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Introspection of teaching contribution to safeguarding the physiological mechanism of children.

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Abstract

The study of physiological mechanism has important practical significance to promote teaching improvement and enhance teaching timeliness. In the usage of young children teaching methods to promote mental development, teachers should deeply analyse and research combined with the characteristics of physiological development of children, properly handle the relationships between physiological mechanism and teaching and launch a pertinence teaching, so as to open the door to wisdom for young children teaching. This paper starts from the research of physiological mechanism of children, then mainly discusses the relationship between their physiological mechanism and teaching, and finally puts forward some constructive suggestions on the existing problems in young children teaching. The outcome of the proposed technique was well received by children.

Keywords: Young children teaching, Mental development.

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Introduction

Based on all kinds of disputes between genetic and environmental determinism, Piaget had developed the theory of cognitive development, and attributed various factors which influences the physical and mental development of children to maturity, experience, social environment and balance. The mature factors include the development of physiological and psychological function, which is a necessary condition for children to accept knowledge. With the further development of European capitalist relations of production, positive science becomes the mainstream research direction instead of the original philosophical ontology, which provides the theoretical basis for this study from a biological perspective. Meanwhile, many achievements of empirical studies also constitute the case support of this study. The clarification of relationship among physiological mechanism of children, cognition and teaching is very crucial to grasp the cognitive law and to improve the quality of young children teaching.

An Overview of Physiological Mechanism of Children

Early childhood is a critical period of human development [1]. According to the analysis of the life story and famous works of Leonardo Da Vinci including 'Mona Lisa' and 'Saint Anne, Lady and Child', Freud came up with the conclusion that incidental factors in early childhood determined his life, and repeatedly mentioned that the clear importance of early childhood could not be doubted again [2]. There should be noticeable changes in both body type and posture at this stage. As the earliest organs in the development, the brain and nervous system play important roles in individual behavior and psychological development, and also in transferring information to other body organs, whose development is closely related to the improvement of the brain cells. Synapses are organisms distributed in the brain cell surface, which will be discussed in detail in the sections below, not be repeated here. The period of synaptic growth in different brain regions is not the same. That is to say, the sensory cortex synapse early begins to grow, while the prefrontal cortex of brain cells develops later. Hence, it starts growing slowly pass by continuous perfection of sensory cortex cells. Generally, it will be basically perfected until sixteen years old or so. The prefrontal cortex is strongly linked with associative memory and long-term memory. The changes of brain areas movement were investigated by the release of amino acids with electron scanning. Some researchers observed that there were amazing activities of the prefrontal cortex of the tested people when making them remind of a related word with a prompted word through a card. The prefrontal impacts on personal behavior are mainly labeled as processing and coordinating information, which will result in planned behavior, and controlling cognitive behavior from the meta-cognitive level. Additionally, thinking and emotional system change with the variation of height and weight of children at the same time. According to early childhood physiology and psychology studies, children over the age of one-year-old can imitate adults consciously, including language and related behaviors. Besides, this trend becomes more obvious with small growth of age, but still in the primary mechanical cognitive processing. The brain weight has already reached 90 percent of its full size by the time a person is six, with the basic ability to recognize and deal with

specific matters. Meanwhile, 6-year-old children can produce emotional resonance and long-term memory in response to external stimuli, with well-developed nervous system.

The Influence of Physiological Mechanism of on Teaching

The growth and development of the brain is the premise of teaching

Teaching and learning are two processes occurring in classroom teaching. Students are the main body of classroom activities. Pedagogy believes that teachers in the education activities should pay attention not only to renew teaching methods, but also to bring their initiative into full play. In this article, it refers to the readiness for learning by the improvement of the main physiological mechanism. According to the meaningful learning theory of Ausubal, the learning mind and knowledge background of students are equally important to promote the completion of learning behavior, which come to this conclusion based on the static perspective. However, from the development angle that is the view of individual physiological mechanism, the teaching should follow individual physical and mental development. The brain is the material basis of cognition, whose function cannot develop well without the interaction between the individual and the external environment. In other words, if lacking of necessary external stimuli, the brain cannot complete the normal growth. The brain institute of Chinese Academy of Sciences has investigated this problem by means of experiment. In their experiment, new-born mice were placed in three different design environments. The beards of one group of mice were pulled out to lose tactile sense, another group was placed in a dark environment to lose sight, and a third group experienced in simulated natural environment to receive multi-modal sensory stimulation [3]. The results showed that the cerebral cortex of the first two groups of mice have no development, hindering the development of other parts simultaneously. In contrast, the sensory cortex of the third group of mice obtained good development by sensory stimulation. The brain neurons are the basic conditions for students to acquire knowledge to complete the development of intelligence. In other words, the acquisition of knowledge is directly related to brain plasticity. As early as before birth, nerve cells have gradually achieved growth and development, then underwent two rapid developments in the 3 months after fetal growth and birth, finally stopped growing around 2 years of age basically. The interaction of environment on the brain cells continue to change the form of relevant functional organizations, which is determined by the plasticity of brain cells. Moreover, it is also the mechanism of human brain to store declarative knowledge, procedural knowledge and strategic knowledge.

