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Interface Design and Analysis of Preschool Children Education APP

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***Abstract*—Preschool education plays an important role in China. In recent years, the state has gradually increased the attention paid to preschool education, and the market demand for preschool education shows an obvious growth trend. Good education methods have an important impact on promoting the healthy development of children. Therefore the state and society should attach great importance to the research, development and design of preschool children's education apps to ensure the standardization of the operation of children's education software market. This paper focuses on the principles and specific methods for the interface design of preschool education APP, hoping to provide reference for relevant designers.**

Keywords—preschool children; education APP; interface design

I. INTRODUCTION

Due to the rapid development of information technology, China's information carrier has undergone great changes, and mobile APP has become a new information communication platform and tool. With the advantages of convenience, simple operation, rich content and powerful functions, preschool children education apps have gradually become popular software programs among parents in the information age. Using APP to teach preschool children to learn and play is not only a key way to increase preschool education channels, but also can cultivate a new type of human that meet the needs of modern society.

II. DEVELOPMENT STATUS OF PRESCHOOL EDUCATION APP

China has a relatively large number of children, and the number has increased greatly especially since the "two-child" policy was fully implemented in 2016. In this context, preschool education apps have a very broad market. With the deepening popularization of Internet and other information technologies, modern preschool children have gradually become the "mobile generation". Coupled with the gradual improvement of the consumption ability of contemporary parents, the market share of preschool education apps is increasing. Such software attracts children's attention with strong interest and interactivity, and can fully meet the needs of language learning, game entertainment, intellectual development and quality improvement of preschool children.

When designing the interface of educational APP for preschool children, designers should focus on the physiological characteristics, psychological rules, behavioral habits, expected cognition and other aspects of preschool children to design educational APP that can truly promote the healthy development of preschool children [1]. Research and analysis on the interface design of preschool children's education APP can help designers enhance the scientificity, professionalism and pertinence of the interface design, not just to stimulate preschool children's interest in learning and enthusiasm for exploration, but also to effectively eliminate the negative effects of mobile apps and promote preschool children's education apps so as to gain more favor from parents.

III. PRINCIPLES TO BE FOLLOWED IN THE INTERFACE DESIGN OF PRESCHOOL EDUCATION APP

A. The Principle of Intelligence Improvement

Intelligence improvement is a key factor to be considered when designing the interface of preschool children's education APP. Parents will also focus on whether the APP has strong intelligence improving character or not when choosing an App. The manifestation of the principle of intelligence improvement is mainly in the following forms: puzzle games, language teaching, artistic creation, fun questions and answers, etc. The main function is to cultivate imagination, develop intelligence, exercise language application ability, strengthen interpersonal communication ability and logical thinking ability, etc. The main role of educational apps is to enlighten preschool children's thinking and meet their spiritual needs. Therefore only by adhering to the principle of intelligent interface design, can designers ensure that the APP meets the development needs of preschool children. The application of this principle to the design of preschool children education APP is mainly realized through the contents of the interface. Scientific interface content planning, interesting plots and creative forms of expression are all ways to enhance the intelligence of APP. Designers should fully combine the principle of intelligence improvement with the content of the interface and exert imperceptible influence on preschool children, so as to achieve the purpose of intelligence development, as shown in "Fig. 1".

Fig. 1. "Story-form" interface layout.

B. *The Principle of Interactivity*

The principle of interactivity is mainly embodied in user experience, sensory interaction and interface interaction. When designing the education APP interface for preschool children, designers should follow the behavioral habits and physical and mental development characteristics of preschool children, so as to enhance the efficiency of APP application. The principle of interactivity in interface design mainly refers to the switching between different interfaces. For example, the operation of switching the main outline interface from the main screen interface first and then entering the interface of specific periods can be referred to as the internal interface interaction. When using the principle of interactivity to design the interface, the designer should ensure that the interface planning is consistent with the habits and senses of preschool children. For example, the size and position of Icons, the layout of the interface and the display effect of pictures should meet children's visual, auditory, tactile and psychological needs. If the interface has good interactivity, it can achieve emotional resonance with children and enhance the interactive experience of preschool children education apps, as shown in "Fig. 2".

