

Animation Creation of Preschool Children Based on Cognitive Development

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Keywords: Animation creation, Preschool children, Cognitive development.

Abstract. Animation is one of the important ways for preschool children to understand the outside world. It is great value to study the rules and methods of animation creation from the perspective of preschool children's cognitive development. By studying the relationship between the cognitive characteristics of preschool children and the story creation of animation, the paper proposed the typical characteristics of animation for preschool children in order to provide references for animation making.

1. Introduction

Preschool children are in the critical period of individual cognition formation and animation is the important part of their daily lives. The content, aesthetic taste and values of animations will influence the cognition of preschool children of both self and others. Nowadays, with the rapid development of the animation industry, the animation for preschool children also growing fast. But cases of adult preaching, plot rigidity and violence of language and behaviour are not rare of ordinary occurrence. Therefore, in order to play its educational function to promote the physical and mental growth of preschool children, it is necessary to research the animation characteristics of preschool children.

Story is the core of animation. The story structure is closely related to cognitive characteristics of preschool children, such as thinking, attention, memory and cognitive load. The cognitive development of preschool children is closely associated with worldview construction, content expression and plot presentation of animation. There are mainly two disciplines to study cognitive development: theory of cognitive development stages of Piaget and modern cognitive psychology. Piaget's theory of cognitive development stage, which divides children's cognitive development into four processes based on age, believes that children in the pre-operational stage characterized by animistic thinking and egotism. Modern cognitive psychology studies human cognitive process from the perspective of information processing, such as attention, memory, thinking, etc. In this paper, different cognitive categories and animation creation are intersected to sort out the rules of animation story of preschool children (refer with: Fig. 1).

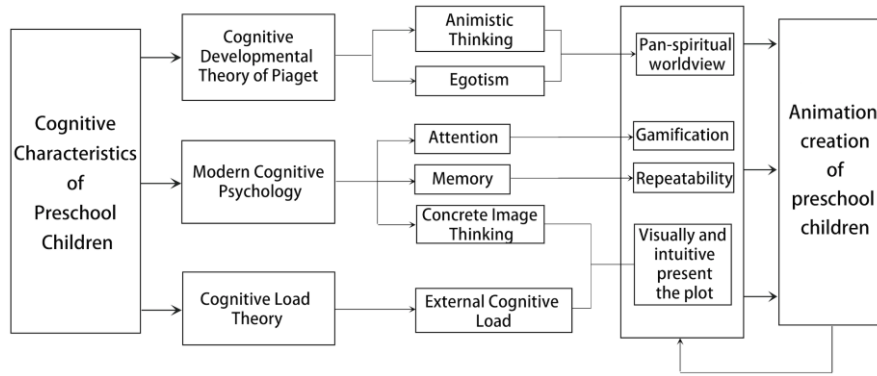


Fig. 1. Relationship between cognitive characteristics and animation creation of preschool children

2. The relationship between animistic thinking of preschool children and the worldview of animation

According to the theory of cognitive development stage of Piaget, children in the pre-operational stage which don't have rational thinking often recognize the external world from their own perspective and experience that is called egotism in psychology. The externalization of the animistic thinking is express the objective world in a pan-spiritual way, such as chatting with the tree, regarding dolls as their close friends and so on. The animation works using the animistic thinking to build the world view are numerous, which are mainly divided into two types (refer with: Table 1): one type is keeping the appearance of objects and endowing them with human language and thinking (refer with: Fig. 2, Fig. 3); the other type is personifying the shape of objects by combining the typical features of objects and the characteristics of upright walking of human based on endowing objects with human language and thinking [1]. For example, Peggy and George in Peppa Pig (refer with: Fig. 4) extract the typical features of pigs such as noses, tails and ears, and make them walk upright; SpongeBob SquarePants (refer with: Fig. 5) has not only the characteristics of sponge but also human behaviour. In addition, animation of preschool children based on animistic thinking can not only promote preschool children's cognitive development, watching interest and resonance, but also the development of their imagination.

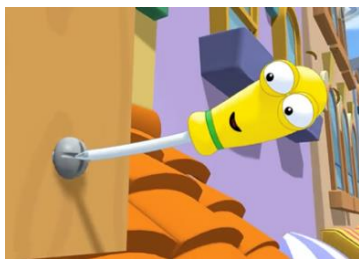


Fig. 2. Phoebe in Handy Manny



Fig. 3. Rainbow Dash in My Little Pony



Fig. 4. Peggy and George in Peppa Pig



Fig. 5. SpongeBob SquarePants

Table 1. The application of animation pan-reification.

Number	Application method	Features	Cases
1	Verbalization	Maintaining the shape of the object, endow human language and thinking to it.	Tom Engineering Car, Clifford's Really Big Movie, Handy Manny, My Little Pony, PAW Patrol, Thomas and his friends.
2	Personification	Based on giving human language and thinking to the object, the appearance is personified.	Peppa Pig, SpongeBob SquarePants, My Friends Tigger & Pooh, Mickey Mouse Clubhouse, The Octonauts.

3. The relationship between attention of preschool children and the gamification of animation

Attention is the ability to focus on and point to something in individuals' inner activities, which is related to memory, thinking, imagination and so on, and playing a leading role in various cognitive activities. According to modern cognitive psychology, preschool children have the characteristics of short time attention and susceptible to external influences due to incomplete developed brain and imbalance of inhibition and excitation of nervous system. Preschool children are in the important period of attention development in people's lives which will impact on their study and lives in the future greatly. Therefore, it is critical to improve attention of preschool children in the growth of them. From the view of cognitive development, one of the best ways to attract preschool children's attention is to make the things interesting. Gamification makes things full of vitality, and adding game elements to the story of animation can improve the watching interest of preschool children significantly.

