

The Educational Value of the Body: A Perspective of Phenomenology



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Abstract A human being is one who unifies the body and the mind. Phenomenology, which implies “returning to things themselves,” suggests that we should “return to nature.” Husserl’s classic phenomenology stressed conscious experience, while Merleau-Ponty replaced it with the perceptual experience of the body, and transformed the phenomenology of consciousness into the phenomenology of the body. The theory of embodied mind, strongly influenced by phenomenology, stresses the construction of cognition by the body and claims that the body, which is not an “object” but a “subject” in the production and reproduction of knowledge, “constructs” knowledge. Cognition, which originated from the recurring mode of consciousness-action of the body, results from the movement of the body and is in essence a sort of experience of the body. The embodied education and teaching emphasizes the unity of the body and the mind and advocates the transformation from the representational view of knowledge to the view of embodied knowledge by using the principle of embodied learning in education and teaching to further the change of the views of education.

Keywords Enactivist view of embodiment · Embodied mind · Phenomenology · Phenomenology of the body · View of education

In education, the body has always been suppressed or disciplined (Fan and Gao 2018). Although the Roman poet Juvenal advocated the maxim, “*Mens sana in corpore sano* (a sound mind in a healthy body),” the dualism tradition which was started by Plato and promoted by Descartes put mind and body into a dichotomy, lowering the body to the servant or carrier of mind. “It is not difficult to see the influences of this tradition on most models of schooling and their disembodied conceptions of human beings, in which the mind is both the subject and object of education, and the body is a service and transport role that is separate and inferior” (Bailey 2017).

But a human being is one who unifies the body and the mind, and “there is deep continuity of life and mind” (Thompson 2007, p. 157). This suggests that

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education, as a human activity, faces the whole person, not merely the mind above one's neck. Phenomenology, which implies "returning to things themselves" suggests that we should "return to nature," return to the original logos, i.e. the lived, present experiences, and sublimate the disembodied education mode that seeks the essence of mind behind the surface of the body. French phenomenologist M. Merleau-Ponty inherited and reconstructed the methodology of classic phenomenology, developing Husserl's phenomenology of consciousness into the phenomenology of the body, stressing the epistemological value of the body and bringing about the birth of the embodied view of education. Education and teaching are entering the embodied era.

1 From Phenomenology of Consciousness to Phenomenology of the Body

The phenomenology was set up by Husserl in the early 20th century, as opposed to the positivism philosophy. Positivism, the basis of Descartes' dualism, proposes that scientific knowledge is the truthful description of an object by the subject. True science should exclude the consciousness experience of the knower, without any subjective bias. Scientists seem to hold the "mirror of nature," which describes facts and reflects nature. However, Husserl believed that positivism can only get the explanation of the experience in nature, and it cannot be equated with things themselves. With the conviction of "phenomenon being essence," Husserl believed that essence did not hide behind the phenomenon, instead, it was expressed in the phenomenon, so the phenomenon is the essence. Here, the "phenomenon" used by Husserl refers to the object of consciousness, the so-called "things." "Returning to things themselves" means returning to the initial appearance of things in consciousness, focusing on the way the object appears in the consciousness and our "initial experience" of it, rather than seeking various external interpretations. This is because those external hypotheses and interpretations can only hide and distort the understanding process and hinder understanding. Phenomenology seeks the lived experience that appears in consciousness. "[T]he phenomenological term 'lived experience' does not refer to any kind of deep experience, fundamental event, or hidden source of meaning—On the contrary, lived experience is just the name for ordinary life experience as it carries us on in its lived everyday current....The point is that we do not think about, or phenomenologically reflect on our experiences while we 'live' them" (Van Manen 2017). Husserl's goal was to challenge the positivism view of knowledge and used the clarification of consciousness experienced as the Archimedes point to pry scientific knowledge, overcome "objective thinking," and restore the legitimacy of subject consciousness in epistemology.

Husserl's phenomenology is the phenomenology of consciousness, discussing the relation between object and consciousness, that is, the so-called "intentionality question." The implication of phenomenology of consciousness for education is that

educators should shake off the prejudice of various education theories and preconceptions, suspend those preconceived theoretical hypotheses, directly face the learners' life world and consciousness experience, and return to the original education activities themselves. However, Husserl's classic phenomenology did not realize the epistemological function of the body. In his early works, Husserl mentioned the reliance of perception and cognition on the body. In *Thing and Space Lectures of 1907* (Husserl 2013), Husserl discussed the role of muscular kinesthetic consciousness in the formation of visual perception. According to traditional views, visual perception results from external objects' stimulating the retina and the formation of visual perception is dependent on the retina, having nothing to do with the body movement system. However, Husserl believed that the movement of extraocular muscle controlled the direction of visual perception, the kinesthetic consciousness feedback coming from this movement will inevitably be involved in the formation of visual perception. Therefore, the formation of visual perception is usually accompanied by the activation of body kinesthetic sensory mode, and the position and shape of the object and the potential body movement mode configured the content of visual perception. This analysis of the formation of visual perception emphasized the role played by the motor system and is echoed by the contemporary analysis of mirror neuron mechanism (Ye 2016).