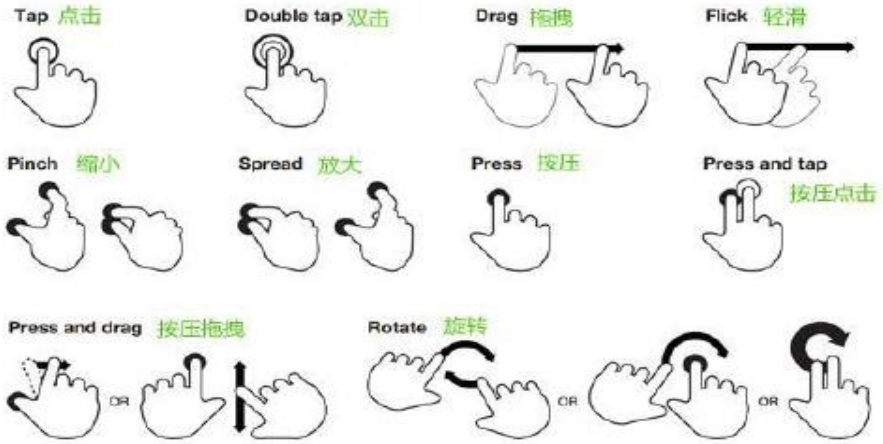

Fig. 2. Different interactive gestures represent different meanings.

C. *The Principle of Interest*

Preschool children are in an important period of releasing their nature. At this stage, children's nature is manifested by strong curiosity, hyperactivity and thirst for knowledge, and their interest in games, exploration and play is much higher than that of sedentary learning. In order to attract children's attention, designers must adhere to the principle of interest when designing the interface of preschool education APP. Novel and innovative interface should be created by combining children's inner feelings, so as to encourage preschool children to actively explore the APP. The principle of interest is mainly reflected in novelty, game, and strangeness and so on. Designing the APP based on this principle is not only an important measure of attract children's attention and affection to educational apps, but also an inevitable choice to expand the market share of preschool education apps [2]. According to the relevant survey, the interface with perfect integration of dynamic and static features and strong interest is more in line with the

psychology of preschool children and enjoys a high popularity. Therefore, designers should ensure that the interface design of preschool children's education APP is novel in shape, harmonious in style, rich in color and interesting in content, so as to achieve the organic unity of function and aesthetics of APP interface, as shown in "Fig. 3".

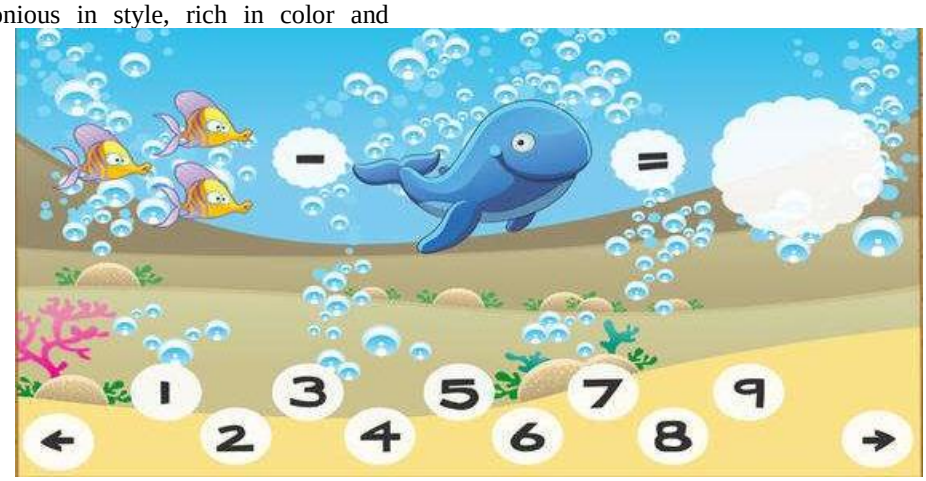

Fig. 3. Game calculation interface of "good baby learn math".

D. The Principle of Functionality

Functionality is the most basic property of preschool children's education APP interface and an important basis to ensure that the APP can fully meet the application needs of preschool children. Therefore, when designing the interface of preschool children's education APP, designers should stick to the principle of function to design a multi-level, multi-dimensional and multi-structure interface, and ensure that different functions can be truly unified. First, when designing the interface functions of preschool children's education APP, designers should list the specific functional contents of each section and determine the functional sequence and structural framework. They should focus on highlighting explicit functions and hide or delete unnecessary functions, especially bad video and advertisements, so as to avoid interference to preschool children.

Secondly, due to the relatively poor cognitive ability of preschool children, designers should reduce the operational difficulty of the interface and increase the guidance program. Visibility principle should be adopted in the functional design of reading interface, game interface and learning interface so as to give clear instructions and operating instructions to preschool children, as shown in "Fig. 4". From the perspective of health and safety protection, the designer should limit the time of using the APP, and provide the application time schedule that conforms to the actual needs for preschool children to avoid children being immersed in it for a long time.

