-posttest experimental design with an A-B structure. Data was gathered through observations and IQ testing. Through IQ testing, the subject 's intelligence capacity score fell in the Borderline Intellectual Functioning category (IQ = 83, Wechsler scale). Observations showed that the subject was a quiet student at school and rarely interacted with peers due to low self-esteem. Direct Instruction (DI) Flashcards are effective for students with poor cognitive capacity and low self-esteem due to their structured approach. This method provides clear expectations, explicit instruction, and consistent feedback, fostering a sense of competence and confidence in slow learners. The subject underwent a series of five sessions, including a pre-test, practice activities, and a post-test. Pretest and posttest scores were recorded, noting the number of correct and incorrect words to assess reading improvement. Observations during treatment sessions provided qualitative insights into the subject's learning process, highlighting specific challenges and strategies that enhanced performance. Error patterns were identified and addressed to improve reading accuracy. The findings of this research confirm that using direct instruction flashcards as a reading practice method is effective to improve slow learner student's reading skills. This research underscores the value of tailored interventions for students with learning difficulties, such as slow learners. Effective interventions rely on attentive observation from teachers or caregivers to understand the challenges faced by the student, timely feedback to enhance self-awareness, and consistent encouragement to boost motivation and engagement in practice.

Introduction

A student with Borderline Intellectual Functioning (BIF) or also referred to as a slow learner has an IQ between 70 to 85 (Peltopuro et al., 2014). As a slow learner, a student's cognitive development progresses at a slower pace, even compared to younger children (Daga & Jain, 2022). It means that even though they might have an interest in learning new concepts or new ideas, they can't learn as fast as their peers (Daga & Jain, 2022). Their poor working memory also affected students' reading performance in general (Alloway, 2010; Pulina et al., 2019). Therefore, a lot of problems might occur during a student's learning process due to their poor cognitive abilities of slow learners can negatively impact their academic performance (Deary et al., 2007). to insufficient reading skills (Diamond & Baroody, 2013).

Poor verbal and written skills of slow learners hindered their development on receptive and expressive language (Thurlow et al., 2009)., they tend to be quiet in the presence of other people (Ningsih & Suyatno, 2023). Their social skills might as well be

affected by their poor showcases by not actively interacting with peers and not getting involved in a group play (Peltopuro et al., 2014). Having poor ability and performance at school leads them to low self-esteem (Korikana, 2020) and made them isolated among their classmates (Peltopuro et al., 2014). In other words, children need reading skills not only to gain knowledge but would help them communicate with other people (Levy et al., 2006), especially with their peers because there is a correlation between verbal and written vocabulary (Thurlow et al., 2009).

A slow learner might as well have difficulty in following several instructions given by teachers (Vasudevan, 2017). Therefore, they need special attention like adjusted instructional strategies from their teachers (Hasibuan et al., 2022). Teachers help them master fundamental basic skills in learning like reading, counting, and to catch up with their classmates on the learning materials (Vasudevan, 2017). They also need assistance from their parents to become more independent in their learning (Khiyarusoleh, 2019). However, this is not the case for most students from lower class economy (Dolean et al., 2019). Their literacy development most likely is not supported by their home because they lack exposure to literacy activities, unavailability of supporting materials to read like access to books and literacy centers like libraries (Pace et al., 2017; Romeo et al., 2022).

One effective method to improve reading ability is practicing with flashcards. Flashcards are effective because they present individual stimuli in a simple and clear format (Kupzyk et al., 2011). Studies have demonstrated that flashcards can enhance various aspects of reading, such as pronunciation, spelling, understanding word meanings, memorizing new vocabulary, and practicing grammar or word (Andriyadi & Irawan, 2018; Kupzyk et al., 2011; Herlina & Dewi, 2017). Additionally, flashcards have also been proven to enhance basic reading skills, including word identification, reading fluency, and comprehension (Andriyadi & Irawan, 2018; Hatiningsih & Adriyati, 2019; Kupzyk et al., 2011). Furthermore, the method has proven effective for students with special needs, including slow learners, and those with Down syndrome, meningitis, dyslexia, and speech delays (Mukaffa et al., 2023). These studies suggested that flashcards can be used on different learning goals and different types of students including slow learners.