As regards the body, Husserl discussed the difference between the body as the object and the body as the subject. The body as the object is the body to be understood, and there is many so-called "scientific knowledge" about this body. In other words, this body is "Körper (the material body)," namely the objective and passive body, the object of knowledge and reflection. By contrast, the body as the subject is the body that generates understanding, different from the material body: we do not view the body as a thing among many things. Rather, the body as the subject is the phenomenological body that is motile and pre-reflective. It generates understanding and experience. At the same time, although the body as the subject is pre-reflective, this does not mean that we do not have any conscious perception. In fact, the position and movement of the body are always in the field of intentionality. This intentionality is pre-reflective and is a phenomenological experience. Husserl's distinction between the body as an object and the body as subject anticipated Merleau-Ponty's phenomenology of the body. Merleau-Ponty furthered Husserl's "phenomenological body theory" by spiritualizing the body and vice versa. The body is no longer the "objective object," but the body-subject that is united with consciousness, realizing the shift from "phenomenal body" to the "phenomenology of the body."

Fundamentally, Husserl's phenomenology is the phenomenology of consciousness, not the phenomenology of the body. Phenomenology of consciousness discusses intentionality of consciousness, in order to solve the puzzle of the source of cognition, namely "how can we be certain of the correspondence between cognition and the object cognized? How can knowledge transcend itself and reach its objects reliably?" (Husserl 1986). Husserl emphasized the construction of objects via conscious experience, in order to achieve an understanding of the things external to consciousness. According to Husserl, the object world does not exist outside consciousness, rather it exists in consciousness via intentionality and has the so-called "inner objectivity."

An object gains particular meaning only when consciousness is directed towards it in various directions. Before being intentionally grasped, the object world is chaotic and meaningless, and it is the construction of the world by the consciousness that gives meaning to the world. So cognition starts from consciousness experience, and “returning to things themselves” means returning to “pure consciousness,” and returning to the initial appearance of the object in consciousness. Merleau-Ponty’s phenomenology of the body replaced “consciousness experience” with “body experience,” replaced “conscious intentionality” with corporeal intentionality, and shifted the focus of phenomenology from the relation between consciousness and object to the relation between body perception and perception objects. Thus the body has the significance of “constructing knowledge,” displaying the epistemological value of the body.

Merleau-Ponty’s phenomenology of the body both inherited and developed Husserl’s classic phenomenology. Husserl insisted on “returning to things themselves.” As Merleau-Ponty asserted, “Phenomenology is the study of essences.... But phenomenology is also a philosophy that puts essences back into existence, and does not expect to arrive at an understanding of man and the world from any starting point other than that of their ‘facticity’ It tries to give a direct description of our experience as it is without taking account of its psychological origin and the causal explanations which the scientist, the historian or the sociologist may be able to provide” (Merleau-Ponty 2001). What Merleau-Ponty needed to do is also “returning to things themselves,” but the “things” understood by him were different from Husserl’s “things.” Husserl’s “things” are “pure consciousness” and “transcendental ego” while Merleau-Ponty’s “things” are the body experience obtained from perception. According to Merleau-Ponty, all rational forms of human beings are built on the experience from body perception. The body perceptual experience is the basis of all reason and is the most original and truthful experience. “Returning to things themselves” is to go back to this vague, pre-reflective body experience.

The core of Husserl phenomenology is “consciousness” while the core of Merleau-Ponty’s phenomenology is “body,” which takes up the central position in Merleau-Ponty’s philosophical system. But Merleau-Ponty’s “body” concept differs from the traditional dualism understanding of the “body.” In the dualism perspective, the body is a physical entity, having extensions, and is the counterpart of the mind. However, Merleau-Ponty believed that the body understood in this way is no longer our body, but the object of biology and medicine. The body without consciousness and spirit is practically a machine with mechanical and biological nature, only a carrier of consciousness. According to Merleau-Ponty, the body is the unity of material and spirit. Just as Merleau-Ponty (2004) said, “rather than a mind and a body, man is a mind with a body, a being who can only get to the truth of things because its body is, as it were, embedded in those things.” The body is neither a purely material, mechanic existence, nor a purely spiritual and conscious existence. It is both the object and the subject, and it is a body-subject. It is both the first-person “I,” and the third person “it.” It can both perceive and be perceived. “The body that sees everything is able to see itself, and recognize the ‘other side’ of its observation in the objects it sees” (Zhu and Lu 2000). The body brings us into the world in this

