



# Integrating the Ideas of Mindful Meditation into Physical Activities to Improve Executive Function Skills of Kindergarten Children: A Buddhist Religious-Educational Perspective Aligned with SDGs

Jiraporn Chano\*, Archrawadee Srijaroon, Bovornpot Choompunuch

Maharakham University, Maharakham, Thailand

\*Correspondence: E-mail: [jiraporn.j@msu.ac.th](mailto:jiraporn.j@msu.ac.th)

## ABSTRACT

This literature review explores the integration of Buddhist mindfulness and physical activity to improve executive function skills among kindergarten children. Executive functions (working memory, inhibitory control, and cognitive flexibility) are essential for early cognitive and emotional development. Drawing from educational and religious perspectives, this study synthesizes findings from 1,006 publications using the keywords “mindful AND meditation.” Bibliometric analysis reveals growing interdisciplinary interest in mindfulness-based cognitive development. The review highlights how Buddhist meditative principles, when combined with physical activities, foster holistic learning. This integration promotes moral discipline, emotional regulation, and attentional control in young learners. The approach supports both educational advancement and spiritual values, aligning with sustainable development goals (SDGs): SDG 3 (Good Health and Well-being) and SDG 4 (Quality Education). By framing mindfulness as a culturally rooted and religiously meaningful practice, this study offers a model for enhancing executive function through a balanced religious-educational framework.

## ARTICLE INFO

### Article History:

Submitted/Received 18 Mar 2025

First Revised 20 Apr 2025

Accepted 13 Jun 2025

First Available online 14 Jun 2025

Publication Date 01 Dec 2025

### Keyword:

Buddhism,  
Executive function,  
Kindergarten,  
Mindfulness,  
Religious education,  
Sustainable development goals  
(SDGs).

## 1. INTRODUCTION

In early childhood education, the development of executive function skills (EFS) is considered essential for children's academic readiness, emotional regulation, and lifelong learning success. Executive functions (including working memory, inhibitory control, and cognitive flexibility) are core cognitive processes that enable children to manage thoughts, emotions, and behaviors in goal-directed ways (Diamond, 2013; Miyake & Friedman, 2012). These skills are most malleable during the preschool years and are strongly influenced by both internal and environmental factors.

Among the growing body of pedagogical strategies aimed at enhancing executive function, two stand out for their accessibility and developmental appropriateness: physical activity and mindfulness meditation. Physical activity, particularly structured play and movement-based tasks, supports brain development through sensory-motor integration, improved circulation, and neural plasticity (Hillman et al., 2008; Tomporowski et al., 2011). Meanwhile, mindfulness (defined as the practice of sustained, non-judgmental attention) has been associated with improvements in self-regulation, attention span, and emotional stability in young learners (Flook et al., 2015; Roeser et al., 2012).

Mindfulness is not merely a modern cognitive strategy; it is deeply embedded in religious and spiritual traditions, particularly in Buddhism. The concept of Sati (mindful awareness) in Theravāda Buddhism is foundational to both personal enlightenment and moral education. In Thai culture and education, Buddhist-inspired mindfulness is often integrated into daily rituals, storytelling, and reflective practices. As such, the pedagogical use of mindfulness in schools can be interpreted not only as a cognitive tool but also as a form of religious and ethical formation (Chansri & Wasanasomsithi, 2016).

While both physical activity and mindfulness have shown independent effects on executive function, there is an emerging interest in integrating the two, particularly in culturally and religiously contextualized environments. This intersection presents a promising area of educational innovation, one that connects movement, meditation, and moral awareness. Yet, current research often treats these elements in isolation, and the religious foundation of mindfulness is frequently overlooked in secular educational discourse.

Until now, fewer studies have explored the religious underpinnings of mindfulness, particularly concerning its integration with physical activities for children. This literature review addresses that gap by critically synthesizing existing research on the integration of mindful meditation and physical activity through the lens of religious-educational values.

