

Research on Interactive Animation for Children's Safety Education in Mobile Devices

Jiuzi^{1, a}, Huang Xinyuan^{2, b}

¹Jiuzi Doctor in Animation Art, Communication University of China

²Huang Xinyuan Dean, Professor and doctoral supervisor, School of Animation and Digital Arts, Communication University of China

^a357834493@qq.com

*Jiuzi

Keywords: developmental appropriateness, cognitive development, interactive design, three-levels of emotional design.

Abstract. Guided by the theory of developmental appropriateness, this paper analyzes the problems and causes of the interactive application of Children's safety education on mobile devices. Based on the characteristics of Children's cognitive development and the operating characteristics of children's mobile devices, combined with the three-level theory model of emotional design, the paper puts forward the interactive educational design model of safety education suitable for preschool children specific design method, and according to this model to develop a mobile child safety education interactive animation design examples to verify.

1. Introduction

The United Nations' Declaration of the Rights of the Child says: Humanity has to do its best for the child. Children as a group in the society are vulnerable, with high-risk of injury. Safety is particularly valuable for children growing up. Therefore, strengthening self-protection abilities and developing good behavior habits are important parts of quality education for children.

With the rapid development of wireless mobile technology, mobile smart terminals such as mobile phones and tablets have become indispensable in people's daily life. Children living in this environment are inevitably affected by it. Their toys, daily supplies, teaching aids, books and so on, are becoming increasingly digital and intelligent. Take mobile phones and tablets for example: the portability, connectivity and interactivity of mobile terminals have given birth to a new teaching mode -- mobile learning. Mobile learning requires no fixed place and is strongly interactive and playful. Children have a high degree of acceptance and love for this new learning mode because they love to play and are curious about new things. So, developing educational digital publications on mobile terminal for children is an urgent need, and also a trend of the market.

The author of this paper statistically analyzed the results from searching on Apple App Store for ertong-jiaoyu ("children's education" in Chinese) as keywords, and found that current digital publications for children's education nurture skills that fall into four broad categories: 'language and reading', 'mathematics', 'science' and 'art'; safety education not get the attention it deserve. In addition, safety education is not as specific subjects such as 'literacy' or 'mathematics' and not easy to get feedback on, as it is relatively abstract. The focus of this paper is on how to combine the knowledge points of safety education with the core of interactive design to arrive at a design model and design methods for digital publications on safety education which are suitable for children's development.

2. Posing the question

2.1 The connotation and development of the theory of developmental appropriateness

Developmentally Appropriate Practice (DAP) was first proposed in 'Developmentally Appropriate education for children aged 0-8 years' by the National Association for the Education of Young Children (NAEYC) in 1987. DAP means educational practice that is 'appropriate for children's

development'. Based on children's level of cognitive development, it emphasizes meeting children's needs instead of expecting children to adapt to social or educational requirements. Therefore, after the release of the statement, DAP has not only become the action guide and evaluation standard of early childhood education in the United States, but also has a profound impact on preschool education worldwide.

The research on DAP get more profound as the time develops and as research deepens. In the statement released by NAEYC in 1987, it was first clarified that DAP includes two aspects: age suitability and individual suitability. Age appropriateness means that teachers should provide appropriate educational experience to children according to their specific cognitive, behavioral and ability development conditions at a certain age. Individual appropriateness means that teachers must take into account the special needs of each child, and interact with children and set curriculum in ways suitable for children. That is, children's education based on the theory of developmental appropriateness should respect children's physio-cognitive development and meet their psychological differentiation needs. Cultural suitability is another connotation of DAP has gradually emerged since the 1990's, juxtaposed with the first two connotations. The development of children has its social constraints. Children come from different cultural backgrounds, and each child's family has different cultural views and values. Therefore, people gradually realize that the development of suitability education also needs to reflect cultural applicability. Based on this, NAEYC made the first revision in 1997, adding the content that teachers should make decisions based on the development level of children, individual differences of children, and relevant knowledge of the social culture in which children live. In 2009, NAEYC revised the theory of developmental appropriateness again, clearly emphasizing that teachers should master three kinds of knowledge related to children: age characteristics of children, individual differences of children and social and cultural background of children's living.

