

## The Implementation of Embodied Learning: A Literature Review

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### Abstract

This literature review aims to determine the implementation of the embodied learning approach in children. The research method used is a narrative review of ten articles that have met the criteria. The criteria for the article are to be found in Google Scholar, published in the last 8 years (2012-2021), and the title contains "Embodied Learning". There are five things that are studied, namely the concept of embodied learning; the relationship between psychology, education, and the environment; student age; tools and materials (technology); and materials that can be provided through an embodied learning approach. This literature review shows that embodied learning is a learning approach that emphasizes the involvement of the body in the process of receiving and responding to the material. Embodied learning can be implemented to improve children's language skills, motor skills, memory skills, and learning foreign language material. The ages of students who accept this embodied learning approach are range from 4 years to 12 years, or kindergarten and elementary school ages. From the ten articles studied, it was found that the involvement of the body in the learning process can build information in students' long-term memory.

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## INTRODUCTION

Learning is a comprehensive activity where we know ourselves. This is a paradoxical activity, doing and submitting at the same time. And the achievements range from just being aware, to what is called understanding and the ability to explain (Oakeshott, 1967). The theory of learning which is inspired by empirical psychology claims to have discovered the general principles governing human learning or what is commonly described in psychological or epistemological terms like 'knowledge' or 'understanding'.

Learning is a process of interaction between students and teachers who design each activity that will be carried out to help students actively learn or master learning material (Gasong, 2018). The interaction process that changes in students is the result of planned learning. Careful planning in carrying out the learning process is the main requirement to minimize disruption in the learning process. Embodied learning is a renewable learning model in learning. Embodied learning in contemporary discourse is used interchangeably with action learning, kinesthetic learning, and embodied cognition (Johnson-Glenberg, 2014).

Embodiment refers to how we explore our body/our abilities, rather than contemplating deficiencies/disabilities (Stolz, 2015). Based on the philosophy "I hear and I forget, I see and I remember, I do and I understand" (Vaillancourt, 2009) provides an overview in the process of better understanding which involves all elements psychologically and the body. The body is complete unity between the soul and organs, they cannot be separated in receiving stimuli through the sensory available to the body. The characteristics of embodied learning provide answers to questions related to the way's knowledge is constructed by students while they view every- one's body as a tool for knowledge construction (Kalantzis & Cope, 2004). In particular, the term "body" in embodied practice includes the physical body, the senses, the mind, and the brain, that is the whole of the student's personality

Facilitating students to learn human being provides a meaningful learning experience and is stored in their long-term memory (Marian et al, 2019). Learning to use physical activity is an activity of gaining knowledge and building a proper understanding of the brain (Ionescu & Glava, 2015). The psychological process in building these two things is the relationship between the performance of cognition, education, and the environment of students. Body involvement is also emphasized on the learning by doing approach, kinesthetic learning, and Montessori methods (Hyland, 2019). Embodied Learning is rooted in the relationship between body and mind in learning (Yakhlef, 2010) Learning through doing and doing activities provides an opportunity for the child's soul and body to collaborate and understand the material provided, they cannot be separated, such as learning through verbal instruction alone, providing abstract images only, or through listening activities in the classroom (Montessori, 2013). According to Lindgren and Johnson-Glenberg (2013), the primary principles of the implementation of embodied learning are the following: the sensorimotor activity, the relevance of gestures to the theme that is to be reproduced, and the emotional involvement of participant in the whole process.

In recent years, the embodied learning approach has influenced educational technology, especially human-computer interaction and the environment, and technology objects for learning purposes. The initial approach has provided information that student interactions and experiences provide an interesting and useful way of learning. Research on education addresses the benefits of learning environments designed to use embodied interactions (Dourish, 2001) in children's learning processes. Meanwhile, new technology or development continues to be designed by scientists, the technology being designed must consider the characteristics and learning principles contained in it (Trninic and Abrahamson, 2013). The development of the times requires teachers and academics to continue to develop in providing learning for students, meaning that if times are developing then the

teaching material must be following the conditions of the times. Technology is one of them, technology will help teachers achieve learning goals. Students can develop according to the times. Embodied learning provides both things in the classroom.

