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Character implementation for children with visual disabilities through traditional games: Case studies in inclusive elementary schools

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Abstract

This study examines the effectiveness of multisensory traditional game-based learning in supporting character development among children with visual impairments in inclusive primary education. Addressing the limited integration of culturally grounded and accessible pedagogies, a quasi-experimental pre-test–post-test design was employed. The intervention incorporated traditional games adapted with auditory and tactile elements. Data were collected through validated observation instruments with established inter-rater reliability and analyzed statistically across indicators of cooperation, self-control, responsibility, and empathy. The results show significant improvements in all measured behaviors, indicating that multisensory game-based learning fosters meaningful social interaction and prosocial engagement. However, behavioral gains do not necessarily indicate full moral internalization, as intrinsic motivation and long-term sustainability were not assessed. This study contributes to inclusive character education by integrating cultural relevance and multisensory accessibility, although it is limited by the absence of a control group and short intervention duration.

Questo studio esamina l'efficacia dell'apprendimento basato su giochi tradizionali multisensoriali nel sostenere lo sviluppo del *character education* nei bambini con disabilità visiva nella scuola primaria inclusiva. In risposta alla limitata integrazione di pedagogie culturalmente fondate e accessibili, è stato adottato un disegno quasi-sperimentale con pre-test e post-test. L'intervento ha integrato giochi tradizionali adattati con elementi uditivi e tattili. I dati sono stati raccolti attraverso strumenti di osservazione validati, con affidabilità inter-valutatore, e analizzati statisticamente considerando indicatori quali cooperazione, autocontrollo, responsabilità ed empatia. I risultati mostrano miglioramenti significativi in tutti i comportamenti osservati, suggerendo che l'apprendimento basato sul gioco multisensoriale favorisca l'interazione sociale e i comportamenti prosociali. Tuttavia, tali

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miglioramenti non indicano necessariamente una piena interiorizzazione morale, poiché la motivazione intrinseca e la sostenibilità nel tempo non sono state valutate. Lo studio contribuisce al *character education* in contesti inclusivi, pur essendo limitato dall'assenza di un gruppo di controllo e dalla breve durata dell'intervento.

Keywords: character education; traditional games; visual impairment; inclusive education; multisensory learning

Parole chiave: *character education*; giochi tradizionali; disabilità visiva; educazione inclusiva; apprendimento multisensoriale

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1. Introduction

Inclusive education has become a global priority in ensuring equitable access to quality learning for all students, including those with disabilities. However, the implementation of inclusive practices remains challenging, particularly in designing learning environments that are both accessible and pedagogically meaningful for children with visual impairments. These learners rely heavily on non-visual sensory modalities, such as auditory and tactile experiences, to engage with their surroundings and construct knowledge (Ismaya & Sutono, 2026). Consequently, conventional instructional approaches often fail to address their specific learning needs, especially in domains that require social interaction and value formation.

At the same time, character education has gained increasing attention as a fundamental component of holistic education. It is widely recognized that character education extends beyond the development of observable behaviors and involves the internalization of moral values, dispositions, and reflective judgment. In inclusive settings, fostering character development presents additional complexity, as students with diverse abilities require differentiated approaches to meaningfully engage in moral and social learning processes. Despite its importance, character education in inclusive contexts is often implemented in a fragmented manner, with limited attention to how pedagogical strategies can simultaneously support accessibility and moral development (Anggraheni & Ertanti, 2026).

Recent studies have explored the potential of game-based learning and culturally responsive pedagogy in enhancing student engagement and social interaction. Traditional games, in particular, offer contextualized and culturally meaningful learning experiences that promote cooperation, empathy, and responsibility (Kurniati et al., 2025). Furthermore, multisensory learning approaches—integrating auditory, tactile, and kinesthetic elements—have been shown to be effective in supporting the learning needs of children with visual impairments (Wulandari & Pujaningsih, 2025). The integration of audio-kinesthetic media with local cultural elements significantly improved learning participation, motivation, and comprehension, with observations showing that 87% of participants actively engaged with learning activities (Ismaya & Sutono, 2026).

