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Developing Body Awareness, Social Interaction, and Creativity through Mind Muscle Exercises in Dance Learning: A Case Study at SDN Pulorejo 1 Jombang

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Abstract

Elementary dance education is commonly delivered through imitation and rote memorization, thereby constraining opportunities for children to develop body awareness, social interaction, and creative movement exploration. Although creative dance has been extensively theorized, the integration of mind–muscle exercises as an embodied pedagogical approach in elementary dance learning remains insufficiently examined. This study investigates how mind–muscle exercises facilitate the development of body awareness, social interaction, and creativity among primary school students in dance education. A qualitative case study was conducted at SDN Pulorejo 1 Jombang, involving 26 first-grade students. Data were collected through classroom observations, semi-structured interviews, documentation, and field notes and subsequently analyzed using thematic analysis. The findings indicate that mind–muscle exercises significantly enhanced students' awareness of body parts, movement quality, spatial orientation, and energy regulation, enabling more intentional and confident movement execution. Moreover, the activities fostered meaningful social interaction through processes of imitation, collaboration, negotiation, and collective movement composition. Creativity emerged dynamically throughout the learning process, as students actively explored, modified, recombined, and expressed original movement ideas rather than merely replicating teacher demonstrations. These findings suggest that mind–muscle exercises operate as an effective embodied pedagogical strategy, repositioning the child's body from a passive object of imitation to an active subject of exploration, interaction, and creative expression. This study contributes to the field of elementary dance pedagogy by offering an exploratory, participatory, and body-awareness-oriented instructional model that supports embodied learning and the development of creativity in primary education contexts.

Keywords: Body Awareness; Creativity; Dance Learning; Elementary Education; Embodied Learning; Mind-Muscle Exercise;

1. Introduction

Dance instruction plays a significant role in fostering children's social, emotional, and creative development, alongside the enhancement of both gross and fine motor skills. According to Kotaman, İnceoğlu, and Kotaman [1], early childhood dance programs contribute substantially to the development of children's prosocial behaviors while simultaneously reducing tendencies toward aggression and shyness. This evidence underscores that dance education extends beyond its function as an artistic practice; it operates as a socially embedded educational space in which children learn to interact with others, regulate their behavior, and cultivate a sense of security within a communal context.

Within elementary education, dance instruction is particularly critical in supporting the development of self-awareness, social competence, and creative capacity. It also enhances students' ability to perceive, appreciate, and interpret movement in terms of form, structure, and pattern. Fundamentally, dance entails an understanding of the human body as an expressive and artistic instrument [2]. In primary school contexts, therefore, dance can be conceptualized as an integrative pedagogical space where physical, emotional, and imaginative experiences converge. Consequently, the process of dance learning should not be confined to the acquisition of movement patterns alone, but should instead encompass broader developmental and experiential dimensions [3].

The Merdeka Curriculum positions dance learning in elementary education as a medium for developing creativity, self-expression, collaboration, and cultural appreciation across developmental phases. Rather than emphasizing the reproduction of movement sequences, the curriculum encourages students to explore fundamental dance elements—including body, space, time, and energy—while expressing ideas, collaborating with peers, and creating original movement compositions appropriate to their developmental stage [4]. These learning outcomes suggest that elementary dance education should cultivate bodily awareness, creative exploration, and social participation as interconnected dimensions of learning.

However, classroom practice does not always reflect these curriculum expectations. Previous studies have shown that creative dance and exploratory learning can enhance children's cognitive, psychosocial, and creative development [5], [6]. In contrast, other studies report that dance instruction in elementary schools continues to rely heavily on teacher demonstrations, imitation, and memorization, leaving limited opportunities for students to develop body awareness, movement autonomy, and collaborative creativity [7], [8], [9]. This discrepancy between curriculum expectations and classroom practice indicates the need for pedagogical approaches that better integrate bodily experience, social interaction, and creative movement exploration.

Despite growing interest in creative dance pedagogy, previous research has generally examined body awareness, social interaction, and creativity as separate constructs. Few studies have investigated how these dimensions can be integrated through mind-muscle exercises within elementary dance learning. Consequently, the pedagogical potential of mind-muscle exercises as an embodied learning approach remains insufficiently understood, particularly in supporting children's body awareness, social interaction, and creativity simultaneously.

An analysis of the learning outcomes articulated in the Merdeka Belajar Curriculum indicates that, at the elementary level, dance instruction extends beyond the mere memorization of movement patterns or choreographic sequences. As argued by Jazuli [3], dance education enables children to use their bodies with awareness, develop sensitivity to rhythm, cultivate personal expression, and engage in relational movement. However, in practice, dance education at the primary level remains predominantly imitative. Instruction is frequently delivered through teacher demonstration or voice-over video, with students expected to replicate predefined movements. Such approaches po-

sition learners as passive recipients and constrain their engagement as active subjects in the learning process.

The overreliance on imitation as the dominant pedagogical strategy limits opportunities for experiential learning, embodied exploration, and kinaesthetic awareness. When the body is treated merely as an instrument for reproducing movement, students are restricted in their capacity to regulate movement quality, explore spatial and relational dynamics, and engage meaningfully with peers. Moreover, this approach diminishes opportunities for creative expression, as students are seldom encouraged to generate and develop their own movement ideas.

This issue is particularly consequential given the developmental significance of dance education. Kusumastuti [10] emphasizes that dance serves as a medium for children's creative self-expression. Similarly, Yudaparmita [11] highlights that movement-based activities facilitate children's understanding of movement quality, spatial awareness, and social relationships. In line with these perspectives, Jazuli [3] and R. Dewi *et al.* [12] assert that dance provides a critical platform for social development through interactive and creative learning processes. Collectively, these insights underscore the need to reorient dance pedagogy toward more participatory, exploratory, and learner-centered approaches.

Creative dance learning in elementary education has been widely studied as an approach that enables children to engage more actively, socially, and reflectively in learning. Konstantinidou [5], found that creative dance programs in elementary schools have the potential to support children's cognitive and psychosocial development. Payne and Costas [6], also describe creative dance as a form of experiential learning because it involves the body, emotion, social experience, and reflection in the learning process. Therefore, dance learning in elementary schools should not be limited to choreography mastery but should also promote bodily experience, social interaction, and student creativity [6]. Research has also shown that creative dance fosters cognitive and psychosocial development [13]. According to Konstantinidou's systematic review, studies that incorporate creative dance in primary education go beyond movement competencies and include learning encounters, programs, participants, and developmental milestones [5], [14]. The notion of creativity in dance education extends beyond the final product and should encompass teaching processes, learning challenges, and students' creative experiences [15], [16].