This paper contributes to the discourse by proposing that religiously informed mindfulness (rooted in Buddhism) can be effectively embedded into physical activities to support holistic child development. The novelty of this review lies in its interdisciplinary synthesis of psychology, education, physical development, and religion. Also, the novelty of this review lies in its interdisciplinary synthesis of psychology, education, physical development, and religion. The impact of this work is twofold: (i) it provides a foundation for educators seeking culturally appropriate, values-based interventions, and (ii) it highlights the role of religious practices in shaping modern pedagogical tools aligned with both academic goals and sustainable development values.

## 2. METHODS

This study employed a literature review method to explore the integration of mindful meditation into physical activities to improve executive function skills in kindergarten children. The review combined a narrative approach with a bibliometric overview to ensure

both conceptual depth and trend-based breadth. This methodological combination was intended to capture key theoretical frameworks, current empirical insights, and religious-educational perspectives across multiple disciplines.

Relevant literature was gathered from scholarly databases including Scopus, Web of Science, Google Scholar, and ScienceDirect. The search was guided by the keyword combination “mindful AND meditation”, which ensured a focused yet comprehensive retrieval of articles addressing both the philosophical and practical dimensions of mindfulness. The literature search spanned publications from 1993 to 2025, capturing historical developments as well as emerging research.

The inclusion criteria were: (i) peer-reviewed journal articles; (ii) studies explicitly discussing mindfulness or meditation; (iii) content relevant to early childhood education, executive function, physical activity, or religious pedagogy. Excluded materials included non-English publications, grey literature, and articles that did not intersect with the core themes of the review.

To supplement the narrative synthesis, a bibliometric analysis was performed to examine publication patterns and research trends. Data were processed using VOSviewer, Publish or Perish, and ResearchRabbit, offering insights into keyword co-occurrence, thematic clusters, and the volume of scholarly output related to mindfulness in education. Bibliometric data focused specifically on publications retrieved using the phrase “mindful AND meditation.” Detailed explanations of bibliometric techniques and review-based methodology can be found in existing methodological studies ([Rochman et al., 2024](#); [Al Husaeni & Nandiyanto, 2022a](#); [Al Husaeni & Al Husaeni, 2022](#); [Susilawati et al., 2025](#)). These works served as foundational guidance for processing data, designing the review structure, and ensuring academic rigor in synthesizing interdisciplinary sources.

This method allows for a well-grounded analysis of how mindfulness practices, informed by religious traditions such as Buddhism, can be effectively embedded into educational strategies to enhance cognitive development in early learners.

### 3. RESULTS AND DISCUSSION

#### 3.1. Bibliometric Trends on Mindfulness, Physical Activity, and Executive Function

A bibliometric overview was conducted to understand the trajectory and scholarly interest in research related to mindful meditation, physical activity, and executive function in early childhood education. Using the keyword combination “mindful AND meditation”, a total of 1,006 documents were retrieved from major academic databases spanning the years 1993 to 2025. This volume of research highlights a sustained and growing interest in mindfulness, particularly in educational and developmental contexts.

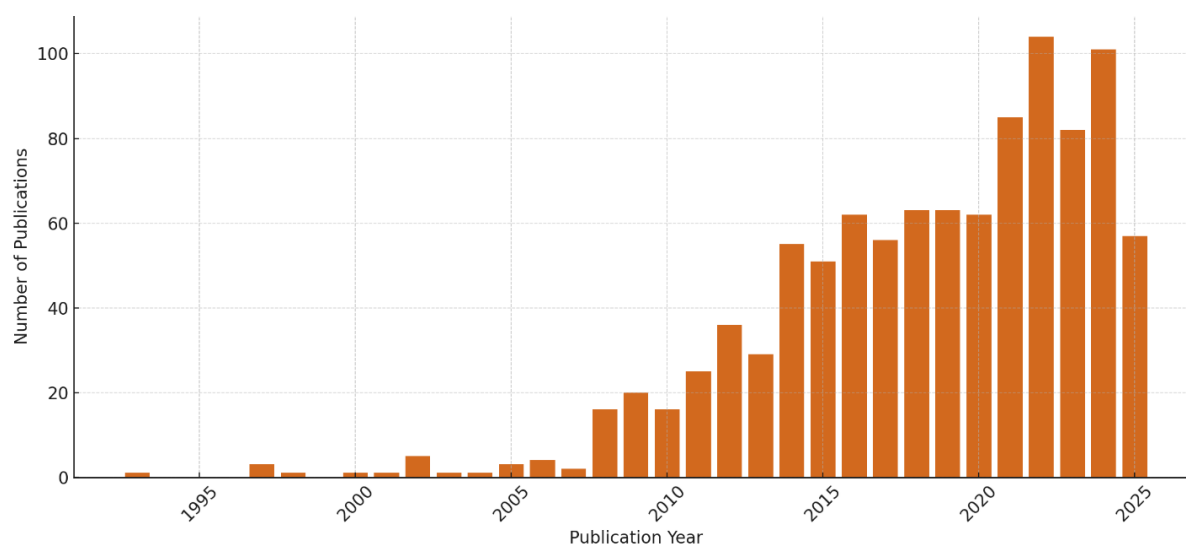
In the early years (1993–2005), research activity was sparse, averaging fewer than five publications per year. During this phase, mindfulness was primarily framed within religious or clinical domains, with limited integration into educational paradigms. However, beginning in 2010, a significant rise in publication output can be observed, coinciding with the global shift toward incorporating mindfulness into secular education and early intervention strategies.

