

## **The Effectiveness of Problem-Based Learning Assisted by Letter Card Media on Early Reading Literacy and Socio-Emotional Development of First-Grade Elementary School Students**

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**Abstract:** Early literacy and socio-emotional development are foundational competencies that influence students' readiness for future learning. This study aimed to analyze the effectiveness of the Problem Based Learning (PBL) model assisted by letter card media in improving early reading literacy and socio-emotional skills among first-grade primary school students. This research employed a quasi-experimental design using a Nonequivalent Control Group Design. The sample consisted of 40 students divided into an experimental class and a control class, each comprising 20 students. The experimental class received learning through PBL supported by letter card media, while the control class received conventional instruction. Data on early reading literacy were collected through written tests, and socio-emotional development was assessed through structured observation. Data were analyzed using normality tests, homogeneity tests, and Independent Sample t-Test. The results showed a significant increase in literacy scores in the experimental class, with mean scores rising from 59.75 to 83.50, while the control class showed only a slight increase from 73.25 to 74.25. Socio-emotional scores also improved more substantially in the experimental class. Statistical testing indicated a significant difference between the two groups (Sig = 0.003). These findings demonstrate that PBL assisted by letter card media is effective in enhancing both early literacy and socio-emotional development.

**Keywords:** problem based learning; letter card media; early literacy; socio-emotional development; primary education; inclusion.

### **INTRODUCTION**

Primary education holds a strategic role in shaping students' academic abilities and character development. At the elementary school level, particularly in first grade, the mastery of early reading literacy and socio-emotional development forms a crucial foundation for readiness to learn at subsequent levels. Early reading literacy is not only related to the ability to recognize letters and produce sounds, but also involves the process of understanding and using information within social and academic contexts. A classroom environment enriched with literacy stimulation has been shown to improve students' early reading abilities and learning motivation (Sinaga, Dhieni, & Sumadi, 2022; Wardani & Astuti, 2022). In addition, literacy practices that are connected to students' real-life experiences can strengthen meaning internalization, accelerate word comprehension, and enhance active participation in learning activities (Maronta, Sutarto, & Isdaryanti, 2023; Parera, Iriani, & Waruwu, 2024).

However, Indonesian students' reading literacy outcomes remain a significant challenge. The PISA 2022 results place Indonesia's reading literacy in a low category compared to many other countries, indicating that the literacy learning process in schools has not yet achieved optimal effectiveness (OECD, 2023). At the same time, socio-emotional development also plays an essential role in learning success, as early-grade students are in a transitional period toward a more formal learning environment and therefore require guidance in managing emotions, building self-confidence, and establishing healthy social relationships. Learning that supports interaction, open communication, and collaboration has been proven to strengthen socio-emotional development in students (Wigelsworth, Verity, Mason, Qualter, & Humphrey, 2022; Cipriano et al., 2023). In inclusive learning

environments, these socio-emotional skills become even more critical because young learners especially those at risk of developmental delays or with mild disabilities often require greater support in emotional regulation, peer interaction, and classroom adjustment.

To address these challenges, Problem Based Learning (PBL) is a relevant instructional model to apply. PBL positions learners as active participants who learn through collaboratively solving authentic problems. This model has been shown to improve critical thinking, problem-solving abilities, and learning autonomy (Manuaba, No, & Wu, 2022; Xu, Wang, & Wang, 2023). Recent meta-analytic evidence also shows that PBL consistently contributes positively to learning outcomes and student engagement in the learning process (Chen et al., 2024). Therefore, applying PBL in early-grade classrooms can create learning experiences that are meaningful, exploratory, and interactive. From an inclusive education perspective, PBL is particularly beneficial because its collaborative nature supports peer-assisted learning, flexible participation, and differentiated pathways that allow students with diverse abilities to contribute according to their strengths.

The success of implementing an instructional model is also strongly influenced by the selection of appropriate media. Letter card media is a concrete visual tool that helps students recognize letter symbols and phoneme-grapheme relationships in a clear and enjoyable manner. Structured use of letter cards has been shown to strengthen visual and phonological memory, thereby developing early reading ability (Maronta, Sutarto, & Isdaryanti, 2023). Furthermore, the use of letter cards in group activities can promote emotional engagement and social interaction among students (Parera, Iriani, & Waruwu, 2024). Letter cards also function as accessible and low-cost literacy supports that benefit not only typically developing children but also those with learning barriers, limited phonological awareness, or early signs of reading delay thereby aligning with inclusive education principles emphasizing universal access to foundational literacy.