However, existing research has largely examined these approaches separately. Limited attention has been given to how multisensory traditional game-based learning can be systematically integrated within inclusive education to support not only behavioral outcomes but also deeper aspects of character formation (Basuki & Purwanta, 2025). While multisensory teaching strategies have demonstrated effectiveness in improving reading skills, attention abilities, and language development in children with various learning difficulties (Zejneli, 2025), their application to character education in children with visual impairments remains unexplored.

This gap indicates a critical need for an integrative pedagogical approach that connects cultural relevance, sensory accessibility, and character education. In particular, there is a lack of empirical evidence on how traditional games, when adapted through multisensory design, can function as a medium for fostering both social interaction and moral internalization among children with visual impairments (Kilat & Apas, 2025). Moreover, previous studies have tended to focus primarily on short-term behavioral changes, without critically examining whether such changes reflect genuine character development or merely situational compliance (Ricaforte et al., 2025).

The pedagogical foundation for such an integrative approach rests on several complementary theoretical frameworks. Multisensory learning theory emphasizes that engaging multiple sensory pathways simultaneously enhances information processing, memory retention, and engagement (Rustiana & Pamungkas, 2025). When combined with contextual and experiential learning—wherein students connect abstract concepts to meaningful, familiar contexts—the multisensory approach provides learners with diverse processing profiles alternative

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learning modalities (Ristyaningsih & Pujaningsih, 2025). Additionally, culturally responsive pedagogy recognizes that connecting national values and local wisdom with students' lived experiences strengthens both academic and moral learning (Novitasari & Walid, 2024). Therefore, this study aims to investigate the effectiveness of multisensory traditional game-based learning in enhancing character-related behaviors among children with visual impairments in inclusive primary school settings. By integrating culturally grounded learning practices with multisensory adaptations, this research seeks to contribute to the development of more inclusive and meaningful character education models. This study offers a novel contribution by positioning multisensory traditional games not only as tools for engagement but also as pedagogical instruments that bridge accessibility and moral development within inclusive education (Sholeha et al., 2025).

2. Literature review

Inclusive education has emerged as a fundamental principle in global educational policy, aimed at ensuring equitable access to quality learning for all students regardless of their abilities or disabilities (Ismaya & Sutono, 2026). For children with visual impairments, conventional instructional methodologies predominantly rely on visual stimuli, creating significant barriers to effective learning and social participation. Research demonstrates that learners with visual impairments depend heavily on alternative sensory modalities—auditory, tactile, kinesthetic, and proprioceptive—to engage meaningfully with their environment and construct knowledge (Ismaya & Sutono, 2026).

Character education, conceptualized as the internalization of moral values, dispositions, and reflective judgment rather than mere behavioral compliance, has become increasingly recognized as essential to holistic educational development. However, implementing character education in inclusive settings presents unique challenges, as students with diverse abilities require differentiated approaches that simultaneously support accessibility and moral development. This gap in the literature necessitates an integrative pedagogical approach that connects cultural relevance, sensory accessibility, and character formation (Anggraheni & Ertanti, 2026).

2.1 Multisensory learning theory and neurological basis

Multisensory learning engages multiple sensory pathways—visual, auditory, kinesthetic, and tactile (VAKT)—to enhance information processing, memory retention, and learner engagement (Wulandari & Pujaningsih, 2025). Neuroeducational research reveals that activating multiple sensory channels simultaneously creates redundant neural pathways, facilitating stronger memory consolidation and improved comprehension (Zejneli, 2025). For students with visual impairments, multisensory approaches leverage intact sensory systems, compensating for visual deficits and enabling fuller participation in learning experiences.

Multisensory contextual learning strategies significantly improved reading skills in students with learning difficulties across all measured domains, with cognitive scores increasing from 15.62 to 21.25 ($t = 6.45$, $p < 0.05$) (Wulandari & Pujaningsih, 2025).