From 2013 to 2019, scholarly output accelerated steadily, with annual publication counts ranging from 29 to 63 articles. This growth corresponds to the increased implementation of mindfulness-based interventions in schools and growing empirical interest in their impact on cognitive and socio-emotional development. Notably, the period between 2020 and 2024 marked a surge in publications, peaking in 2022 with 104 documents, followed closely by 101 in 2024 and 82 in 2023. This spike may be partly attributed to the heightened demand for

emotional regulation strategies and resilience-building tools during the COVID-19 pandemic and its aftermath.

Importantly, recent publications reflect not only cognitive and psychological perspectives, but also religious and ethical dimensions, especially in regions where mindfulness is culturally embedded. The growing number of contributions from Southeast Asia, including Thailand, signals a renewed appreciation for Buddhist-inspired educational approaches. This aligns with the focus of this paper, which seeks to explore religiously grounded applications of mindfulness in physical and cognitive development during early childhood.

The annual distribution of publications is visualized in Figure 1, which clearly illustrates the expanding academic interest in the integration of mindfulness with child development and education. This trend validates the relevance and timeliness of conducting a targeted literature review on the subject, particularly from a religion-informed educational lens.



**Figure 1.** Number of Publications on Mindfulness, Physical Activity, and Executive Function in Early Childhood (1993–2025). The bibliometric analysis includes 1,006 documents, showing a significant surge in scholarly interest beginning in 2010, with a peak in 2022 (104 publications), indicating growing global relevance of this interdisciplinary topic.

### 3.2 Executive Function Skills in Early Childhood

Executive function skills (EFS) refer to a group of high-level cognitive processes that enable individuals to control attention, regulate behavior, and engage in goal-directed thinking. These core processes—working memory, inhibitory control, and cognitive flexibility—are critical for school readiness and social-emotional development in early childhood (Miyake and Friedman, 2012; Diamond, 2013). Between the ages of three and six, children experience significant growth in executive function as the prefrontal cortex undergoes accelerated development. During this period, children begin to demonstrate abilities such as focusing attention, following multi-step instructions, controlling impulses, and adapting to new social environments.

Extensive research has shown that strong executive function skills in early childhood predict academic achievement, classroom behavior, and long-term outcomes in adulthood, including health and employment (Best et al., 2011). Conversely, children who struggle with executive function may exhibit difficulties with emotional regulation, learning retention, and

interpersonal relationships, all of which may affect both academic progress and well-being (Blair and Raver, 2015).

While traditional education often focuses on content knowledge and behavioral compliance, the development of executive function requires active engagement, play-based learning, and emotionally supportive environments. Movement, conversation, problem-solving, and creative tasks have been identified as more effective for stimulating executive processes than rote memorization or passive observation. In recent years, educators have increasingly turned to interdisciplinary interventions—including physical activity and mindfulness-based strategies—to improve EFS in young learners.

