The Effectiveness of Plasticine Media in Enhancing Fine Motor Skills in Children with Intellectual Disabilities: A Systematic Literature Review

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Abstract

This study aims to evaluate the effectiveness of plasticine media in improving fine motor skills in children with intellectual disabilities through a Systematic Literature Review (SLR). Children with intellectual disabilities often experience limitations in fine motor abilities, which affect daily tasks such as writing, grasping small objects, buttoning clothes, and putting on shoes. The SLR was conducted by systematically collecting and analyzing research articles published between 2020 and 2024 from reputable databases such as Google Scholar and ResearchGate. The inclusion criteria focused on studies that implemented plasticine-based interventions to enhance fine motor skills in children with intellectual disabilities. From an initial pool of studies, five articles met the established criteria and were analyzed using a qualitative synthesis approach to identify recurring themes and consistent findings. The review results indicate that the use of plasticine media consistently improves fine motor skills, particularly finger strength, hand–eye coordination, and finger flexibility. Overall, the synthesis of evidence demonstrates that plasticine is an effective, engaging, and accessible medium to support the development of fine motor abilities in children with intellectual disabilities.

Keywords: Children with intellectual disabilities, Fine motor skills, Plasticine media

Introduction

Children with special needs are integral members of society who deserve equal access to education. As emphasized by Maulidiyah (2020), education should be inclusive and accessible to all individuals, regardless of their physical or cognitive conditions. In practice, the education of students with special needs requires teaching methods and learning media that are tailored to the specific challenges they face (Adiatama et al., 2023; Hakiki et al., 2023). Inclusive education plays a vital role in ensuring that children with disabilities receive equitable learning opportunities within a supportive environment. Research suggests that inclusive educational practices contribute positively to the social, emotional, and academic development of children with special needs (Starynska et al., 2023).

Teachers serve as key facilitators in implementing inclusive education. Their capacity to adapt teaching strategies to accommodate diverse learning needs depends on adequate professional training and access to appropriate resources (Haris & Cahyadi, 2021). For example, adaptive physical education

programs have demonstrated potential in supporting the engagement of students with special needs; however, their success relies on teachers' specialized knowledge and pedagogical skills (Hakiki et al., 2023).

Children with special needs encompass various categories based on distinct characteristics and developmental challenges, one of which is intellectual disability. Individuals with intellectual disabilities experience cognitive limitations that affect their capacity to learn, think logically, and perform daily tasks. Hafid et al. (2023) describe intellectual disability as a condition characterized by below-average intelligence, which impacts mental, emotional, social, and physical development, thereby hindering environmental adaptation. These limitations also influence fine motor abilities (Adiatama et al., 2023), emphasizing the necessity for specific educational strategies that address both cognitive and motor domains.

In addition to academic development, fostering adaptive behavior and functional independence is essential for individuals with intellectual disabilities. Research indicates that promoting social participation and independence enhances their overall well-being and integration into society (Emerson et al., 2014). The transition from school to employment or independent living presents additional challenges, which require structured planning, workplace support, and individualized guidance (Joyce et al., 2024). Therefore, educational programs should not only focus on academic instruction but also equip students with practical and adaptive skills necessary for independent living.

For children with special needs, two primary domains of independence are crucial: (1) academic and communication skills—such as reading, writing, and verbal interaction—and (2) adaptive behavior skills, including self-care and social adjustment. Difficulties in writing, gripping objects, or performing everyday tasks are common among children with intellectual disabilities due to limitations in fine motor skills (Mursusilowati, 2023). Motor development involves the coordination of the nervous system, muscles, and brain, encompassing both gross and fine motor functions that influence cognitive, social, emotional, and physical growth (Madden, 2021). Fine motor movements, which require small muscle coordination in the hands and fingers, are essential for performing precise actions such as holding a pencil, buttoning clothes, or tying shoelaces (Adiatama et al., 2023).

Given the importance of fine motor development, particularly for children with intellectual disabilities, effective interventions are needed to enhance these abilities. Learning media can facilitate the development of motor, cognitive, and emotional capacities through engaging and interactive activities (Rahida et al., 2023). Among the various media used, modeling clay—or playdough—has gained attention as an effective tool to improve fine motor coordination. Studies have identified its potential to promote hand–eye coordination, grip strength, and finger dexterity in enjoyable and child-centered ways (Musviro et al., 2023; Li et al., 2025).