entangled way. This body is a physical subject, different from Husserl's "conscious subject," which gazes and overlooks the world. The physical subject can contact and understand the world via things that one can see, things that can be seen, touch and perception. For example, when my right-hand touches my left hand, the right hand seems to be the subject and the left hand the object. But the left hand is also touching the right hand and the right hand is object. The relationship between the body and the world is such an entangled one. Heidegger's "being-in-the-world defines the style of the body's understanding of the world. Merleau-Ponty pointed out, "The body is our general medium for having a world" (Merleau-Ponty 2001), and is the medium through which we are connected to the world.

As a medium, the body opens up to the world. The intentional activities of understanding the world are not the connection between consciousness and the world, but the connection between perception and the object of perception, namely the so-called "corporeal intentionality." Merleau-Ponty believed that this corporeal intentionality is closely related to physical perception. The object of consciousness activities is the object of body perception. The initial appearance of "things" does not happen in consciousness, but in the body's perception of the world. So the relationship between the body and the perceived world is the most original. The start of cognition is not the construction of the consciousness object by the consciousness, but the merge and infiltration of body perception and the perception objects. Body, as the medium through which we are connected to the world, does not need to start from the construction of consciousness to understand intentionality.

The corporeal intentionality and the conscious intentionality have the same formal structure. Husserl believed that meaning is constructed by the intentionality of consciousness and everything in the world get their meaning because they are connected to consciousness, becoming the objects of consciousness. Merleau-Ponty believed that in the initial body experience, the body is a Gestalt of life, the focus and center of meaning. Everything in the world has stable meaning only after they have become connected to the body and become its perception objects. Therefore, compared with consciousness intentionality, corporeal intentionality is more original and more fundamental. The intentional activity of the body does not need the "*cogito* (I think)" element, as it is vague, pre-conceptual and pre-reflective, and it is the body understanding of space and visual perception characteristics of things. It represents "I can," which is a more fundamental intentional activity. In the process of the body's opening up to the world via perception, the perception objects gain meaning because of their connection with the body movement capability, which "suggests that for a normal person, every movement is both movement and moving consciousness. In the requirement of normal living, intentionality and body movement are connected. Through the projecting of the body, the normal person establishes a meaning relation between perception and perception world" (Ji 2010). Therefore, the body is the center of meaning, and the basis of all changes of meaning.

Merleau-Ponty's phenomenology of the body highlighted the foundational role of the body in cognizing the world, questioned and criticized the consciousness philosophy tradition from Descartes that "suppressed the body and promoted the mind," and changed the view of knowledge. Traditionally, knowledge is the result of

consciousness construction, independent of the body. But the phenomenology of the body tells us that man is the unity of the body and consciousness, the unity of flesh and spirit, sensibility and reason, object and subject, as well as that of nature and value. In this perspective, the mind, the body and the environment are inseparable from each other. The “embodied mind” is formed in this intellectual background. The embodied mind reflects the idea of the phenomenology of the body, places the “body-subject” which has the mind-body duality, in the center of cognition, not only influencing the development of cognition science but also bringing forceful impacts on the traditional education mode that features “shaping the heart” (Ye 2015).

2 The Value and Significance of the Body in Education and Teaching

Under the influence of dualism thinking, mainstream Western philosophy has been engaged in the exploration of reason, will and wisdom while the body becomes the sacrifice of reason and soul. This philosophical belief extends to the education domain, where education and teaching are viewed as “the shaping of souls” and “the discipline of the body.” The “emphasis on mind” and “disembodiment” became the typical catchphrases of this education theory. But the initial form of education is the instruction between the elders and the young children, which involved personal examples and verbal instruction. In this process, the body plays a key role, especially before the emergence of words when the body movement of educators and the educated, as well as the body experience thus generated, constituted the main channel of learning. However, in today’s education, the voice of the body is waning, as if education and teaching are unrelated to the body. Merleau-Ponty’s phenomenology of the body suggests that we must return to the experience domain of body activity, and focus on the value and meaning of the body in education and teaching.