2.2 Existing problems in interactive application of safety education for children

This paper identifies the following problems by analyzing current interactive application for children's safety education on the theoretical basis of developmental appropriateness:

2.2.1 Age Inappropriateness: not conforming to the characteristics of children's development stage

Age appropriateness is the first major factor in the development of appropriateness theory. The early childhood education products with age appropriateness should be consistent with the development needs of children, rather than making children meet the specific requirements of products. However, most of the current digital publications of children's safety education ignore the cognitive characteristics of preschoolers. In terms of educational content, their scenario and script content are not close to the life of and the learning of preschool children;

In terms of educational goals, their requirements are set too low or too high, not matching children's cognitive development; from the perspective of educational means, the operating characteristics of mobile devices used by children are ignored, and children cannot adapt to the use of products.

2.2.2 Individual Inappropriateness: not truly integrating safety education knowledge with the core of interaction design

Some children's safety education digital publications lack knowledge on safety education and lack in-depth research on children's mind. They see children as recipient of knowledge and skills and ignore children's emotional experience. Without researching on emotion formation mechanism, they failed to fully consider design factors such as plot, interaction with education goal. Their monotonous task execution framing structure are not individual appropriate. From interface design to interactive mechanism, they fail to appeal to children's emotional demands and fail to reflect trend in children's aesthetic taste and interest, resulting in superficial products on the market that nobody wants.

2.2.3 Cultural Inappropriateness: lacking local cultural background

The appropriateness of cultural development is a core educational concept advocated by DAP. Educational content to be provided for children should conform to the social and cultural environmental knowledge of children's life (8). Some digital publications for children's safety

education have borrowed from excellent examples from other countries but fail to selectively combine the borrowings with the cultural characteristics of their own countries or the social and cultural environment of children there. Specifically, when children use or read these digital publications, the knowledge they learn is inconsistent with their actual environment, which affects the consistency of their learning and the accumulation of their learning experience inevitably. This is contrary to the goal of safety education.

According to the three analyses above, the root cause of problematic children safety education digital publications lies in designers and developers ignoring the rules of children's cognitive development and emotional experience, and their failure in skillfully combining the knowledge of safety education with interaction design. Therefore, safety education application should be designed with children's cognitive development and emotional experience in mind to subtly improve children's ability for protecting themselves.

3. Analysis of preschool children's cognitive characteristics and mobile device use habits

Preschoolers aged 3-6 years are in Piaget's preoperational stage, a transition from concrete to abstract thinking. Psychological and cognitive development characteristics of children in this age group and their mobile device operation habits have obvious phased characteristics.

3.1 Psychological cognitive development characteristics of preschool children

Preschoolers aged 3 to 6 have intuitive and representational thinking. The mind and consciousness are not completely detached from the objective world, Their judgments and analyses of things focus on their intuitions about the world. Their thinking ability is also limited to real or imagined concrete things. Preschoolers ages 3 to 6 tend to have implicit memories, The things that support children in performing memory tasks are what they do repeatedly in their daily lives or through games. These memory tasks are done implicitly and unconsciously. Children in this age group have no intention to pay attention to high development, but gradually develop their attention intentionally. As a result, preschoolers are easily distracted and have difficulty concentrating for a long time, but have begun to control their attention initially. Preschool children's imagination activities mainly belong to unintentional imagination; that is, their imagination has no predetermined purpose and needs to be directly caused by external stimulation. The subject matter of imagination is unstable, and the content is scattered.

Preschool children's sense of morality, sense of beauty and reason has begun to develop. As preschoolers shift the focus of their life from their family to kindergarten, children begin to socialize, through which they will gradually master various codes of conduct and develop a sense of morality. Aesthetic sense is people's aesthetic experience of things. Preschool children have some typical aesthetic experience. For example, they prefer red, yellow, blue and other colors with high saturation and brightness. Reason is a higher mentality peculiar to humans. One of the most obvious characteristics of children aged 3-6 years is that they like to ask questions, continuously asking 'why' questions; they feel happy to get answers to questions. They have strong curiosity and thirst for knowledge, as they begin to enjoy some intellectual games and activities, which are all manifestations of reasoning.

3.2 Behavior and habits of children using mobile devices

Gesture is an important way of human-computer interaction. Compared with adults, children are less receptive to complex gestures and tend to use simple gestures such as to click or to slide in one direction. Preschool children in the stage of curiosity is strong; they are able to click on any content on the screen as they try to explore and discover new content; therefore, simply click actions can be entirely enough for children's basic use of apps. Use of gestures too complex may make children unable to establish a good interaction between the application and causes frustration, depression, and eventually abandonment. In addition, once children are familiar with an app, they become very involved in repeating it; when children get interesting feedback on every effective click, even if they have learned

through many previous operations what would happen exactly as they click a certain point on the screen, they can still enjoy the experience very much.

