СЭТГЭЛ СУДЛАЛ-БАЙГУУЛЛАГЫН СЭТГЭЛ СУДЛАЛ

THEORETICAL EXPLORATION OF CHILDREN'S THINKING, COGNITION, AND HEURISTIC COMPANION ACTIVITIES TO BOOKS

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Abstract: *Children's books are an important way for children to understand the world, expand their thinking and preserve knowledge. They are also an important channel for children to independently connect with everything outside, so as to shape their personality and assume the social responsibility of enlightenment for the next generation. Under the background of today's era, children's book innovation and design are facing greater opportunities and challenges.*
Keywords: *Children's book, Cognitive development, Heuristic companion activities*

INTRODUCTION

In the past, children's books described in a single text or illustrative illustrations have gradually failed to meet the needs of children's thinking and cognitive enlightenment, and it is even more necessary to explore heuristic creative book designs to promote cognitive activities in children's reading. In order to understand the characteristics and cognitive needs of children's thinking, break the educational form of passive knowledge indoctrination. The book itself is not heuristic, but the following activities could be heuristic.

1. Purpose of the study

On the basis of transferring intellectual content, we will constantly innovate and improve book binding design, and give full play to the important role of book books and materials in the cultivation of children's thinking

and cognitive ability, and inspire their imagination, understanding and creativity of non-fixed thinking.

2. Research background

This is my project's mission as stated in my proposal:

I want to thoroughly analyze the nature and use of children's books and then use my research to improve their design.

In practice I will be designing and testing ideas at the time as carrying out research into the whole area of Children's books. In this proposal, however, I will describe the research that I will do and then what I expect to do with it.

RESEARCH METHODS AND METHODOLOGY

1. Research and comparative analysis

Through data search and online questionnaires, the developmental characteristics of children and the children's books on the market were investigated. To understand which problems children generally show strong curiosity and cognitive demands for in the initial formation of thinking and cognitive activities, and to classify them in detail. Taking this as a reference, this paper compares and analyzes whether the books on the market can better meet these cognitive needs of children.

2. Literature review and comprehensive analysis

The library and the Internet collect materials, consult the latest theoretical research results at home and abroad, and gain an in-depth understanding of the theoretical basis of related issues. With the help of theoretical research results in many fields such as art, design psychology, cognitive science and thinking science, this paper comprehensively explores the characteristics, difficulties, implementation methods and specific application forms of innovative design of children's books under the "heuristic thinking cognitive concept".

STUDY RESULTS

1. Theoretical analysis of children's thinking and cognitive development

1) Characteristics of children's stages of thinking and cognitive development

Stageist theorists[23] believe that the changes in children's thinking and cognitive development are qualitative, covariant, mutual, and

[23] *(E.H. Erikson, 1902) was a famous American psychiatrist and a representative of the new psychoanalytic school. He believes that the development of people's self-and other consciousness lasts for a lifetime, and he divides the formation and development process of self-and other consciousness into eight stages, the order of these eight stages is determined by heredity, but whether each stage can be successfully passed is determined by the environment, so this theory can be called the theory of psychosocial stages. Every stage is not negligible.*

overall changes. Qualitative change means that under the accumulation of cognitive processes, a sudden change in the nature of thinking ability will inevitably occur, and children's subjective cognition will reflect the existence of objective things, so that the understanding of objective things will be expressed in the imagination space of subjective consciousness. In real life, considering that due to the particularity of children, we often judge whether children have undergone qualitative changes in thinking and cognition based on the observations and reactions of bystanders such as parents and elders. Covariance refers to the hypothesis of synchronicity based on the one proposed by John Hurley Flavell[24]. The change of children's cognitive understanding of a number of external things is completed at the same time, that is to say, when they cannot understand a certain concept, they are also unable to understand other concepts that are similar to the content of this concept or have the same degree of complexity. (John Hurley Flavell is a founder of social cognitive developmental psychology. His research on "role-taking," the cognitive skills that children require in order to understand and accept the roles of others, was a major contribution to developmental psychology. Flavell was one of the first psychologists to study the ways in which children think about their thinking processes and the human mind. He is the author of more than 120 books and articles and was an advisory editor of the journal Cognitive Psychology. In 1984, Flavell received the Distinguished Scientific Contribution Award of the American Psychological Association (APA). He is the Anne T. and Robert M. Bass Professor in the School of Humanities and Sciences at Stanford University.) Sudden change (H 2010) refers to the fact that the transition of a child's thinking and cognition from one stage to the next is sudden, not gradual. The transformation of the whole refers to organizational consistency, that is, although children do not yet have the complete and mature thinking and cognitive abilities of adults, their cognitive activities are still a systematic and holistic process, and cannot be regarded as meaningless fragments that are separated independently.