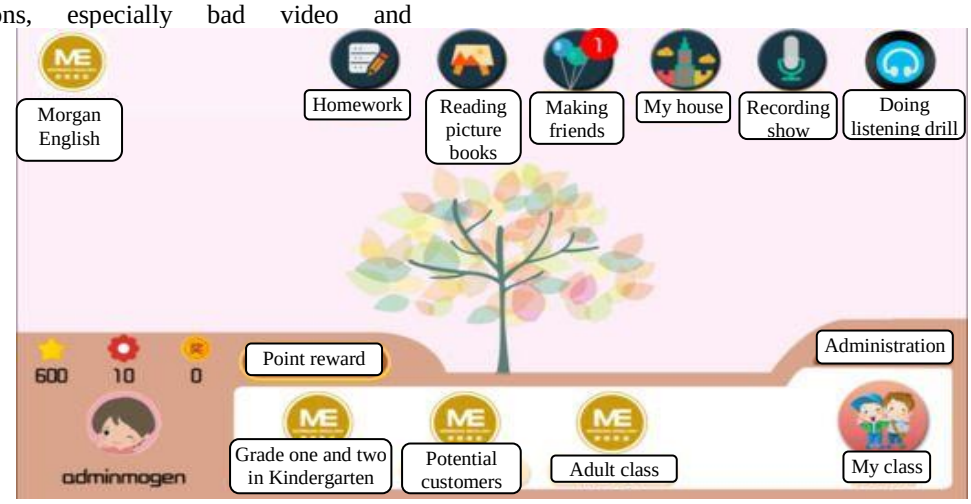

Fig. 4. Function Interface of "Morgan English".

Finally, because preschool children have a relatively simple thinking mode and cannot fully understand complex things, designers should ensure that the interface functions of educational apps are simple and clear. The functional structure should be dominated by the tree structure, and the functional options should be set with the simplicity principle

as the entry point. The functional operation can be designed as a gradual process from easy to difficult, from easy to deep, so as to ensure that the APP can develop together with children and meet the actual needs of preschool children of all ages.

IV. Specific Operation of Interface Design of Preschool Children Education APP

A. Comprehensive Consideration of Interface Elements

1) Graphic design: When designing the interface of preschool children's education APP, designers need to comprehensively consider the interface elements, and graphic design plays an important role in the interface design. Interface graphic design includes Icon design and Logo design. Designers need to follow the consistency principle to carry out the design work and ensure the consistency between graphic design and interface design on the premise of meeting the requirements of graphic systematization. By analyzing the investigation results of physiology, psychology, behavior and cognition of preschool children, it can be concluded that preschool children are more interested in the figurative graphics with lovely shapes, bright colors and that are close to life, and have lower acceptance of abstract graphics. Therefore, designers should try to avoid using very abstract patterns. For example, the use of text should be avoided for content that can be represented with simple graphics to prevent unnecessary confusion for preschool children, as shown in "Fig. 5".

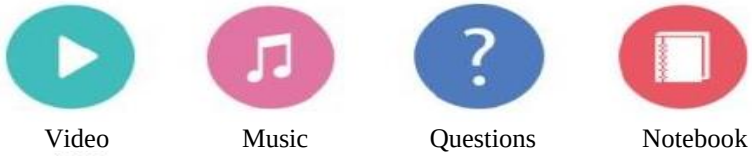

Fig. 5. Using graphics instead of text.

2) Text design: Pre-school children, most of who are between 3 and 6 years old, have limited verbal memory and are unable to remember overly complex words. Therefore, when designing the interface text, designers can use the form of both pictures and texts to summarize the content of the picture with concise words to avoid verbosity. For the text that needs to be highlighted, the using artistic font is more likely to attract children's attention. Improving the advantages of text design of preschool education APP interface can greatly increase the status of text in children's mind. This can not only make them realize the charm of words and stimulate their initiative and enthusiasm in learning, but also enhance the information transmission of preschool education APP and help children better understand and remember words.

3) Role design: In the learning process of preschool children, they are mostly exposed to pinyin, Chinese characters, Numbers and English, with a lack of learning stickiness. In order to arouse children's learning interest and keep their learning enthusiasm, designers should design attractive guiding roles on the interface [3]. The best choice for this role is the one that preschool children are familiar with and like, such as animated characters in the popular "Pleasant Goat and Big Big Wolf" and "Boonie Bears" in recent years, as well as the enduringly appealing "Journey to the West" and "Calabash Brothers". These characters are lively and brave, lovely and smart, which can encourage children to give full play to their subjective initiative, and actively explore the learning content.