2.2 Character education and moral development

Character education extends beyond observable behaviors to encompass the internalization of moral values through lived experience and reflection. The BRAVE (Building Religious and Value-based Education) model demonstrated that digital game-based character education produced dramatic behavioral changes, with honesty scores increasing from 58% to 84%, courage from 55% to 81%, and independence from 60% to 86% ($p < 0.05$).

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These findings suggest that interactive, experiential learning modalities more effectively facilitate character internalization than conventional verbal instruction.

2.3 Traditional games and cultural pedagogy

Traditional games serve as culturally embedded pedagogical tools that integrate cognitive, affective, and social development through meaningful, contextual play (Kurniati et al., 2025). These games embody local wisdom, values transmission, and social-emotional learning, while simultaneously preserving cultural heritage. Notably, traditional games such as *egrang, gobak sodor*, and *engklek* develop specific character values including honesty, empathy, cooperation, sportsmanship, responsibility, and rule adherence.

2.4 Social-Emotional Learning (SEL) and inclusive contexts

The integration of social-emotional learning within inclusive education promotes the development of interpersonal and intrapersonal competencies essential for academic success and life adjustment (Cipriano et al., 2023). Meta-analytic evidence from 424 studies involving 575,361 students confirm that universal school-based SEL interventions significantly improve social-emotional skills, attitudes, behaviors, school climate, peer relationships, and academic achievement. The effectiveness of SEL is moderated by intervention content, features, context, and implementation quality.

3. Multisensory approaches for visual impairments and inclusive settings

3.1 Accessibility and adaptive instructional strategies

Students with visual impairments face persistent barriers related to non-inclusive teaching methodologies, inadequate adapted instructional materials, and limited specialized teacher training. Evidence-based practices emphasize the importance of multisensory instruction, Expanded Core Curriculum implementation, environmental adaptation, and collaborative support systems. Teaching cell biology to blind students using multisensory approaches—including palpation of three-dimensional models, printed representations with Braille support, and hand-made schematic drawings with high-relief contours—demonstrated improved learning abilities, increased class participation, and positive communication skills development.

3.2 Inclusive multisensory environments and play

Multisensory elements support joyful learning experiences while storytelling and guided play add meaningfulness to activities. Multisensory tactile teaching strategies targeting body awareness and body autonomy revealed that participants' feedback deepened understanding of sexual education and body boundaries, particularly through interactive tactile activities.

3.3 Universal Design for Learning (UDL) principles

Interactive multimedia modules designed using UDL principles and grounded in Meaningful Learning Theory effectively support visually impaired students and their peers (Badiah & Kurniawan, 2025). Validation by experts in learning planning and inclusive education deemed such modules highly effective and suitable without requiring revisions, while trials demonstrated enhanced understanding and engagement.

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4. Character development through traditional game-based learning

4.1 Traditional games as character education vehicles

Regional songs and traditional games proved effective in developing character in early childhood education, significantly fostering values of politeness, love of the homeland, and appreciation for cultural diversity (Siregar et al., 2025). The integration of traditional games into character education demonstrates sustained engagement catalyzing behavioral institutionalization, transforming discrete actions into habitual practices and ultimately stable character patterns.

An Islamic board game integrated with daily manners content and local wisdom achieved high feasibility scores (88.8%), with 80% of children able to recall relevant prayers and 73% demonstrating improved manners. Classroom action research implementing traditional games for character development showed improvement in social-emotional competence from 27% in the pre-cycle to 77% in the first cycle, and 96% in the second cycle (Kartikasari et al., 2025).

4.2 Social group dynamics and character internalization

Social group dynamics constitute powerful mechanisms for character development through traditional games, progressing through forming, storming, norming, and performing phases, each contributing uniquely to character internalization. Four distinct facilitator functions emerged: communication, facilitation, motivation, and dynamization. Traditional games like *congklak, Balogo*, and *Cublak-cublak Suweng* served not only as entertainment but as structured learning tools fostering interpersonal engagement and emotional growth.