The body is not the object to be cognized in the production and reproduction of knowledge, but the subject of cognition which plays the role of constructing knowledge. For teachers’ instruction and students’ learning, the body plays the role of the subject of cognition. Traditional education is deeply influenced by philosophy. Both R. Descartes’ “*Cogito Ergo Sum* (I think, therefore I am)” and I. Kant’s idea of “reason prescribes laws to nature” reflect the dominance of consciousness. In consciousness philosophy, the subject consciousness was promoted to the criterion of knowledge and the subject prescribing everything. The body was degraded to be its servant or attendant. In a word, there is an insurmountable gap between knowledge and the body. When the view of mind prioritizing mind is implemented in education, the mind becomes a process happening in the central nervous system of the brain, unrelated to the body. The school thus becomes a spiritual training camp that develops the mind and disciplines the body.

But is the body a mere carrier or vessel of the mind? Varela and other scholars pointed out the motility of the body profoundly: “By using the term ‘embodied’

we mean to highlight two points: first, that cognition depends upon the kinds of experience that come from having a body with various sensorimotor capacities, and second, that these individual sensorimotor capacities are themselves embedded in a more encompassing biological, psychological, and cultural context... (1) perception consists in perceptually guided action and (2) cognitive structures emerge from the recurrent sensorimotor patterns that enable action to be perceptually guided...” (Varela et al. 2016). The message of this passage is that cognition is not unrelated to the body, but comes from the bodily movement experience. Essentially, cognition is a body experience, which comes from the body with certain physical construct and motor ability. Cognition is impossible without this body. As a cognition process, the perception as cognition process is not detached from the body, but exists in the action directed by perception, and is united with body movement. In other words, it is an embodied action. The previously conceived sacred cognition is by no means mysterious. It is neither the result of Kant’s a priori categories, nor the strengthened coupling developed by the environment. The cognition structure is formed in the sensorimotor mode that repeatedly occurs in body activities, and it is the internalization of the body actions. It is not unrelated to the body that has a certain sensorimotor capability. Therefore cognition is the body’s cognition, the body is the subject of cognition. The subject’s construction of knowledge is not done by consciousness, but by the embodied action, in the repeatedly and frequently occurring sensorimotor mode.

Varela’s embodied mind emphasized the direct connection between cognition and body experience, explicitly reflecting the influence of Merleau-Ponty’s phenomenology of the body. The phenomenology of the body replaces the “*cogito* (I think)” with the “I can” of the body, and establishes the cognition of the world on the foundation of the corporeal intentionality. Such a phenomenology is reflected in Varela’s embodied mind theory. The embodied mind is neither “pure consciousness” nor “purely corporeal.” On the contrary, it blends consciousness and the body, sensibility and reason, material and spirit, and is the physical mind, reflecting the nature of “body-subject.” The construction of knowledge is completed by the embodied mind of the “body-subject.”

Similarly, G. Lakoff and M. Johnson’s image schema theory reflects the influence of the phenomenology of the body (Lakoff and Johnson 1999). Image schema is the knowledge structure developed via body action experience and can be applied to understanding experience and metaphorical inference. In the process of adapting to the environment, man interacts with the environment with various body movements. The body exists in the contacts and interactions with the objective world, such as walking upright, passing barriers, entering the room, drinking water when one is thirsty, eating when one is hungry, etc., which seem to be irrelevant body activities but entails a stable structure. Through these activities, we form the patterns such as up-down, left-right, front-back, entrance, exit, entailment, crossing, jumping out, etc. The cognitive representation formed by these activity patterns constitutes the so-called “image schema,” such as space schema, vessel schema, movement schema, balance schema, force schema, etc. Image schemata constitute the basic way in which man cognizes the world. The originally chaotic natural world becomes ordered

and meaningful via the projection of image schemata. But the formation of image schemata relies on the body activity experience working on the environment. It perfectly matches the embodiment belief that “cognition structure comes from the repeatedly occurring sensorimotor mode.” The most familiar body activity to man is “eating.” Through the body experience of “three dinners a day,” we developed the image schema of eating. As we cognize the world using the image schemata shaped by body movement, we developed the Chinese interpersonal and social understanding such as “eating soft rice (usually a man relying on his wife or female partner), “eat a pitfall and increase a portion of wit (A fall into the pit, a gain in your wit),” “eat bitter (have a tough time),” and “eat flavor (be jealous).” Man has two hands to push things forward. The body movement of frequently and repeatedly pushing things develops into the image schema of “force.” Using this image schema to understand the society, we have the abstract metaphor of “pushing” social progress. Can the development of being “pushed” manually? But via the metaphorical mapping of image schemata, we can “push” society. Here, the action of the “push” shapes our way of thinking to cognize the society. These examples demonstrate the value and meaning of the body in knowledge construction. Image schemata result from physical activities, not from rational thinking, not from conscious reflection. The formation of image schemata is non-conscious, and has the experience characteristics of pre-reflective phenomenology, and complies with the basic principles of the phenomenology of the body.