In many cultural and religious settings, including Buddhist-majority societies like Thailand, the goals of executive function align closely with spiritual values such as discipline, self-control, and right conduct. Religious education in such contexts often reinforces the same developmental outcomes targeted by executive function programs, positioning EFS not only as a psychological framework but as a moral and spiritual objective embedded within the educational tradition.

A synthesis of representative studies that explore the connection between executive function, early childhood education, and integrative practices such as mindfulness and physical activity is provided in Table 1. These studies form the empirical basis for the interdisciplinary approach advanced in this review.

**Table 1.** Summary of Key Literature on Executive Function in Early Childhood

Author(s) and Year	Context	Sample	Key Findings
Flook <i>et al.</i> , (2015)	Mindfulness-based kindness curriculum for preschool children	68 preschoolers in the U.S.	Improvements in executive function, prosocial behavior, and emotional regulation
Diamond and Lee (2011)	Review of interventions for enhancing executive function in children	Meta-review of early childhood interventions	Mindfulness, aerobic activity, and play improve EFS more than traditional classroom tasks
Tompsonowski <i>et al.</i> , (2011)	Effects of exercise on children's cognition and academic performance	Children aged 5–13 in multiple experimental studies	Physical activity enhances attention, cognitive flexibility, and academic performance
Blair and Raver (2015)	Neurocognitive perspective on poverty and self-regulation in early childhood	Low-income preschoolers in U.S. Head Start programs	Cognitive regulation skills are sensitive to environmental and socioeconomic contexts
Best <i>et al.</i> , (2011)	Relationship between aerobic fitness and executive function in school-age children	Cross-sectional studies with elementary school children	Aerobic fitness is positively associated with higher executive function outcomes

### 3.3 Mindfulness Meditation and Its Religious-Educational Roots

Mindfulness meditation has its origins in ancient contemplative traditions, particularly within Buddhism, where it is rooted in the practice of *Sati*—a Pali term referring to moment-to-moment awareness. In the Theravāda tradition, mindfulness is cultivated as part of the Noble Eightfold Path and is regarded as a tool for cultivating ethical conduct, mental

discipline, and wisdom. This spiritual foundation highlights mindfulness not merely as a cognitive technique, but as a holistic discipline encompassing attention, emotion, morality, and spiritual awareness.

Over time, mindfulness has been secularized and adapted for use in modern psychological interventions such as Mindfulness-Based Stress Reduction (MBSR) and Mindfulness-Based Cognitive Therapy (MBCT). These models emphasize attention regulation, acceptance, and non-judgmental awareness as means to enhance mental health and cognitive functioning (Kabat-Zinn, 2003). While highly effective, many of these programs intentionally detach mindfulness from its religious context, focusing instead on observable outcomes like stress reduction and cognitive clarity.

However, in educational settings—particularly in culturally Buddhist societies such as Thailand—mindfulness is often taught with its religious-ethical framework intact. Here, mindfulness is not only a means of enhancing focus and behavior but also a method of cultivating moral consciousness, empathy, and respect for others (Chansri & Wasanasomsithi, 2016). Teachers may integrate storytelling, chanting, or silent reflection in a way that reflects Buddhist teachings while promoting self-discipline and ethical behavior in young learners.

From a developmental perspective, introducing mindfulness in early childhood has shown benefits in improving inhibitory control, attention span, and emotional regulation—all of which are key components of executive function (Flook et al., 2015). When taught in a way that honors its spiritual roots, mindfulness also supports the internalization of virtue ethics, reinforcing positive character formation alongside cognitive development.

The religious underpinnings of mindfulness offer unique advantages for integration into holistic education systems. Rather than viewing mindfulness as a standalone cognitive tool, this paper advocates for understanding it as a practice deeply aligned with both educational aims and spiritual traditions. In this view, mindfulness becomes a bridge between academic growth and ethical formation—an approach particularly relevant to the values and philosophies of education in Buddhist-majority societies.

As the literature continues to expand, there is growing recognition that re-centering mindfulness within its religio-cultural context may offer deeper, more sustained outcomes—particularly when applied in early childhood education. The next section explores how these meditative practices interact with physical activity to promote executive function development in a more embodied and experiential way.