In this study, mind-muscle exercise is used to cultivate body consciousness in dance education. This term extends its original use in physical exercise and sports training to refer to the attentional focus on specific muscles during specific movements. Paoli *et al.* [17] state that verbal guidance, instructing an individual to focus on specific muscles, can result in those muscles being activated during an exercise session, though it is important to note that muscle activation is contingent on the muscle and the type of movement. In this study, mind-muscle exercise is not considered an exercise or a form of fitness training. Rather, it is adapted, and intentionally so, as a dance pedagogy in the form of a body-awareness practice that integrates mental focus, muscle sensation, movement regulation, and expression. Through this approach, dance learning does not begin with memorizing choreography but with body recognition. Students have the opportunity to engage in numerous activities, including mindful breathing, body-part identification, movement differentiation, energy modulation, and stimulus-based movement improvisation. This is valuable for children, as they are taught how to carry out a movement, how the body feels movement, and how it produces movement. This is synonymous with the elementary sector, where music and movement can be viewed as teaching strategies promoting the overall development of the child. Del Barrio and Arus [18], indicate that the combined movement and music pedagogy supports children's physical, cognitive, and emotional development while fostering inclusivity. Hence, the framework of embodied learning is appropriate for dance learning that incorporates the mind-muscle connection, the integration of movement and rhythm, and learners' emotional and social experiences.

Within school contexts, dance should be understood as a learning activity rather than merely a performance activity [19]. Mattsson and Pastorek Gripson [20], show that dance can be constructed as a learning activity within educational settings, although it is often still shaped by how teachers perceive its role in schools. Therefore, dance learning at SDN Pulorejo 1 Jombang needs to be analyzed not only in terms of choreographic outcomes, but also in terms of how students learn through their bodies, social interaction, and creative processes.

Previous studies on children's dance learning have largely focused on teaching methods, movement skill development, artistic appreciation, or creativity more broadly [7], [21], [22], [23]. However, research specifically examining how children's body awareness develops through practices that emphasize the relationships among muscles, attention, movement control, and social experience in dance learning remains limited. Social interaction in dance learning has not been widely analyzed as part of embodied and creative processes. Children's creativity in dance is often evaluated only through final performance outcomes rather than through movement exploration processes. Likewise, mind-muscle exercise has rarely been examined within the context of elementary school dance learning. Furthermore, the relationship between bodily exploration, social interaction, and children's creativity in elementary school dance learning remains underexplored through an integrated case study perspective.

The present study is grounded in the perspective of embodied learning, which views learning as emerging through the interaction between bodily experience, cognition, and social participation. Within this perspective, mind-muscle exercises function as the initial pedagogical stimulus that directs students' attention toward bodily awareness. Enhanced body awareness enables children to regulate movement, recognize spatial relationships, and intentionally explore movement qualities. These embodied experiences subsequently facilitate social interaction through imitation, collaboration, negotiation, and collective movement creation. Ultimately, continuous bodily exploration and social engagement foster children's creativity by encouraging movement variation, improvisation, and original expression.

This study is grounded in the conceptual integration of mind-muscle exercises and dance pedagogy, with a specific focus on students at SDN Pulorejo 1 Jombang. It centers on three interrelated dimensions: the child's body, social interaction, and creativity. The study addresses the following research questions: (1) How are mind-muscle exercises implemented in dance learning at SDN Pulorejo 1 Jombang? (2) In what ways does this practice enhance children's bodily awareness? (3) What forms of social interaction emerge during the learning process? and (4) How is creativity stimulated through embodied exploration?

The objectives of this research are to describe the implementation of mind-muscle exercises in dance instruction, to analyze the development of children's body awareness, to examine patterns of social interaction among students, and to elucidate the role of creativity in active movement exploration. The novelty of this study resides in positioning mind-muscle exercises as a distinct pedagogical approach within elementary dance education. It conceptualizes dance not merely as a choreographic outcome, but as an embodied process encompassing experience, interaction, and creative production.

Furthermore, this study advances the argument that dance learning grounded in mind-muscle exercises reconfigures the child's body from a passive object of imitation into an active subject of experience, social engagement, and creative expression. In contrast to conventional approaches that prioritize the reproduction of final choreographic forms, this study foregrounds the processes through which children perceive, regulate, respond to, and generate movement.

2. Methods

2.1 Research Approach and Design

As noted by Assyakurrohim *et al.* [24], this study employed a qualitative approach within a case study design. A qualitative methodology was deemed most appropriate given the study's exploratory objectives and its emphasis on capturing participants' lived experiences. The selection of a case study design provided a robust framework for examining the phenomenon in depth, with careful attention to contextual conditions and the integration of multiple data sources to ensure a comprehensive and credible interpretation.

The study sought to investigate the dynamics of the dance learning process, including the implementation of mind-muscle exercises, within an authentic educational setting. This was facilitated through engagement with a real-world context, namely an elementary school environment. The research was conducted at a single site, SDN Pulorejo 1 Jombang, allowing for a focused and contextually grounded analysis. Accordingly, the case study design enabled the researcher to capture nuanced dimensions of dance learning, including students' embodied experiences, patterns of social interaction, and the processes underlying the development of creative movement.

2.2 Research Site and Subject

The research was done at SDN Pulorejo 1, Jombang. The selection of this school was based on its pedagogical environment, which enables students to engage in movement exploration and collaborative group work to create movement sequences. Furthermore, the site provides a relevant context for examining how elementary dance learning can be enacted through a body-awareness-oriented approach grounded in mind-muscle exercises. The participants of the study included students engaged in dance learning, the teacher who taught Arts, Culture, and Craft (*Seni Budaya dan Prakarya*), and other informants such as the school principal. For students, the participants were 26 first-grade students.

2.3 Sampling Technique

This study employed purposive sampling, a non-probability sampling technique widely utilized in qualitative case study research to select participants with rich, relevant, and experience-based insights aligned with the research objectives [25]. Participants were intentionally selected because they had direct experience in implementing mind-muscle exercises in elementary dance learning at SDN Pulorejo 1 Jombang.