One of the important consequences of the embodied cognition approach is the understanding of the learning process. If cognitive processes are manifested, then using the body during learning helps store and build knowledge, and helps shape abstract thinking (Ionescu and Glava, 2015). Learning will be more meaningful if it is carried out with meaningful activities as well. Building student knowledge through a continuous learning process and building sufficient understanding for students through learning that is carried out will help (Hergenhahn and Olson, 2008). Advocated by educators and philosophers as diverse as Dewey, Montessori, Sartre, and Merleau-Ponty embodied learning in contemporary discourse is used interchangeably with action learning, kinesthetic learning, and embodied cognition (Hyland, 2019). It is learning that is augmented by the learner's physical movement (Soylu, Holbert, and Wilensky, 2017). The concept of embodied learning emphasizes the learning process that connects psychological processes with the body and the environment to get the right concept and understanding.

This research has the novelty the embodied learning approach has not been widely discussed by Indonesians, with this research it is hoped that teachers, parents, and the general public pay attention to what aspects are involved in the learning process for students, providing a new perspective on learning approaches that involve the body. in the learning process for both normal students and students with special needs. This study provides a practical view of embodied learning starting from the embodied learning concept; the relationship between psychology, education, and the environment; student age; tools and materials (technology); and materials that can be provided through an embodied learning approach. Make it easy to process the embodied learning approach in the classroom. This study was adopted from ten articles discussing the concept of embodied learning and the procedures and requirements for implementing an embodied learning approach.

## **METHODS**

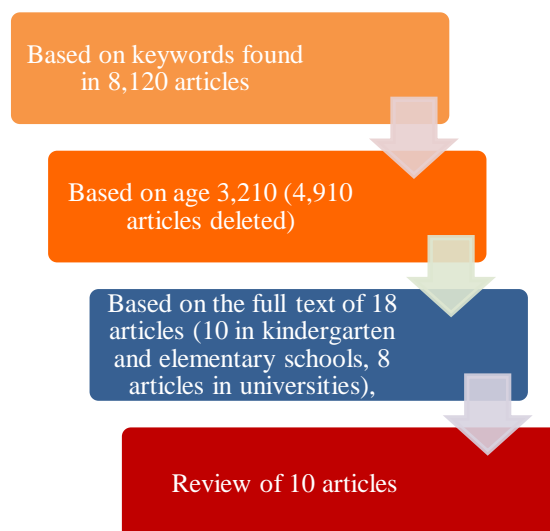
This study uses a narrative review of previous academic articles that discuss embodied learning (EL) theory. The research flow using a narrative review starts from determining the topic, searching literature, selecting literature, processing data, and conclusions. This review was conducted by searching "Google Scholar" with the keyword embodied learning. Journals that provide these keywords include Taylor & Francis, Science Direct, SAGE, Elsevier, CEEOL, and Emerald. The articles selected are the eight-year articles from January 2012 to January 2021.

The criteria for selecting articles to be analyzed further are as follows: (a) International journals; (b) About embodied learning for preschool children; (c) Published in the last eight years (2012-2021); (d) The article is available in full text (not just abstract); (e) Research in special schools, in inclusive schools, in regular schools; (f) Research in the form of literature studies or experimental research; (g) Limited to preschool children (4-12 years). Academic articles are selected according to the criteria then reviewed and analyzed. Furthermore, a simple concept and implementation of embodied learning are developed for preschool children that provide a fresh perspective on the learning process.

### **Data Collection**

Figure 1 describes the process of selecting the analyzed articles. Starting from searching for the keywords "Embodied Learning (EL)", then selecting more significant ones based on the title, abstract, and subject, the next step is selecting based on criteria: educational implementation setting, age of the subject, and the research method used. Based on a search using keywords, 8,120 articles

were found, then articles were selected based on the age of students, 3,210 articles were selected, then the articles were selected for the next stage based on the full text available. Based on this obtained 10 articles are available in full text. Finally, 10 articles were reviewed and discussed in full and detail.



**Figure 1.** Article Selection Process

## RESULTS AND DISCUSSIONS

Ten articles matched the criteria, so they were selected and analyzed to find the concepts and ways of implementing embodied learning in preschool and school-age children. Table 1 provides a summary of the ten articles analyzed to find a practical theory of embodied learning.

### Embodied Learning Concept

Based on the information from table 1 regarding the summary of the article on the concept of embodied learning, a common understanding and meaning are obtained about what embodied learning is. Embodied learning (EL) has the meaning that teaching students by involving physical is a response to the performance of cognition which is a psychological process in the student's body. The embodied learning approach is based on the idea of an inseparable relationship between body and mind in the learning process, which aims to involve the activeness of children in the classroom (Kosmas, Andri & Panayiotis, 2019). Learning by involving members of the body allows the material conveyed by the teacher to be stored in long-term memory, it is evident that the same learning is displayed differently a year later, the result is that students can interpret the concept well (Kosmas and Ioannou, 2019).