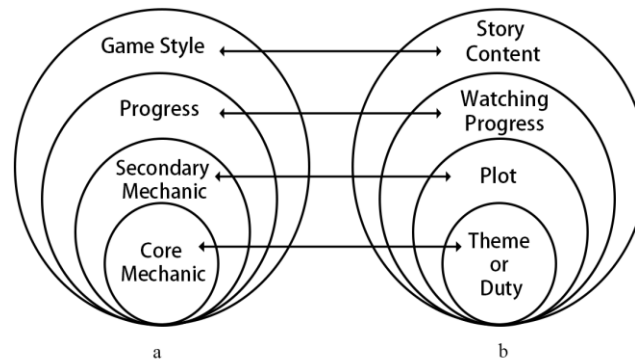


Fig. 6. Structure model of gamification of animation stories

Here, game structure model proposed by Charmie Kim which is a game developer is used to illustrate the gamification of animation. According to game structure model (refer with: Fig. 6a), the game can be divided into four parts including core mechanic, secondary mechanic, progress and game style which are nesting layer by layer [2]. Corresponding to that, animation stories can be divided into story theme or duty, plot, watching process and story content (refer with: Fig. 6b). The core mechanic which determines the gameplay is the most basic element in the game structure model, and the core mechanic of the animation stories is theme or duty; the secondary mechanic in the game structure model is the game level which determines whether the player can successfully complete the task, and the secondary mechanic of animation stories is plot; progress is where the game changes, and the progress of animation is the watching process of audiences; game style including style features,

characters, scenes, interactive interfaces and so on is the external presentation of the game, and the corresponding presentation of animation is content [3].

There are two methods to apply game elements in the animation. One way is to set up the story as assign tasks, solve problems and complete tasks. For example, the plot of Dora the Explorer includes the process of assign tasks, solve problems and complete tasks. The gameplay of the animation is theme which is English teaching that integrates English content into the task of each step; the secondary mechanic is execution of tasks; progress is the viewing process of the audiences; the content of the story is the presentation of link tasks and target tasks. The other way is to add game elements which close related to the preschool children's daily lives to the animation stories. For example, a game of looking for chocolate eggs is added to one episode of Peppa Pig, and the first episode of Bear Millet joins the game of building castles.

4. The relationship between memory of preschool children and repetitive expression of animation

Memory, which is the basis of mental activities such as thinking and imagination, is in the transitional stage from primary cognition to complex cognition [4]. It contains unconscious memory which refers to the memory that has no purpose and effort to external information and it is the important source of experience and conscious memory which means the process of individuals actively encode and store memories. Conscious memory contains logical memory and mechanical memory. Logical memory is remembering something by using the ability of logical thinking, while mechanical memory requires repeated information. Because of not yet formed a mature logical thinking of preschool children, their memory mainly relies on mechanical memory [5]. Therefore, in animation creation, in order to strengthen preschool children's memory, it is necessary to repeat the knowledge or the tasks several times.

There are two purposes for the repetition in animation. On one hand, it can promote pre-school children to understand the content and theme of the animation story by repeatedly introducing the characters and the tasks to remind audiences of the relationships between animated characters and the plot. For example, in the first episode of Bear Millet and His Friends, Bear Millet repeats the task of building the castle for three times; Peppa introduces herself and her family to the audiences at the beginning of each episode of Peppa Pig. On the other hand, repeat a certain knowledge point to promote the construction of relevant cognitive schema and cognitive ability. For example, Dora repeats English words and phrases more than three times in Dora the Explorer.

5. Cognitive load and concrete image thinking of preschool children and the presentation of animated plots

Cognitive load, the total amount of mental activities, is determined by cognitive processing system. Working memory which is used to store and remember information that is being processed is the basic component of the cognitive system. If the amount of information being processed exceeds the maximum amount of information processed in working memory, the cognitive activities cannot be carried out normally. Therefore, reducing cognitive load is very important to preschool children's cognitive development. In three types of cognitive load, external cognitive load is related to the way things are presented. when the organization of things meets to the cognitive characteristics of preschool children, it can effectively reduce the occurrence of cognitive load [6]. According to modern cognitive psychology, preschool children are dominated by specific image thinking and relying on imagery to help them to think which enable them to distinguish different things but cannot understand the essence of them. As a result, it is conducive to the cognitive construction of preschool children to present things in the way of intuitive and visual. Therefore, visually present the animated plot will effectively reduce the cognitive load of preschool children and improve their efficiency of cognition.

By study the excellent animation works of preschool children both in domestic and foreign, it is found that there are three ways to present the animated plots visually. One way is to illustrate the plot by a voice-over. For example, in the first episode of Bear Millet, Grandpa Beaver is introduced by the voice-over when he showed up. In the second method, characters explain their behaviors by themselves. For instance, the protagonist of Super Wings will repeat what he is going to do before he takes action. The last way is that the characters in the play ask a question and visually present the answer after a little while. For example, in Dora the Explorer, when there is a task of path choice, two paths will appear in the picture and then the right path will flash to indicate the correct answer. The intuitive and visual way of plot presentation can improve their cognitive efficiency and help preschool children to understand the animation more easily.

6. Summary

Above all, cognitive characteristics of preschool children is unique. Their animistic thinking determines that the animation should have a pan-spiritual worldview; the way of their attention determines that game elements should be added to the animation; their memory characteristic determines that the important parts of plot should be repeated to increase the conscious memory of preschool children. Finally, the visual and intuitive way of plot presentation can reduce the cognitive load of preschool children. Creators of animation should analyze the cognitive characteristics of preschool children in order to create animation works in line with their physical and mental development.

Acknowledgement

This research was financially supported by the Social Science Foundation of Beijing (Grant NO. 17YTC030).

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