4) Animation and sound design: Preschool children have more complex sensory systems than adults, and their attention cannot be focused on a fixed thing for a long time. In the process of learning, they are often distracted by other external factors. According to scientific data, preschool children's attention span most often lasts only 5 to 10 minutes. In order to ensure that preschool children's attention can be maintained for a long time, designers should take animation and sound design as the focus when designing the interface of preschool children's education APP, and use dynamic pictures to divert children's attention and reduce external interference, to well design follow-up sound effects, operating sound effects, background music, etc. Good sound effects can enhance the atmosphere and extend the concentration time of preschool children.

B. Construction of Special Function Zone for Parents

Preschool children lack self-control, judgment and self-restraint, and they are highly dependent on their parents, so parents' help is needed in the use of preschool children education app. Therefore, designers need to design the APP interface on the premise of considering parents' participation, and set up a special area for parents' functions on the interface to enhance parents' sense of participation, which can not only promote parent-child communication, but also improve children's learning efficiency. There are two ways for parents to participate in APP learning, namely "accompany" and "supervise". The former refers to that parents accompany their children in learning and answer questions and guide them in the learning process, while the latter refers to parents' management and control of children's learning situation, progress and content. The main functions of the "special function zone for parents" are mainly children's learning time setting, learning content selection, learning intensity and progress control, learning effect

detection, course content download, announcement reading, hot discussion and reply, etc. [4].

In order to avoid setting modification and other problems caused by operational error of preschool children, this function module needs to be set as a hidden function, and the opening condition should be set as the fingerprint of parents or fixed interactive gesture. For example, the designer can design the unlocking method as "double fingers sliding in a certain direction at the same time". After unlocking, the interface directly jumps to the designated position. Or they can learn from the way of smartphone unlock such as "pattern unlock", "password unlock", "fingerprint unlock" and so on. To prevent children from opening the interface, the designer should reduce the visual attraction of preschool children while increasing the difficulty of opening the page, select the pattern with low eye-catching degree and place it in the corner of the screen. When designing this special function zone, designers should pay attention to adults' operation habits on mobile apps, set the priority of functions, and try to avoid the problems of mixed contents and different interactive gestures.

C. Visual Design of the Interface

1) Simplification and visualization: Through the analysis of the survey results of preschool children's visual cognition, it can be concluded that "preschool children aged 3 to 6 pay more attention to pictures in the process of reading comic stories, and graphics are the focus of children's visual perception". Therefore, designers should pay more attention to the visual design of the interface when designing the education APP interface for preschool children. From the perspective of interface composition, graphics are the basic elements of the picture; and from the perspective of interface visual design, graphics are the core of visual design and affect preschool children's visual perception of colors, patterns, contents and scenes. In order to avoid causing cognitive errors to children, designers should ensure the simplification and visualization of interface visual design. For example, designers can choose simple lines and simple patterns, characters and fonts. "Baby loves memory" is an educational APP for preschool children, in the design of which the designers use simple, interesting and concrete graphic design scenes and pictures. In terms of color matching, bright colors like red, green, blue and yellow are used as the priority; the graphics of avatar and the modeling of the house are relatively simple; the title font is bold and artistic. All this contributes to children's easier understanding of the pictures they saw and the cultivation of their imagination.

2) Rich color picture: From the perspective of physiology, the sensory perception of preschool children was analyzed, and it was found that children at this stage had a strong sense of color, and they remembered relatively bright colors or patterns composed of rich and bright colors relatively quickly. The visual senses of preschool children are inclined to color expression, and they highlight the beauty of things, prefer colors with high purity and lightness, and have strong color emotional tendency. Therefore, when designing the interface of preschool education APP, designers can use a large amount of bright colors to build icons, scenes, contents and roles. Rich and diversified colors should be given priority to in the match of colors to avoid monotonous visual color schemes. In this way, the interface screen of preschool education apps can present colorful visual effects [5]. Additionally, what need designers to notice is, they are not supposed to increase color vision effect and enumerate colors intentionally, which can make collocation too mixed and disorder.

V. CONCLUSION

To sum up, as more and more people gradually realize the importance of preschool education APP, designers should pay more attention to the interface design of APP. In order to improve the practicality of preschool education apps, designers should make clear the physical and mental development characteristics of preschool children, and carry out the design according to the principles of intelligence improvement, interactivity, interest and functionality. In the design, the factors such as graphics, text, characters, animation and sound effects should be mainly considered to ensure the simplification, visualization and color richness of the interface visual effects. In addition, parents, an important influencing factor, should also be taken into account, that is, to set up a special function zone for parents, so as to obtain parents' priority to choose.

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