As children gradually adapt to the external environment, they gradually have the ability to perceive external things and recognize the characteristics of

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specific objects. However, even when it comes to cognitive understanding of the same type of things, children's "knowing" and adults' "knowing" are of different nature. In the period when children's cognitive abilities begin to develop gradually, their thinking development is also in a rapid and active stage, which is mainly manifested in frequent and repeated asking a large number of questions that adults are incredible, and often saying some groundless and illogical "fairy words". These bizarre questions and unusual ways of speaking not only reflect children's lack of daily common-sense problems, specific subject knowledge concepts, life experience, etc., nor do they mean that children's way of reasoning about problems is more superficial and naпve than adults. In particular, it is characterized by the following two characteristics:

① Periodic

The development of children's thinking and cognition has its own periods, such as the ability to learn language, most people have a strong ability to learn foreign languages at a young age, and their ability to understand a second language is greatly reduced when they grow up. For this advantage in the early development process, it becomes the characteristic of the weakness in the later development process. There is a period effect of ability in the development of children's thinking, that is, some of our abilities will be fully developed in the early stage of cognition, and with the change of the growth cycle, these abilities will be affected by various factors in the outside world or ourselves, showing different states of maintaining the status quo or gradually declining.

② Special variability

The ability to think and perceive is not innate. However, in childhood, some basic concepts that we can understand, or easy imaginative behaviors, unexpected creativity, are difficult to understand when we are older, and even lose these whimsical abilities. And these new thinking abilities are not stifled by mental maturity or the enhancement of knowledge. It is closely related to the cultivation of our early thinking and cognitive mode, and it is necessary to have a positive impact and effect on our future thinking mode and thinking development through acquired enlightenment in the formation stage of thinking cognition, so as to strengthen the ability of thinking and cognitive development.

1) The way in which children's thinking and cognition develop

① Entry of information

Information input refers to the process of transmitting information about external things into a child's brain. In the early stage of children's thinking and cognition,

they mainly rely on auditory input, tactile input and visual input. Auditory input such as tone, voice, etc. Tactile inputs such as cool and hot. Visual inputs such as colors and shapes. Through this information input mechanism, the brain analyzes and extracts information from it, allowing them to perceive some regularities in the environment. (Johnson 2015) In addition, imitation, as a specific learning mechanism in the process of children's cognitive learning, is also one of the important ways of information input, which is different from the intentional imitation of older children or adults, and the imitation behavior of young children at this stage is more of an unintentional imitation with no learning purpose, only curiosity and interest, and passively provides a new way for their thinking and cognitive development in the process.

② Processing of Information

The processing here refers to the child as the subject. Use your own way to understand, integrate, absorb and use the information that has been input into the brain for effective processing. According to the research and demonstration of information processing theory, it mainly relies on four kinds of change processing methods:

First: automated information processing. It refers to the gradual improvement of the execution efficiency of brain information processing in the cognitive process, the need for less energy, and the degree of automation of information processing and processing for multiple cognitive activities is gradually increased. This allows children to use the extra attention to discover the easily overlooked connections between ideas and real events, as the information content input is repeated many times and the brain enters the information mode. This automation of information processing will also increase day by day.

Second: information encoding processing. It refers to the fact that children recognize and remember the salient features of an object or event, encode it, and use this coding to actively form a characteristic cognition of unknown objects or events in the future.

Third: information generalization. It refers to the ability of children to unconsciously or consciously generalize the knowledge and experience in different situations and apply them to other situations.