The body not only constructs knowledge but also plays an irreplaceable role in the knowledge learning process. Especially in the learning process of grasping the meaning, the intervention of the body is the key to the success of learning. In education history, learning theory once constituted a fad. This theory establishes learning on the basis of observation and experiments, emphasizes the objectivity of the learning process, and believes that learning is a conditioned reflex and a change of behavior. Just like the dogs in Pavlov’s laboratory, the learning process is one in which learners establish a stable connection between environment stimulus and behavior reaction. This connection is mechanic, and its mechanism is causal and can be explained using natural science, not involving any subjective consciousness and values. The learning theory believes that only the knowledge thus obtained is objective and scientific. However, this objective way of learning does not explain the learners’ subjective experience. Due to the detachment from the first person “I” experience, this objective way of learning can only explain learning on the observable level, and it is unable to explore the “meaning” plane of learning and unable to help explain the learning of meaning.

Cognitivism or constructivism are just answers to this problem of learning theory, attempting to resolve the problem of meaning learning through learners’ subjective construction. This theoretical perspective has Kant’s a priori categories as its blueprint, which advocates that knowledge does not come from the external world, but from the inner mechanism of the learner or the construction of thinking categories. Environment stimuli do not impose the content of learning mechanically on us. Education and teaching do not stuff knowledge into the learners’ brain. Knowledge is constructed actively through learners’ inner mechanisms. This construction

process is the process of meaning generation. However, the cognitivism or constructivism views of meaning learning face the same problem as the traditional view of learning does: Where is the role of the body? Can meaning be generated simply through the construction of consciousness? If knowledge and meaning are the results of certain cognition mechanisms or the result of processing stimuli by thinking categories, how can we prove the existence of such a mechanism or categories? Can it be like a dwarf living in a certain part of our brain? Here the dualism dilemma of Descartes became an insurmountable gap for the cognitivism or constructivism views of meaning learning.

There are many forms of knowledge learning and meaning grasping, not all forms are objective, experiential and rational. The phenomenological “returning to things themselves” lets us return to the vague and pre-reflective experience. They are the sources of meaning and the main channels of meaning learning. “Merleau-Ponty’s philosophy seems to be a very suitable theory to explain the important role of perceptual experience and body in knowledge understanding. For the knowledge learning from the grasping of meaning, Merleau-Ponty’s philosophy is cannot be more relevant” (Stolz 2015).

Embodied learning is the Merleau-Ponty style of learning. It is a kind of learning through bodily experience. In this learning process, the body and the perception experience of its activity are in the central position. Embodied learning is not about the acquisition of conceptual knowledge, but an understanding obtained via body experience. Its key lies in the fact that we gain understanding from our own body experience, i.e. the first person “I,” which is a phenomenological way of cognizing. The world is meaningful to us. The world of our perception is not elemental, objective and cold existence, but a coherent meaningful consortium, which has the body as its center. In the perspective of phenomenology, the world appears in our perceptual experience in an integrated form. We do not construct the meaning of the world in perceptual stimulus. Rather, meaning is an inseparable part of the world of perception, and is determined by the relation between the body and the world. Take the example of a table, its meaning is not constructed by us and is not reflected by the perceptual elements, such as its shape and color. Just as Merleau-Ponty (2004) pointed out, the way of appearing of a table in our world of perception is a way of appearing of meaning: its size and height provide us with a device to support our body, which is its practical meaning. This meaning comes from our body. If it is a table left to me by my parents, it has affection meaning, as it is related to my parents’ caring and my fond memories of them. If the table has a good shape and makes my room beautiful, it has aesthetic meaning. These are all determined by my body and life experience. Without the body, the table has no meaning. This demonstrates one point: The grasp of meaning is inseparable from the body.

Emotional learning is more closely related to the body. One century ago, American psychologist William James, the founder of pragmatism, discussed the physical nature of emotions. He believed that emotions were not caused by cognition, but body reaction. When we meet bears in the wild, we do not flee because we panic. Instead, we panic because we flee. The fleeing body reaction causes panic. The key to this emotion theory is that the body reaction anticipates emotional experience;

environmental stimulus causes body reaction, the feeling of the body reaction is emotion.