Direct Instruction (DI) flashcards combine the Direct Instruction teaching approach with the use of flashcards for reading practice, effectively enhancing the reading abilities (Alanazi, 2017). DI is an explicit teaching performed directly by a teacher to their students that limits the amount of new learning materials including the subject and goals according to student's needs (Engelmann, 2024). It can also be used for students' reading development (Carnine et al., 2006). DI flashcard employs the use of an error correction procedure. Immediate error correction is an important component of Direct Instruction (Skarr et al., 2014). Error correction involves repeating the teaching process to help students develop critical skills and gain encouragement for their efforts and accomplishment (Engelmann, 2024). The benefit of DI flashcards is that this method can generalize their practice into reading a text (Seines et al., 2015). Therefore, it is recommended to employ DI flashcards in hope that the skills can give a snowball effect for the later skills.

The novelty of this research lies in its application and adaptation of the Direct Instruction (DI) Flashcards method to specifically address the challenge of distinguishing between the letters 'b' and 'd' in a slow learner student. While previous studies have demonstrated the effectiveness of DI Flashcards in improving general reading skills (Kupzyk et al., 2011), this research introduces several unique contributions. The researcher incorporates real-time feedback and adjusts the intervention dynamically based on observed

behaviors, such as the subject's tendency to rush through tasks or rely heavily on prompts. This adaptive teaching strategy highlights a personalized method for tackling specific learning obstacles (Skarr et al., 2014). This research aimed to evaluate the effectiveness of Direct Instruction Flashcards in helping a slow learner distinguish between the letter 'b' and 'd'.

Research Method

This research used a single-subject experiment design to determine if a specific treatment influences an outcome with pre-test and post-test as measures (Creswell & Cresswell, 2018). This research utilized the Direct Instruction Flashcard method after reviewing relevant literature on its effectiveness. The goal was to assess whether this approach could enhance the reading skills of a slow learner in distinguishing between the letters 'b' and 'd.' The treatment procedures were adapted from a research by Heric et al. (2016), which successfully improved the reading accuracy of a 10-year-old student with specific learning disabilities by combining DI flashcards with repeated reading using multiple baselines.

The subject of this research was a 10-year-old female student (aged 10 years and 3 months) in the 4th grade at a public primary school in Depok, West Java, Indonesia. She was assessed using the WISC (Wechsler Intelligence Scale for Children), and her IQ score placed her in the Borderline Intellectual Functioning category (IQ = 83, Wechsler scale). Based on teachers and the researcher's observation, she was a quiet student at school and rarely interacted with others, meanwhile she was a chatty kid at home. She seemed to have low self-esteem in the presence of her peers. Back at home, she was chatty and expressed herself more but a quiet kid at school. In class, when the subject felt confused by the teacher's instructions, she rarely worked on her assignment right away, instead she looked around, observed the teacher, and watched her classmates working on the tasks. After a while, she would begin to work on her own tasks while not initiating asking for teacher's assistance. Whittaker (2012) found that protecting self-esteem in the classroom was the reason why student hesitates to ask questions. Her academic achievement was poor due to her inability to read fluently. That is why it is necessary to improve her reading ability.

Her reading baseline was determined through an informal test on her reading ability, which indicated that her skills were at Level 1. At this stage, she was still developing her ability to decode letters into sounds (Chall, 1983, Steinman et al., 2006) especially when she had to read letters 'b' or 'd'. At this stage, she would use bottom-up characteristics of a text, such as phonetic rules, instead of relying on contextual knowledge when decoding. She associated the shapes of letters with phoneme patterns. Simple graphemes and combinations of graphemes were linked to sounds that could be merged and blended to read new words (Breech & Pedley, 1994 in Steinman et al., 2006).