The use of modeling clay as a learning medium aligns with developmental theories emphasizing the value of play-based and multisensory learning experiences (Suryadi et al., 2023). Manipulative play, such as playdough activities, provides tactile stimulation that supports both fine motor and cognitive development (Hadžimehmedović et al., 2023; Salehian et al., 2023). Furthermore, integrating fine motor activities into educational programs can enhance children's readiness for academic and daily living tasks, while fostering greater independence (Darizal et al., 2023).

Overall, prior studies underscore the significance of using modeling clay as a learning and therapeutic tool for children with intellectual disabilities. Its hands-on and adaptive nature allows educators to tailor activities to each child's developmental level, ensuring inclusivity and engagement (Kavanagh et al., 2023). Thus, examining the effectiveness of modeling clay as a medium to enhance fine motor skills among children with intellectual disabilities is a relevant and necessary step in advancing inclusive education and special needs pedagogy.

Method

In this study, the Systematic Literature Review (SLR) method was employed to systematically identify, evaluate, and interpret existing research related to the use of plasticine in improving fine motor skills among students with intellectual disabilities. The review process consisted of several stages, including data identification, screening, eligibility assessment, and inclusion based on predetermined criteria. Data were obtained from the Google Scholar database, which provides extensive access to scholarly articles relevant to the research topic. The inclusion criteria applied in this review were as follows: (a) participants in the studies were students with intellectual disabilities; (b) the research focused on fine motor skills in students with intellectual disabilities; (c) plasticine or playdough was used as a medium to enhance fine motor skills; (d) the outcomes measured were related to the effectiveness of plasticine media on fine motor skill development; and (e) the studies were published between 2020 and 2024. After identifying relevant literature, each selected study was organized into a data extraction table that included the research title, author(s), publication year, and key findings. During the identification stage, 94 references were initially found using the keywords *"intellectual disability," "plasticine,"* and *"fine motor skills."* Following the screening and eligibility assessment, only five articles met all inclusion criteria and were analyzed in this review.

This study acknowledges several limitations that should be considered when interpreting the findings. The inclusion of only five articles published between 2020 and 2024 limits the scope of the data and may not fully represent the broader body of research. Variations in research design, intervention duration, and measurement methods across the analyzed studies may affect result consistency and reduce the generalizability of the findings. Moreover, most of the reviewed studies focused on short-term outcomes, leaving the long-term effects of plasticine-based interventions on fine motor development insufficiently explored. The literature search was also limited to the Google Scholar database, which may have excluded relevant studies from other academic repositories. Therefore, future research is recommended to expand the literature sources, include a larger number of studies, and employ longitudinal designs to enhance the validity of the findings and provide a more comprehensive understanding of the effectiveness of plasticine media in improving fine motor skills among children with intellectual disabilities.

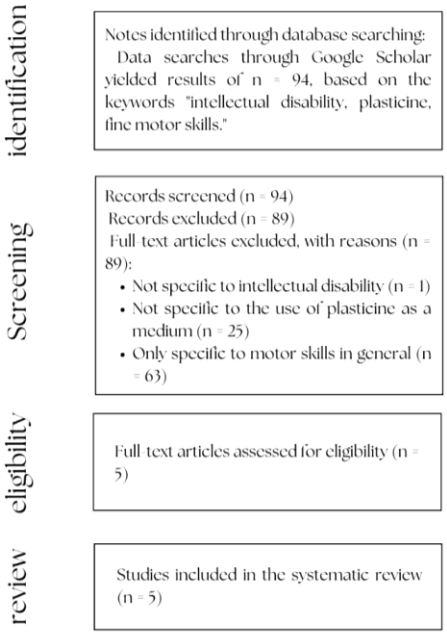

Figure 1. PRISMA Flowchart

Result

After conducting an in-depth literature review, five articles were found to meet the criteria for further analysis. The five articles to be reviewed in more detail are as follows:

Table 1. Analysis Result

Title	Author	Year	Method
The Application of Plasticine Media in Improving the Fine Motor Skills of Children with Intellectual Disabilities at SLB Tunas Harapan I Tembelang	Anisah Nur Kamila dan Nur Iffah	2022	Classroom Action Research
Improving Fine Motor Skills Through the Use of Plasticine in Third Grade Students with Intellectual Disabilities at SLBN 1 Baubau	H.Syamsudin, Endah Budy Mursusilowati, Triyanto Pristiwaloyo	2023	Descriptive Quantitative
The Effect of Plasticine Media in Improving the Fine Motor Ability of Children	Takhmidah Rahida, Imam Yuwono, Hayatun Thaibah	2023	Quantitative with Single Subject Research (SSR)
Improving Fine Motor Skills Through Plasticine Media in Fifth Grade Children with Intellectual Disabilities at SLBN Prof. Dr. Sri Soedewi MS, S.H. Jambi	Helda Desmayati, Grahita Kusumastuti	2024	Classroom Action Research (CAR)
Improving Fine Motor Skills of Children with Mild Intellectual Disabilities Through Plasticine Play Media	Hurriyati, Dwi, and Roro Ajeng Puspaningrum Putri Agung	2022	The research method uses qualitative analysis involving observation and measurement before and after using plasticine

The conclusion of the study by Kamila & Iffah (2022) indicates that there was an improvement in the fine motor skills of students with intellectual disabilities at SLB Tunas Harapan I Tembelang through the implementation of plasticine media. This study was conducted in two cycles, each of which showed better results compared to the pre-cycle stage. In the pre-cycle, the average fine motor skill of students in connecting lines was 55.1% and in throwing a ball was 31.8%, which fall into the categories of "fair" and "poor."

However, after the application of plasticine media, in Cycle I, students' fine motor skills improved to 63.6% for connecting lines and 59% for throwing a ball, with an increase in the percentage of students achieving mastery. In Cycle II, the improvement became more significant, with the average ability to connect lines reaching 73.3% and throwing a ball reaching 93.3%. The percentage of students achieving mastery also increased drastically, from 53.3% in Cycle I to 93.3% in Cycle II for the line-connecting test, and from 80% to 100% for the ball-throwing test.

This demonstrates that plasticine media is effective in improving the fine motor skills of students with intellectual disabilities. The authors also suggest that schools use longer observation periods, select varied models or methods appropriate to each child's characteristics, and conduct remedial classes to support a more effective learning process in the future

The study by Mursusilowati (2023) demonstrates that the use of plasticine significantly enhances the fine motor skills of third-grade students with intellectual disabilities at SLBN 1 Baubau. Prior to the use of plasticine, the students' fine motor skills were in the "very poor" category, indicating an urgent need for intervention in developing their motor abilities. After the implementation of a learning method using plasticine, the results showed that the students' fine motor skills improved to the "good" category, indicating the effectiveness of this method.

The focus of this research on fine motor components such as finger strength, hand-eye coordination, and finger flexibility proved to be relevant. Activities involving molding, cutting, and rolling plasticine not only improved fine motor skills but also supported the cognitive and social development of the students. Therefore, the use of plasticine as a learning tool can serve as a beneficial method for teachers in teaching fine motor skills to children with special needs. Overall, the findings of this study contribute significantly to the development of special education, particularly in improving the fine motor skills of students with intellectual disabilities. The study also recommends that similar methods be more widely implemented in educational contexts for children with special needs to support their optimal development.

The study by Rahida et al. (2023) shows that intervention using plasticine media significantly improves fine motor skills in children with intellectual disabilities. Using a Single Subject Research (SSR) design with an A1-B-A2 phase structure, observational results indicated a substantial increase from the baseline phase 1 (A1) to the intervention phase (B), where the subject's fine motor skill scores increased from 57%–63% in A1 to 70%–77% in B. Furthermore, in baseline phase 2 (A2), the subject's fine motor skills reached a mean level of 94.25%, indicating that the intervention was not only effective during the treatment phase but also had a sustained positive impact. Thus, it can be concluded that the use of assistive tools such as plasticine in interventions can help children with intellectual disabilities improve their fine motor skills, which in turn can reduce their dependence on others in daily activities.

The study by Helda & Grahita (2024) demonstrates that the use of plasticine media can significantly improve fine motor skills in children with intellectual disabilities. Through a classroom action research approach conducted in two cycles, the researchers successfully identified and addressed the challenges faced by students in using their fingers for activities such as holding pencils and squeezing small objects. Observational and measurement results showed a clear improvement in students' fine motor skills following the intervention.