Due to its difference from common sense, William James' emotion theory was dismissed by many as ridiculous. The follow-up emotional cognition theories paid more attention to the consciousness and evaluation elements in emotions and believed that emotions came from the cognitive evaluation of environmental stimuli. Here the body experience of emotion is downgraded as a secondary phenomenon. It is more an accompaniment of emotions than its cause, and it is the physiological clue to the ongoing emotions. But people soon find the drawbacks of emotional cognition theory, namely, it cannot explain the consciousness experience of emotion as a phenomenon. The evaluation of stimuli can lead to emotions. But what is the nature of emotion, namely what is our feeling under certain emotional states? These questions cannot be answered without reference to body experience. If we do not consider various body factors, such as accelerating heartbeat, muscular tension, short breath, and flush, we cannot determine the intensity of emotions. All of these require reference to body experience. This experience is not the product of conscious reflection, but the product of the first-person experience of "phenomenon." Without the body, the road leading to this phenomenon experience is totally blocked.

The difficulties of the cognitive theory of emotion brought people back to James' theory. An early experiment revealed that nodding and shaking heads indeed can change a person's emotional experience. In an experiment, those subjects making the vertical movement of the head (nodding) like the presents in front of them better while those subjects making the horizontal movement of the head (shaking) like other presents. Unconsciously, the nodding movement and shaking influenced the subjects' emotional experience of the things in front of them. (Wells and Petty 1980). Recent research had the same conclusion. In this research, those participants who performed the gestures of extending their hands to approach or receive had more positive emotion towards the target object than those who performed the gesture of dodging with their hands (Koch 2014). These experiments demonstrated one point: body movements can change one's emotional experience. James' "body reaction anticipates emotional experience" does not seem to be ungrounded. In the perspective of the phenomenology of the body, the experience caused by body movement must affect the emotional experience, because the mind is a physical experience. Then in emotional learning, it is necessary to make full use of the body, form different body experiences so as to develop appropriate emotions.

Education and teaching experiments also confirmed the facilitative role of the body in learning. In a young child language learning study, researchers divided the young children aged between 4 and 5 into two groups. One group listens to stories while doing activities related to the stories. The other group listened to the stories and watched the pictures related to the stories. The results revealed that the first group not only outperformed the second in the follow-up retelling of the plot sequence but also recognized more new words and idioms (Ionescu and Ilie 2018). The involvement of the body leads to differences in learning achievements. Another research found that the smooth physical experience of hands can facilitate students' creative thinking. Those required to perform smooth movement of hands outdid those required to

perform rigid hand movement in creative enactment, cognitive flexibility and long-distance association (Slepian and Ambady 2012). In addition, research also demonstrated that body gestures not only have a communication function but also facilitate students' acquisition of concepts and the change of mindset. In learning mathematical concepts, if the teachers can make full use of gestures, students will have better memory retention and more effective inductive reasoning. Why is this the case? "[G]esture may be effective simply because it involves the body" (Congdon et al. 2017). Mathematics has been long since regarded as irrelevant to the body, because mathematical concepts are abstract, involving numbers and symbols. However, even the abstract disciplines, such as mathematics, cannot do without the body.

3 Education and Teaching Striding Towards Embodiment

Phenomenology asks us to "return to things themselves," asking us to focus on the original, lived, first experiences in education and the teaching process. According to Husserl, this experience is a pure consciousness experience. In Merleau-Ponty's terms, it is the perceptual experience of the body, which comes from bodily activities in the environment and the basis of all human reason. This thought, after being condensed by Francisco Varela and others, developed into the heat wave of embodied mind research. The embodied mind examines the value and status of the body in knowledge, changes the denigration of the body by educators, and drives education and teaching towards embodiment.

Psychology has been regarded as the scientific basis of education. The behaviorist learning theory, Piaget's theory, cognitive psychology theory, and humanistic psychology have all impacted education and teaching. The view of the mind in psychology, i.e. how to view the influence of consciousness and psychology on education and teaching, determines the curriculum setting, selection of pedagogy and determination of teaching strategies. From this point of view, the appearance of "embodied mind" inevitably challenged traditional education and teaching, which is used to "shape one's heart."

The traditional disembodied education mode, which emphasizes shaping one's heart, has the following characteristics. First, the dualism view of mind and body believes that the mind is different from the body. Second, human intelligence is rational: it involves the use of language and/or other kinds of symbols. Third, human intelligence is abstract: it involves concepts that are less closely or less obviously tied to concrete experience. Fourth, thinking is conscious, involving analysis, induction and inference. Fifth, thinking is reflective, likely to feel effortful, rather than smooth and automatic. "The key question is: how much can we attribute these more intellectual abilities to the workings of the body? The Cartesian answer was: not at all!" (Claxton 2015). The traditional pedagogy is built on the basis of this understanding of the mind.