Table 1. Flashcard's List of Words

Set	List of Words
1st set (20 cards)	buba; babi; dodi; dabu; baba; labi; deba; bahu; kuba; noda; subu; bidi; desi; didi; jeda; dada; rubi; dera; dudu; gada
2nd set (20 cards)	basi; babi; wade; ladu; kuda; daki; dubu; fada; bola; tabu; bobo; sabi; daki; cadi; dadu; bate; debu; seda;

	bela; diba; suba
3rd set (10 cards)	dodi; noda; boba; ladu; labi; kuba; kodi; nadi; babi; suba
4th set (10 cards)	duka; midi; debu; bahu; rudi; daki; bela; fada; bobo; diba
5th set (20 cards)	buka; padi; dada; tabu; jeda**;** dubu; baba; judi; wade; didi; tadi; buda; badu; bidi; coba**;** widi; dudu; bola; rabu;

Table 1 presents the set of flashcards used in this research. The 1st set was used during sessions 1, 3, and 5; the 2nd set was used during sessions 2 and 4; the 3rd set was used to review progress after sessions 1, 3, and 5; the 4th set was used to review progress after sessions 2 and 4; and the 5th set was used for pre- and post-treatment measurements. The steps for administering the Direct Instruction Flashcard treatment were as follows: 1) The researcher placed the prompts in front of the subject; 2) The subject practiced reading 'b' and 'd' using the prompts; 3) The subject was asked to read the words on the flashcards; 4) If the subject read a word correctly, the researcher complimented her and placed the card at the back of the set; 5) If the subject read a word incorrectly, the researcher corrected her by demonstrating the correct pronunciation and asked her to try again; 6) Cards read incorrectly were placed three cards behind in the stack for repetition; 7) After all the cards had been read, the subject took a 5-minute break; 8) After the break, the subject was asked to review the card set. The reading practices were recorded using a voice recorder to ensure accuracy in documenting the process.
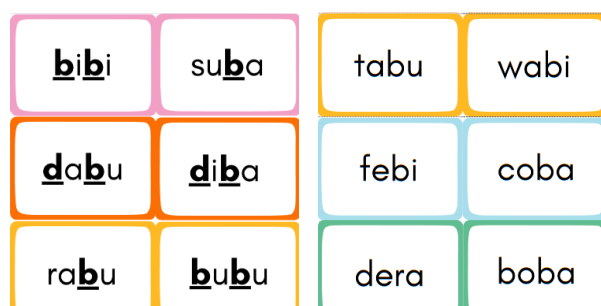

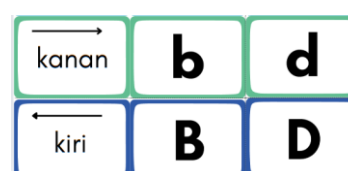
Figure 1. Example of Flashcard   **Figure 2. Prompts**

Figure 1 shows the example of Flashcards used in this research. The words for treatment were bold and underlined to emphasize the letter (Figure 1, left) meanwhile the words for review and pre/post-test were not bold or underlined (Figure 2, right). Figure 2 shows the prompts used in this research to assist the subject in reading 'b' and 'd' letters.

In order to analyze the data, pretest and posttest were conducted. The number of correct and incorrect words during the pretest and posttest sessions was recorded. This serves as the primary indicator of the subject's improvement in reading skills. Observations of the subject's performance during the treatment sessions were documented to provide qualitative insights into her learning process. The subject's progress was evaluated across the five sessions, with attention given to specific challenges (e.g., distinguishing 'b' and 'd') and strategies that improve performance. Mistakes were examined to identify and address consistent error patterns during practice sessions.