### 3.4 Physical Activity and Cognitive Engagement in Kindergarten

Physical activity plays a pivotal role in the cognitive, emotional, and physical development of young children. In the early years of life, movement is not only a means of energy release but also a powerful tool for developing neural pathways, especially those associated with executive function skills such as working memory, inhibitory control, and cognitive flexibility (Hillman et al., 2008). For kindergarten-aged children, structured and unstructured physical activities offer opportunities for goal-setting, impulse regulation, rule-following, and adaptive behavior—all of which directly engage executive processes.

Multiple studies have established a strong correlation between gross motor activity and cognitive outcomes in early childhood. Children who participate in activities such as running, jumping, climbing, or balancing often demonstrate improved attention span, problem-solving ability, and self-regulation in the classroom (Tomprowski et al., 2011). Moreover, fine motor tasks—including drawing, building blocks, and hand-based coordination—have also been associated with enhanced neural efficiency and better classroom engagement.



Kindergarten environments that prioritize physical play-based learning tend to produce more favorable cognitive and behavioral outcomes than sedentary, instruction-heavy classrooms. Programs that integrate movement games, team sports, and cooperative motor tasks foster both cognitive stimulation and social interaction, which are essential to whole-child development.

In addition to their neurodevelopmental benefits, physical activities contribute to emotional well-being and stress regulation in children. Physical exertion facilitates the release of endorphins and supports the regulation of arousal levels, making it an effective non-pharmacological tool for improving mood, attention, and behavior. These effects are particularly important for young learners adapting to structured classroom routines for the first time.

Culturally, physical activity in early childhood education can take many forms. In Thailand, for instance, traditional children's games and rhythmic movements often carry moral lessons, promote community harmony, and reflect cultural values of cooperation and discipline. When such physical activities are designed intentionally to support cognitive engagement, they become more than play—they become vehicles for learning with the body and mind.

While physical activity alone contributes meaningfully to executive function development, its potential is further amplified when combined with mindfulness, as explored in the next section. Movement practices that are paired with focused attention, breath control, and intentional reflection hold promise for developing both the neural control mechanisms and the moral-emotional maturity that young learners need to succeed.

### 3.5 Integration Models: Mindful Physical Activities

Recent developments in early childhood education emphasize the need for integrative approaches that combine physical activity with mindfulness-based practices to improve executive function skills. Rather than addressing cognitive, emotional, and behavioral domains separately, integrated models aim to foster holistic development by simultaneously engaging the body, mind, and spirit. These models are especially relevant in cultural and religious contexts where moral and spiritual formation is intertwined with education.

One of the most promising integration frameworks involves combining mindful breathing, yoga-inspired movement, and cooperative physical tasks in classroom routines. These practices are designed to improve self-regulation, attention control, and working memory by engaging children in focused movement activities that require intentional breathing, calm posture, and social cooperation. For example, programs such as "Mindful Movement for Kids" or "Yoga in the Classroom" have shown positive outcomes in preschool settings by reducing behavioral problems and improving task persistence (Flook *et al.*, 2015).

In Buddhist-inspired educational settings, such as many found in Thailand, these integrative practices can be naturally embedded within cultural routines. Rhythmic activities like walking meditation (*cankama*), seated breathing exercises (*ānāpānasati*), or traditional games incorporating reflective pauses allow children to internalize the virtues of patience, discipline, and compassion while simultaneously developing core executive functions. These culturally grounded models illustrate how religious values can enhance cognitive learning when integrated meaningfully into daily school practice.

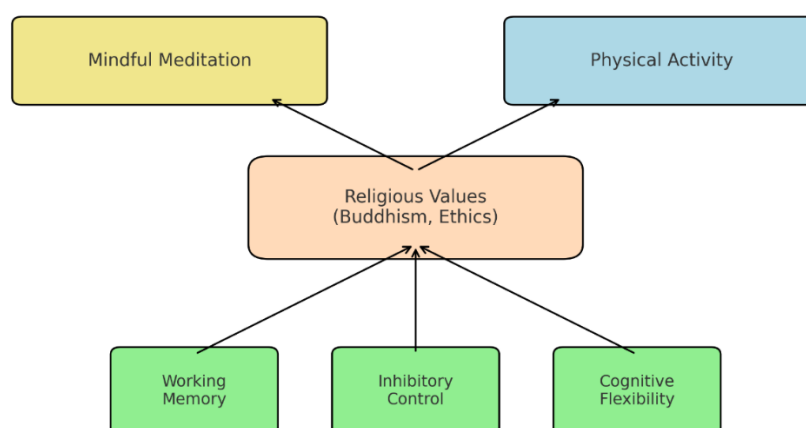
A comparison of representative integration models is provided in **Table 2**, outlining their structural components, religious alignment, and cognitive outcomes. These models vary in design but share a common goal of promoting intentional movement combined with present-moment awareness and emotional grounding.