The embodied mind under the influence of phenomenology puts the body in the center of cognition and asserts that "perception, thinking, feelings, and desires—the

way we behave, experience, and live the world—are contextualized by our being active agents with this particular kind of body. In other words, the kind of body we have is a constitutive precondition for having the kind of behaviors, experiences, and meanings that we have” (Overton 2013). This means the body has gained unprecedented importance in the embodied mind, become the cognition subject that unites flesh and spirits, determined the way we experience the world and construct meaning. These body-subjects set the ontological foundation for embodied education and teaching.

The embodied education and teaching is based on the enactivist view of the embodiment, which regards cognition or mind as “enacted.” In other words, cognition is generated in the body activity that is imposed on the environment, and its aim is to instruct the organism to act effectively. Cognition is closely related to body movement. Its basic views are listed as follows.

First, cognition is enactive. In other words, cognition is not the impression or representation of the objective world by a ghostly subject. Rather, cognition is the result of body movement and is the action of the body imposed on the environment. Its aim is to guide this activity. Just as the Chinese proverb goes, “roads are made by travelers.” There is no road in the first place. A road is formed when more and more people travel by it. Using this metaphor to understand cognition, we will find that cognition is not the representation of the world following a fixed route. On the contrary, cognition is generated in the action of the body on the environment, in order to make the organism adapt to the environment. It is “enacted” by body movements, not “represented” in the brain.

Second, the body is the subject of cognition and is in the central position of cognition. The body is neither the object of cognition nor the servant of the central nervous system. On the contrary, cognition is the cognition of the body and the body is the cognition subject. Just as Merleau-Ponty put it, we do not own our bodies; we are our bodies, and our bodies constitute the way we own the world. “[I]t is the body which ‘understands’ in the acquisition of habit...To understand is to experience the harmony between what we aim at and what is given, between the intention and the performance—and the body is our anchorage in a world” (Merleau-Ponty 2001, p. 190). Different bodies have a different experience of the world. The different types of bodies have different ways of knowing the world. The way and scope of interaction between organisms and the environment depend on their forms of bodies and capacity of action.

Third, lived experience is the focus of cognition research. Influenced by phenomenology, the enactivist view of embodiment emphasizes the lived experience of the first person, which is human experience examined in a direct and live situation. Fundamentally, cognition is the body experience generated in the interactive process of the actor and the world, which is lived, vague and pre-reflective, and is the body experience of the organism in the life world. Due to its first-person nature, lived experience has always been rejected in cognition science. However, the research of learning, memory, feelings, motivation and will has been wandering among the observables and unable to tap the real experience of the actor, due to

the rejection of the actor's experience. Therefore, the enactivist view of embodiment emphasizes the direct perception phenomenology, and grasps the first person experience directly. Fourth, cognition, body and environment constitute a dynamic whole, the parts of which interact and couple nonlinearly. There are no clear-cut boundaries among them. According to the enactivist view of embodiment, the body plays a constitutive role in cognition; cognition does not happen at a particular place, it happens in the interaction among brain, body, and the environment. The ego and the world are not subject and object. They are entangled, just as Merleau-Ponty put it: "The world is inseparable from the subject, but from a subject which is nothing but a project of the world, and the subject is inseparable from the world, but from a world which the subject itself projects." (Varela et al. 2016, pp. 4–5).

The summary above is not the total of the enactivist view of embodiment and it is a summary of theories related to education and teaching. Embodiment education and teaching are based on such an understanding of mind. Its emphases are reflected in the following points.

First, it emphasizes the unity of body and mind and adheres to the principle of mind-body unity. Traditional education theories view body and mind as a dichotomy. Based on this dualism, traditional education and teaching prioritizes mind and downplays the body. School education focuses on the transmission of ideas and the cultivation of spirits. Learning is viewed as spiritual training, not related to the physical body and its movement capacity. Under the guidance of this thought, the school curriculum obviously inclines towards content related to the mind. Abstract courses such as math, physics and language are given the most attention. Courses related to the body, such as physical education, art, and humanistic courses, are subject to auxiliary or unimportant status in the hierarchy of curriculum. Embodied education and teaching accepts Merleau-Ponty's phenomenology of the body, views mind and body as inseparable from each other: Mind is the mind of the body; the body is the mentalized body; the mind is "body-subject" and is the incarnation of the subject that combines spirit and flesh. The implication of this mind-body unity principle for school education and teaching is that school curriculum should not only focus on courses related to abstract thinking, but also break through the limits of pedagogy and combine the embodied knowledge with curricular knowledge, and train learners' thinking and innovative ability through body movement. John Dewey emphasized "learn from doing" and had children obtain an understanding of the world through body movement. He also emphasized the combination of bodily movement with reflective thinking practice, through bodily practice. Knowledge learning is not a purely mental process, but the product of body and mind activity. Regrettably, Dewey's embodied "learning from doing" was forgotten among the waves of the rationalism of education, and replaced by the focus on the so-called "internal mechanism." In school education, "mathematics has been firmly entrenched at the top of the curriculum hierarchy ..., while physical and vocational subjects have languished at the bottom" (Bailey 2018). Embodied education and teaching starts from the body-mind unity principle, reexamines the role of the body in knowledge construction and knowledge learning, attaches the same importance to "learning and understanding via body" in curricular learning as math, physics and language courses, integrates

the teaching and learning of bodily knowledge and abstract knowledge, to promote the healthy development of students.