Reading literacy develops through the gradual strengthening of vocabulary, pronunciation, and language structure comprehension. Structured early literacy interventions have been shown to significantly improve long-term reading comprehension (Kim & Quinn, 2021; Cabell & Hwang, 2020). The integration of literacy activities with collaborative learning encourages students to construct meaning through interaction and dialogue (Gillies, 2020; McTigue, Solheim, Zimmer, & Uppstad, 2021). In addition, socio-emotional development through interpersonal communication contributes importantly to learning readiness and academic well-being (Jones et al., 2021; Sheridan & Williams, 2022). Socio-emotional interventions have also been demonstrated to increase learning motivation and reading outcomes (Owens & Tanner, 2023; García & Cain, 2024). Problem-based learning involving investigation and collaborative discussion is effective in improving critical thinking and conceptual understanding among elementary school students (Lin & Tsai, 2021; Chen et al., 2024). However, socio-emotional competencies may manifest differently among learners with disabilities such as challenges in behavioral regulation, social reciprocity, or communication making it essential for literacy instruction to adopt approaches that are responsive to diverse developmental needs.

Although numerous studies have demonstrated the effectiveness of PBL in enhancing critical thinking and learning engagement, most of these studies have not specifically integrated PBL with letter card media to simultaneously improve early reading literacy and socio-emotional development. Some research focuses only on literacy outcomes, while others focus solely on socio-emotional aspects without linking them to early literacy skills. Furthermore, little attention has been given to how this instructional combination may support learners with diverse abilities, including those at risk of reading delays or socio-emotional difficulties in inclusive classrooms. Therefore, research that applies PBL assisted

by letter card media as a unified approach to strengthen both aspects simultaneously remains limited and requires further investigation.

The novelty of this study lies in the application of the PBL model assisted by letter card media as a strategy that integrates the development of early reading literacy and socio-emotional skills in first-grade elementary learners. This approach not only optimizes early reading processes through visual and phonological stimulation, but also promotes collaboration, social interaction, and students' confidence through group-based problem-solving activities. In addition, the study contributes to inclusive education scholarship by offering an instructional model that is accessible, low-barrier, and supportive of diverse learners' participation responding to current gaps in research that rarely combine early literacy, socio-emotional growth, and inclusive pedagogical principles. Accordingly, this study offers an integrative pedagogical approach that has not been widely implemented in previous research.

## METHOD

This study employed a quantitative approach, as the data collected were numerical and statistically analyzed to examine the effectiveness of the treatment on the research variables. A quantitative approach is appropriate when the researcher intends to assess the influence of a particular instructional model objectively and in a measurable manner (Creswell & Creswell, 2018). Arikunto (2019) explains that quantitative research emphasizes systematic data collection and processing in order to produce conclusions that can be generalized. However, given the small sample size and limited school context, the generalizability of findings should be interpreted cautiously.

The type of research used was a quasi-experimental design with a Nonequivalent Control Group Design, because the experimental and control groups were determined based on pre-existing classroom groups. This design is commonly used in educational research in school settings, as researchers typically do not have the authority to randomly assign students into different classes (Campbell & Stanley, 2019). Furthermore, this design is recommended for studies aiming to examine the effectiveness of a learning model in real classroom contexts (Furtak & Penuel, 2020; Schneider & Preckel, 2023). The research design is presented in Table 1. In addition, this design allowed the researchers to observe learning processes as they naturally occur in inclusive classroom settings, although the composition of learner diversity is explicitly clarified in subsequent sections.

**Table 1. Nonequivalent Control Group Research Design**

| Group        | Pretest | Treatment                         | Posttest |
|--------------|---------|-----------------------------------|----------|
| Experimental | O1      | PBL assisted by letter card media | O2       |
| Control      | O3      | Conventional instruction          | O4       |

The Problem Based Learning (PBL) model was implemented in the experimental class because it encourages students to actively construct knowledge through collaborative problem-solving involving authentic tasks. Theoretically, PBL supports the development of critical thinking, collaboration, and communication skills (Savery, 2021; Loyens, Jones, Mikkers, & van Gog, 2021). The application of PBL also aligns with 21st-century learning demands that emphasize learner autonomy and cooperative skills (Loes & Pascarella, 2022). To ensure accessibility in learning, PBL activities were structured to allow flexible participation, simplified instructions, and peer-assisted collaboration strategies that support learners with varied ability levels, including those potentially at risk of reading and socio-emotional delays.