Based on the ten articles that have been reviewed, all provide the same concept and view of what is meant by embodied learning (see table 1). This approach emphasizes a learning process that involves members of the participant's body, paying attention, and considering their psychology to obtain maximum results. Research has proven that everyone does not learn in the same way (Fischer and Rose, 2001). The variety of student learning styles in schools is certainly an important consideration for teachers in designing learning activities. Maximizing the acceptance of material through audio, visual, and kinesthetic is a good way to embed teaching materials to them (Bire and Geradus, 2014). The use of single-paced learning that is delivered using a single learning approach ignores differences in student learning styles in the classroom (Forsten, Grant, and Hollas, 2002). Learning in the classroom ideally provides opportunities for all students to be able to develop their potential and develop social interaction skills between students in the classroom.

Embodied learning refers to pedagogical approaches that focus on the non- mental factors involved in learning, and that signal the importance of the body and feelings (OECD, 2018). Mixing and matching body movements, soul, teaching materials, intelligence is a way of learning in an embodied learning approach. Research proves that the learning process that involves movement and song at Miryam Kindergarten Semarang is that students can find learning concepts, and students are responsible for completing tasks together and promoting good behaviors during the learning process (Sudjono and Kusumastuti, 2017). The definition of embodied learning based on the analysis of the ten articles above is not only knowing but doing, doing which involves the manipulation of physical

**Table 1.** Article Summary

Author	EL concept	Psychology, education, and the environment	Student Age	Tools and Material (Technology)	Scope of Teaching Materials
Schmidt, M., Benzing, V., Wallman-Jones, A., Mavilidi, M. F., Lubans, D. R., & Paas, F (2019).	Involves physical activity (moving)	It is important to include all these aspects	8 dan 10 years	Adequate space for activities, flashcards, monitor screens, and proper planning of activities	Develop foreign language skills
Macedonia, M. (2019).	Involves physical activity (moving)	Learning is inseparable from these three relationships	7-12 years	Functional Magnetic Resonance Imaging (fMRI) scanner, comic, and number cards	Develop speech and math language skills
Kosmas, P., Ioannou, A., & Zaphiris, P. (2019)	Involves physical activity (moving)	In intuition, the soul is involved in the implementation of learning, as well as teaching materials and the environment	4 - 8 years	Microsoft Kinect camera. Motion sensors, monitors, projectors, computers, and games.	Memory and language skills
Stolz, S. A. (2015).	Involves physical activity (moving)	It is important to include all these aspects	Preschool age up to 12 years	Hight technology and low technology	The ability to perceive
Evans, J., Davies, B., & Rich, E. (2009)	Involves physical activity (moving)	It is important to include all these aspects	Elementary school age	Corporeal device	Develop motoric skills

Ionescu, T., & Ilie, A. (2018)	Involves physical activity (moving)	It is important to include all these aspects	Kindergarten and primary school age	A picture book entitled "Musicians of the City of Bremen"	Language learning
Marian, A., Rogobete, D., Vescan, R., Ilie, A., & Ionescu, T. (2019)	Involves physical activity (moving)	Learning is inseparable from these three relationships	Preschool age	A picture book	Language learning
Ionescu, T., & Glava, A. (2015)	Involves physical activity (moving)	Learning is inseparable from these three relationships	4 – 12 years	Game, picture book, acting etc.	Perception, language, and motor skills
Kontra, C., Goldin-Meadow, S., & Beilock, S. L. (2012).	Involves physical activity (moving)	Learning is inseparable from these three relationships	9 – 12 years	Simulation room, clear material concept text, clear simulation rules.	Understand the concept of science
Kosmas, P., & Zaphiris, P. (2020)	Involves physical activity (moving)	It is important to include all these aspects	8- 9 years	Game Pan Boy	Develop language skills

activities, movements, and experiences throughout, not only involving the mind but also the body, performance effects include beliefs, feelings, attitudes, dispositions, and score.