Next, embodied education and teaching require the transformation of view of curricular knowledge. Traditional education adheres to the representational view of knowledge, according to which knowledge is independent of the subject and cognition is the subject's true reflection or an accurate representation of objective knowledge. In other words, there exists an object of knowledge and the subject has this object as its object. Knowledge comes from the correspondence between the subject and the object. This view of knowledge is based on Descartes' dualism, adhering to the dichotomy of subject and object, and the image theory of the relationship between knowledge and the world. Its limitations are reflected as follows. This objectivism view of knowledge ignores the influence of individual body perception-movement experience and subject value beliefs, only adhere to the accurate representation of objective knowledge by the mind, separates knowledge from the living world of the knower, making knowledge an abstract system that transcends time and life. The implementation of this view of knowledge in education and teaching results in the separation of curricular knowledge and student individual life experience, and the separation of the teaching process and students' practice activities. Teachers become the porters of knowledge, and students become the receivers of knowledge. Teachers have to have a pail of water to fill students' cups. Education and teaching nearly become stuffing and linear filling. Students' manual skills and innovative thinking are generally suppressed. In contrast, embodied education and teaching centers around the body, emphasizes embodied knowledge, and reconstructs the view of curricular knowledge. According to the enactivist view of the embodiment, cognition is an embodied activity. "Cognition is not something happening inside us or to us, but it's something we *do*, something we achieve" (Merritt 2015). This means that knowledge is closely related to the body movement of an individual's body. From the relationship between knowledge and body, knowledge is not the objective reality independent of the body. Due to the differences in the body structure, kinesthetic ability, and the interaction and relationship with the environment, the world facing an organism varies greatly. There is no such thing as objective knowledge world detached from the organic world. Knowledge is constructed, the construction process is embodied, and is the result of organic body movement. Considering the curricular teaching from the embodied view of knowledge, the teachers and students are the actors of the knowledge production process, not passively waiting and receiving. Instead, they do use the body to practice and create. This is the direction of exploration for the embodied education and learning.

In addition, embodied education and instruction require us to switch learning styles, establishing the learning of abstract knowledge on the basis of body experience, and making embodied learning the basis of the learning process. Traditional education and teaching establish the learning process on the basis of rationalism or empiricism. The rationalistic view of learning regards knowledge as the highest attainment of cognition, regards the propositional, abstract and universal knowledge as the main aim of learning. This view of learning believes that there is an insurmountable gap between the things happening in the mind and those existing in the

objective world, and that learning is a process in which learners use their rational ability. Rational ability comes from the brain, playing the role of collecting, storing and applying knowledge. This view of learning pays more attention to the cultivation of rational thinking and the acquisition of abstract and universal knowledge. Opposite to the rationalistic view of learning is the empiricist view of learning, which views knowledge as objective, external and permanent, and views learning as the absorption of objective knowledge, as if the learner is a “*tabula rosa* (blank slate).” Perceptual experience carves various marks on this blank slate. The learning process is passive and inactive. Both rationalism and empiricism neglect the key role played by the body in the learning process.

The embodiment view of learning puts body and the perceptual experience acquired via body movement on the key positions in learning. It focuses on the “phenomenon world” presented to us via body perception, the knowledge of which is vague, pre-reflective and is fundamentally a body experience. This experience is the basis of all rational forms of the human being. The embodied learning grasps this first-person body experience, focuses on situatedness, embodiment, interaction, and enactiveness. It requires us to start from the “life world” of learners in education and teaching, focuses on the body activity experience of learners. The learning of knowledge cannot solely rely on the abstract understanding of causal relations. It requires the learners’ perceptual understanding and experience, requires the learners to experience and feel, in order to grasp the meaning of things. At the same time, embodied learning happens in social contexts. In this learning, others are both subjects and objects. Others’ behavior shapes ours, makes our behavior adapt to the requirements of the contexts. Being in a learning context is being in a relation. The social nature of embodied learning makes learning no longer a “solipsism” process, but a participatory sense-making, reflecting the characteristics of intersubjectivity.

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