



The Effect of Cooperative Puzzle Play on The Social Skills of Children With Intellectual Disabilities at Slbm Surya Gemilang Margosari Kendal

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Article Info :

Received:
25-08-2026
Revised:
09-09-2026
Accepted:
14-09-2026

Abstract

This study examined the effect of Cooperative Play Puzzle on the social skills of children with intellectual disabilities at SLBM Surya Gemilang Margosari Kendal. A quantitative pre-experimental design with a one-group pretest–posttest approach was applied to 28 participants selected through purposive sampling. Social skills were measured using the DASST questionnaire before and after four intervention sessions conducted over two weeks. Descriptive analysis showed that the mean social-skills score increased from 46.21 at pretest to 101.25 at posttest, while the median increased from 48.00 to 102.00. The Shapiro–Wilk test indicated that both datasets were not normally distributed, with significance values of 0.002 and 0.005. Therefore, the Wilcoxon Signed-Rank Test was used and produced $Z = 4.630$ with $p = 0.000$, indicating a statistically significant difference after the intervention. These findings demonstrate that Cooperative Play Puzzle can provide structured opportunities for communication, cooperation, turn-taking, sharing, and peer interaction. The intervention may therefore serve as a practical play-based strategy to support social-skills development among children with intellectual disabilities in special-school settings. Its simple format also supports feasible implementation within routine special-school educational activities.

Keywords: Cooperative Play Puzzle, Social Skills, Intellectual Disabilities, Play-Based Intervention, Social Interaction.



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INTRODUCTION

Children with intellectual disabilities experience limitations in intellectual functioning and adaptive behavior that may affect their conceptual, practical, and social development. Social limitations are particularly important because they can interfere with the ability to communicate, cooperate, follow social rules, establish friendships, and respond appropriately to everyday interpersonal situations. Jacob et al. (2022) emphasize that individuals with intellectual disabilities frequently require systematic support to develop social competence and improve their participation in social environments. These developmental characteristics indicate that strengthening social skills should become an integral component of educational and developmental interventions for children with intellectual disabilities.

Social skills represent a set of learned behaviors that enable individuals to establish and maintain effective interpersonal relationships in different social contexts. These skills include verbal and nonverbal communication, cooperation, turn-taking, sharing, emotional understanding, conflict management, and the ability to respond appropriately to others. Children with intellectual disabilities often encounter difficulties acquiring these abilities naturally because cognitive and adaptive limitations can restrict their understanding of social cues and interpersonal expectations (Jacob et al., 2022). Structured learning experiences are therefore needed to provide repeated opportunities for children to observe, practice, and reinforce appropriate social behaviors.

The school environment provides an important developmental context because children interact regularly with teachers and peers through both academic and non-academic activities. Peer interaction can create opportunities for children with intellectual disabilities to practice communication, cooperation, negotiation, and participation in shared activities. Bowman-Perrott et al. (2023) found that peer-mediated interventions can generate favorable social and behavioral outcomes among

students with intellectual and developmental disabilities, while Bancroft et al. (2024) demonstrated the value of peer contexts for supporting interactive play behaviors. Educational activities that deliberately incorporate peer participation may consequently offer greater opportunities for meaningful social learning than activities dominated by individual instruction.

Play-based intervention represents one practical approach for promoting active participation and social development among children with developmental disabilities. Play provides a concrete and engaging context in which children can interact with objects, communicate with others, follow rules, solve problems, and experience social consequences directly. A systematic review by Bent et al. (2024) identified several therapeutic factors associated with play-based approaches for young people with intellectual disabilities, while Carrington et al. (2024) highlighted the potential contribution of play interventions to functioning and participation among children with disabilities. Play activities may therefore function not merely as recreational experiences but also as structured developmental media that support communication, adaptive behavior, and interpersonal engagement.