Individual differences in physiological function determining the choice of educational methods

Although there is little difference between the number of human perception and emotional system, the action mechanisms of these systems are not also decided by individual differences of genetic factors. Personal experiences of external stimuli and life situation determine the quality and the way of their experience. The brain makes corresponding changes according to a certain stimulus; as a result every brain development is diverse from each other. Even at the same age stage, children also have various intellectual development levels. In order to avoid affecting the intelligence development of children, proper arrangements should be made fully in accordance with the principle of the recent development of the brain area, when working out teaching plans and related teaching methods in early childhood, a crucial time in the brain development of a child. Physical development of every child should be took care of as much as possible in teaching, with advanced teaching techniques and means to help improve their intelligence. As a complete system, the overall function of physiology is influenced by the growth rhythm and various components. Therefore, we should consider the development of the function of each component in the development of teaching system, and coordinate their balanced development and priority development.

Teaching in the Horizon of Physiological Mechanism

Teaching should respect physiological law

Sound physical function is an important foundation for teaching to be effective. The development law of physiological mechanism can direct teaching practice. In view of the idea of humanism, all the starting point and destination of teaching should be toward to the people in reality, with the purpose of promoting the full development of human beings. In the final analysis, the respect for human learning rules is to properly handle the relationship between physiological mechanisms and learning in teaching [4]. That is, we should make reasonable teaching objectives, methods and strategies, never too soon or too lower the difficulty of teaching, in line with the principle of moderation and children's growth and development, to avoid the overlook of learning. Yet in traditional young children teaching, overemphasized classroom teaching would make children early contact with difficult knowledge learning, contrary to the lively nature, and ultimately inhibit the excitability of cerebral cortex, rejecting to learn. The teaching methods and means of kindergarten teachers often disconnect with practical needs, lacking of theoretical research and the respect for physiological mechanism. While respecting the physiological mechanism of children and establishing coincident teaching system can get twice the result with half the effort.

Teaching is to mobilize the physiological mechanism to play the process

Biological experiments show that the number of brain cells of three-year-old children can reach hundreds of billions, close to adult levels, with well-developed synapses and infinite plasticity. Additionally, the cortex tissue hidden underneath the surface of the brain has a thickness of 2 mm, all over the nerve cells. Through observation, a single nerve cells stretch several tens of thousands of tentacles composed of dendrites and axons from the inside out, and the transmission of information to the synaptic is in a meaningful and planned way in teaching [5] as shown in Figure 1. What is more, the speed of information exchange between the cells through the synaptic can be nearly 100 meters per second based on the analysis of measuring data, thus forming a huge information transmission system. Besides, the information storage capacity of brain is also unusually large, which can reach almost a thousand units of information per second. Even in infancy, the functionality of brain development is beyond imagination. High-quality teaching can maximize the mobilization of brain function, fulfil personal potential, and improve intelligence as well.

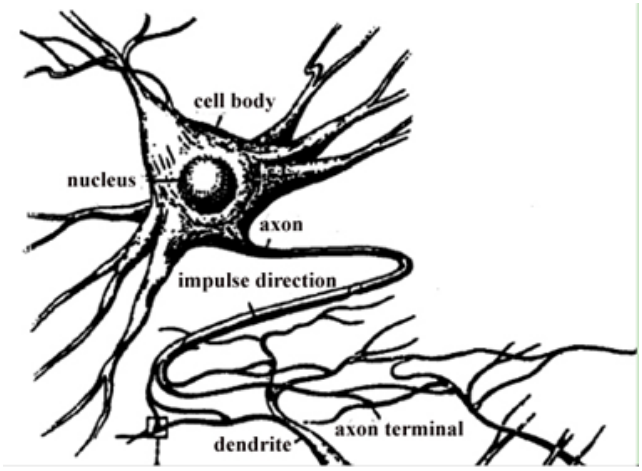

Figure 1. Diagram of synaptic.