The population of this study consisted of all first-grade students at SD Negeri Bandung 01 and SD Negeri Bandung 02 in Pecalongan District. The sample consisted of 40 students, with 20 students assigned to the experimental class and 20 students assigned to the control class. The sampling technique used was cluster sampling, in which samples are drawn based on pre-existing classroom groups (Arikunto, 2019). Although the two schools operate under general education settings, the researchers confirmed that both classrooms included students with diverse learning characteristics; however, no students with formally diagnosed disabilities were identified by the schools during the research period. Accommodations such as simplified instructions, visual demonstrations, paired activities, and additional verbal support were provided to ensure that the intervention remained accessible for students with mild learning difficulties or developmental delays.

The research instruments consisted of several components. First, an early reading literacy test was used to measure the ability to recognize letters, produce letter sounds, combine syllables, and comprehend simple words. The development of this test referred to the principles of grapheme phoneme correspondence in early literacy development (Vaughn & Linan-Thompson, 2023; Kim & Quinn, 2021). The content validity of the instrument was examined through expert judgment and analyzed using Aiken's *V*. Second, a socio-emotional observation sheet was used to assess indicators such as cooperation skills, empathy, social initiative, and emotional regulation. Observation was selected as the measurement technique because it captures students' social behaviors in their authentic learning environment (König & Freitag, 2023). Third, letter card media served as the instructional support to help students connect letter symbols with phonemic sounds through visual and phonological approaches. This medium has been shown to be effective in improving phonological awareness and early reading skills (Correia & Marques, 2022; Rahman, Setiawan, & Rukmini, 2024). Fourth, the reliability of the research instruments was tested using Cronbach's Alpha, where  $\alpha \geq 0.70$  indicates that the instrument has good internal consistency (Ghozali, 2018). All instruments were reviewed to ensure that the tasks, language, and visual formats remained accessible for early-grade learners with varied cognitive and socio-emotional profiles, reflecting an inclusive approach to assessment.

Data analysis proceeded in several steps. First, the Shapiro Wilk normality test was conducted to determine whether the data were normally distributed. Second, a homogeneity of variance test was performed to ensure that the variances of the experimental and control groups were equivalent. Third, an Independent Sample t-Test was conducted to examine differences in early reading literacy outcomes and socio-emotional development between the two groups after the treatment. Additionally, Effect Size (Cohen's *d*) was calculated to determine the magnitude of the practical effect of the instructional model. This comparative analytical model is recommended for intervention evaluation research in education (Schneider & Preckel, 2023). Given the limited sample size and contextual focus on two schools, the interpretation of effect sizes and statistical outcomes should consider these external validity constraints, particularly when generalizing to broader or more diverse inclusive education contexts.

## **FINDING AND DISCUSSION**

### **Finding(s)**

This study was conducted to determine the effectiveness of the Problem Based Learning (PBL) model assisted by letter card media on early reading literacy and socio-emotional development of first-grade elementary school students. The experimental class received instruction using PBL supported by letter card media, while the control class received conventional instruction. Measurements were carried out through a pretest, posttest,

and socio-emotional observation during the learning process. The results of the study are presented as follows. In alignment with inclusive education perspectives, the analysis also considers how students with lower initial skills benefited from the intervention.

### ***Early Reading Literacy in the Experimental Class***

Before the treatment was administered, students in the experimental class demonstrated early reading literacy at a low level. After the implementation of PBL assisted by letter card media, their early reading literacy ability showed a meaningful improvement. The mean score, minimum score, and maximum score before and after the treatment are shown in Table 2.

**Table 2. Pretest and Posttest Scores of Early Reading Literacy in the Experimental Class**

| <b>Statistic</b> | <b>Pretest</b>   | <b>Posttest</b>    |
|------------------|------------------|--------------------|
| Mean             | 59.75            | 83.50              |
| Minimum Score    | 35               | 70                 |
| Maximum Score    | 85               | 95                 |
| Mastery (%)      | 25% (5 students) | 100% (20 students) |

Table 2 shows an increase of 23.75 points in the mean score, with mastery improving from 25% to 100%. This indicates that the use of PBL assisted by letter card media can significantly improve early reading literacy in first-grade students. Notably, students with the lowest initial pretest scores (35–45 range) showed the largest individual gains, suggesting that the intervention was particularly supportive for early readers who may be at risk of learning delays.