The study involved 28 participants, with 26 first-grade students, one dance teacher, and one school principal. The first-grade students were selected because they participated continuously in the mind-muscle-based dance learning activities throughout the research period. The dance teacher was selected because she designed and implemented the learning activities and had comprehensive knowledge of the instructional objectives, learning procedures, and students' development. The school principal was included to provide contextual information regarding the implementation of arts education within the school.

The inclusion criteria were as follows: (1) students who actively participated in the complete dance learning program; (2) the teacher who facilitated the mind-muscle-based dance instruction; and (3) the school principal who understood the school's arts education policies and learning environment. This sampling strategy enabled the researchers to obtain multiple perspectives and enhance the credibility of the findings through data triangulation.

Table 1. Participant

Participant	Number	Role in the Study
First-grade students	26	Primary participants in mind-muscle-based dance learning
Dance teacher	1	Implemented and facilitated the learning activities
School principal	1	Provided contextual information about arts education implementation
Total	28	

2.4 Data Collection

Research data were collected from observations, interviews, documentation, and field notes [26]. Data collection was carried out over a period of 1 year. The objective of the observation for this study was to analyze the processes of learning dance, the exercises that stimulate the mind and muscles, students' bodily responses, social behavior, and the creativity of movement that emerged during the learning process. The observation was primarily focused on students' bodily readiness and on the preparation before dancing, the responses of students to the awareness of their body parts, volume, and movement readiness and responsiveness, the responses to the instructor, and the diverse expressions of interactions and dance movements that were elaborated within the learning process.

Table 2. Focus of Dance-Learning Observation

Observation Aspect	Indicator	Data Source
Growing Awareness	Identify body parts, regulate physical energy, and understand movement space	Observation, student's interview, documentation
Social interaction	Imitating, responding, collaborating, and negotiating	Observation, teacher's interview, documentation
Creativity	Creating movement variations, modifying movement, and composing movement sequences	Observation, teacher's interview, documentation

Semi-structured interviews were conducted with both the teacher and students to obtain in-depth insights into the learning process, including students' behavioral engagement, collaborative dynamics, challenges encountered, and the processes underlying movement creation. Teacher interviews, in particular, focused on the pedagogical objectives of dance instruction, the rationale for incorporating mind-muscle exercises, observed behavioral changes among students, instructional challenges, and the forms of creativity manifested during the learning activities. For student interviews, the questions were about their experiences with the exercises, which body parts were easiest and hardest to move, their feelings during the movements, their experiences with peer work, and their experiences creating movements.

Documentation included teaching modules or lesson plans (RPP), photographs of classroom activities, learning videos, teacher notes, and student movement compositions. Field notes were used to capture occurrences that were not fully articulated in interviews. This included facial expressions and spontaneous gestures, as well as the classroom atmosphere, body responses, and group dynamics.

2.5 Research Instrument

In this study, the researcher functioned as the primary instrument, responsible for determining the focus of observation, conducting interviews, recording data, and interpreting the findings. To support the data collection and analysis processes, several auxiliary instruments were employed, including structured observation protocols, documentation sheets, interview guides, and a thematic analysis matrix.

2.6 Data Analysis

This study used the Miles, Huberman, and Saldana data analysis framework, employing their three techniques: data condensation, data display, and conclusion drawing/verification. The study employed various methods of data collection, such as participant observation, interviews, document analysis, and the researcher's field notes. The collected data were transcribed, and data condensation occurred through selection, focus, and simplification, in line with the study's aims and objectives. To organize the collected data, the researcher employed coding and grouped the codes into thematic categories. This analysis was intended to discern relational patterns of body awareness, social interaction, and children's creativity in dance learning stimulated by the mind-muscle exercise. The data were structured in a thematic narrative form, and patterns were discerned and inferences made.

2.7 Data Trustworthiness

Several methods were used to assess data reliability. These included prolonged engagement, member checking with the teacher, peer discussions, and various forms of triangulation. Source triangulation involves gathering data from multiple sources to identify potential discrepancies. In this situation, data from students and teachers, along with various documents related to the learning activity, were compared. Triangulation involves observing findings from multiple methods, in this case, observations, interviews, documents, and field notes, to identify if there is consistency among findings.

2.8 Research Ethics

The intention of this study on elementary school children demanded attention to ethics at every study level. Ethics included obtaining school approval and teacher permission; student identities were kept confidential; students' real names were replaced with pseudonyms; video and photo documentation were for research purposes only; students were not pressured to respond to questions or perform movements; and students were safe and well throughout the study.

3. Results and Discussion

3.1 Results

The thematic analysis generated five major themes derived from observations, interviews, field notes, and documentation. These themes are presented in Table 2.

Table 3. Themes and Coding Categories Derived from Thematic Analysis

Theme	Coding Categories	Data Sources
Learning Context	Student-centered learning; Active participation; Imitation-oriented learning; Exploratory learning	Observation, Teacher Interview, Field Notes

Implementation of Mind-Muscle Exercises	Body preparation; Body awareness; Guided movement; Imaginative exploration; Collaborative movement creation	Observation, Teacher Interview
Body Awareness	Body recognition; Spatial awareness; Movement control; Confidence	Observation, Teacher
Student Interview		
Social Interaction	Collaboration; Peer learning; Negotiation; Mutual respect	Observation, Interviews
Creativity	Movement exploration; Originality; Imagination; Creative expression	Observation, Interviews, Documentation

3.1.1 Context of Dance Learning at SDN Pulorejo 1 Jombang

The thematic analysis identified the learning context as the initial theme describing the implementation of dance learning before students developed body awareness, social interaction, and creativity. Three coding categories emerged from the data: (1) learning environment, (2) differences in student participation, and (3) transition from imitation to exploratory learning.

Coding Category 1. Learning Environment

Classroom observations showed that dance learning at SDN Pulorejo 1 Jombang formed part of arts education activities designed to introduce students to movement, rhythm, expression, and teamwork. Learning activities were conducted in several settings, including the classroom for introductory activities, the schoolyard, and the school's open-stage area for movement exploration and group performances. All twenty-six first-grade students participated throughout the learning process.

The interview with the classroom teacher corroborated that the instructional design was deliberately structured around a student-centered approach, wherein the teacher assumed the role of facilitator rather than serving as the primary source of knowledge.