**Table 2.** Comparative Features of Mindfulness-Based Physical Activity Models

Model Name	Components	Religious/Cultural Alignment	Physical Format	Reported Outcomes
Mindful Movement for Kids	Breathing exercises, stretching, stillness practice	Secular (adaptable to religious contexts)	In-classroom yoga and breathing	Improved attention, reduced behavioral issues, better emotional regulation
Walking Meditation Program	Rhythmic walking with breath awareness ( <i>cankama</i> )	Theravāda Buddhist practice	Structured walking paths	Enhanced self-regulation, patience, and spatial awareness
Yoga in the Classroom	Poses, guided relaxation, body scans	Adaptable (origin in Hindu tradition)	Floor-based movement in group settings	Improved working memory and classroom behavior
Thai Cultural Rhythm Games	Traditional games with pause-reflection phases	Buddhist-inspired cultural heritage	Dance, clapping, group-based games	Strengthened social skills, attention, and cooperative behaviors
Mindfulness + PE Hybrid Modules	Warm-up, mindful breathing, reflection at end of session	Values-based secular (open to adaptation)	School gym or outdoor spaces	Boost in executive function, emotional calm, and positive peer interaction

To clarify the structure and theoretical foundation of these integrative models, a visual representation is offered in **Figure 2**. This conceptual framework maps the interaction between mindful meditation, physical activity, and executive function domains, with religious values embedded as guiding principles for ethical and behavioral development. The framework illustrates how body-centered learning activities (when paired with mindful awareness) can directly enhance working memory, inhibitory control, and cognitive flexibility.

These models are not only supported by empirical findings but are also consistent with religious-educational philosophies that emphasize balance, self-discipline, and harmonious living. As such, integrated mindfulness-physical activity programs are ideally suited for kindergarten curricula that aim to develop the whole child—cognitively, emotionally, and spiritually.



**Figure 2.** Conceptual framework illustrating the integration of mindful meditation and physical activity, grounded in religious values, to enhance executive function skills in early childhood. Core outcomes include working memory, inhibitory control, and cognitive flexibility.



### 3.6 Theological and Pedagogical Integration

The integration of theological values into educational practices offers a unique opportunity to nurture not only cognitive development but also moral and spiritual growth. In early childhood education, where foundational habits of thought, emotion, and behavior are formed, the inclusion of religious principles (when applied respectfully and contextually) can provide a powerful framework for shaping character alongside executive function skills.

From a Buddhist perspective, mindfulness (*Sati*) is not a neutral cognitive strategy but a deeply ethical practice aimed at cultivating right conduct, compassion, and insight. These values are central to the Noble Eightfold Path, which emphasizes moral discipline (*Sīla*), mental concentration (*Samādhi*), and wisdom (*Paññā*). In many Buddhist-majority societies, including Thailand, these virtues are integrated into school routines through rituals, chants, storytelling, and reflective practices. When children engage in mindful breathing or respectful movement with awareness, they are not only practicing attention control but also embodying spiritual values such as respect, non-harming, and self-awareness.

From a pedagogical perspective, integrating these religious values with modern educational goals creates a holistic model of development. While executive function training is often framed in terms of attention, memory, and impulse control, its deeper purpose resonates with religious ideals: to help the individual live with clarity, intention, and care for others. In this view, executive function becomes a bridge between the psychological and the spiritual, a convergence of mental discipline and ethical responsibility.

Such integration aligns well with value-based education models that prioritize not just academic success but moral reasoning, social responsibility, and inner calm. It encourages children to develop self-regulation not merely for task performance, but as a practice of respect for the self, others, and the world around them. When physical activities and mindfulness are contextualized within this framework, they support both cognitive control and moral formation.