Cooperative play is particularly relevant because it requires children to participate with others in achieving a shared objective rather than completing an activity independently. Cooperative Play Puzzle involves children working together to identify, select, combine, and arrange puzzle pieces until a complete form is produced, thereby creating repeated opportunities for communication and coordination. During this process, children can practice asking for assistance, helping peers, sharing materials, waiting for turns, following instructions, and resolving simple problems collaboratively. Evidence from Riskayani (2020) suggests that cooperative puzzle play can improve social adaptation among children with intellectual disabilities, indicating its potential application as a structured intervention for strengthening social functioning.

Empirical evidence from other forms of play intervention also supports the potential role of structured play in developing social competence among children with intellectual disabilities. Amanda and Hidayat (2024) reported significant improvement in social skills following origami play therapy, suggesting that manipulative and interactive activities can facilitate meaningful social engagement. Gobel and Suharsono (2024) similarly described play therapy as an intervention capable of increasing social interaction among children with intellectual disability, while Feniger-Schaal et al. (2023) demonstrated that therapeutic play experiences can enhance playfulness within this population. These findings collectively indicate that developmentally appropriate, enjoyable, and interactive activities may provide an effective medium through which children repeatedly practice behaviors required in real social situations.

Despite the growing evidence supporting play-based and peer-mediated interventions, research specifically examining Cooperative Play Puzzle as a means of improving social skills among school-aged children with intellectual disabilities remains relatively limited. Previous studies have examined social adaptation, general play therapy, origami activities, interactive video instruction, or broader peer-mediated interventions, but the specific contribution of cooperative puzzle activities to multiple dimensions of social skills requires further investigation (Barman & Jena, 2023; Bowman-Perrott et al., 2023; Amanda & Hidayat, 2024). A preliminary assessment at SLBM Surya Gemilang Margosari Kendal identified 199 students with various special needs and indicated that cooperative play media had not yet been optimally utilized as a structured form of social-skills stimulation. This condition creates a practical and scientific need to evaluate an intervention that is simple, visual, affordable, enjoyable, and adaptable to the developmental characteristics of children with intellectual disabilities.

The present study therefore focuses on the effect of Cooperative Play Puzzle on the social skills of children with intellectual disabilities at SLBM Surya Gemilang Margosari Kendal. The intervention is expected to provide repeated opportunities for participants to communicate, cooperate, share responsibilities, wait for turns, provide assistance, and interact directly with peers within a structured group activity. The study also addresses an applied research gap by examining changes in social-skill scores before and after a Cooperative Play Puzzle intervention in a specific special-school setting. Accordingly, this study aims to determine the effect of Cooperative Play Puzzle on the social skills of children with intellectual disabilities at SLBM Surya Gemilang Margosari Kendal.

RESEARCH METHODS

This study employed a quantitative approach using a pre-experimental design with a one-group pretest–posttest model. The research was conducted among children with intellectual disabilities at

SLBM Surya Gemilang Margosari Kendal. A total of 28 participants were selected through purposive sampling based on predetermined inclusion and exclusion criteria. The inclusion criteria consisted of children aged 6–12 years who were diagnosed with intellectual disabilities, were actively enrolled in school activities, obtained parental or guardian consent, and were able to participate in the social-skills assessment. Children with unstable physical or medical conditions, severe psychological or emotional disturbances that could interfere with participation, or an inability to complete the research procedures were excluded. Social skills were measured using the DASST questionnaire consisting of 30 items rated on a four-point Likert scale, producing a total score ranging from 30 to 120, with higher scores indicating better social skills.

The Cooperative Play Puzzle intervention was conducted in small groups of three to four children for four sessions over a two-week period, with two sessions held each week and each session lasting approximately 30–45 minutes. During the intervention, the participants were guided to complete puzzles cooperatively using different themes in each session under the supervision of teachers and facilitators. Data collection began with a pretest of social skills, followed by the Cooperative Play Puzzle intervention, and concluded with a posttest using the same measurement instrument. Univariate analysis was performed to describe participant characteristics and the distribution of social-skills scores, while bivariate analysis was used to examine differences between pretest and posttest scores. The Shapiro–Wilk test was applied to assess data normality, and because both pretest and posttest data were not normally distributed, the Wilcoxon Signed-Rank Test was used with a significance level of $p < 0.05$. Ethical principles applied throughout the study included informed consent, anonymity, confidentiality, beneficence, non-maleficence, justice, the right to withdraw, participant assistance, and responsible reporting of research findings.