4.3 Emotional intelligence and prosocial behavior development

Traditional games significantly contribute to emotional intelligence development in early childhood, with studies reporting enhancements in empathy, self-regulation, and cooperative behavior. Furthermore, traditional games foster prosocial behaviors such as sharing, conflict resolution, and peer relationship quality.

5. Game-based learning effectiveness and engagement

5.1 Cognitive and behavioral outcomes

Game-based learning demonstrates moderate to large effects on cognitive, social, emotional, motivation, and engagement outcomes (Alotaibi, 2024). A meta-analysis examining cooperative learning effects across 40 studies involving 3,985 participants revealed moderate positive overall effect size (ES = 0.459, 95% CI [0.324], [0.592], $p < 0.001$), indicating that cooperative learning enhances physical education across affective, cognitive, and social domains (Böke et al., 2025).

5.2 Motivation and participation

Digital game-based learning proves effective in engaging students and fostering student-centered learning environments, reinforcing its role in enhancing engagement and character development. Teachers emphasize that multisensory teaching, including storytelling, music, movement, sensory play, and hands-on activities, enhances children's participation and cognitive growth. Eye-tracking results indicate that incentive system design elements trigger students' motivation and excitement about playing games.

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5.3 Long-term behavioral change and retention

Project-based multisensory instruction achieved remarkable success, with 100% of third-grade students reaching satisfactory performance levels by Cycle II, compared to 75% in Cycle I, representing improvements up to 35.25% for initially struggling students (Basuki & Purwanta, 2025). Social-emotional learning through traditional games showed improvement in emotional ability from 27% in the pre-cycle to 77% in the first cycle, and 96% in the second cycle (Kartikasari et al., 2025).

6. Implementation challenges and contextual factors

6.1 Teacher competency and professional development

Teacher competencies—including curriculum adaptation ability, implementation of varied learning strategies, and effective communication—constitute crucial factors in successfully implementing gamification and SEL. However, educators frequently identify challenges such as limited training opportunities, overcrowded classrooms, resource shortages, and inadequate support that hinder consistent implementation of multisensory teaching. Turkish special-education teachers demonstrated that only 8.4% received CVI-related coursework during preservice preparation, yet those receiving brief CVI-specific training reported substantially higher confidence.

6.2 Infrastructure and resource limitations

Traditional games face obstacles including limited open space, inadequate financial support, lack of teacher training, and absence of valid assessment instruments (Kurniati et al., 2025). Rural schools encounter particular challenges including isolation, infrastructural limitations, and teacher resistance underpinned by negative attitudes toward impairments. Additionally, the integration of traditional games into formal education settings requires policies supporting curriculum integration and educator training.

6.3 Equity and accessibility concerns

Despite policy frameworks advocating inclusive education, substantial gaps in implementation and resource allocation undermine their efficacy. Students with visual impairments face accessibility issues including incompatibility of digital platforms with screen readers, outdated educational materials, and formatting issues, alongside challenges in learning process such as excessive individual study load and insufficient access to specialized support.

7. Research methods

This study adopted a quasi-experimental research design employing a one-group pre-test and post-test approach to investigate the effectiveness of multisensory traditional game-based learning in enhancing character-related behaviors among children with visual impairments in an inclusive primary school setting. This design was selected due to practical and ethical constraints that limited the implementation of a control group within the natural classroom context.

The research design involved three sequential phases: (1) pre-test, (2) intervention, and (3) post-test. The pre-test phase aimed to establish baseline data on students' character-related behaviors, including cooperation, self-

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control, responsibility, and empathy. The intervention phase consisted of structured learning activities integrating traditional games adapted with multisensory elements, such as auditory instructions, tactile materials, and guided social interaction. These adaptations were specifically designed to ensure accessibility and active participation for children with visual impairments. The post-test phase was conducted to measure changes in behavioral indicators following the intervention.

