



Research on Children's Language Acquisition in the Context of Embodied Cognition Theory

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ABSTRACT. The rise of embodied cognition provides a new cognitive perspective and a new pathway for students' language learning. At the same time, children's language development is both embodied and contextual, and children acquire language through bodily and perceptual involvement, mental simulation, and contextual reification in language learning. This paper uses an embodied cognitive perspective to understand and study the development of children's language cognitive skills, and proposes three suggestions for children's multi-sensory use, the creation of contextualized speech activities, and the construction of an effective embodied cognitive environment, in order to promote the growth of children's language intelligence.

Keywords: embodied cognition; children's language acquisition; bodily experience; language teaching

1 INTRODUCTION

Embodied cognition is an approach to cognition that has emerged since the rise of second-generation cognitive science. The core idea of its perspective is that the body plays a key role in the realization of cognition and that cognition is acquired through the interaction between the body and the environment. Many language scholars at home and abroad have found through their research that the formation of language is intrinsically linked to the body, and that language is a unique communication tool for humans. Human bodily functions and linguistic cognition point directly to external linguistic behaviour, thus allowing humans to survive and flourish in mutual communication and action. And through language, people direct their attention to people, objects, events, and possible actions, thus placing us in the reality of the world around us. Language is thus closely linked to the body and the external world, and human language understanding is inseparable from embodied cognition. According to Piaget's theory of children's cognitive development, the pre-operational stage (2-7 years old) is considered the best time for children to learn the language when they have reached 70% of their adult level of intellectual development. Children who start learning a foreign language at this age are more likely to learn more effectively. Children at this age have already developed their initial mental representations and the

ability to use language, but their main cognitive activities still rely on sensory-motor support, i.e. their linguistic cognitive abilities are largely dependent on the sensory-motor experiences they gain through physical contact with the external environment[1]. Therefore, using the perspective of embodied cognition to understand and study the development of children's language cognitive abilities has important theoretical implications for promoting children's language education and learning; and introducing the guiding ideas of embodied cognition into teaching practice will have a profound impact on improving the effectiveness of classroom teaching and children's interest in learning languages.

2 The link between embodied cognition and children's language

Embodied cognition is a broad research project involving psychology, neuroscience, ethics, philosophy, linguistics, robotics and artificial intelligence, and refers to the strong connection between physical experiences and mental states. In embodied cognition theory, core concepts such as 'contextuality', 'generation', and 'dynamical systems' have also been invoked. From an embodied viewpoint, understanding abstract concepts in the dynamic interaction between mind, body and context allows individuals to map abstract concepts that they cannot directly perceive through bodily experience into a concrete contextual realm that is directly linked to the body's perceptual-motor system, thereby gaining understanding and access to language.

Much of the current thinking on language suggests that meaning in language is linked to people's experiences of contextual action in the physical and social world. Moreover, these experiences and the perceptions, sensations, actions and interactions are stored in the mind and brain, not in the form of propositions or words, but in the form of moving images that link the perceptual sensations of the world and our internal body states. There is growing evidence that embodied and verbal experiences should be seen as inseparably entwined: just as sensory and perceptual systems are reactivated to make sense of meaning [2].

Panagiotis Kosmas, Andri Ioannou and Panayiotis Zaphiris used experimental methods to demonstrate the importance of embodied learning in the development of children's language skills. The study used embodied learning as part of the classroom curriculum and involved 52 primary school children in four months of in-class learning activities using movement-based games in an authentic classroom setting. The data set included standardized pre-and post-tests of children's cognitive and academic performance, general learning analysis from the use of the game, interview transcripts, and observation data from the teachers involved. The findings show that embodied learning has a significant impact on children's cognitive ability (i.e. short text reading) and academic performance (i.e. expressive vocabulary)[3]. In a recent experimental study, researchers selected a total of 134-second graders and 140 fourth graders to complete tasks measuring reading comprehension, non-verbal intelligence, rapid automatic naming, working memory, morphological awareness and phonological awareness. Each child was assigned to one of three groups: re-reading, observed

manipulation and participant manipulation. Those in the observed manipulation group were asked to reread the story while simultaneously watching a video of the corresponding manipulation. Those in the participant-performed manipulation group were instructed to manipulate objects to represent the content of the story, with the next period involving the practical effects of the manipulation. Children in the observed manipulation group were instructed to read a new story using the manipulation performed by the participant, and those in the other two groups were asked to read the new story using the same strategy they had used in the previous period. The results showed that the manipulation performed by the participants resulted in greater improvement than that observed, and that both manipulations provided greater improvement than rereading[4].