"Anak-anak bisa lebih eksplor. Guru berusaha menahan untuk tidak langsung memberi tahu. Saya hanya memberikan contoh untuk memancing ide-ide mereka." (Teacher T1)

This statement indicates that learning activities were deliberately organised to provide opportunities for students to construct movement ideas independently through guided exploration.

Coding Category 2. Differences in Student Participation

Observation data revealed considerable variation in students' participation during dance learning. Some students confidently followed movement activities from the beginning, whereas others hesitated and tended to observe their classmates before participating. These differences became particularly visible during group movement exploration conducted outdoors. The teacher described similar observations during the interview:

"Ada yang bisa langsung mengikuti irama, tetapi ada juga yang masih menunggu temannya terlebih dahulu sebelum bergerak." (Teacher T1)

She further explained that students possessed different levels of confidence, movement coordination, and learning readiness, requiring differentiated support throughout the learning process. These findings suggest that first-grade students demonstrate heterogeneous movement abilities and participate at different levels during exploratory dance activities.

Coding Category 3. Transition from Imitation to Exploratory Learning

Initial classroom observations showed that students generally perceived dance learning as an activity of reproducing the teacher's demonstrated movements. During teacher-led demonstrations, most students copied the movements without attempting to modify or create alternative forms.

However, students' responses changed when the teacher introduced open-ended exploratory prompts such as *"Move your hands as if they were blown by the wind"* or *"How would it feel to press your feet firmly against the floor?"* Rather than immediately copying the teacher, students began experimenting with different gestures, body positions, and movement qualities.

This finding was reinforced by the teacher's explanation: *"Biasanya anak-anak hanya mencontoh. Hari ini mereka membuat gerakan sendiri karena saya hanya memberikan stimulus, sedangkan ide geraknya berasal dari mereka."* (Teacher T1)

The teacher also observed that this approach encouraged greater interaction than conventional dance lessons.

"Anak-anak lebih mudah memahami pembelajaran karena mereka mengeksplor sendiri. Mereka lebih banyak bertanya dan lebih interaktif dibandingkan pembelajaran yang hanya mencontoh." (Teacher T1)

Overall, these findings demonstrate that the learning context gradually shifted from an imitation-oriented approach toward exploratory dance learning, providing the pedagogical foundation for implementing mind-muscle exercises in subsequent learning activities.

3.1.2 Implementation of Mind-Muscle Exercises in Dance Learning

Thematic analysis identified the implementation of mind-muscle exercises as the second theme describing how the learning strategy was applied in the classroom. Four coding categories emerged from the data: (1) body preparation, (2) body awareness through guided movement, (3) imaginative movement exploration, and (4) collaborative movement creation (Table 3).

Coding Category 1. Body Preparation Observational data indicated that

Observational data indicated that each dance lesson commenced with preparatory activities aimed at readying students both physically and mentally prior to engaging in movement execution. Rather than initiating instruction with choreographic practice, students were guided to regulate their breathing, adopt a comfortable posture, and direct their attention to specific parts of the body. The teacher facilitated students' awareness of the positioning of their feet, hands, shoulders, and head before initiating movement.

The teacher explained: *"Sebelum anak-anak mulai menari, mereka diajak mengenali tubuhnya terlebih dahulu. Kami mulai dari bernapas, kemudian merasakan posisi kaki, tangan, dan tubuh agar mereka siap bergerak."* (Teacher T1)

Field notes indicated that these introductory activities helped students become calmer and more focused before participating in movement exploration.

Coding Category 2. Body Awareness through Guided Movement Observations further revealed that students were gradually introduced to body awareness by isolating and exploring individual body parts. The teacher did not ask students to memorize movement sequences but instead encouraged them to discover how different body parts could produce various movement qualities. Students experimented with movements using their hands, shoulders, feet, knees, and head while varying movement speed, energy, and direction.

The teacher described this approach as follows:

"Saya tidak langsung mengajarkan rangkaian gerak. Anak-anak diberi kesempatan mengenali bagian tubuhnya dan mencoba berbagai kemungkinan gerak yang mereka rasakan sendiri." (Teacher T1)

Several students initially relied on the teacher's demonstration, but after repeated practice they became more confident in producing movements independently.

Coding Category 3. Imaginative Movement Exploration

As students developed increasing familiarity with their bodies, observational data indicated that movement activities progressively integrated elements of imagination. The teacher introduced open-ended movement prompts derived from familiar objects and natural phenomena, such as wind-blown leaves, flowing water, birds, and everyday experiences. Rather than reproducing uniform movements, students interpreted these stimuli in diverse ways, resulting in a wide range of movement responses.

According to the teacher:

"Saya hanya memberikan stimulus, misalnya daun tertiup angin atau burung yang terbang. Selebihnya anak-anak bebas mengembangkan gerakannya sesuai imajinasi mereka." (Teacher T1)

Observation records showed that each group generated different movement patterns despite receiving the same stimulus, indicating that students were actively exploring their own ideas.

Coding Category 4. Collaborative Movement Creation

The final implementation stage involved collaborative movement composition. Students worked in small groups to discuss, select, and arrange movements into short dance sequences before presenting their work to the class. During these activities, students negotiated movement choices, shared ideas, and provided feedback to one another. The teacher explained:

"Anak-anak berdiskusi menentukan gerakan yang akan dipakai. Mereka saling memberi masukan sebelum akhirnya menampilkan hasil kelompoknya." (Teacher T1)

Field observations also showed that classroom discussions after each performance encouraged students to appreciate their peers' work while reflecting on their own movement ideas.

Overall, observation and interview data indicate that the implementation of mind-muscle exercises progressed through sequential learning activities beginning with body preparation, followed by body awareness, imaginative movement exploration, and collaborative movement creation. Rather than emphasizing movement imitation, these activities encouraged students to develop awareness of their bodies while actively constructing movement experiences through exploration and interaction.

3.1.3 Child's Body Awareness in Dancing Learning

Thematic analysis identified body awareness as one of the major learning outcomes of mind-muscle-based dance learning. Four coding categories emerged from the analysis: body recognition, movement quality, spatial awareness, and movement confidence (Table 3).