This design allows for the identification of changes in observed behaviors before and after the treatment, providing preliminary empirical evidence of the intervention's effectiveness. However, as no control group was included, the findings should be interpreted with caution, particularly in relation to causal inference. The design is therefore considered exploratory, offering a foundation for future studies employing more rigorous experimental or longitudinal approaches.

7.1 Population and sample

The population of this study consisted of children with visual impairments enrolled in inclusive primary schools, where students with special needs learn alongside their peers in regular classroom settings. This population was selected to reflect authentic inclusive education contexts in which character development occurs through social interaction and adaptive learning experiences. The study involved 67 children with visual impairments aged 4–6 years from three inclusive primary schools in Surabaya, Indonesia. The schools were coded as School A (n = 20), School B (n = 22), and School C (n = 25) to maintain confidentiality. Participants included children with total blindness and low vision, as classified based on school medical records and formal special education assessments.

The sample was selected using purposive sampling, guided by specific inclusion criteria to ensure relevance to the research objectives. The criteria included: (1) children identified as having visual impairments, (2) active participation in inclusive classroom learning, and (3) the ability to engage in multisensory game-based learning activities with appropriate instructional support. The participating schools were also selected based on the following criteria: (1) formally recognized as inclusive schools, (2) having enrolled students with visual impairments, and (3) willingness to implement adaptive traditional game-based learning during the research period. Ethical considerations were strictly observed. Parental consent and institutional approval from each participating school were obtained prior to data collection. All participants were ensured equal access to the intervention through appropriate multisensory adaptations.

While purposive sampling enabled in-depth exploration within a specific and relevant context, it also limits the generalizability of the findings. Therefore, the results should be interpreted cautiously, and future studies are recommended to include larger and more diverse samples across different regions to enhance external validity.

Both teachers and researchers had the opportunity to exercise direct, highly structured observation of the target behavior during classes with the help of a character-descriptive observation tool. The set of activities was based on traditional games. The objective was to help the children with a sight problem. The children were to experience touch with ropes, textured stones, or even raised materials, as given in the teacher's systematic verbal instructions. These barriers were meant to help prevent exclusion among all the children during the learning stage.

7.2 Indicators of measurement of character education

The measurement of character education in this study was based on observable behavioral indicators that reflect key dimensions of moral and social development. Drawing on the framework proposed by Thomas Lickona (2012), character education encompasses moral knowing, moral feeling, and moral action. In alignment with

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this framework, as well as perspectives from Kristján Kristjánsson (2015) and the Jubilee Centre for Character and Virtues, this study operationalized character education into four core indicators: cooperation, self-control, responsibility, and empathy.

These indicators were selected because they represent essential virtues that can be observed in social interaction and are relevant to early childhood development in inclusive settings. Each indicator was further defined through specific behavioral descriptors to ensure clarity and consistency in observation.

- Cooperation refers to the ability of children to work collaboratively with peers, share roles, follow group rules, and contribute to achieving common goals during learning activities.
- Self-control refers to the ability to regulate emotions and behavior, including waiting for turns, managing impulses, and adhering to agreed rules within the game context.
- Responsibility refers to the willingness to complete assigned tasks, take ownership of roles, and demonstrate accountability for actions during the learning process.
- Empathy refers to the ability to recognize, understand, and respond appropriately to the feelings and needs of others, particularly during cooperative play.

These indicators were assessed using structured observation sheets designed to capture the frequency and quality of behaviors exhibited by participants during multisensory traditional game-based learning activities. Observations were conducted by trained observers to ensure consistency and minimize subjectivity.

Although the measurement focuses on observable behaviors, it is important to acknowledge that such indicators represent external manifestations of character and may not fully capture deeper aspects of moral internalization, such as intrinsic motivation and value-based reasoning. Therefore, the findings should be interpreted as indicative of behavioral tendencies rather than comprehensive character formation.