### ***Early Reading Literacy in the Control Class***

The control class received conventional learning, which commonly emphasizes teacher-centered instruction such as lecturing, question-and-answer sessions, and worksheet practice without the use of manipulative media or problem-solving strategies. This type of instruction tends to position students as passive recipients of information, which slows the internalization of initial reading skills. To measure student progress, a pretest and posttest were administered. The results are shown in Table 3.

**Table 3. Pretest and Posttest Scores of Early Reading Literacy in the Control Class**

| <b>Statistic</b> | <b>Pretest</b>    | <b>Posttest</b>   |
|------------------|-------------------|-------------------|
| Mean             | 73.25             | 74.25             |
| Minimum Score    | 60                | 65                |
| Maximum Score    | 90                | 90                |
| Mastery (%)      | 70% (14 students) | 75% (15 students) |

After conventional instruction was given, the improvement in the control class was minimal only a 1.00 point increase in the mean score and a 5% increase in mastery. This suggests that conventional methods provided limited reinforcement for reading skills, particularly for students with initially low reading proficiency. Unlike the experimental group, students in the lowest scoring subgroup showed almost no progress, highlighting potential inequities in traditional instruction for learners with emerging or struggling literacy skills.

### Comparison of Improvement Between Experimental and Control Classes

To evaluate the effectiveness of the treatment comprehensively, the increase in mean scores between both classes was compared directly. This comparison is essential to ensure that the improvement observed in the experimental class was due to the intervention and not merely natural learning development. The results are shown in Table 4.

**Table 4. Comparison of Early Reading Literacy Score Improvement**

| Class        | Mean Pretest | Mean Posttest | Increase |
|--------------|--------------|---------------|----------|
| Experimental | 59.75        | 83.50         | +23.75   |
| Control      | 73.25        | 74.25         | +1.00    |

The improvement in the experimental class (23.75 points) is substantially greater than that of the control class (1.00 point), indicating that the increase was directly influenced by the implementation of PBL assisted by letter card media. Thus, this model is more effective for enhancing early reading literacy in elementary students. This contrast reinforces that the intervention not only boosted overall performance but also reduced achievement gaps between higher-performing and lower-performing learners, supporting principles of equitable and inclusive literacy instruction.

### Socio-Emotional Observation Results

In addition to reading literacy outcomes, this study also assessed socio-emotional development, as early childhood education emphasizes both cognitive and affective domains. PBL encourages students to collaborate, express ideas, respect peer perspectives, and make group decisions, providing opportunities to develop empathy, self-regulation, communication, and social responsibility. The comparison results are shown in Table 5.

**Table 5. Comparison of Socio-Emotional Observation Scores**

| Class        | Total Score (High Category) | Interpretation |
|--------------|-----------------------------|----------------|
| Experimental | 106 points                  | Very Good      |
| Control      | 92 points                   | Good           |

The table 5 indicates that the experimental class demonstrated higher socio-emotional development than the control class. This signifies that problem-based and collaborative learning naturally facilitates socio-emotional growth alongside academic learning. Observation notes also showed that students who initially exhibited lower participation or weaker emotional regulation became more engaged during group tasks, indicating that the collaborative structure of PBL provided a supportive environment for diverse learners.

### Inferential Statistical Test (Independent Sample t-Test)

To confirm whether the differences observed between the two groups were statistically significant, an Independent Sample t-Test was conducted.

**Table 6. Independent Sample t-Test Results**

| Group Comparison        | Sig. (2-tailed) | Decision                | Conclusion             |
|-------------------------|-----------------|-------------------------|------------------------|
| Experimental vs Control | 0.003           | H <sub>0</sub> Rejected | Significant Difference |

A significance value of  $0.003 < 0.05$  indicates that there is a statistically significant difference between the reading literacy outcomes of the experimental and control classes. Thus, PBL assisted by letter card media is statistically proven to be effective in improving early reading literacy among first-grade students. Given that students with initially lower pretest scores in the experimental group showed the greatest gains, the intervention

demonstrates strong potential for supporting equity in early literacy outcomes, particularly for learners who may be at risk of or experiencing early learning difficulties.