Teaching for the creation of physiological mechanisms to create space

Scientific research confirmed that the correct environmental stimuli are of positive relevance with physiological mechanisms. High-quality teaching can provide a "suitable" environment for brain development, and promote its development, while produce obstacles in opposite. Aiming at the characteristics of physiological mechanism in different periods, it can effectively promote the organic changes of cerebral cortex and neuron synapse, and improve the brain development simultaneously, benefited from providing some beneficial experiences for children through certain teaching methods and ways. Young children teaching is more dependent on the play of teaching situation, whose understanding of knowledge is limited to direct experience. The creation of teaching situations can not only powerfully enhance sensory experience including perception, audition and touch, access to intuitive teaching content, but also effectively enhance the excitability of the cerebral cortex, to obtain a pleasant learning experience. In carrying out teaching process, the mutual coordination of various physiological mechanisms should be paid attention to, such as the direct correlation between emotions and thinking, that is different emotions of children will have an impact on teaching even in the same teaching environment. More specifically, stress, anxiety and burnout have negative impacts, while happiness, comfort, challenges and other factors help to obtain a positive attitude. In a word, positive emotions can effectively improve the flexibility of thinking and shorten the time required for information processing. On the contrary, negative attitudes often inhibit to play the function of the brain normally.

Construction of Young Children Teaching Practice on the Basis of Biology

Creating appropriate teaching environment

"Studies of gifted children have shown that intelligence was not inherited like redheads and blue eyes. Our intelligence seems to have been determined by the quality of the environment before and after birth. All gifted children almost grew up in the environment of rich and colorful." said Peter Russell, a scientist who works on brain research [6]. More or less, the importance of shaping environment is told in this view, although absolutizing the role of environment. Above all, it is extremely important to create an appropriate teaching environment for young children. Galloway et al. and Mercer proposed techniques to improve teaching and retention among children [7,8].

Create positive activities with a variety of sensory stimulation

Perception of the world of the children more depends on the systematic and combined action of various senses, whose abstract thinking has not yet developed. The relevant studies have shown that the full use of multiple sensory functions could effectively enhance the learning efficiency, making external stimuli play a balanced role in the entire sensory system. The feelings of a child about the same external stimuli vary from person to person in teaching, as well as experience mode, so teaching should be presented in a variety of ways as much as possible [9].

Face the educational value of "environment"

Designers give more consideration to obvious factors such as light, temperature and noise in the design of the education environment, without the support of physiological mechanism. However, the effects of environment on human brain function determine its recessive function. It is of great significance to promote learning by embedding education-related elements in the environment, achieving communication with the brain, strengthening and enriching children's emotional experience, and contributing to the slow and lasting function of education.

Based on the physiology research in environmental education value, the differences of early childhood brain development are mostly derived from the proportion of educational components in environmental design and whether full participation in teaching. But in reality, young children teaching often comes into the crisis of theory divorced from practice, due to the lack of meaningful teaching design in life space. In addition, it should be recognized that the environment is neither static nor absolute. In accordance with different teaching requirements, educators should make real-time adjustment of relevant environment elements, including items, equipment and appliances, to give the connotation of a vivid scene as shown in Figure 2.