7.3 How to use traditional games on visually impaired children

In this study, traditional games were systematically adapted into multisensory learning media to serve as an intervention for fostering character education among children with visual impairments in inclusive primary schools in Surabaya. The intervention was conducted over three sessions, each lasting 90 minutes, and structured into three phases: preparation (15 minutes), game implementation (45 minutes), and reflection and closing (30 minutes). This structured design was intended to ensure consistency, active engagement, and opportunities for both behavioral practice and reflective learning.

During the preparation phase, students were organized into small groups of four to six participants to facilitate social interaction and cooperative engagement. Each group was supported by a teacher or assistant acting as both facilitator and observer. Game instructions were delivered using verbal explanation, auditory cues, and tactile demonstration, ensuring accessibility for children with visual impairments. Physical boundaries of the play area were introduced using textured materials such as ropes, wooden blocks, and tactile markers, enabling children to orient themselves spatially through touch. This phase emphasized initial understanding of rules and promoted readiness for participation.

In the implementation phase, children engaged in adapted traditional game activities inspired by the *Engklek* pattern, modified into tactile and auditory pathways. Participants followed patterned trajectories using textured floor arrangements and auditory signals such as bells, claps, or verbal directions. These activities required children to coordinate movement, maintain balance, and respond to directional cues, thereby supporting not only motor and spatial skills but also behavioral regulation and cooperation. Positive reinforcement was provided when children successfully completed tasks, encouraging persistence and engagement.

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To extend beyond behavioral practice, the intervention incorporated audio-based reflective mini-games designed to stimulate moral reasoning. These included guided questions related to everyday social situations (e.g., helping peers, asking politely, responding to challenges), aiming to connect observed behaviors with underlying moral understanding. This component was introduced to address a key concern in character education research—namely, the distinction between behavioral compliance and moral internalization.

The closing phase involved guided reflection facilitated by the teacher. Students were encouraged to discuss their experiences, identify positive behaviors demonstrated during the activities, and reflect on values such as cooperation, patience, and empathy. Feedback was provided in a balanced manner, combining positive reinforcement with constructive guidance. Small rewards (e.g., stickers or symbolic tokens) were used to enhance motivation, while reflective dialogue aimed to strengthen the internalization of character values across contexts.

The intervention integrated two adapted traditional game patterns—flat and mountain *Engklek*—transformed into tactile-auditory play environments using textured pathways and sound markers. This multisensory design ensured accessibility while maintaining cultural relevance. By combining physical engagement, social interaction, and reflective activities, the approach aimed to bridge experiential learning with character development.

However, while this intervention effectively promotes observable prosocial behaviors, it is important to note that such outcomes may not fully represent deep moral internalization. The inclusion of reflective components represents an initial effort to address this limitation, although further longitudinal investigation is required to examine the sustainability of character development over time**.**

7.4 Observation method

This study employed a structured observation method to assess character-related behaviors exhibited by children during multisensory traditional game-based learning activities. Observation was selected as the primary data collection technique because it allows for the direct assessment of observable behaviors in natural learning contexts, which is particularly relevant in early childhood and inclusive education settings. The observation focused on four key indicators of character education—cooperation, self-control, responsibility, and empathy—derived from the theoretical framework of Thomas Lickona (2012) and further supported by virtue-based perspectives from Kristján Kristjánsson (2015). Each indicator was operationalized into specific and observable behavioral descriptors to ensure clarity and consistency in measurement.

Observations were conducted during both the pre-test and post-test phases, as well as throughout the intervention sessions, to capture changes in behavior over time. A team of trained observers, consisting of teachers and research assistants, was involved in recording student behaviors using standardized observation sheets. Prior to data collection, observers participated in a calibration session to ensure a shared understanding of the indicators and scoring procedures. To enhance the validity of the data, the observation instrument underwent content validation through expert judgment, involving specialists in early childhood education and inclusive pedagogy. Reliability was established using inter-rater reliability analysis, calculated through Cohen's Kappa coefficient, indicating a satisfactory level of agreement among observers.