Fourth: information planning and construction processing. It refers to the process of generating and discovering new ways to solve problems according to the logic of previous processing programs in the process of children's thinking and cognitive development.

These four methods work together to achieve the purpose of effective information processing.

③ Output of information

Information output: refers to the ability of children to export and convey the information they have read to the outside world in their own unique way. Children's interaction with the world is mainly in two aspects: sensory input and motor response. Therefore, we can help children flexibly use existing information and output different information content by adopting more creative design techniques in the way of information input and output reflection, so as to achieve the cognitive purpose of stimulating children's imagination and creativity.

2) Internal and external factors influencing children's mental and cognitive development

As we observe in our daily lives, children in the early stages of cognition mainly use perception and action as a way for them to think about information and explore the world, so as to communicate and connect with the outside world. Therefore, most of the research on children's mental and cognitive development has only focused on exploring children's individual behaviors. According to Robert S. Siegler's research on the development of children's thinking. We should also expand our research areas from within and from the outside. (Siegler 2006) On the one hand, it is necessary to give full play to the advantages of the brain itself in childhood, grasp the internal conditions, and explore the relationship between the development of the brain and the changes in children's thinking ability from the fields of biology and neuroscience. Secondly, before cognitive behavior occurs, the way and form of external information input have an impact, and the way and form of information input are affected by external environmental factors such as social environment and conceptual awareness, so it is necessary to explore the impact of cultural customs and innovative educational forms on children's individual development from the perspectives of sociology, anthropology, and education.

① Internal factors: the influence of the human brain on children's thinking and cognition

The development of the human way of thinking from the lower to the higher is externally manifested in the increase in the weight and size of the human brain, which is one of the main internal reasons why adults can understand more complex knowledge concepts. The brain in childhood also has its own unique advantages, which are mainly determined by the peculiarities of cerebral cortex and protrusion generation during this period. On the one hand, the

cerebral cortex is a special ability that distinguishes humans from other animals, allowing us to have a high level of cognitive skills and ways of thinking, such as language skills and the ability to solve complex problems. The cerebral cortex in childhood is less common in the brain than in adults, and therefore relatively immature, although this means that some of the higher cognitive functions are not possible at this time. Specific structures within the brain will change slightly, and other more mature parts will participate in the completion of cognitive behaviors, giving the mind more creative possibilities (Siegler, Children's thinking development 2006). For example, when one of a person's five senses loses its ability, the other remaining sensory organs will have a stronger perceptual response. In the same way, this internal complementarity occurs in the human brain. On the other hand, neurons in various areas of the mature brain of adults have been specifically designed for a specific function, and the thinking and cognition are gradually inherent. In contrast, young children often have a large number of extra synapses in their brains, which allows the immature brain to consciously "rewire". The ability to flexibly respond to changes in experience with great adaptability makes the thinking and cognitive development of childhood more malleable. (Siegler, Children's thinking development 2006)

② External factors: the influence of society on children's thinking and cognition

The development of thinking and cognition is inevitably affected by the social environment, and the vital role of social life in the development of children's thinking is also emphasized in current sociocultural theories.

The term "society" here is broad-based and is divided from the dimension of the objectively existing subject. It includes people who interact directly with and interact with children in social life, i.e. parents, elders, teachers, siblings, peers and friends, etc.

Including in the process of continuous development and change of society, people have made tools and products such as books and computers that play a huge role in cultural and educational life. For example, creativity, efficiency, uniqueness, etc., are the value criteria for problem-solving strategies in different skill directions such as reading, drawing, science, and games.

It also includes places where cultural cognition is established in childhood, such as home and school. Children are not directly involved, but they still affect the social system of children's development, they are all subordinate to a part of

the "society", and they also affect the content and way of children's thinking and cognition.

In short, the influence of society on children's thinking and cognitive development is relative and environment-specific. Once completely detached from the specific social context in which it takes place, it becomes meaningless. The author emphasizes here mainly the influence of social interaction and the influence of cultural tools.