The current body of research confirms that embodied factors have significant effects on children's language comprehension, memory, language expression, reading ability and academic achievement, and contribute to the development of children's language cognitive skills.

3 The application of embodied cognition in children's language

3.1 The influence of bodily experience on children's language processing

Embodied cognition theory suggests that higher-level cognitive processing (including language processing) activates the sensorimotor system, which is involved in lower-level processing. The Theory of Experiential Traces suggests that bodily experience plays an important role in language comprehension. Each time we interact with the world, we produce traces similar to this experience, which are then activated when we encounter the same object or concept, i.e. the understanding of concepts and language is based on the activation of experiential traces[5]. Some studies on language have shown that people engage their sensory-motor systems and even emotional neural mediators when they engage in language comprehension[6]. Processing a word automatically activates the brain regions that are activated when the corresponding action is performed, affecting the response of the sensorimotor system. This embodied effect has been demonstrated not only for the processing of individual words but also for the processing of sentences and short conversations[7].

3.2 The role of contextualization on children's language processing

Embodied cognition theory suggests that cognition is not only embodied but also contextual, that context is an extension of embodiment, and that not only is the mind and body one, but the cognitive process is also one between the central body and the environment. "The mind is in the brain, the brain is in the body, and the body is in the environment". In other words, the mind occurs in the brain, the brain exists in the body, and the body is embedded in the present reality, i.e. the mind-body and the

environment are also one. The body as embodied cognition cannot be separated from the context, and once it is separated from the context, there can be no practical activity, no interaction between the subject and the world, and no cognitive process can take place. Therefore, cognition cannot exist independently of the everyday world, i.e. the context. Cognition cannot be separated from the concrete reality of the situation; it is not only embodied, but also contextual. Environmental variables, simulations, contextual actions, etc. are important factors that influence the cognitive process or constitute elements of cognition in themselves. Therefore, according to the embodied cognition perspective, the cognitive process of students is dynamic, based on the natural flow of the subject's bodily experience interacting with the context. The teaching and learning process is a life-giving process, one that is spiritually caring, aspirational and spontaneous. The teaching process is a process of realizing the meaning of life, a process of growing meaning, and a process of dynamic interaction between mind, body, and context. In the teaching process, neither the students nor the teacher is a machine for processing information, not a symbolic transformation, not a one-way transmission of information. The classroom is also not a static site, but a field of life movement.

4 Suggestions for language teaching based on the embodied theory

4.1 Children's multisensory use

The body generally uses all types of senses to perceive information, which is a physiological attribute of embodied learning. In the process of language learning, in addition to the perception of the five senses, pupils can be guided to perceive things through touch, physical contact, etc. Meaningful cognition and effective learning are inevitably dependent on physical participation. Multisensory experiences facilitate students' wholehearted perception of language features and facilitate their understanding, mastery and use of language and writing. In the teaching process, teachers should attach great importance to this feature and create opportunities to maximize students' enthusiasm and initiative in language learning activities.

use pictures wisely.

Einstein said, "Interest is the best teacher." The basic methods of thinking are figurative thinking and abstract thinking. In the early grades, students think mainly in terms of images. As the grades grow, they can distinguish between the essential and the non-essential, but they still think mainly in terms of images. Therefore, in the teaching of oral communication, I often use colourful pictures to stimulate students' interest in learning. For example, when teaching the oral communication "Little Fair", in order to give students the feeling of being at the fair, I showed pictures of the fair, starting with the lively scene of the fair, then framing the camera on a wide range of goods, and finally asking students to take out the small goods they had brought with

them, and then inspiring them to say clearly what they had The characteristics of the items.

media reproduction.