### **Psychology, education, and the environment**

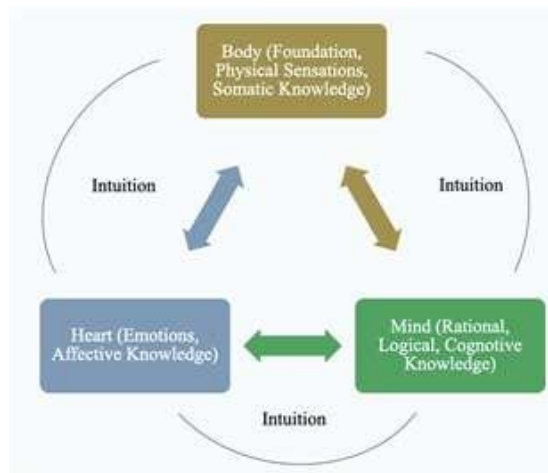
Three articles discuss the psychological, educational, and environmental relationships that must be in the embodied learning approach, namely embodied learning: connecting psychology, education, and the world (Ionescu & Glava, 2015), embodied learning: why at school the mind needs the body ( Macedonia, 2019), and embodied learning of language in preschoolers: emotion, enactment, and cognition (Marian et al, 2019). According to Ionescu and Glava (2015), the embodied learning approach makes students aware of adapting to the world. Let the soul and body work together in adapting, and emphasize learning starting from the concrete to the abstract. Psychology has made progress in analyzing the learning process and has collected data on conditioning through a behaviorist approach (Skinner, 2015). The principle of embodied learning encourages educators (teachers) to recognize and explore potential complex variables in different learning situations to support students in gaining relevant and authentic learning experiences. For example, posture helps children match the words heard with those seen with the correct object.

According to Macedonia (2019), cognitive processes are mediated by body-based systems, for example, perception and action. Neuroscience research has shown that processing objects, spatial information, music, faces, tastes, smells, and simply thinking about concepts evoke sensorimotor responses, namely activities related to the body (Pulvelmuller, 2005). The body through the actions and movements of the body is a powerful tool for understanding and studying subjects in school. The human brain does not work like a computer that processes symbols. Neuroscience has revealed

brain patterns in language and mathematical thinking based on actions and perceptions that occur in the body (Macedonia, 2019).

Discussion by Marian and friends (2019), embodied learning in developing language in preschool children involves emotion, action, and cognition. Positive emotions are an important element in teaching students at preschool age, not only using verbal instruction but more than that, showing the action of what is being learned. Give a real picture of the meaning of the words they learn through storytelling. The right emotional stage, good sensorimotor response, and concrete material give the impression of meaningful learning for students at preschool age. Learning by doing and processing through the brain and giving the right perception is true learning.

Figure 2 describes the connection of psychology, the body, and the environment is embodied learning. Emotion, mind, and body have a strong connection and build knowledge and understanding of things. Intuition and enthusiasm will influence the body in processing stimuli and shaping students' perceptions. Body, heart, and mind are unity in our body. In the heart, we can respond to stimuli through emotions, and affective knowledge is also in the heart. Affective knowledge is related to attitudes and values. Affective knowledge includes behavioral traits such as feelings, interests, attitudes, emotions, and values (Alifah, 2019). The mind plays a role in rational logical and cognitive knowledge. Rational thinking will be honed well if a person experiences a meaningful learning process. Cognitive knowledge is closely related to abilities that include mental (brain) activities. This means that this ability contains all efforts related to brain activity to develop knowledge/memory abilities; understanding; application; analysis; synthesis; and evaluation (Kluwe, 1982). The body deals with foundation, physical sensations, and somatic knowledge. The body is the entry point for stimuli and is a tool to respond to what is processed and considered by the brain.



**Figure 2** Psychology, education and the environment

### Student Age

The embodied learning approach can be applied to students starting from preschool age to elementary school age (4-12 years). In this age range, students are very happy to discover something new by moving (Rachmawati 2012). Finding out many things through playing and making friends with other people is a way for children to understand the environment and make sense of things. The age range of 4-12 years is where children like to move places, moving in all directions in finding new things, exploring their knowledge needs (Diana, 2006). The embodied learning approach provides the opportunity for children to form new knowledge in a mobile way according to the demands of their development so that this is stated to improve the ability of children and early adolescents to interpret the teaching material provided.

Age consideration is important in implementing embodied learning in the classroom. To be right on target and so that the goal is achieved by the teacher, the age of the student, and the ability of the student to become a benchmark in providing the right learning approach for students (Kontra, Goldin, and Beilock, 2012). Providing inappropriate knowledge will make it difficult for students to receive the material. Errors in providing a stimulus that is not appropriate for the age of the student will harm student development.