Social interaction refers to the early stages of a child's perception of the outside world. Their cognitive behavior is inseparable from the participation and interaction of other social actors, until after a period of time, this social interaction is gradually embedded in the inner subconscious, so that they can form a certain thinking pattern and complete the cognitive process independently. This series of processes emphasizes the role of others in guiding and supporting children's development, and this form of role is also known as "social scaffolding". [25] It refers to the use of external help to enable children to think in the right way so that they can successfully complete cognitive tasks. Specifically, when children are just beginning to learn a certain skill, parents and other social roles give them examples or hints, providing a temporary framework for reference learning, so that children can think and solve problems in a more advanced way. After a period of time, they will be able to engage in these relatively higher-level ways of thinking on their own, albeit without outside help.

Cultural tools, as carriers that assist children in acquiring cultural knowledge, include all cultural objects and ideas that enable people to achieve their goals. For example, machines (computers), cultural carriers (books), concepts and methods for understanding the world (scientific principles and mathematical formulas), symbol systems (words), etc. It has a non-negligible importance in shaping and forming thinking and cognition, which will lead to changes in the nature and mode of children's cognitive development, and also represent more possibilities for children's learning opportunities, even ordinary cultural tools can help children better and more comprehensively understand society and the world (Yi 2011(01)).

2. The basic definition of the cognitive concept of heuristic thinking

[25] *The idea of "social scaffolding" is an analogy with scaffolding erected on a construction site. It enables construction workers to erect the basic structure of a building in the air, thus building tall buildings, and once the basic structure is built, workers can stand on these structures to work while removing scaffolding.*

1）Understanding the concept of "heuristic teaching"

The definition of the word "enlightenment" in the Baidu Encyclopedia Chinese dictionary has four meanings.

First: it refers to enlightenment to make them comprehend.

Second: it refers to clarification and play.

Third: lift the covering and leave it exposed.

Fourth: refers to excavation.

The "enlightenment" mentioned by the author in this paper mainly refers to a kind of guidance applied to educational enlightenment, emphasizing the focus on cognitive desires, and active enlightenment and enlightenment to make it comprehend and understand. In the course of education development, the term "heuristic teaching" is often mentioned as a guiding ideology of education and teaching. It refers to the fact that teachers start from the actual situation of students in the teaching process, inspire students' thinking according to the objective laws of teaching tasks and learning, so as to more fully mobilize their initiative and enthusiasm for learning, strictly demand them based on the cultivation of students' strong interest in learning, and point out the learning path based on encouraging students to think and solve problems. For example, in the West, the famous ancient Greek thinker Socrates[26] helped students to acquire independent thinking in the process by constantly asking questions and interacting with questions and answers, so as to inspire them to explore the truth. These educational methods all have the same purpose, and with the precipitation of time, the guidance of various educational ideas and theories, and the practical application of countless contact educators and thinkers in the advancement of the historical process, they have been continuously improved, and only then have the "heuristic teaching ideas" in the modern sense of teaching education. It is hoped that students can take their existing experience and knowledge as the starting point of learning, and be able to think on their own under the guidance of teachers, truly grasp and understand things, and gain a new mode of thinking and cognition.

3) Conceptual understanding of "Thinking cognition"

Thinking cognition is based on people's subjective perception, but it does not only cover the scope of

[26] *Socrates was a Greek philosopher from Athens who is credited as the founder of Western philosophy and among the first moral philosophers of the ethical tradition of thought.*

subjective perception. It refers to the exploration and discovery of the internal essential connections and laws of things in all cognitive behaviors or intellectual activities, and is an advanced stage of the cognitive process. In our lifelong growth trajectory of knowledge, study, and work, thinking and cognition are ubiquitous and have a far-reaching impact.

On the one hand, from the perspective of species, the unique thinking and cognitive activities of human beings are one of the most important factors that distinguish them from other organisms, and their influence often runs through people's lives, and plays a decisive role in our physical and mental growth and future development.

On the other hand, based on the division of individuals, the thinking and cognitive ability of each independent individual also has its own low, strong and weak, flexible and rigid, but this is not only because of its innate physiological conditions and living environment, but also inseparable from the acquired unintentional stimulation and intentional cultivation (Danling 2011).