RESULTS AND DISCUSSION

Characteristics of Participants and Social Development of Children with Intellectual Disabilities

The characteristics of the participants provide an important context for interpreting the social development of children with intellectual disabilities involved in this study. A total of 28 children from grades 1 to 6 at SLBM Surya Gemilang Margosari Kendal participated in the intervention, representing different age groups and educational levels. Such heterogeneity is relevant because social functioning among children with intellectual disabilities may vary according to developmental experience, opportunities for interaction, and exposure to structured learning environments. Jacob et al. (2022) emphasize that social-skill development within this population should be understood in relation to individual functioning and the social environments in which interpersonal behaviors are practiced.

The gender distribution showed that male participants constituted the largest proportion of the sample, with 20 children or 71.4%, whereas female participants accounted for 8 children or 28.6%. This distribution describes the composition of the study population rather than demonstrating a relationship between gender and social skills because gender was not examined as an independent predictor in the present study. Differences in participant composition should therefore be interpreted descriptively and not as evidence that one gender possesses better or poorer social competence. Studies of social and behavioral interventions for children with intellectual and developmental disabilities generally emphasize the importance of intervention characteristics and opportunities for peer engagement rather than relying exclusively on demographic distinctions (Bowman-Perrott et al., 2023).

Age distribution indicated that children aged 8–10 years represented the largest group, consisting of 13 participants or 46.4% of the sample. Children aged 6–7 years accounted for 10 participants or 35.7%, while those aged 11–12 years represented 5 participants or 17.9%. The predominance of middle childhood participants is relevant because school-age children increasingly encounter situations that require communication, cooperation, rule-following, and participation in shared activities. Bancroft et al. (2024) demonstrate that structured peer contexts can provide meaningful opportunities for children with developmental disabilities to practice interactive behaviors that may otherwise be difficult to acquire spontaneously.

The developmental period represented in this study is also characterized by increasing exposure to formal and informal social demands within the school environment. Children are expected to communicate needs, participate in classroom activities, respond to instructions, interact with peers,

and regulate their behavior in accordance with situational expectations. Intellectual disability can complicate these processes because limitations in adaptive functioning may influence how children interpret social cues and respond to interpersonal situations (Jacob et al., 2022). Structured activities that combine direct participation with repeated opportunities for interaction may therefore be particularly appropriate for children within the age range represented by the participants.

Educational level also varied considerably, with respondents distributed across all six elementary grade levels. The largest number of participants was found in grade 2, comprising 7 children or 25.0%, followed by grades 3 and 6 with 5 participants each or 17.9%, grades 4 and 5 with 4 participants each or 14.3%, and grade 1 with 3 participants or 10.7%. This variation suggests that the participants had different levels of school experience and potentially different frequencies of exposure to peer interaction and classroom routines. Gladh et al. (2022) indicate that social play supported by peers and structured instruction can facilitate participation by providing repeated opportunities to engage in reciprocal social behavior.

Table 1. Distribution of Participants by Gender, Age, and Grade

Variable	Classification	Frequency (n)	Percentage (%)
Gender	Male	20	71.4
	Female	8	28.6
Age	6–7 years	10	35.7
	8–10 years	13	46.4
	11–12 years	5	17.9
Grade	Grade 1	3	10.7
	Grade 2	7	25.0
	Grade 3	5	17.9
	Grade 4	4	14.3
	Grade 5	4	14.3
	Grade 6	5	17.9
Total		28	100.0

The distribution presented in Table 1 demonstrates that the study involved participants with diverse developmental and educational characteristics rather than a homogeneous group from a single age or grade level. Such diversity is particularly relevant in research involving intellectual disabilities because social competence can be shaped by the interaction between individual abilities and opportunities to practice adaptive behavior. Barman and Jena (2023) found that appropriately designed instructional interventions may support learning performance and social skills among children with intellectual disabilities, suggesting that learning activities should accommodate variability among participants. The present participant profile therefore supports the use of an intervention that is concrete, flexible, and capable of being implemented across different developmental levels.