Results and Discussion

This research aimed to evaluate the effectiveness of Direct Instruction Flashcards in helping a slow learner distinguish between the letters 'b' and 'd'. Table 2 below shows the incorrect words read by the subject during pretest, intervention sessions, and posttest.

Table 2. Wrong Words Read

Session	List of Words
Pretest (7 out 20)	padi; baba; badu; coba; bidi; dudu; jeda.
1st review (4 out 10)	dodi; kuba; suba; kodi
2nd review (3 out 10)	bela; daki; duka
3rd review (3 out 10)	dodi; kuba; suba
4th review (2 out 10)	daki; duka
5th review (3 out 10)	dodi; ladu; nadi
Posttest (5 out 20)	jeda; dabu; bidi; febi; dubu

The treatment was conducted over five sessions, starting by conducting the pre-test on the first session and completing the last session with post-test. A pretest was given to the subject before carrying out the practice session. 13 words were read correctly meanwhile 7 others were read incorrectly. The first practice session then was conducted. In this session, the prompts were placed on the table and the researcher assisted her to practice distinguishing the letters by repeatedly teaching her the direction faced by the letter where the 'b' faced right, and 'd' faced left. After several attempts reading the flashcards, the researcher noticed that instead of trying to figure out how to read the letter, the subject relied on the prompts to ease her effort. As a result, the researcher removed the prompts from the table and explained to the subject that the practice would now be without prompts as if it was part of the activity. However, reading practice with prompts was still carried out at the beginning of each session as a refresher to assist her in distinguishing between the letter 'd' and 'b'.

The researcher also noticed that during reading practice sometimes she read the card so hurriedly leading to mistakes. For example, when she was reading the word 'dabu' incorrectly, the researcher pointed to the 'd' letter then the 'b' letter then asked, "What letter is it?" and she answered correctly. But when she was asked to read the word instead of saying 'dabu' she said 'badu' instead. Then the researcher directed her to read slowly and explained when reading too fast she might read it incorrectly again. After that feedback, she succeeded in reading the word 'dabu' correctly. From then on, the researcher occasionally reminded her to read slowly.

It was observed that oftenly the subject read 'dera' as 'bera'. The researcher initially used the same method applied to 'dabu' to help her recognize the mistake, but she continued to read it incorrectly. To address this, the researcher presented three cards simultaneously: dera,' along with correctly read words 'desi' and 'didi,' arranged vertically side by side. The researcher asked her to compare the letter 'd' in 'dera' with the same letter in 'desi' and 'didi.' She confirmed that all three were the same letter. After this exercise, she was able to read 'dera' correctly. To address this, the researcher placed both the 'kuda' and 'kuba' cards side by side while explaining that the words were different. After that, the researcher gave her

a brief pause without showing any cards. Then the researcher displayed both cards again. When asked to read the words, she successfully read both 'kuda' and 'kuba' correctly. For other words, she was able to read them correctly after being reminded to first identify the letters and to read the word slowly.
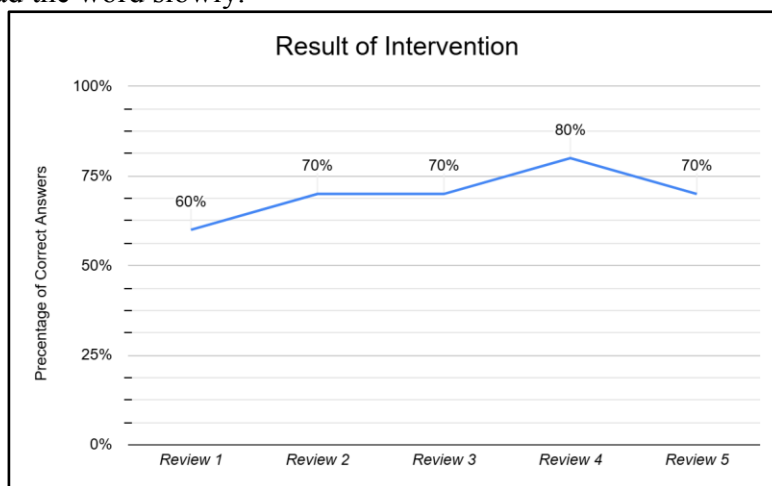