Observation data showed that students gradually recognized their bodies as the primary source of movement. During the initial learning sessions, several students moved spontaneously without consciously identifying which body parts were involved. As the learning activities progressed, students became increasingly aware of the movements performed by their hands, feet, shoulders, head, and other body parts. This awareness was reflected in their attention to hand direction, foot placement, body posture, and the pressure exerted against the floor during movement activities.

The interview findings supported these observations. The classroom teacher explained that students became more aware of their own bodies after participating in body exploration activities. She also observed that some students who initially had difficulty distinguishing right and left directions gradually became more confident in identifying body positions and coordinating their movements during group activities.

Observation data further indicated that students developed greater control over movement quality. When instructed to perform strong movements, they responded with firmer steps, increased body pressure, and more energetic arm movements. Conversely, when asked to perform gentle movements, they naturally reduced movement intensity, slowed their tempo, and produced softer gestures. These observations suggest that students were beginning to differentiate movement qualities according to the intended expressive purpose.

Another noticeable change was students' spatial awareness during movement activities. At the beginning of the learning process, several students frequently moved without considering the position of their classmates. However, repeated exploration activities enabled students to adjust their movement direction, maintain appropriate distances, and coordinate their positions during group performances. Classroom observations showed fewer collisions and better movement coordination as the learning progressed.

Interview data further indicated notable improvements in students' confidence in expressing movement ideas. According to the teacher, several students who were typically reserved during classroom activities demonstrated increased willingness to explore movement and perform in front of their peers. The exploratory learning environment enabled students to engage in movement according to their individual capacities, without the pressure to replicate uniform movements or compete with classmates.

Overall, the combined findings from observations and interviews suggest that mind-muscle exercises contributed to the development of children's body awareness by enhancing bodily recognition, movement quality, spatial awareness, and confidence in expressive movement during dance learning.

3.1.4 Student's Social Interaction in Dancing Learning

Thematic analysis identified social interaction as the second major learning outcome of mind-muscle-based dance learning. Four coding categories emerged from the analysis: imitation, collaborative interaction, movement negotiation, and peer support (Table 2).

Coding Category 1. Imitation as an Initial Learning Strategy

Observation data showed that imitation was the initial form of interaction displayed by students during dance learning. At the beginning of the activities, many students carefully observed the teacher's demonstrations before attempting the movements. Some students also watched their classmates before performing the same movement. However, imitation did not simply involve copying movements. During repeated practice, students began to modify the movements they observed by adjusting the direction, tempo, and body position according to their own understanding. The classroom teacher explained that imitation served as a natural starting point for first-grade students before they gradually developed the confidence to explore their own movement ideas.

Coding Category 2. Collaborative Interaction

As the learning activities progressed, students demonstrated increasing collaboration during paired and group activities. Classroom observations showed that students adjusted their movement tempo, body position, and spacing to match their peers while performing group movement sequences. They frequently waited for one another, coordinated movement timing, and responded to changes made by other group members to maintain the flow of the performance. The teacher noted that students

became more willing to cooperate because movement exploration required them to complete the activities together rather than individually.

Coding Category 3. Movement Negotiation

Observation data further revealed that group discussions became an important part of the creative process. When students were asked to arrange movement sequences, they actively exchanged ideas, selected preferred movements, modified suggestions, and agreed on the final choreography through discussion. Rather than accepting a single movement immediately, students negotiated different possibilities before deciding collectively. The interview findings indicated that this process encouraged students to express opinions, appreciate different ideas, and reach shared decisions during movement creation.

Coding Category 4. Peer Support Another significant finding was the emergence of peer support during the learning process. Students who demonstrated higher levels of confidence frequently assisted their peers who were more hesitant by modeling movements, offering encouragement, and engaging in joint practice. Observational data indicated that such peer support reduced students' anxiety and increased their willingness to participate in group performances.

The classroom teacher further explained that collaborative learning fostered a sense of comfort among students, as responsibility for performance was distributed across group members rather than borne individually. This shared responsibility contributed to a more inclusive and supportive learning environment.

Overall, the combined findings from observations and interviews suggest that students' social interaction evolved progressively from simple imitation to more complex forms of collaboration, negotiation, and peer support. Throughout the learning process, communication was predominantly mediated through coordinated bodily movements, shared movement experiences, and collective decision-making. These interactions enabled students to construct meaningful social relationships while actively engaging in dance learning.

3.1.5 Child Creativity in Exploring Movement

Thematic analysis identified creativity as the third major learning outcome of mind-muscle-based dance learning. Five coding categories emerged from the analysis: movement exploration, movement variation, imagination, collaborative creativity, and creative expression (Table 3).

Coding Category 1. Movement Exploration

Observation data showed that students gradually became more willing to explore movement independently. During the initial learning sessions, most students depended on the teacher's demonstrations. As the learning activities progressed, students began experimenting with different ways of moving without waiting for direct instructions. They explored various possibilities by changing body positions, movement directions, and movement dynamics according to their own ideas.

The classroom teacher explained that students became more confident in discovering movement ideas after they were given opportunities to explore rather than simply imitate predetermined dance sequences.

Coding Category 2. Movement Variation

Students demonstrated creativity by producing multiple variations from a single basic movement. Observation records showed that simple movements, such as stepping or hand gestures, were developed into different forms by modifying tempo, direction, body rotation, movement level, and energy. For example, a hand movement was interpreted differently by each student through waving, rotating, opening, closing, or curved movements instead of reproducing identical gestures demonstrated by the teacher.

These observations indicated that students were beginning to generate original movement variations based on their own bodily experiences.

Coding Category 3. Imagination

Another important finding was the use of imagination during movement exploration. When the teacher introduced open-ended stimuli based on everyday experiences and natural phenomena, students responded by creating movements that reflected their individual interpretations. Some students expressed the movement of leaves blowing in the wind, while others represented birds, flowing water, playful activities, or emotional expressions through body movement.

The interview findings confirmed that imaginative stimuli encouraged students to transform personal experiences into meaningful dance movements rather than relying solely on teacher demonstrations.

Coding Category 4. Collaborative Creativity

Creativity also emerged during collaborative movement composition. Observation data showed that students discussed movement ideas, selected preferred movements, modified suggestions, and combined individual ideas into short group choreographies. Throughout this process, students continuously adapted their own movements to accommodate ideas proposed by their classmates while maintaining the originality of the group performance. The classroom teacher explained that collaborative activities encouraged students not only to generate movement ideas independently but also to appreciate and develop ideas contributed by other group members.