School-based interaction represents an essential setting for translating individual capacities into observable social behaviors. Participation in classroom and group activities exposes children to situations requiring turn-taking, cooperation, communication, sharing, and adjustment to the actions of other children. Athamanah and Cushing (2023) demonstrated that peer-mediated approaches can support social and functional skills among students with intellectual disabilities by creating direct opportunities for interpersonal practice. The inclusion of children from multiple grade levels in the present study consequently provides a relevant context for examining an intervention based on cooperative interaction rather than exclusively individual task completion.

The age and grade distributions also reinforce the importance of using developmentally accessible media during social-skills interventions. Children with intellectual disabilities may have difficulties understanding abstract instructions, maintaining attention, or transferring verbally explained concepts into practical social behavior, making concrete activities particularly valuable. Kulnazarova et al. (2023) highlight the importance of intervention approaches that facilitate social adaptation and interpersonal relationships through activities suited to the cognitive characteristics of children with intellectual disabilities. A puzzle-based cooperative task provides a visible goal and

tangible materials, allowing interaction to occur around an activity that can be directly observed and manipulated.

The participant characteristics further suggest that social stimulation should not be limited to conventional verbal instruction. Children at different ages and grade levels may respond more actively when learning takes place through structured activities that combine cognitive engagement, physical participation, and direct interaction with peers. Carrington et al. (2024) reported that play-based interventions can contribute to functioning and participation among children with disabilities, indicating that play has potential beyond recreational purposes. Duan et al. (2024) similarly showed that structured physical play interventions can influence interpersonal capacities among children with intellectual disabilities, reinforcing the relevance of interactive activities as developmental media.

The demographic profile of the 28 participants therefore provides a meaningful foundation for understanding the subsequent changes in social-skills scores following the Cooperative Play Puzzle intervention. The dominance of children aged 8–10 years, combined with representation from every grade between grades 1 and 6, indicates that the intervention was implemented within a socially and developmentally varied group. Bent et al. (2024) explain that play-based interventions for young people with intellectual disabilities operate through multiple therapeutic and interactional factors, including engagement, relational experience, and opportunities for active participation. These characteristics support the relevance of examining Cooperative Play Puzzle as a structured activity capable of creating shared social experiences among children with different developmental and educational backgrounds.

Changes in Social Skills Before and After the Cooperative Play Puzzle Intervention

The descriptive findings demonstrated a substantial change in the social-skills scores of children with intellectual disabilities following participation in the Cooperative Play Puzzle intervention. Before the intervention, the mean social-skills score was 46.21, whereas the mean score after the intervention increased to 101.25. This pattern indicates that participants demonstrated considerably higher social-skill performance during the post-intervention assessment than during the initial assessment. Similar evidence has been reported by Amanda and Hidayat (2024), who found that structured play activities can provide meaningful stimulation for social-skill development among children with intellectual disabilities.

The pretest results showed that participants initially obtained scores ranging from 30 to 57, with a median of 48.00 and a standard deviation of 8.702. These scores illustrate the relatively limited level of social performance observed before children received structured cooperative stimulation. Difficulties in communication, social responsiveness, cooperation, and adaptive interaction are frequently encountered among children with intellectual disabilities and may require repeated opportunities for behavioral practice. Mirahmadi and Hemmati Alamdarloo (2016) demonstrated that group-based play therapy can improve social skills among students with intellectual disabilities, supporting the importance of interactive experiences in addressing such limitations.

The comparatively low pre-intervention scores may also be interpreted in relation to the characteristics of social learning among children with intellectual disabilities. Social behaviors are not always acquired effectively through verbal explanation alone because children may require observable, concrete, and repeatedly practiced experiences to understand expected interpersonal responses. Hidayat (2023) showed that play-based methods and educational media can influence social-skills learning among children with intellectual disabilities, suggesting that intervention format is relevant to children's engagement with social learning. Derks et al. (2022) similarly demonstrated that structured game-based interventions can contribute to adaptive and cognitive development among children with intellectual disability and autism spectrum disorder.