Figure 3. Result of Treatment

Figure 3 illustrates the results of each treatment session. Scores showed improvement between Review 1 and 2, as well as between Review 3 and 4, likely because the sessions were conducted on the same day, enabling the subject to better retain the letters. The scores were able to be maintained between Review 2 and 3 because there was no skipped day. However, the review scores declined when there was a one-day gap between practice sessions, suggesting that the absence of consistent practice contributed to the drop in performance.
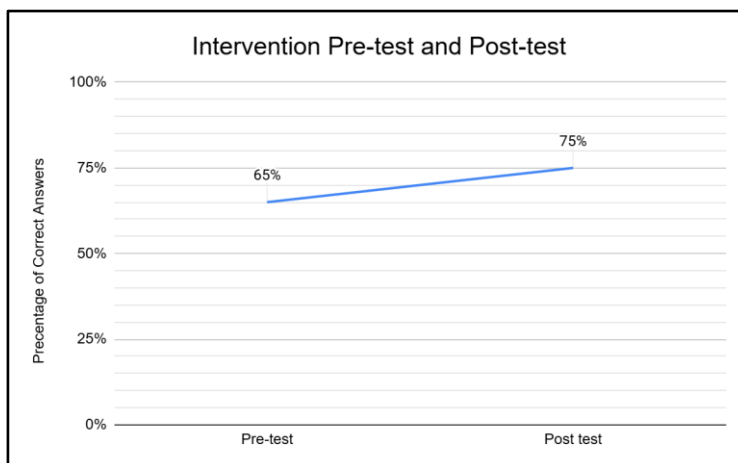

Figure 4. Result of Pretest and Posttest on the Treatment

After all the treatment sessions were completed, the researcher then conducted the posttest on the subject. 15 out of 20 words were read correctly, which means that she could read more words than the last time she got tested through pretest. Figure 4 shows the result of both pretest and posttest scores. It can be inferred that the treatment had a positive impact on the subject's ability to distinguish letters 'b' and 'd'. This is like previous studies that have proven that using flashcards can improve a student's ability in distinguishing 'b' and 'd' letter (Puradireja, 2022). The result of both pretest and posttest is shown on Figure 4.

Initially, the subject correctly read 13 words and incorrectly read 7. During the first practice session, prompts were placed on the table to help her distinguish between the letters 'b' and 'd'. However, she relied heavily on these prompts rather than attempting to recognize the letters independently. This showed that providing prompts hindered her learning process instead (Brown et al., 2009). However, the researcher did not remove the prompts entirely, hence the research emphasizes the reliance of slow learners on concrete objects and provides insights into transitioning them towards understanding abstract symbols. It bridges a gap between theoretical learning and practical application by showing how to gradually reduce reliance on prompts (Vasudevan, 2017; Pham & Hasson, 2014).

During subsequent practice sessions, the subject occasionally misread words due to hurried reading. For instance, she misread 'dabu' as 'badu.' After targeted feedback involving a breakdown of individual letters ('d' and 'b'), the subject successfully read 'dabu' correctly. This strategy of immediate corrective feedback, as employed here, has been shown to be an effective way to reinforce learning and correct errors in struggling readers (Skarr et al., 2014). It was also observed that the subject often read hastily, leading to mistakes. For instance, she misread 'dabu' as 'badu'. By guiding her to read slowly and identify each letter, she eventually read 'dabu' correctly. This approach was reinforced in subsequent sessions, as slower reading allowed her to process information more accurately, mitigating the effects of her limited working memory (Alloway, 2010; Pham & Hasson, 2014).