This theological-pedagogical synthesis is especially relevant in educational contexts seeking to balance global standards with local cultural and spiritual identity. In Thailand and other Southeast Asian nations, where Buddhism shapes both formal and informal education, the inclusion of religious mindfulness into physical activity-based learning is not only appropriate but also culturally resonant. It supports the development of children who are not only attentive and emotionally stable but also ethically grounded and spiritually aware.

### 3.7. Integrating Mindful Physical Activity into the SDG Framework

The integration of Buddhist mindfulness and physical activity into early childhood education aligns significantly with the United Nations Sustainable Development Goals (SDGs), particularly SDG 3: Good Health and Well-being and SDG 4: Quality Education. Mindfulness-based physical activity supports SDG 3 by promoting holistic physical and mental well-being from an early age. These practices help reduce stress, improve emotional regulation, and cultivate habits that contribute to lifelong health. At the same time, incorporating mindfulness into education systems reinforces SDG 4 by fostering inclusive, equitable, and quality learning environments that support cognitive and socio-emotional growth.

Moreover, this model encourages the development of lifelong learning competencies, such as self-awareness, focus, and behavioral control, all of which are foundational to student success. Rooted in religious and cultural context, the inclusion of Buddhist values ensures that interventions are not only effective but also respectful and relevant to local communities. This culturally sensitive approach contributes to sustainable education reform and child

development practices that uphold global and local ethical standards. This study adds new information regarding SDGs as reported elsewhere (Makinde et al., 2024; Keisyafa et al., 2024; Kerans et al., 2024; Djirong et al., 2024; Awalussillmi et al., 2023).

#### 4. CONCLUSION

This literature review has explored how the integration of mindful meditation into physical activities, guided by religious values, can enhance executive function skills among kindergarten children. The reviewed studies consistently demonstrate that both mindfulness and physical activity, when applied independently, produce significant gains in working memory, inhibitory control, and cognitive flexibility. When these approaches are intentionally combined, they offer a synergistic model for supporting the holistic development of young learners.

The bibliometric analysis confirms a growing academic interest in the intersection of mindfulness, education, and child development, particularly in the years following the global COVID-19 pandemic. This reflects an urgent need for educational strategies that are not only cognitively effective but also emotionally supportive and ethically grounded. In this context, the religious roots of mindfulness (especially within Buddhism) emerge as an underutilized yet potent foundation for educational innovation.

Culturally embedded practices such as walking meditation, reflective movement, and moral storytelling provide authentic, developmentally appropriate platforms for teaching both self-regulation and social harmony. These practices align closely with the aims of executive function development and offer a meaningful alternative to secular, task-focused methods.

This review supports the achievement of Sustainable Development Goal 3 (Good Health and Well-being) by promoting self-regulatory skills, emotional balance, and non-pharmacological mental wellness in children. It also contributes to SDG 4 (Quality Education) by advocating for inclusive, culturally responsive pedagogy that integrates cognitive, emotional, and spiritual dimensions of early learning. In particular, this work aligns with SDG 4.7, which encourages education that promotes global citizenship, appreciation of cultural diversity, and sustainable development.

Ultimately, the integrative approach presented in this review empowers educators to cultivate children who are not only attentive and emotionally resilient, but also ethically conscious and spiritually grounded, equipped to thrive in both school and society.

#### 5. AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. Authors confirmed that the paper was free of plagiarism.

#### 6. REFERENCES

- Al Husaeni, D. F., and Nandiyanto, A. B. D. (2022a). Bibliometric using VOSviewer with publish or perish (using Google Scholar data): From step-by-step processing for users to the practical examples in the analysis of digital learning articles in pre and post COVID-19 pandemic. *ASEAN Journal of Science and Engineering*, 2(1), 19–46.
- Al Husaeni, D. N., and Al Husaeni, D. F. (2022). How to calculate bibliometric using VOSviewer with Publish or Perish (using Scopus data): Science education keywords. *Indonesian Journal of Educational Research and Technology*, 2(3), 247–274.