The posttest distribution presented a markedly different pattern, with scores ranging from 76 to 120 and a median of 102.00. The post-intervention mean of 101.25 was 55.04 points higher than the pre-intervention mean of 46.21, indicating a pronounced descriptive improvement during the study period. This increase is consistent with the premise that children may display stronger social behaviors when they are repeatedly involved in enjoyable activities that require direct interaction with other participants. Gobel and Suharsono (2024) found that play therapy can facilitate social interaction among children with intellectual disabilities by creating opportunities for active interpersonal engagement.

The increase in social-skills scores can also be understood through the cooperative structure of the intervention rather than through puzzle completion alone. Cooperative Play Puzzle required participants to work toward a shared outcome, thereby encouraging communication, turn-taking, material sharing, assistance, and coordination among group members. Collaborative play has long been recognized as a context in which children can practice social behaviors through direct participation rather than passive observation, as illustrated by Battocchi et al. (2010) in collaborative puzzle-based activities. Peer-oriented and group-based activities may therefore create conditions in which children receive immediate social responses to their actions and gradually adjust their behavior during repeated interaction.

Table 2. Distribution of Social-Skills Scores Before and After the Cooperative Play Puzzle Intervention

Assessment	N	Minimum	Maximum	Mean	Median	Standard Deviation
Pretest	28	30	57	46.21	48.00	8.702
Posttest	28	76	120	101.25	102.00	15.660

Table 2 demonstrates that improvement occurred across several descriptive indicators rather than being reflected only in the mean value. The minimum score increased from 30 to 76, while the maximum score increased from 57 to 120, and the median more than doubled from 48.00 to 102.00. These changes suggest that higher post-intervention performance was observable throughout the score distribution among the participants. Riskayani (2020) similarly reported improvement in the social adaptation of children with intellectual disabilities after cooperative puzzle play, supporting the relevance of this activity as a structured medium for social stimulation.

The increase in the standard deviation from 8.702 at pretest to 15.660 at posttest indicates that participants showed greater variability in their social-skills scores following the intervention. This variation may reflect differences in individual responsiveness, developmental capacity, communication ability, attention, and engagement during cooperative activities rather than a uniform response across all children. Intellectual disability encompasses heterogeneous levels of adaptive functioning, making variation in responses to intervention theoretically plausible. Lappa and Mantzikos (2019) emphasize that social-skills interventions for children with disabilities need to accommodate differences in individual abilities and participation patterns within group-based learning contexts.

The findings are also consistent with studies showing that structured play can generate social opportunities beyond the immediate objective of completing a game. Feniger-Schaal et al. (2023) observed that therapeutic play experiences can increase playfulness among children with intellectual disabilities, which may facilitate willingness to participate and engage with other people. Eltantawy (2022) likewise reported improvements in social interaction following a structured recreational program for children with intellectual disabilities. These findings suggest that an engaging play environment may reduce barriers to participation while simultaneously providing repeated occasions for practicing socially relevant behaviors.

A cooperative puzzle activity may particularly support social learning because successful completion depends on relationships among participants rather than solely on individual cognitive performance. Children must observe the actions of peers, respond to requests, negotiate access to puzzle pieces, wait for opportunities to participate, and contribute toward a common goal. Jacques et al. (1998) demonstrated that cooperative learning can promote social acceptance of children with mild intellectual disabilities, while Brown and Bergen (2002) identified play contexts as meaningful environments for social interaction among children with disabilities. The present improvement in posttest scores therefore corresponds with theoretical and empirical evidence indicating that cooperative participation can strengthen interpersonal learning.