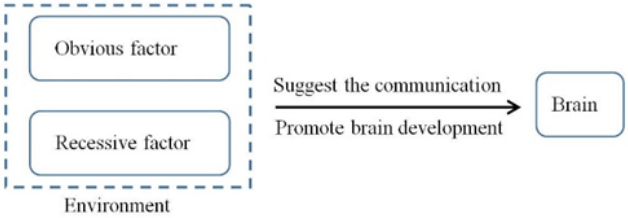

Figure 2. *Schematic diagram of environment promoting brain development.*

Create a relaxed atmosphere

As studies have proven that the hippocampus located in the brain edge will slow down or stop the transmission of information to other brain tissue when children face adverse situations, such as threat or significant pressure, lead brain function to be affected and inefficient. As a brain tissue closely related to young children learning, the hippocampus connects short-term memory with long-term memory. Long-term inhibition of the normal operation of the hippocampus would greatly weaken the learning ability of children and even make it into emotional disorders or affect brain development. Learning psychology holds that a moderate tension is conducive to improve learning efficiency for learners. The purpose of the so-called moderate tension is not to make learners into excessive stress and panic, but to obtain a certain degree of challenge. On the one hand, it is beneficial to activate the learning motivation, and to promote solving problems and playing creativity. On the other hand, the improvement of learning alertness could make students complete learning tasks more seriously.

Conduct situational teaching

The brain has been well developed in early childhood, with the learning conditions thanks to the synapses and activities speed of brain cells. Teaching organizers need to design classroom knowledge system in accordance with children's cognitive laws, due to the difference between children's sensory cognitive ways and adults' learning styles. Situational teaching may be better to take young children teaching activities, no matter from sensory experience or cognition.

Theme-based model

Theme-based teaching is a teaching model with independent knowledge unit, which is carried out follow certain logical organization order and relevant teaching methods, on the basis of young children knowledge category and cognitive laws. Based on the interconnected independent subject, the model makes the teaching contents have direct sensuality, which is of great practical significance for improving the interestingness of teaching task and attracting children's attention. According to cognitive learning theory by Ausubel mentioned above, one of the conditions for meaningful learning is the experience to assimilate new knowledge. The maximum development and use of the brain, not only lies in learning new knowledge, but giving more consideration to the connection of knowledge in mind and the formation of the system, that is the meaning of theme-based teaching.

Typical cases and analysis of theme-based model

As shown in Figure 3, a classic case of young children teaching that with a theme of "fruit and vegetables" is derived to make a brief introduction, for a more intuitive understanding of the theme-based model. By the fusion of different educational context, theme-based teaching tries to expand children's exposure to external stimuli through all kinds of methods, to enable various events to induce brain function to promote information transmission from outside to inside. Educators should guarantee the quantity and quality of teaching situation in different forms in the design of the theme curriculum, then present wonderful and rich teaching content, to ensure children's meaningful extraction of processing knowledge and experience [10]. So besides focusing on the relevance between knowledge in the theme teaching activities, we will also need to understand the inherent experience of children fully, and to activate the fun of the teaching task of new knowledge, then to mobilize the learning motivation of young children, and finally to combine subjective motive with correlation for more conductive to memorization.

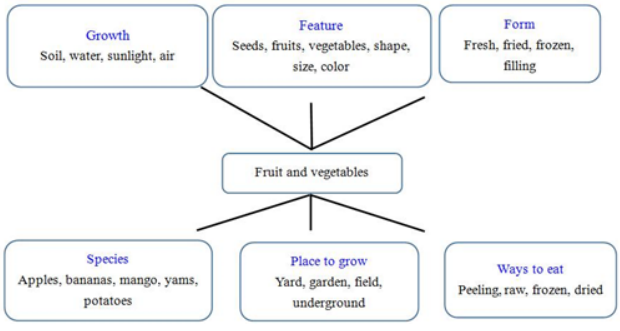

Figure 3. *The teaching case diagram of "vegetable and fruit".*

Early childhood is the critical period of human growth and development, which is essential to the perfect and development of future physiological function. As a prerequisite for the follow-up education and teaching, correct guidance for children's intellectual development can not only help to realize individual self-worth, but also to lay the foundation for the

realization of social value of the individual, including that children's early experience may indirectly affect the development of all mankind [11]. In this work two general works from literature were taken [12,13] and case diagram were constructed.

Conclusion

As a planned, organized educational activities, teaching should fully respect the law of teaching and be persuasive, to promote the all-round development of young children. From the perspective of biology, this paper reflects on the main problems in young children teaching, which is beneficial to solve some fundamental problems in the field of early childhood education from the mechanism level. Moreover, it also provides beneficial references for the application of multi-discipline research results in teaching, which has a vast research value in the future. The teaching practice strategy proposed in this paper is based on the theoretical research on the relationship between physiological mechanism and teaching, which is of great reference value to the young children teaching reform in the future.

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