## **Discussion**

The findings of this study show that the implementation of Problem Based Learning (PBL) assisted by letter card media resulted in a significant improvement in early reading literacy skills and socio-emotional development of first-grade elementary school students. This increase was reflected in the changes in mean scores and mastery percentages, which rose substantially in the experimental class compared to the control class. This condition indicates that a learning approach that allows students to construct meaning through direct learning experiences and collaborative activities is more effective than traditional teacher-centered instruction. These findings are consistent with previous studies showing that PBL can enhance student activity, motivation, and learning outcomes in elementary school (Novianti, Bentri, & Zikri, 2020), and is effective when applied in integrated thematic learning in lower grades (Masliah, Nirmala, & Sugilar, 2023). Moreover, the stronger learning gains among students with lower initial scores suggest that the intervention supports equity in learning an important dimension in inclusive education.

Theoretically, PBL positions learners as active subjects who engage in problem identification, information exploration, group discussion, and conclusion drawing. Such a learning structure directly fosters intensive mental engagement because students are not merely receiving information, but are processing, clarifying, and linking it to real learning experiences. This aligns with the view that PBL enhances higher-order thinking skills and conceptual understanding (Afni, 2020). In addition, involvement in collaborative problem-solving strengthens learning motivation through students' sense of responsibility for completing shared tasks (Prasetyo, 2022). Therefore, PBL does not merely facilitate the transfer of knowledge, but also builds learner autonomy through meaningful learning experiences (Zulfa, Tursinawati, & Darnius, 2023). In inclusive education perspectives, the collaborative nature of PBL also enables peer scaffolding, providing natural academic and social support for students who may experience learning delays or require additional assistance.

Furthermore, the implementation of PBL in early reading instruction effectively supports literacy development because it provides opportunities for students to identify, test, and use letter symbols in functional contexts. Active interaction in small groups makes the process of conveying ideas, explaining letter sounds, and pronouncing words more communicative. This supports previous research indicating that PBL positively affects the development of critical thinking skills among elementary students (Rahmawati & Airlanda, 2023). From an inclusive pedagogy standpoint, PBL encourages differentiated participation: students can contribute through verbal explanation, manipulation of letter cards, or social interaction, allowing multiple modes of engagement consistent with Universal Design for Learning (UDL).

The success of improving early reading literacy skills was also influenced by the use of letter card media. This media strengthens the connection between letters and sounds through a multisensory approach visual, auditory, and kinesthetic. Kurnia & Apriliya (2022) emphasize that early reading instruction should be supported by concrete media that help students visualize letter symbols. The use of letter cards also supports phonological pattern formation, making it easier for students to combine letters into syllables and words (Rahayu & Wardhani, 2023). Additionally, learning becomes more enjoyable and engaging because the activities resemble playful experiences (Kholifah, 2022). When students enjoy the

learning process, meaning-making becomes stronger and longer lasting in memory. This aligns with research showing that illustrated syllable card media effectively improve early reading abilities (Pratama, Suzanti, & Widjayatri, 2024). From an accessibility perspective, letter card media can be adapted for students with different needs (e.g., enlarged print for low-vision learners, textured surfaces for tactile support, picture cues for students with language delays), making this approach compatible with inclusive and UDL-based literacy instruction.

From the socio-emotional perspective, problem-based learning provides broad opportunities for students to interact, communicate, and collaborate in group tasks. During discussions, students learn to listen, respect others' opinions, and express their ideas politely. Such learning conditions help students develop empathy, cooperation, and confidence. Sriyatno (2020) states that collaborative learning in PBL can enhance students' social interaction skills. Moreover, patterns of social interaction in cooperative learning environments contribute to developing mutual respect and shared responsibility (Handayani & Koeswanti, 2021). In inclusive settings, these interactions are crucial because peer collaboration is one of the strongest predictors of social participation for children with disabilities, enabling them to engage meaningfully in classroom communities.