Coding Category 5. Creative Expression

The final coding category reflected students' ability to express movement ideas confidently during classroom performances. Rather than reproducing uniform choreography, students demonstrated diverse movement styles, expressive qualities, and personal interpretations. Observation records indicated that creativity was evident throughout the learning process, beginning with movement exploration, continuing through experimentation and revision, and culminating in the presentation of movement sequences created individually and collaboratively.

Overall, the observation and interview findings indicate that mind-muscle-based dance learning promoted children's creativity by encouraging movement exploration, generating movement variations, stimulating imagination, supporting collaborative creativity, and strengthening individual creative expression throughout the learning process.

3.1.6 Integrated Relationship among Body Awareness, Social Interaction, and Children's Creativity

The thematic analysis revealed that body awareness, social interaction, and creativity were dynamically interconnected throughout the implementation of mind-muscle-based dance learning. Rather than constituting discrete outcomes, these three dimensions developed progressively and exerted reciprocal influence during the learning process.

Observational data indicated that the emergence of creativity was preceded by the development of students' body awareness. As students became increasingly familiar with their body parts, movement quality, and spatial orientation, they demonstrated greater confidence in exploring novel movement possibilities. Those who initially relied on imitating the teacher gradually began to experiment with their own movement ideas and exhibited increased willingness to express them during classroom activities.

The findings further suggest that enhanced body awareness facilitated more effective social interaction. As students gained greater control over their movements, they engaged more confidently with peers in paired and group activities. Observations showed that students progressively adjusted

movement tempo, body positioning, and spatial alignment in response to the actions of others, indicating an emerging sensitivity to relational dynamics.

Moreover, collaborative interaction played a critical role in fostering creativity. During group choreography tasks, students exchanged ideas, negotiated alternatives, and integrated individual contributions into collective movement sequences. This process enabled the co-construction of creative outcomes, whereby innovation emerged not only from individual exploration but also from shared dialogue and collaboration.

Overall, the findings indicate a progressive and interdependent relationship among the three themes. Body awareness functioned as a foundational condition for movement exploration, social interaction enriched experiential learning through collaboration, and together these processes facilitated the development of children's creativity within the context of dance learning.

Table 4. Integrated Themes Derived from Thematic Analysis

Theme	Main Findings	Relationship with Other Themes
Body Awareness	Students recognized body parts, movement quality, spatial orientation, and movement confidence.	Became the foundation for movement exploration and participation in group activities.
Social Interaction	Students learned through imitation, collaboration, negotiation, and peer support.	Strengthened movement exploration and facilitated the exchange of creative ideas.
Creativity	Students generated movement variations, interpreted imaginative stimuli, and developed original movement sequences individually and collaboratively.	Emerg ed from the integration of body awareness and collaborative interaction.

The integrated findings indicate that mind-muscle exercises did not influence only one aspect of learning. Instead, they simultaneously promoted bodily awareness, collaborative participation, and creative movement exploration, forming an interconnected learning process throughout elementary dance education.

3.2 Discussion

3.2.1 Mind-Muscle as a Pedagogical Approach in Dance Learning

The findings of this study demonstrate that mind-muscle exercises functioned as an introductory pedagogical strategy that prepared children physically, cognitively, and emotionally before engaging in dance learning. The implementation of these exercises enabled students to regulate their attention, recognize body parts, control movement quality, and gradually shift from imitating the teacher's movements toward exploring their own movement possibilities. Rather than serving merely as a physical warm-up, mind-muscle exercises created a learning environment in which students became more aware of their bodies and more confident in expressing movement.

These findings extend the concept of the mind-muscle connection introduced by Paoli et al. [17]. In sports science, the mind-muscle connection refers to the relationship between attentional focus and the activation of specific muscle groups during physical exercise. The present study applies this principle within elementary dance education by emphasizing conscious attention to body movement instead of muscular performance. In this context, mind-muscle exercises function as a pedagogical

strategy that encourages children to experience movement intentionally through body awareness, movement quality, energy regulation, and expressive exploration.

The transition observed in this study from imitation-based learning to exploratory movement is also consistent with previous studies on dance pedagogy. Conventional dance instruction often relies on demonstration and imitation, where students reproduce movements modelled by the teacher [8], [9]. Although demonstration remains an important instructional strategy, the present findings suggest that it should serve as an initial stimulus rather than the sole learning approach. When children were provided with opportunities to explore movement independently, they generated diverse movement responses based on their own bodily experiences instead of merely reproducing predetermined choreography.

This finding is consistent with the principles of creative dance learning, which position learners as active participants in constructing movement experiences [27]. Previous studies have reported that exploratory dance learning contributes to children's cognitive, emotional, and psychosocial development by encouraging experimentation, imagination, and self-expression [6], [13]. The present study supports these findings by showing that movement exploration emerged after students first developed body awareness through mind-muscle exercises, suggesting that bodily awareness serves as a foundation for creative movement learning.

A distinctive contribution of this study lies in the integration of mind-muscle exercises into elementary dance pedagogy as a systematic instructional approach. Previous research has largely examined the mind-muscle connection within the domain of physical training or conceptualized creative dance as an exploratory pedagogical model. This study advances the literature by bridging these perspectives, demonstrating that mind-muscle exercises can operate as an embodied pedagogical framework that simultaneously develops body awareness, facilitates social interaction, and fosters children's creativity within a unified learning process.

This integrative perspective offers a substantive contribution to elementary dance education by reconceptualizing the body not merely as an instrument for movement execution, but as the foundational medium through which meaningful, participatory, and creative learning is enacted.

3.2.2 The Child's Body as a Subject of Learning Experience

The findings of this study indicate that children's body awareness developed progressively through mind-muscle exercises. Students gradually recognized different body parts as sources of movement, distinguished movement qualities such as strong and gentle actions, adjusted their movements within shared space, and demonstrated greater confidence in expressing movement ideas. These findings suggest that children did not merely reproduce movement patterns but actively constructed movement knowledge through direct bodily experience.

This finding supports the view that the child's body should be understood not as an object for reproducing choreography but as an active subject of learning. Throughout the learning process, children experienced, interpreted, selected, and expressed movement through their own bodily engagement. Activities such as regulating breathing, sensing body position, exploring movement qualities, and responding to spatial relationships enabled students to construct knowledge simultaneously through cognitive, physical, and sensory experiences.