To minimize observer bias, observations were conducted unobtrusively during regular learning activities, and observers followed a consistent protocol across all sessions. In addition, repeated observations were used to improve data stability and reduce the influence of situational factors. Despite these efforts, it is important to acknowledge that observation-based measurement primarily captures external behavioral manifestations and may not fully reflect internal dimensions of character, such as intrinsic motivation or moral reasoning. Therefore, the findings should be interpreted as indicative of behavioral tendencies rather than comprehensive character development.

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8. Results

This section presents the quantitative findings derived from pre-test and post-test observations to examine changes in character-related behaviors among children with visual impairments following the implementation of multisensory traditional game-based learning in inclusive primary schools.

Table 1 shows the comparison of mean scores across four character indicators: tolerance, discipline, self-control, and empathy. The pre-test results indicate that students initially demonstrated relatively low to moderate levels of character-related behaviors across all indicators. Following the intervention, post-test scores increased consistently across all groups and indicators, suggesting a positive shift in observable behaviors.

Table 1

Pre-Test and Post-Test Scores of Character Indicators

Group	T (Tolerance)	D (Discipline)	SC (Self-Control)	E(Empathy)	n
Pre-Test					
A	2.61	2.42	2.18	2.21	20
B	2.54	2.49	2.11	2.09	22
C	2.69	2.56	2.29	2.27	25
Average (Pre)	**2.61**	**2.49**	**2.19**	**2.19**	**67**
Post-Test					
A	3.21	3.05	2.89	2.92	20
B	3.08	3.12	2.76	2.81	22
C	3.32	3.24	3.01	3.05	25
Average (Post)	**3.20**	**3.14**	**2.89**	**2.93**	**67**

The observed increase across all indicators suggests that multisensory traditional game-based learning provides meaningful experiential opportunities that support the development of prosocial behaviors. In particular, improvements in cooperation-related indicators (e.g., tolerance and discipline) indicate that structured group activities encouraged active participation and adherence to shared rules. Similarly, gains in self-control reflect enhanced behavioral regulation during interactive tasks, while increased empathy scores suggest improved social awareness and responsiveness toward peers.

Table 2 presents the mean gain scores and percentage improvements for each indicator. All four indicators demonstrated positive gains, with empathy showing the highest improvement (+0.74; 33.8%), followed by self-control (+0.70; 31.9%), discipline (+0.65; 26.1%), and tolerance (+0.59; 22.6%). The overall mean gain of +0.67 (28.6%) indicates a substantial improvement in character-related behaviors following the intervention.

Table 2

Mean Gain Scores and Percentage Improvements of Character Indicators

Indicator	Pre-Test Mean	Post-Test Mean	Mean Gain	Improvement (%)
Tolerance (T)	2.61	3.20	+0.59	**22.6%**
Discipline (D)	2.49	3.14	+0.65	**26.1%**
Self-Control (SC)	2.19	2.89	+0.70	**31.9%**

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Empathy (E)	2.19	2.93	+0.74	**33.8%**
Average Improvement	—	—	**+0.67**	**28.6%**

These findings indicate that the intervention was particularly effective in enhancing affective-social dimensions (e.g., empathy) and behavioral regulation (e.g., self-control), which are critical components of early character development. The relatively higher improvement in empathy may be attributed to the interactive and cooperative nature of the games, which required children to respond to peers' actions and needs in real time.
Furthermore, paired-sample t-test analysis revealed statistically significant differences between pretest and post-test scores across all indicators ($p < 0.01$). This suggests that the observed improvements are unlikely to be due to chance and are associated with the implementation of the intervention. The magnitude of change, as reflected in the mean gain scores, indicates a meaningful behavioral shift within a relatively short intervention period.
However, it is important to note that these results primarily reflect observable behavioral changes. While the increase in scores indicates improved participation, cooperation, and social responsiveness, these findings do not necessarily confirm the full internalization of moral values. Therefore, the results should be interpreted as evidence of enhanced behavioral tendencies rather than definitive character formation.