In the first cycle, students exhibited low initial abilities, with DW reaching only 21.8% and MA 25%. However, after a series of sessions involving task organization, implementation, observation, and reflection, both students showed significant progress. In the second cycle, MA reached 75% and DW 71.8%, indicating that the applied learning method was effective in helping students develop the skills needed for learning and functioning independently. Overall, this study supports the hypothesis that plasticine media can be used as an effective tool in special education, particularly in enhancing fine motor skills. These findings provide valuable insights for educators and practitioners in designing more inclusive and responsive learning strategies for students with disabilities.

The study by Hurriyati & Agung (2022) found that the use of plasticine media significantly improves fine motor skills in students with intellectual disabilities at SMALB-C YPAC Palembang. After practicing with plasticine, the children showed progress in skills such as grasping, writing, and holding objects. This improvement was evident from the average scoring results before and after using the plasticine media. The average score before using plasticine to train fine motor skills in children with intellectual disabilities was 9.8, which increased to 15.6 after the intervention.

Before using the plasticine play media, three students had fine motor skill scores below 10 points, while the other three scored above 10 points. After the intervention, the results improved, with four students scoring above 15 points and the remaining two scoring below 15 points. Based on these data, it is clear that the use of plasticine play media had a positive impact on the development of fine motor skills in children with intellectual disabilities. This indicates that plasticine media can be an effective method for supporting the development of their fine motor skills.

Discussion

The results of the article review in this Systematic Literature Review (SLR) consistently demonstrate that the use of plasticine media significantly enhances fine motor skills in children with intellectual disabilities. Interventions involving plasticine have proven effective in developing skills such as finger strength, hand-eye coordination, and finger flexibility. For instance, the study by Kamila and Iffah (2022) showed an improvement in students' motor skills from the "fair" to the "good" category after two intervention cycles, with the average ability to connect lines increasing from 55.1% to 73.3%. Similar results were reported by Rahida et al. (2023), who employed a Single Subject Research (SSR) design and found a significant improvement from the baseline to the intervention phase, with average fine motor skills reaching 94.25% in the final phase—demonstrating the effectiveness of plasticine not only during intervention but also in the long term.

In addition to enhancing fine motor skills, the use of plasticine has a positive impact on the cognitive and social aspects of children with intellectual disabilities. Activities such as kneading, molding, and cutting plasticine engage motor coordination that strengthens small muscles while also training concentration, patience, and problem-solving abilities (Mursusilowati, 2023). The study also reported that plasticine intervention improved students' social adaptability, such as interacting in groups through collaborative play. These findings have important implications for the field of education, especially in Special Needs Schools (Sekolah Luar Biasa/SLB), as plasticine can be used as an instructional aid that fosters the development of independence in children with intellectual disabilities.

Moreover, research conducted by Safari et al. (2023) observed similar enhancements in fine motor development when using plasticine, underscoring its role in providing a tactile learning experience that engages children's creativity while promoting fine motor skills. This was echoed in the work of (Nordin et al., 2021), who emphasized that fine motor activities significantly influence the cognitive abilities of children, reinforcing the notion that physical play can be cognitively stimulating as well. Additionally, Harsismanto et al. (2021) highlighted that plasticine play was more effective than other interventions like finger painting, further validating the selection of plasticine as a preferred medium for skill enhancement.

However, despite the positive outcomes, this review faces several limitations. Variations in the duration of interventions and the methods used to measure fine motor skills affect the consistency of the results. Therefore, future research should implement long-term interventions and compare the effectiveness of various instructional media. Overall, this SLR affirms that plasticine media is effective in improving fine motor skills in children with intellectual disabilities and recommends that this method be more widely applied in special education to support their optimal development.

Conclusion

The conclusion of this Systematic Literature Review (SLR) indicates that plasticine media is significantly effective in enhancing fine motor skills in children with intellectual disabilities. The reviewed studies show improvements in skills such as finger strength, hand-eye coordination, and finger flexibility following interventions using plasticine. This intervention not only positively impacts fine motor abilities but also supports the cognitive and social development of children, which plays an important role in fostering their independence in daily activities.

Plasticine media has been proven to be an effective educational tool, as it provides stimulation that promotes comprehensive fine motor development. This offers valuable insights for educators and practitioners in designing learning methods that are more inclusive, responsive, and aligned with the needs of children with intellectual disabilities. Nevertheless, further research with longer durations and more varied designs is needed to strengthen these findings. Overall, the results of this review emphasize the importance of using plasticine media as an innovative instructional method that can be widely implemented to support the optimal development of children with intellectual disabilities.

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