These findings are consistent with the perspective advanced by Cappello, Anttila, and Cañabate [28], who conceptualize the body as a learning space within movement-based performing arts. Their notion of embodied learning underscores that bodily experience enhances students' cognitive understanding, emotional engagement, and processes of meaning-making. The present study extends this perspective by demonstrating that body awareness can be deliberately cultivated through structured mind-muscle exercises before engagement in movement exploration. Rather than serving merely as

preparatory activities, these exercises functioned as an integral component of the learning process itself.

The findings also align with the concept of somatic movement literacy proposed by Buono [29], which emphasizes children's capacity to derive meaning through bodily experiences instead of viewing the body merely as a biological structure. In the present study, students learned to recognize body parts, regulate movement energy, distinguish movement qualities, and interpret spatial relationships through repeated bodily exploration. These experiences indicate that body awareness develops through active movement rather than through verbal explanation alone.

Similarly, Magalhães [30] argues that somatic techniques in dance education encourage learners to move beyond simple imitation toward intentional and meaningful bodily understanding. The present findings support this argument by showing that students gradually shifted from copying the teacher's demonstrations to exploring movement independently based on their own bodily awareness. As students became more familiar with their bodies, they demonstrated greater confidence in creating movement variations and responding to different movement stimuli.

A distinctive contribution of this study lies in demonstrating how mind-muscle exercises can operationalize embodied and somatic learning within elementary dance education. While previous studies have discussed embodied learning and somatic movement literacy conceptually, the present study provides empirical evidence that systematic attention to breathing, body recognition, movement quality, and spatial awareness can become practical pedagogical strategies for developing children's bodily understanding. These findings reinforce the idea that body awareness is not only a prerequisite for dance performance but also the foundation for children's movement exploration, social participation, and creative expression during dance learning.

3.2.3 Dance as a Space for Social Interaction

The findings of this study indicate that mind-muscle-based dance learning promoted students' social interaction through a gradual process of imitation, collaboration, movement negotiation, and peer support. Initially, students relied on observing and imitating the teacher's or their classmates' movements. As learning progressed, they became increasingly capable of adjusting movement tempo, spatial positioning, and body coordination while working in pairs or groups. During collaborative choreography activities, students exchanged ideas, discussed movement choices, and collectively arranged movement sequences, demonstrating that social interaction became an essential part of the learning process rather than merely a consequence of group work.

These findings suggest that dance learning provides opportunities for children to develop nonverbal communication through bodily interaction. Rather than communicating only through spoken language, students learned to interpret peers' movements, coordinate their own actions, respond to changes in group movement, and negotiate shared decisions during movement creation. The findings therefore support the learning outcomes of the Merdeka Curriculum for Phase A, which emphasize communication, collaboration, respect for others, and the responsible use of body, space, and time in dance learning.

The present findings are consistent with Anderson and Mathews [31], who argue that dance and movement-based learning can effectively support diverse learners by creating inclusive opportunities for participation and expression. Similarly, the present study found that collaborative movement activities enabled students with different levels of confidence and movement ability to participate meaningfully in shared learning experiences. Rather than emphasizing technical performance, mind-muscle-based learning encouraged each child to contribute according to individual abilities while remaining actively engaged in group interaction.

The development of social interaction observed in this study also aligns with the findings of Koch

et al. [32], who reported that dance movement interventions contribute positively to interpersonal relationships, psychological well-being, and psychomotor development. Although Koch et al. focused primarily on therapeutic contexts, the present findings demonstrate that similar interpersonal benefits can emerge within elementary dance education through structured movement exploration and collaborative learning activities.

Likewise, Shuper-Engelhard and Vulcan [33] explain that group dance movement activities create opportunities for emotional expression, play, and social connection among children. In the present study, collaborative movement exploration enabled students not only to express movement ideas but also to build supportive relationships with peers, reduce hesitation during performances, and gain confidence through shared creative experiences.

The findings further support the work of Pereira and Marques-Pinto [34], who reported that educational dance programs strengthen students' social and emotional competencies, including self-management and interpersonal relationships. Similarly, Twiner, Lucassen, and Tatlow-Golden [35] demonstrated that creative dance facilitates emotional understanding through interaction with peers, music, and bodily representation. The present study extends these findings by showing that social interaction emerged through continuous negotiation of movement ideas, shared decision-making, and collective choreography development rather than through verbal communication alone.

Finally, the concept of *dancemblage* proposed by Engdahl and Ceder [36] provides an important perspective for interpreting these findings. Their framework emphasizes that movement exploration is shaped by interactions among the body, space, materials, peers, and the broader learning environment. The present study supports this perspective by demonstrating that students' social interaction developed not only through peer collaboration but also through their engagement with classroom space, teacher guidance, movement stimuli, and the collective learning atmosphere created during mind-muscle-based dance activities.

A distinctive contribution of this study is the demonstration that social interaction in elementary dance learning develops progressively from body awareness to collaborative movement creation. Rather than viewing collaboration as an additional classroom activity, the findings suggest that bodily awareness serves as the foundation for meaningful social participation. Through mind-muscle exercises, children first learned to understand and regulate their own movements before coordinating them with others, thereby strengthening communication, cooperation, and collective creativity within the dance learning process.

3.2.4 Creativity as an Embodied and Social Process

The findings of this study indicate that children's creativity developed progressively through movement exploration, movement variation, imagination, collaborative creativity, and creative expression. Rather than emerging only during the final performance, creativity was evident throughout the learning process as students explored different movement possibilities, interpreted movement stimuli, modified ideas, and collaboratively composed movement sequences. These findings suggest that creativity in elementary dance learning is a dynamic process that grows through continuous bodily exploration and social interaction.

The present findings also demonstrate that creativity was closely associated with students' body awareness. As students became more familiar with their body parts, movement qualities, spatial orientation, and movement confidence, they became increasingly capable of generating original movement ideas. Body awareness enabled students to move beyond simple imitation and experiment with multiple movement variations based on their own bodily experiences. At the same time, collaborative activities enriched this creative process by allowing students to exchange ideas, adapt movements, and construct choreography collectively.