9. Discussion

The findings of this study indicate that multisensory traditional game-based learning is associated with significant improvements in character-related behaviors among children with visual impairments in inclusive primary school settings. The observed increases across all indicators—tolerance, discipline, self-control, and empathy—suggest that structured, culturally grounded, and sensory-accessible learning environments can facilitate meaningful social interaction and behavioral engagement.
From a theoretical perspective, these findings align with the framework of Thomas Lickona (2012), which emphasizes that character development involves the integration of moral action through repeated practice in social contexts. The improvement in cooperation-related behaviors, such as tolerance and discipline, reflects the role of shared activities in reinforcing social norms and collective responsibility. Similarly, the increase in self-control supports the idea that structured and rule-based play environments provide opportunities for children to practice behavioral regulation in context.
Furthermore, the relatively higher gains in empathy suggest that multisensory and interactive learning experiences may enhance children's sensitivity to others' needs. This finding is consistent with virtue ethics perspectives proposed by Kristján Kristjánsson (2015), which highlight the importance of habituation and social interaction in developing moral dispositions. The use of auditory cues, tactile pathways, and collaborative tasks appears to have created conditions that enabled children with visual impairments to actively participate and respond to social stimuli, thereby supporting affective dimensions of character development.
Importantly, the integration of reflective mini-games and guided discussion represents a critical pedagogical component in this study. While traditional game-based activities primarily support behavioral engagement, the addition of reflective elements provides an initial pathway toward connecting action with moral understanding. This addresses a key concern in character education research, particularly highlighted by the Jubilee Centre for Character and Virtues, which emphasizes that character education should involve not only behavior but also moral motivation and reasoning.

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However, despite the significant improvements observed, it is essential to interpret these findings with caution. The increase in observable behaviors does not necessarily indicate full moral internalization. As noted in contemporary character education literature, behavioral compliance in structured settings may not always translate into stable character traits across different contexts. The present study did not directly assess intrinsic motivation or the long-term sustainability of these behaviors, which are critical components of genuine character development.

In addition, the findings should be understood within the methodological limitations of the study. The absence of a control group restricts the ability to draw strong causal conclusions, and the relatively short duration of the intervention may limit insights into long-term developmental outcomes. Nevertheless, the consistency of improvements across multiple indicators suggests that the intervention provides a promising foundation for further investigation.

From a practical perspective, this study highlights the importance of designing inclusive, culturally relevant, and multisensory learning environments that enable active participation for children with visual impairments. Traditional games, when appropriately adapted, can serve as effective pedagogical tools that bridge accessibility and character education. For educators, this implies the need to move beyond conventional instructional approaches and incorporate experiential, socially interactive, and reflective learning strategies.

Future research is recommended to extend this work by employing longitudinal designs and mixed-method approaches to explore deeper aspects of character formation, including motivation, value internalization, and transferability across contexts. Expanding the study to diverse educational settings and larger samples would also enhance the generalizability of the findings.

10. Conclusion

This study demonstrates that multisensory traditional game-based learning can be effectively implemented as an inclusive pedagogical approach to support character-related behaviors among children with visual impairments. The findings show consistent and statistically significant improvements across tolerance, discipline, self-control, and empathy, indicating that culturally grounded and sensory-accessible learning environments can enhance prosocial engagement and behavioral regulation. Importantly, this study contributes to the literature by integrating multisensory pedagogy, traditional game-based learning, and character education within inclusive settings. The results highlight that experiential and socially interactive learning environments provide meaningful opportunities for children with visual impairments to participate actively in value-oriented learning processes.

However, the observed improvements primarily reflect behavioral manifestations and do not necessarily indicate full moral internalization. In addition, the absence of a control group and the short duration of the intervention limit the generalizability and causal interpretation of the findings. Future research is therefore recommended to employ longitudinal and mixed-method approaches to examine deeper dimensions of character formation, including intrinsic motivation and sustainability across contexts. Overall, this study suggests that adaptive, culturally relevant, and multisensory learning strategies offer a promising pathway for strengthening inclusive character education practices.

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