### **Tools and Material (Technology)**

The implementation of embodied learning in the classroom can be done in various ways. Using various forms of media including high-tech ones. The article was written by Kosmas, Andri, and Panayiotis on the implementation of embodied learning in the classroom explains how this is done in detail. They use reliable technology, namely the Kinect-based educational game, Kinems. The game suite includes several games that combine motor, academic and cognitive goals, with adaptability and curriculum adaptability. All available games require body or hand movements to interact with content via the Microsoft Kinect Camera (Kosmas et al, 2019). Game Kinems involves students in learning related to verbal, mathematics, and motor skills, among others, through natural interactions, using only the hands and the body, through the Kinect camera (Kourakli, 2016).

Figure 3 is an example of a game in embodied learning using Kinect, a tool used by motion sensors, interactive video, and sensor technology.



**Figure 3.** Games used in the implementation of embodied learning

Source: Kommas et al, 2019 in the article implementing embodied learning in classroom

The adoption of technological innovations is an effort to improve the quality of education that education policymakers, education implementers, and those involved in the education process must pay attention to. The successful use of technology-based media is an important concern to do in the learning process of students (Gergiou & Ionnou, 2019). Researchers and practitioners argue that games that involve the body (motion) require student interaction with both the technology used and the learning material, this introduces the involvement of the student body with the learning process (Abrahamson, 2013). Body involvement has an important role in achieving learning goals using an embodied learning approach.

Embodied learning can also be implemented simply, the most important thing is that the learning process involves physical activity and interacting with the environment so that the participants can adapt well (Leitan & Chaffet, 2014). The material provided is based on the curriculum and lesson planning must be made in a clear and orderly manner, so those class activities are carried out properly. Tools and media such as flashcards by doing activities on the floor, ropes as



a medium, and some props that are interesting in shape can be done (Foglia & Wilson, 2014). Figure 4 is an example of a simple game that can involve the body in learning, environmental adaptation, and interaction with space.



**Figure 4.** Games in embodied learning using simple ways

Source: <https://theo-dawson.medium.com/what-is-embodied-learning-255469215efe>

Many simple tools and materials can be used to involve the body's activities during the learning process. Telling a fairy tale one of them. Ionescu (2018) in implementing embodied learning uses picture storybooks that are read in front of students. Students sit on the carpet in a circle, and among the students sit a teacher ready to read Serita's pictorial book with various additional media such as finger puppets and musical instruments that are prepared nearby. Each student has a picture book. Before starting the teacher explains the rules for students so that the class is conducive. Page after page was read by translating what was read using modeling by the teacher or the students themselves. Each page that is read is practiced again by the teacher in collaboration with the students. Learning that is carried out like this increase learning motivation and the ability of students to perceive what is seen, heard, felt, and done (Halim and Munthe, 2019).

### **Scope of Teaching Material**

Based on ten articles summarized and analyzed, the scope of teaching material that can be provided to students using an embodied learning approach is language development, motor development, perception development, foreign language skills, and understanding scientific concepts. Relation to early children's development. The embodied learning approach provides an engaging learning experience that increases the impact on developmental age. Language is obtained by imitating the sounds heard by children (Kurniati, 2017). Language is obtained by continuous interaction between children and the environment (Putra, Yudiernawati, and Maemunah, 2018). This means that involving the body, brain, liver, and the environment provides good facilities so that aspects of development in children develop properly.

Researchers of embodied learning claim that in this type of learning the body, next to the mind, constitutes a significant factor in the overall learning process, while it facilitates the meaning of learning through bodily experiences and interactions with the environment (Foglia & Wilson, 2013; McClelland, Pitt, & Stein, 2015). Therefore, several aspects of development can be significantly improved with an embodied learning approach. In other academic fields, it can also be given such as getting to know science and mathematics.

### **CONCLUSION**

This study provides an overview of the implementation of the embodied learning approach from various aspects for educators so that it can be adopted according to the needs of students in the

classroom. The embodied learning approach provides a meaningful learning experience for students. Integrate cognitive, motor-sensory, perception, and environmental abilities and the learning process to build knowledge and long-lasting understanding for students. Providing opportunities for students to learn as a whole and interact and adapt to the environment is the main goal of this approach. The implementation of embodied learning in the classroom can use media that has high technology capacity and simple media. Subsequent research can explore and concentrate on tools and media that are always innovating in the successful implementation of the embodied learning approach.

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