Another challenge arose when the subject misread 'kuba' as 'kuda' (the Indonesian word for horse). This error likely stemmed from her familiarity with the word 'kuda,' leading her to instinctively pronounce it without pausing to decode the letters in 'kuba.'. However, the researcher was able to correct the subject, showing the importance of differentiating similar stimuli in literacy instruction for slow learners, as familiarity with certain words can interfere with their decoding processes (Ehri, 2005).

Progress was noted in reviews conducted on the same day (Reviews 1 and 2, as well as Reviews 3 and 4) (refer to Figure 3), with scores improving due to the reduced gap between practice sessions. Conversely, a one-day gap between sessions led to a decline in review scores, emphasizing the subject's need for frequent and consistent practice to retain newly acquired skills. This finding is supported by Nugrahayati and Mustadi (2019), who highlight that slow learners require ongoing repetition to solidify learning. Additionally, the subject's difficulty in retaining verbal information further explains the stagnation or regression observed with longer gaps (Vasudevan, 2017).

After the completion of all treatment sessions, a posttest was administered. The subject correctly read 15 out of 20 words, an improvement from the 13 correct words of the pretest. This result demonstrates the effectiveness of the Direct Instruction (DI) Flashcards in improving her ability to distinguish between letters 'b' and 'd.' Similar positive outcomes have been reported in previous studies, where flashcard-based interventions significantly enhanced letter recognition and reading accuracy among students with learning difficulties (Fraher et al., 2019; Puradireja, 2022).

Conclusion

The research revealed that the Direct Instruction Flashcards method is effective in enhancing the reading ability of a slow-learning elementary student, particularly in distinguishing between the 'b' and 'd' letters. The findings highlighted the importance of frequent practice with minimal gaps between sessions, as the student's poor memory necessitated consistent repetition to retain learning. A single day without practice resulted in

noticeable regression. Alongside frequent practice, providing direct feedback played a crucial role in the student's progress. Awareness of correct answers gave her a sense of achievement, while recognizing her mistakes helped her focus on identifying the letters rather than guessing their sounds. Encouragement was also vital, as it motivated her to persist when she hesitated due to low self-esteem during reading sessions.

This research underscores the value of tailored interventions for students with learning difficulties, such as slow learners. Effective interventions rely on attentive observation from teachers or caregivers to understand the challenges faced by the student, timely feedback to enhance self-awareness, and consistent encouragement to boost motivation and engagement in practice.

Recommendation

The researcher provides several recommendations for teachers or caregivers working with slow learners to teach reading using flashcards. First, teachers and caregivers should consistently guide the student in practicing reading with flashcards. It is beneficial for the student to practice as often as possible, using varied word lists of similar difficulty. Second, for students with very limited vocabulary, pictures may need to be added to the flashcards to aid understanding. Third, it is crucial for teachers and caregivers to monitor the student's progress and provide guidance throughout the learning process. Direct feedback is essential, as it helps the student build self-confidence by receiving compliments for correct answers and understanding which words need improvement through constructive corrections. Fourth, teachers and caregivers should observe whether providing prompts motivates the student to learn better or causes them to overly depend on the prompts when reading. Some students may benefit from prompts during initial practices to build confidence in their reading abilities. Fifth, it is the responsibility of teachers and caregivers to ensure that the student remains motivated and confident by providing reassurance that learning is challenging and that making mistakes is acceptable. This is particularly important because slow learners often struggle with low self-confidence due to repeated failures in academic settings.

There are several recommendations suggested for future research. First, research might conduct a longitudinal research to explore how consistent practice over an extended period impacts reading skill retention and improvement. Second, researchers should consider involving students from various age groups, different learning disabilities, or backgrounds to assess the broader applicability of the method. Third, researchers can compare the effectiveness of Direct Instruction Flashcards with other teaching methods such as phonics, multisensory approaches, or by using digital tools. Fourth, it is also recommended to conduct a more controlled experimental design such as an ABAB design to strengthen the causal inferences of the method's effectiveness.

Acknowledgement

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