In addition to gestures, voice interaction is also a behavioral feature of children using mobile devices. Preschool children are in a stage of development of listening, speaking, reading and writing abilities; they have a relatively high ability of recognizing sounds compared with their speaking, reading and writing abilities. Speech interaction not only reduces the difficulty of using applications for children, but also attracts their attention.

4. Construction of interactive application design model for children's safety education

4.1 Three-level theoretical model of emotional design

The three-levels of emotional design is a design model proposed by Norman from the perspective of cognitive psychology. Norman divided users' cognitive processing into three levels: visceral, behavioral and reflective. The visceral level refers to the sensory experience brought by the product to the user, who can make immediate judgment at the moment of contact with the product. The behavioral level refers to the user experience brought by the product. The design of the behavioral level should be based on the 'human-centered' principle to make it feel friendly to users; it pays attention to utility and attaches importance to performance. The reflective level refers to the emotional experience brought by the product to the user, which goes deep into the significance of the product, into the level where emotions and memories are generated.

The three-level theoretical model of emotional design is a design concept and method, a tool to help designers to design. Therefore, this model is not a static theoretical model that can be directly used, but one that adapts to local conditions and keeps pace with the times. For different audiences and functions of various products, different design elements will be generated when the theory is applied in different design fields. For example, the design elements generated when the theory is applied in industrial design and web design are quite different. Even in the same design field, design elements are different due to different audiences, such as designing furniture for adults and designing furniture for children.

As for digital publications for preschool children's safety education, whose main function is to let children learn safety knowledge and avoid safety hidden dangers in life, the target audience is children aged 3 to 6 years old. Therefore, the design of visceral level should fully respect children's aesthetic preference; at the behavioral level, children's mobile device habits should be considered and their psychological experience should be consistent with the physical properties of the external world. The design of the reflective level needs to use situations created by story as the basis for children to construct their knowledge system and memory system. At the same time, tasks and challenges should be set under reasonable logic and specific plots.

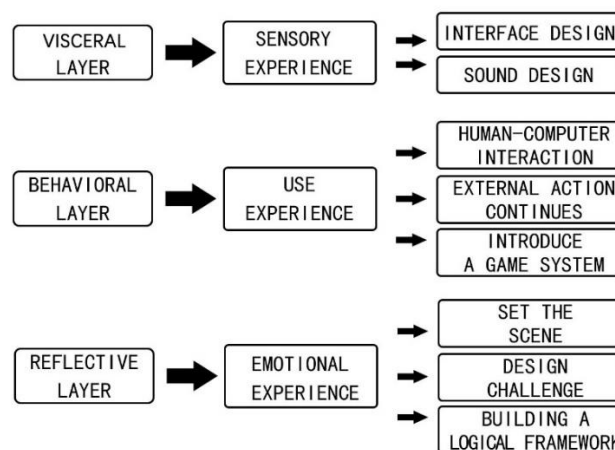


Fig. 1. Integration of the three-levels of emotional design with the designing of Interactive Animation for children's safety education

4.2 Design process and method

User cognitive processing follows the chronological sequence from visceral to behavior to reflection. However, from the designer's point of view, The product design process and users' cognitive process proceed in opposite direction. Designers should first make clear the core meaning of products (reflective layer design), which becomes the basis for building the interaction between users and products (behavioral level design); lastly, they make suitable external product packaging (visceral level design).

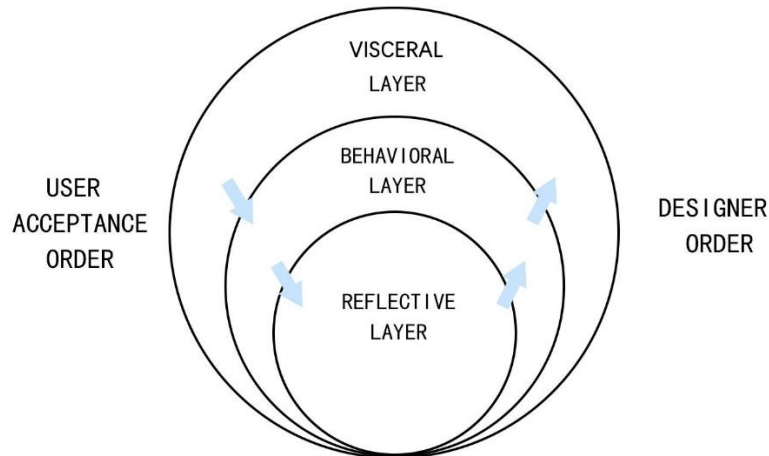


Figure 2 user acceptance order and designer design order

4.2.1 Reflective design

The reflection of children's safety education is the subtle learning of safety knowledge by children in entertainment; as children encounter similar scenes in life, they can transform the knowledge stored in memory to avoid danger. Since children are in the primary cognitive stage, designers should help them learn knowledge and store memory by constructing an environment close to their real life. The methods are as follows:

(1) Create story context: As can be seen above, preschoolers' memory reserves are quite short in supply, making their memory implicit and not so persistent. The way to support children to complete memory tasks is to organize the situation according to the continuity of events and story schema, so that they may complete their cognitive and memory tasks. Children need a complete story context to help build a memory framework to complete their knowledge reserve, so that they can use this knowledge reserve in future practices with others, with nature and with society, and develop more complex story schema to enrich their knowledge structure. The story situation should be close to children's daily life and learning, so that children can have a sense of familiarity for better understanding and immersion. The story should be written to let children try to participate in it as its member. At the same time, characters such as partners, parents and teachers can be added to complete the development of the story.

(2) Construct parallel logic framework: Generally speaking, the design of story scripts is organized in a logical sequence of linear time, with the benefit of clarity and ease of use. However, the single logical framework is also a little rigid, and cannot take into account the individual differences of children, in contrary to the "individual appropriateness" aspect of DAP. In order to give consideration to the clarity of organization and flexibility of use, this paper recommends that after creating the story context, a specific story plot should be extracted to construct a parallel logic framework; that is, a part of the linear logic framework should be extracted to increase non-linear narrative logic, transforming single line interactions into parallel clue interactions. Specifically, the whole story line should follow the logic of linear narrative, while a specific plot in the story should add parallel narrative logic. Take 'Baby Travel Safety' as an example: the publication creates a scenario in which the young protagonist Qiqi and her mother buy three items at a "fruit stand across the street," a "mall," and a "community supermarket. However, the choice of three locations is not a single route preset by the designer, and there is no order of priority. Each scene belonging to a parallel

structure can be entered into several times. The end of the story is that Qiqi and her mother have bought three things and come home safely.

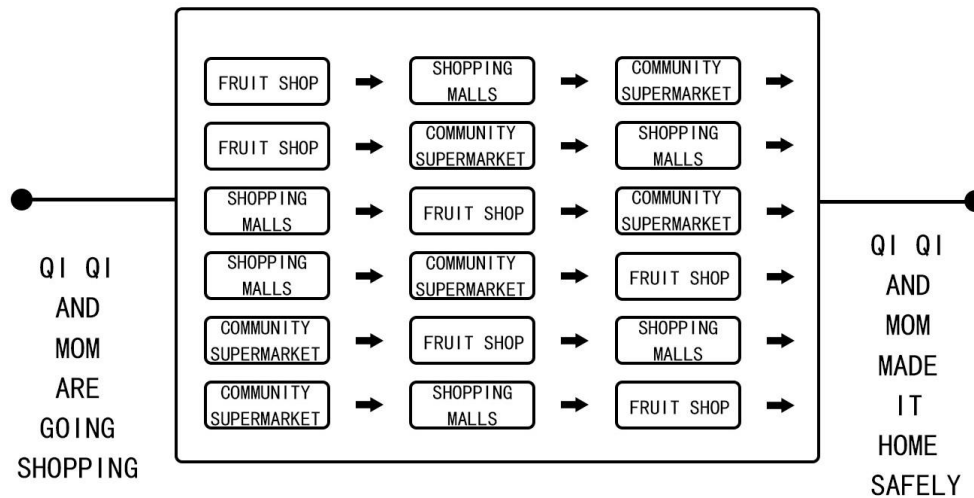


FIG. 3 logical diagram of "Baby Travel Safety"

(3) Design challenge tasks: Children do not have the ability of abstract thinking and need to be in certain situations to complete cognitive tasks well. Preschool children's memory inclines towards implicit memory. Tasks introduced by specific plots with feedbacks given on task completion can subtly help children build a memory framework. The design of challenging tasks is to be completed on the basis of creating story scenarios and establishing logical structure. Designers should consider the correlation between safety knowledge points, story scenarios and challenging tasks. Vygotsky's Zone of Proximal Development (ZPD) theory states that ZPD is "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance, or in collaboration with more capable peers" According to this theory, the best teaching effect happens in ZPD; so, practitioners and product designers of children's education should grasp each ZPD of children's development and design challenging tasks for every ZPD to enhance children's knowledge construction.