- Awalussillmi, I., Febriyana, K.R., Padilah, N., and Saadah, N.A. (2023). Efforts to improve sustainable development goals (SDGs) through education on diversification of food using infographic: Animal and vegetable protein. *ASEAN Journal of Agricultural and Food Engineering*, 2(2), 113-120.
- Best, J. R., Miller, P. H., and Naglieri, J. A. (2011). Relations between executive function and academic achievement from ages 5 to 17 in a large, representative national sample. *Learning and Individual Differences*, 21(4), 327–336.
- Blair, C., and Raver, C. C. (2015). School readiness and self-regulation: A developmental psychobiological approach. *Annual Review of Psychology*, 66, 711–731.
- Chansri, S., and Wasanasomsithi, P. (2016). Buddhist principles and EFL teaching in Thailand. *PASAA: Journal of Language Teaching and Learning in Thailand*, 51, 13–36.
- Diamond, A. (2013). Executive functions. *Annual Review of Psychology*, 64, 135–168.
- Diamond, A., and Lee, K. (2011). Interventions shown to aid executive function development in children 4 to 12 years old. *Science*, 333(6045), 959–964.
- Djirong, A., Jayadi, K., Abduh, A., Mutolib, A., Mustofa, R.F., and Rahmat, A. (2024). Assessment of student awareness and application of eco-friendly curriculum and technologies in Indonesian higher education for supporting sustainable development goals (SDGs): A case study on environmental challenges. *Indonesian Journal of Science and Technology*, 9(3), 657-678.
- Flook, L., Goldberg, S. B., Pinger, L., and Davidson, R. J. (2015). Promoting prosocial behavior and self-regulatory skills in preschool children through a mindfulness-based kindness curriculum. *Developmental Psychology*, 51(1), 44–51.
- Hillman, C. H., Erickson, K. I., and Kramer, A. F. (2008). Be smart, exercise your heart: Exercise effects on brain and cognition. *Nature Reviews Neuroscience*, 9(1), 58–65.
- Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present, and future. *Clinical Psychology: Science and Practice*, 10(2), 144–156.
- Keisyafa, A., Sunarya, D.N., Aghniya, S.M., and Maula, S.P. (2024). Analysis of student's awareness of sustainable diet in reducing carbon footprint to support sustainable development goals (SDGs) 2030. *ASEAN Journal of Agricultural and Food Engineering*, 3(1), 67-74.
- Kerans, G., Sanjaya, Y., Liliyasi, L., Pamungkas, J., and Ate, G., Y. (2024). Effect of substrate and water on cultivation of Sumba seaworm (nyale) and experimental practicum design for improving critical and creative thinking skills of prospective science teacher in biology and supporting sustainable development goals (SDGs). *ASEAN Journal of Science and Engineering*, 4(3), 383-404.
- Makinde, S.O., Ajani, Y.A., and Abdulrahman, M.R. (2024). Smart learning as transformative impact of technology: A paradigm for accomplishing sustainable development goals (SDGs) in education. *Indonesian Journal of Educational Research and Technology*, 4(3), 213-224.

- Miyake, A., and Friedman, N. P. (2012). The nature and organization of individual differences in executive functions: Four general conclusions. *Current Directions in Psychological Science*, 21(1), 8–14.
- Rochman, S., Rustaman, N., Ramalis, T. R., Amri, K., Zukmadini, A. Y., Ismail, I., and Putra, A. H. (2024). How bibliometric analysis using VOSviewer based on artificial intelligence data (using ResearchRabbit Data): Explore research trends in hydrology content. *ASEAN Journal of Science and Engineering*, 4(2), 251–294.
- Susilawati, A., Al-Obaidi, A. S. M., Abduh, A., Irwansyah, F. S., and Nandiyanto, A. B. D. (2025). How to do research methodology: From literature review, bibliometric, step-by-step research stages, to practical examples in science and engineering education. *Indonesian Journal of Science and Technology*, 10(1), 1–40.
- Tomporowski, P. D., Davis, C. L., Miller, P. H., and Naglieri, J. A. (2011). Exercise and children's intelligence, cognition, and academic achievement. *Educational Psychology Review*, 23(2), 131–144.