This study also supports the view that socio-emotional competence is linked to literacy development. Emotional stability enables students to focus, receive feedback, and participate more actively in reading activities. Mubarok, Sudana, & Nurhuda (2023) found that peer interaction support can strengthen students' confidence in learning to read. Therefore, improvements in socio-emotional development are not only essential for personal growth, but also directly impact academic performance, including early reading literacy. For diverse learners, including those with speech, behavioral, or learning challenges, improved socio-emotional readiness can reduce barriers to early literacy acquisition by fostering confidence, persistence, and engagement.

The Independent Sample t-Test result showed a significance value of  $Sig = 0.003$ , indicating a statistically significant difference between the experimental and control groups after the treatment. This aligns with research by Rahmawati & Suwandi (2022), which demonstrated that PBL has a significant impact on improving learning outcomes in elementary mathematics. This means that the application of PBL is not only qualitatively beneficial in learning processes but also quantitatively measurable in improving learning outcomes. In addition, the deeper gains among initially lower-performing students demonstrate that the intervention contributes to reducing achievement gaps, a central concern in inclusive and equitable education frameworks.

In conclusion, the implementation of PBL assisted by letter card media is an effective and relevant instructional approach to improve early reading literacy and socio-emotional development in lower-grade students. The primary strength of this approach lies in its ability to integrate cognitive, affective, and social-communicative dimensions within a single learning process. More importantly, the findings reveal that PBL with manipulable, multimodal letter card media aligns with inclusive pedagogy principles by offering multiple ways of engagement, expression, and representation key components of UDL. This suggests that the approach has strong potential not only for mainstream learners but also for children with diverse learning needs, including those at risk of reading delays or with mild learning difficulties.

## **CONCLUSION**

This study demonstrates that the implementation of Problem Based Learning (PBL) assisted by letter card media is effective in improving early reading literacy skills and socio-emotional development among first-grade elementary school students. The use of PBL provides students with opportunities to actively engage in problem-solving, discussion, and group collaboration, thereby making the learning process more meaningful, collaborative, and learner-centered. The interactive and collaborative nature of PBL also aligns with inclusive learning principles by offering varied opportunities for participation among students with different learning profiles.

The improvement in early reading literacy is evident from the significant increase in the mean scores and learning mastery in the experimental class, which were considerably higher than those in the control class. The letter card media played an important role in strengthening the grapheme–phoneme relationship and facilitated students' ability to recognize letters, combine syllables, and gradually read simple words in a structured and systematic manner. This indicates that the use of concrete media aligned with the cognitive development of early learners has a positive impact on the enhancement of early reading skills. Additionally, the manipulable nature of letter card media allows for adaptations such as enlarged print, tactile textures, or picture cues, supporting accessibility for students with low vision, language delays, or early learning difficulties.

Moreover, the application of PBL also contributed positively to students' socio-emotional development. Interaction within learning groups encouraged the formation of mutual respect, cooperation, empathy, and confidence in expressing opinions. The open and collaborative learning activities helped students develop social skills, self-regulation, confidence, and a sense of responsibility both in learning contexts and in daily social interactions. In inclusive classroom settings, these peer-interaction opportunities are particularly valuable because they promote social participation for diverse learners, including those who may experience challenges in communication or social engagement.

The novelty of this research lies in the integration of PBL with letter card media as a unified strategy to simultaneously enhance two developmental domains: early reading literacy and socio-emotional skills. This approach has not been widely examined in the context of lower grade elementary students, particularly within thematic learning that emphasizes direct and collaborative experiences. Therefore, this study provides a new contribution in the form of an integrative and applicable instructional model for early primary education. Its contribution is especially relevant for inclusive pedagogical design, as the model supports multiple modes of engagement (UDL), encourages peer scaffolding, and reduces barriers to participation for learners with varied needs.

However, this study has limitations in terms of research context, as it was conducted in a single school area with a limited sample size, which restricts the generalizability of the findings. Additionally, the short duration of the study did not allow observation of the long-term effects on the sustainability of reading skills and socio-emotional development. Another limitation is the lack of detailed identification of students with disabilities or learning difficulties, which restricts conclusions about the specific effectiveness of the intervention for diverse learner profiles. Future research is recommended to involve a larger number of schools, diverse student characteristics, and longer learning periods to obtain a more comprehensive understanding of developmental progress. Future studies should also examine how PBL assisted by letter card media can be adapted for children with disabilities, such as those with hearing impairments, dyslexia, or attention difficulties, and whether

differentiated or UDL-based modifications improve accessibility and instructional impact in inclusive classrooms.

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