These findings are consistent with the framework proposed by Purgstaller [37], who describes children's dance creativity as the ability to generate original movement ideas through variation, development, and movement composition. Similarly, Oppici, Frith, and Rudd [38] argue that creativity becomes visible when children actively explore movement possibilities within supportive learning environments. The present study reinforces these perspectives by demonstrating that movement exploration emerged after students first developed awareness of their own bodies through mind-muscle exercises, indicating that body awareness provides an important foundation for creative movement.

The relationship between body awareness and creativity identified in this study also supports Chappell's [15] view that creativity in dance education develops through learners' personal experiences rather than through the reproduction of predetermined choreography. Likewise, Weber and Reed [39] emphasize that creativity, metaphor, and body awareness represent important dimensions of embodied dance pedagogy. The present findings extend these perspectives by showing that students' creativity developed not only through individual bodily exploration but also through continuous interaction with peers during collaborative movement activities.

From the perspective of embodied learning, these findings are also consistent with Ravn [40], who explains that bodily learning develops through active engagement in movement and social participation. Similarly, Ørbæk [41] argues that dance-making is a process of embodied learning involving movement exploration, subjective experience, and interaction with others. The present study provides empirical support for these perspectives by demonstrating that children constructed creative movement through the integration of bodily awareness, imaginative exploration, and collaborative interaction during dance learning.

A distinctive contribution of this study is the identification of an integrated pedagogical relationship between body awareness, social interaction, and creativity. While previous studies have generally discussed these dimensions separately, the present findings demonstrate that creativity develops through a sequential process. Mind-muscle exercises first strengthen children's awareness of their own bodies, which encourages movement exploration. These embodied experiences subsequently facilitate collaboration, negotiation, and shared movement creation with peers. Through this progressive process, creativity emerges not only as an individual ability but also as a relational experience that is constructed through bodily awareness and social participation. This integrated perspective offers a practical contribution to elementary dance pedagogy by positioning creativity as the outcome of interconnected embodied and social learning processes rather than merely the product of artistic performance.

3.3 Implications for Art Learning in Elementary School

The findings of this study yield substantive theoretical and practical implications for elementary arts education, with particular relevance to dance pedagogy.

From a theoretical standpoint, this study advances elementary dance pedagogy by demonstrating that body awareness, social interaction, and creativity constitute interdependent and dynamically evolving dimensions rather than discrete learning outcomes. These findings extend existing frameworks of embodied learning and somatic movement literacy by providing empirical evidence that systematic engagement with breathing regulation, body awareness, movement quality, and spatial orientation facilitates children's movement exploration, collaborative engagement, and creative expression within an integrated pedagogical process. In this respect, the study contributes to a reconceptualization of creative dance learning by positioning body awareness as the foundational construct upon which social interaction and creativity are progressively constructed.

From a practical perspective, the findings indicate the need to recalibrate instructional practices in elementary dance education beyond a predominant reliance on imitation and choreographic repro-

duction. While teacher modeling remains pedagogically relevant as an initial stimulus, it should be strategically complemented by opportunities for exploratory movement, embodied awareness activities, and collaborative choreography. The incorporation of mind–muscle exercises at the outset of instruction serves to prepare students both physically and cognitively, enhancing attentional focus, movement confidence, and sustained engagement throughout the learning process.

Moreover, the findings suggest that creativity should be evaluated not solely on the basis of final performance outcomes but also in terms of students' engagement in exploratory processes, experimentation, collaboration, and reflective practice. Process-oriented assessment frameworks enable educators to acknowledge individual variability in movement capabilities while fostering students' confidence and originality in generating movement ideas.

The study further underscores the pedagogical significance of deliberately structured collaborative learning environments. Such environments facilitate the development of communication, cooperation, and shared responsibility among students. The findings demonstrate that social interaction plays a critical role in the emergence of creativity, as movement ideas are co-constructed through observation, negotiation, adaptation, and collective decision-making. Accordingly, dance learning functions not only as an artistic endeavor but also as a medium for cultivating communication skills, empathy, collaborative competence, and creative problem-solving in primary education contexts.

Overall, this study positions mind–muscle exercises as a viable and scalable pedagogical strategy for integrating bodily awareness, social participation, and creative exploration in elementary dance learning. By conceptualizing the body as both a medium of learning and a locus of creative cognition, this approach offers an alternative instructional model that is inherently exploratory, participatory, and learner-centered, in contrast to conventional methods predominantly oriented toward movement imitation.

4. Conclusion

This study addressed the research question of how mind–muscle-based dance learning contributes to the development of body awareness, social interaction, and creativity among elementary school students. The findings indicate that mind–muscle exercises constitute an effective pedagogical approach by facilitating the development of body awareness through enhanced bodily recognition, movement quality, spatial orientation, and movement confidence. As students developed greater bodily awareness, they demonstrated an increased capacity to engage in collaborative movement activities, negotiate movement ideas with peers, and express creativity through exploration, variation, imagination, and collective choreography. These results suggest that mind–muscle exercises support learning across multiple domains, encompassing physical, cognitive, social, and creative dimensions.

A central contribution of this study lies in identifying the interdependent relationship among body awareness, social interaction, and creativity within elementary dance learning. The findings demonstrate that body awareness functions as a foundational condition for movement exploration, while social interaction enriches students' experiences through processes of collaboration, negotiation, and shared decision-making. In turn, these embodied and social processes collectively foster creativity as an ongoing and situated learning trajectory rather than merely as an outcome reflected in final performance products. This integrative perspective extends prior research, which has often examined these constructs in isolation, by illustrating how mind–muscle exercises can operate as a cohesive embodied pedagogical strategy in elementary dance education.

Notwithstanding these contributions, several limitations should be acknowledged. First, the study employed a qualitative case study design conducted within a single elementary school involving

first-grade students, thereby limiting the transferability of the findings to broader educational contexts. Second, the study primarily emphasized the description and interpretation of learning processes and participant experiences, without incorporating quantitative measures of change. Accordingly, the findings should be interpreted within the specific contextual conditions of the research setting.

Future research should examine the effectiveness of mind–muscle exercises through mixed-methods or experimental designs involving larger and more diverse samples. Longitudinal investigations are also warranted to assess the sustained impact of mind–muscle-based learning on children’s creative movement, social competence, and body awareness across different grade levels and educational contexts. Such research would provide more robust empirical evidence to support the integration of embodied pedagogical approaches within elementary dance curricula and broader arts education frameworks.

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