This is mainly due to the fact that human cognitive abilities are inextricably linked to the process of cognition. Our cognition is often the product of our cognitive process, and cognitive process, as the most basic psychological process of human beings, can also be affected by acquired intervention to a certain extent. When the information of an objective thing from the outside world is input into our brain, each part of the brain will play a role in processing the input information, and in this process, we will have feelings, perceptions, thinking associations, specific language, etc. As this process is completed, these original inputs will be converted into internal mental activities, which will be output into specific coping patterns, which in turn will influence our subsequent specific behaviors (Danling, General Psychology 2011).

4) The definition of "heuristic thinking" in the field of design

The concept of "heuristic thinking cognition" explored and used by the author in this paper is mainly derived from the two basic concepts of "thinking cognition" and "heuristic teaching". To sum up, the author emphasizes that "heuristic thinking cognition" refers to the process of intervening in cognition by understanding the characteristics of thinking development in the early stage of cognitive formation and innovating in the form of information input. The acquired way of promoting and enlightening the subject's cognition of objective things maximizes the cognitive ability that can be stimulated at the beginning of the stage of thinking development, and

the visual language of information input is more novel and creative. In order to achieve the educational purpose of obtaining more flexible and diverse thinking, cognitive ability and behavior patterns.

DISCUSSION

A specific interpretation of thought-inspired children's book binding design

1. Specific concepts of thought-inspired children's books

Thinking heuristic children's books mainly refer to the concept of "heuristic thinking cognition". Printed books and related games that guide children to acquire cognition and promote thinking skills. With "heuristic teaching ideas" as the guiding principle of education, it uses creative and interesting guidance methods to input specific things, truths, phenomena, concepts, common sense and other information from the outside world into children's brains, so that they can be more easily understood and understood in the form of content, so that children can better accept and inspire them to derive their own thinking in the cognitive process.

2. Definition and definition of thought-inspired children's book binding design innovation

With the discussion and exploration of generations of excellent book designers in the wheel of the times, the understanding of book design has gradually gained a new definition and interpretation. In terms of the innovation of thinking heuristic binding design, it should be based on the basic requirements of today's book binding design, starting from the specific content with cognitive inspiration such as basic life knowledge and specific subject knowledge, and using creative design to image the specific content, so as to more effectively reflect the thinking enlightenment, practical knowledge, interesting creativity, pertinence, interactivity and other characteristics that thinking inspired reading materials should have.

CONCLISION

Reading books is important for education, but does almost nothing to practice children's heuristic ability. We may utilize a child's previous reading experience to improve their heuristic ability, where they may use non- theory methods to generate their own stories from pictures.

With more and more attention paid to children's enlightenment education, the development of the children's book publishing industry is becoming more and more rapid, and the forms of innovative design of children's books are becoming more and more diverse. The design innovation of the overall binding of books inspired by children's thinking should first understand the

characteristics and ways of children's cognition in the early stage of thinking development, and consider the physical and mental needs of children, the safety, interactivity and realistic sales possibility of books in the market. It emphasizes the more refined division of a variety of subject categories in children's enlightenment books, and the design and presentation of different knowledge contents in books should be different, so that children can logically form a targeted cognitive system for different subject knowledge, so as to better grasp all kinds of knowledge, and complete the design innovation of books under the premise of determining children's cognitive appeals, clarifying the classification of enlightenment disciplines, and the characteristics of audience categories.

In the design practice and application of this topic, the author selects several aspects such as the internal content, external form, games and knowledge points of the book to explore specific and targeted design methods, especially emphasizing that the overall innovative design of children's books should not only contain rich, concrete, scientific and reasonable knowledge and information content, but also should be indispensable for rich creative ideas, clear and logical content levels, clear theme melodies, and intuitive and interesting design elements and enlightenment inspirations, that is, specific content, atmosphere and feeling, enlightenment, meaning, etc., are indispensable. Secondly, in terms of the flexibility, practicality, concentration and other characteristics of reading to maximize the innovative advantages of children's paper books, in terms of beautiful shape, ingenious structure, innovative materials to optimize the beauty of the structure of children's paper books, in terms of literary, humanized, perceptual, interactive and other characteristics to strengthen the meaning of the existence of children's paper books.

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