Sukhomlinsky once said, "Children think with images, colors and sounds." If in the process of oral communication, multimedia is cleverly used to show wonderful images and create life scenes that are pleasing to the students, the students' multiple senses are stimulated. For example, when teaching the oral communication lesson "Let's discuss", the author uses multimedia to let students enjoy the video, using a real picture to reproduce the scene of students around them not obeying traffic rules, pulling them into the scene of life. The visuals, the senses and the scenarios opened up the students' conversation boxes and made the oral communication training more vivid.

Using audio-visuals to reduce the burden on teachers and students.

Currently, society is in the era of the Internet +, friendly to the brain in the audio-visual senses involved in the way of learning in the classroom. This way of learning graphics, sound, scenery, contextual blend, learning, and practice combined with the educational process, enhance the educational impact and improve the educational effect. When teaching a new lesson, the teacher uses PowerPoint to make a slide show of the main content of the classroom teaching, exercises and so on. This allows the teacher to focus on how to inspire and engage students' minds in learning without the hassle of hanging wall charts and writing on the board. In revision lessons, the teacher can make the revision content into a multimedia lesson involving the audio-visual senses, which saves time and effort and makes it easier for students to understand, master and remember the content, thus reducing the teacher's burden, increasing the classroom teaching capacity and improving teaching efficiency.

4.2 Creating contextualized language activities

The embodied cognitive perspective emphasizes the coupled relationship between mind, body and environment, i.e. that the three contribute to each other and are mutually beneficial. According to this theoretical perspective, teaching methods must integrate the relationship between the three. Teachers and students are no longer absolute subjects and objects of teaching, or there is no absolute source and receiver of information. There is more of a mutual subject-object relationship between the two. Teachers and students use their own life contexts to face the same new object, interpreting and exchanging information with each other in their own particular way, and knowledge is the product of a mutual dialogue process. The teacher is influenced by the students as well as receiving influence from them.

In this way, students and teachers are joint participants in the process of language teaching and learning, with the teacher providing the environment and some of the external conditions for the learning process. In this process, the teacher and the students experience and appreciate the learning together, while at the same time the teacher and the students themselves are part of the environment. The teacher, as part

of the environment, influences the students' experience, and the students, as part of the environment, influence the teacher's experience, thus changing their perceptions of the learning content, the learning environment and society and the world at large. The teaching and learning process fully embodies the characteristics of teaching and learning together, i.e. it is no longer a one-dimensional flow of knowledge, but a two-way interaction that facilitates and grows, with the learning process influencing and transforming the student as well as the teacher. Embodied cognition brings theoretical underpinnings to this conception of teaching and learning and idealized teaching and learning outcomes.

The following are some general insights into how contextual language teaching design can be planned from the perspective of embodied cognition theory. Firstly, teaching staff should reconsider their position and role in the teaching and learning process, changing from being organizers and managers of teaching and learning to be providers of contexts and mediators of information resources and communication platforms. Secondly, contextual learning emphasizes the physical experience of the learner, allowing students to actively generate knowledge through the process of experiencing their bodies in contact with the environment. The design of teaching and learning should emphasize the identification and formulation of students' own problems, so that they need to create situations in which they can find and solve problems, and ultimately allow them to develop answers to their questions through the interaction of their peers and teachers. Thirdly, the teacher must change from being the traditional 'educator' to being an 'equal participant'. The teacher's role is to work with students to provide them with more and different contexts in their own lives, so that they can discover more questions and find more answers to them in a new perspective and context, forming a new body of knowledge that is different from both their own world and the teacher's life. Contextual learning theory is, from its point of view, complete feedback on the principles of embodied cognition, and we can clarify the impact of embodied cognition on educational learning theory, expanding new horizons and pathways for the development of applied educational practice.

4.3 Effective construction of an embodied cognitive environment

Construction of the physical environment.