Comparable findings have also been reported in research involving puzzle and other socially structured interventions. Oktaviyani and Suri (2019) demonstrated developmental benefits from puzzle-based play, while Safari et al. (2021) reported positive developmental outcomes following puzzle activities among children with intellectual disabilities. Hidayat et al. (2023) further emphasized the usefulness of structured play-based educational approaches for improving social skills, and Putri

and Faizal (2026) specifically identified improvements in social interaction following Cooperative Play Puzzle therapy among children with intellectual disabilities. Taken together, the increase from a mean pretest score of 46.21 to a posttest score of 101.25 provides descriptive evidence that Cooperative Play Puzzle was associated with substantial improvement in social-skills performance among the participants.

Effect of Cooperative Play Puzzle on the Social Skills of Children with Intellectual Disabilities

The inferential analysis was conducted to determine whether the observed improvement in social-skills scores represented a statistically significant difference between measurements before and after the Cooperative Play Puzzle intervention. The first analytical step involved examining the distribution of the pretest and posttest data using the Shapiro–Wilk normality test because the study involved 28 participants. The results showed that neither measurement met the assumption of normal distribution, which required the subsequent analysis to use a nonparametric statistical procedure. This analytical approach is consistent with intervention studies involving relatively small groups of children with intellectual disabilities, whose behavioral scores may show considerable individual variation (Cortezano Rosales et al., 2023).

The Shapiro–Wilk analysis for the pretest produced a statistic of 0.863 with 28 degrees of freedom and a significance value of 0.002. Since the significance value was below 0.05, the pre-intervention social-skills scores were considered not normally distributed. This result indicates that participant scores before the intervention did not follow the distributional pattern required for parametric paired testing. Variability in baseline functioning is plausible among children with intellectual disabilities because adaptive and interpersonal abilities may differ according to developmental characteristics and previous opportunities for social participation (Priatna & Arianingsih, 2014).

The posttest data produced a Shapiro–Wilk statistic of 0.883 with 28 degrees of freedom and a significance value of 0.005. This value was also below the 0.05 threshold, demonstrating that the post-intervention data were not normally distributed. The non-normal distribution remained evident despite the substantial increase in the overall social-skills scores following the intervention. Such variation may reflect differences in how individual children respond to structured cooperative activities, particularly when cognitive, communicative, and adaptive abilities differ across participants (Salsabilla & Ningsih, 2024).

The violation of the normality assumption for both measurements provided the statistical basis for using the Wilcoxon Signed-Rank Test rather than a paired-samples parametric test. The Wilcoxon procedure is appropriate for examining changes between two related measurements when the distribution of scores does not satisfy normality assumptions. Its application in the present study allowed the direction and statistical significance of within-participant changes to be evaluated without assuming normally distributed differences. This approach was particularly suitable because the research design compared the same 28 children before and after exposure to the Cooperative Play Puzzle activity.

The Wilcoxon Signed-Rank Test produced a Z value of 4.630 with an asymptotic significance reported as $p = 0.000$, indicating $p < 0.001$ and therefore a statistically significant difference between the pretest and posttest measurements. The median social-skills score increased from 48.00 before the intervention to 102.00 afterward, while the score range shifted from 30–57 to 76–120. These findings demonstrate that the post-intervention improvement was not restricted to changes in the mean but was also reflected in the median and overall distribution of participant scores. The result supports previous evidence indicating that cooperative puzzle activities can strengthen social adaptation and interpersonal participation among children with intellectual disabilities (Riskayani, 2020; Putri & Faizal, 2026).

Table 3. Normality and Wilcoxon Signed-Rank Test Results for Social-Skills Scores

Statistical Test	Measurement	N/df	Statistic/Median	Minimum–Maximum	Significance
Shapiro–Wilk	Pretest	28	0.863	—	0.002
Shapiro–Wilk	Posttest	28	0.883	—	0.005

Wilcoxon Signed-Rank	Pretest	28	Median = 48.00	30–57	0.000
Wilcoxon Signed-Rank	Posttest	28	Median = 102.00	76–120	0.000
Wilcoxon Signed-Rank	Pretest–Posttest difference	28	Z = 4.630	—	0.000

The statistically significant improvement can be interpreted in relation to the cooperative structure embedded within the puzzle activity. Children were required to participate in a shared task in which successful completion depended on interaction, coordination, and contributions from more than one participant. Piercy et al. (2002) demonstrated that cooperative-learning techniques can promote social acceptance among children with intellectual disabilities by creating situations in which peers work toward common objectives. Cooperative Play Puzzle may operate through a similar mechanism because children repeatedly experience sharing, turn-taking, requesting assistance, and responding to peers while pursuing a visible common goal.