The construction of the embodied teaching environment should be based on students' physical and mental development rules and age characteristics, and meet their developmental needs. First of all, change the traditional neat way of arranging rice paddies, and adopt a group seating arrangement, horseshoe shape, and round table shape to give students sufficient time and space for group discussion, games, and student presentations. Based on the concepts of "student-centred" and "focus on developing students' personalities", the desks and chairs are arranged to promote student dialogue, teacher-student communication, guide students to take the initiative to express themselves and create opportunities for students to deepen their semantic understanding through practice. Secondly, teachers and students negotiate the setting up of a 'themed' classroom environment, with students designing their plans, teachers providing the appropriate resources, and students dividing up the task of beautifying

the classroom collaboratively. Finally, the effective use of multimedia teaching, especially in literacy teaching, allows teachers to use visual teaching methods, such as modelling, language, objects and movement, to link abstract symbols with concrete objects that students can see, touch and hear, so that students can participate in the practice of acquiring new knowledge with multiple senses and improve the effectiveness of literacy teaching.

Mental environment construction.

Because teachers tend to focus only on the creation of the physical environment, they place too much emphasis on classroom preconceptions and neglect the importance of classroom generation, resulting in classroom interactions between teachers and students being merely formal and lacking substantive interactions between the body, cognition and the environment. Therefore, it is particularly important to create an embodied psychological environment for primary school teaching. The implicit psychological environment can be built through 'role-playing' in which children become 'participants'. For example, in daily play activities, children are given the opportunity to role-play, and as the theme of the game unfolds, the plot of the game becomes more complex. In this process, children move away from reliance on existing play materials and begin to communicate with their peers autonomously and creatively. At the same time, the construction of friendly interpersonal relationships is the focus of embodied cognitive theory, which uses the body's senses to perceive, feel, experience and learn about the world, promoting deeper cognition and emotion.

5 Conclusion

Language is the body's involvement in cognitive activities, and is particularly important in early childhood learning, where the interaction between the body and the environment is essential. Language learning is an important neurological activity that is unique to humans. After birth, children are able to acquire language through a complex series of physical and mental activities, including imitation, in a certain social environment. Although embodied cognition theory is not all-inclusive and does not explain all the issues related to cognition or the nature of cognitive processes, nor can it create a pedagogical epistemology or theory of teaching that solves all the puzzles and problems of teaching practice, the pedagogical implications of embodied cognition theory are significant. This paper, therefore, draws on the ideas of embodied cognition theory to further highlight the concepts of embodiment, contextuality, generativity, and subjective experience in language teaching and finally provides practical suggestions for the application of embodied cognition in children's language teaching. It can be said that a pedagogy based on embodied cognition theory can promote the change, reconstruction and development of teaching culture and teaching concepts, accelerate teachers' professional growth, improve the quality of classroom teaching and promote the reform of language teaching practice. However, how to effectively apply the embodied cognitive perspective to children's language teaching

in order to improve the timeliness of teaching should be a topic of common research and extensive discussion among educators.

6 REFERENCES

1. Piaget, J. (1950). *The psychology of intelligence*. London, UK: Routledge and Kegan Paul
2. Barsalou, L.W. (1999a). Language comprehension: Archival memory or preparation for situated action. *Discourse Processes*, 28, 61–80.
3. Kosmas P, Ioannou A, Zaphiris P. Implementing embodied learning in the classroom: effects on children's memory and language skills[J]. *Educational Media International*, 2019(1):59–74.
4. Xu Z, Liu D. A comparison of embodied methods to improve Chinese children's reading comprehension: observed and participant performed manipulations[J]. *Journal of Research in Reading*, 2020, (4):556-576.
5. Zwaan, R. A. & C. J. Madden 2005 *Embodied sentence comprehension*[A]. *Grounding Cognition: The Role of Perception and Action in Memory, Language, and Thinking*[C]. Cambridge University Press.
6. Zwaan, R. A. & L. J. Taylor 2006 *Seeing, acting, understanding: Motor resonance in language comprehension*[J]. *Journal of Experimental Psychology: General* 135(1).
7. Winter, B. & B. Bergen 2012 *Language comprehenders represent object distance both visually and auditorily*[J]. *Language & Cognition* 4(1).
8. James Paul Gee. *Reading as Situated Language: A Sociocognitive Perspective*[J]. *Journal of Adolescent & Adult Literacy*, 2001, 44(8).

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