The interactional characteristics of the intervention are also consistent with evidence from technology-assisted and collaborative game environments. Ke and Moon (2018) showed that collaborative gaming can provide structured opportunities for practicing social behaviors, while Ali et al. (2025) emphasized the potential contribution of both physical and digital games to the social engagement of children with intellectual disabilities. Khalaila et al. (2025) likewise illustrated how collaborative puzzle-oriented activities can combine problem solving and interpersonal participation within a shared learning experience. Although the media and populations in these studies differ, they reinforce the broader principle that goal-oriented collaborative tasks can create meaningful contexts for social practice.

The effectiveness observed in this study may additionally be related to the concrete and visually structured nature of puzzle-based learning. Children can directly observe the task, manipulate the materials, identify missing components, and communicate about an immediate problem rather than responding only to abstract verbal instructions. Cortezano Rosales et al. (2023) suggest that play-based instructional approaches can support children with special needs by providing accessible and engaging learning experiences. Salsabilla and Ningsih (2024) also reported the practical use of cooperative puzzle play for improving social skills among school-aged children with moderate intellectual disabilities, strengthening the contextual relevance of the present intervention.

The magnitude of change should nevertheless be interpreted in relation to the pre-experimental one-group design used in this study. The statistically significant pretest–posttest difference establishes that participant scores changed substantially during the intervention period, but the absence of a control group prevents all alternative explanations from being completely excluded. Factors such as repeated exposure to the measurement instrument, interaction with teachers and facilitators, maturation, or other social experiences occurring during the two-week intervention period may also have contributed to part of the observed change. The findings therefore provide strong within-group evidence of improvement while future studies should employ controlled designs, longer follow-up periods, and larger samples to strengthen causal inference.

The inferential findings indicate that Cooperative Play Puzzle was associated with a statistically significant improvement in the social skills of children with intellectual disabilities at SLBM Surya Gemilang Margosari Kendal. The increase in the median from 48.00 to 102.00, the shift in score ranges from 30–57 to 76–120, and the Wilcoxon result of $Z = 4.630$ with $p = 0.000$ collectively demonstrate a pronounced difference following the intervention. These results are consistent with evidence that structured, cooperative, play-based activities can facilitate interpersonal learning by creating repeated opportunities for communication, collaboration, shared problem solving, and reciprocal interaction (Piercy et al., 2002; Cortezano Rosales et al., 2023). Cooperative Play Puzzle can therefore be considered a promising practical activity for supporting social-skills stimulation among children with intellectual disabilities, while more rigorous experimental research remains necessary to establish the durability and generalizability of its effects.

CONCLUSION

This study demonstrates that Cooperative Play Puzzle was associated with a substantial improvement in the social skills of children with intellectual disabilities at SLBM Surya Gemilang Margosari Kendal. The mean social-skills score increased from 46.21 before the intervention to 101.25 after the intervention, while the median increased from 48.00 to 102.00. The intervention provided children with structured opportunities to communicate, cooperate, share materials, wait for turns, request and provide assistance, and participate in a shared goal. These findings indicate that cooperative puzzle activities can function as an accessible and engaging play-based strategy for supporting social interaction and adaptive participation among children with intellectual disabilities.

The Wilcoxon Signed-Rank Test confirmed a statistically significant difference between pretest and posttest social-skills scores, with $Z = 4.630$ and $p = 0.000$. Cooperative Play Puzzle can therefore be considered a practical activity for supporting social-skills stimulation in special-school environments, particularly when implemented through small-group interaction and structured guidance. However, the one-group pretest–posttest design and the relatively small sample require the findings to be interpreted within the context of this study. Future research should involve larger samples, control groups, longer intervention periods, and follow-up assessments to determine the consistency and sustainability of the observed improvements.

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