4.2.2 Behavioral design

The design of behavior is the link between children and products. In behavioral level design, the behavior habits of children using mobile devices and the interactive design for ease of use and for interestingness should be taken into account. The methods are as follows:

(1) Click-based interaction; Children are less receptive to complex gestures and are more inclined to use the simple gestures of clicking. Overly complicated gestures will lead to frustration, anxiety and other negative emotion in children, preventing them from establishing a good and effective interaction with applications. Moreover, children are curious about new things, so they will click anywhere on the screen. Therefore, "click" gesture operation can meet the needs of interactive design of children's products. Based on this, the interaction design for preschool children should not be too complex. It should be mainly based on clicking and supplemented by simple single-direction sliding. The designer should work on the interaction effect rather than the interactive behavior itself.

(2) Extending action in daily life into the app; Preschool children are in the primary stage of cognition, and their thinking and consciousness are not separated from the objective world. Therefore, children will talk with cartoon characters and regard their toys as living companions. Therefore, when interactive designers extend action in children's life into apps, children will have a sense of intimacy with the apps; moreover, children can quickly master the way of communication with the apps to generate a strong sense of pride.

(3) Introduce games into design; Piaget believed that game is an aspect of intellectual activity and cognition, which is the manifestation of assimilation over adaptation. In fact, the process of games is the process of learning for children. In children's eyes, most of their behaviors in daily life are gameful behaviors. Children deepen their cognition by completing games one by one. Therefore,

designers should be good at using game mechanism to attract and inspire children in behavioral design. But, the design of the game is not created out of a vacuum, but on the basis of reflective level design. Game mechanics are often associated with designing challenges in the reflective level. Turning plots and quests into strongly operational and entertaining games greatly helps to balance the entertainment aspect of and educational aspect of digital publications.

(4) Design interactive feedback; Feedback information is the evaluation of behaviors according to user operations; it can give users index information provide prompts of success or failure to users, and help users and make judgments and decisions. For preschoolers, the design of "feedback" is very necessary. The designer should give timely feedback in the process of children doing tasks. This not only gives children self-confidence, but also guides them to complete the next task. Pre-school children is at the beginning of their understanding of the world; they are driven by curiosity to click on any object on the screen to attempt to interact with it; on this basis, designers can design into the app hidden surprises to be trigger by users' successful attempts; children will highly enjoy those and try them again and again to get entertained.

(5) Voice interaction; Preschoolers' listening and speaking ability is obviously higher than their reading and writing ability. Preschoolers' understanding of words is very limited, but they are in an explosive period of growth in language ability. At this stage, children already know how to express their ideas and opinions and communicate with others through language. Voice interaction not only reduces the difficulty for children to use the application, but also attracts their attention.

4.2.3 Visceral level design

Visceral level design to present the most intuitively aesthetic image in front of children. Whether it can attract children's attention at the first glance depends on the intuitive feeling brought to children by visceral level design. On the basis of fully catering to children on reflective level and behavioral level, visceral level design fully caters to children's aesthetic preference. The methods are as follows:

(1) Bright pictures; Children's psychology and research on more successful digital publication on the market for children show that interactive applications most popular with children use blue, green, yellow, and red; among them, the cool colors of blue and green are usually the main tone of or the background color of the interface, and their brightness are usually enhanced. With yellow, red, orange, pink and other complementary colors, the whole picture is then made smart and lively.

(2) Kind and cute personified cartoon images; Children between the ages of 3 and 6 begin to show socialized tendencies, from focusing on the self to gradually realizing the differences between the world and the self. Cute personified cartoon images are easy to empathized with; they facilitate children to further understand rules of the world that they explore. In addition, preschoolers have begun to understand the meaning of life and to cognize 'animism', believing that everything around them is alive; so, they have conversations with objects around them. Based on this, the image design for children often adopts the 'anthropomorphic' design method. Although most cartoon images adopt the 'anthropomorphic animal' design method, the 'anthropomorphic' object is by no means limited to animals. Vegetables, fruits and even geometric shapes can be 'anthropomorphic' design objects.

(3) the background of joy music; Bright colors and cute cartoon images can improve children's attention to the application. Background music further enriches the auditory sense elements on the basis of visual experience. Cheerful music can effectively stimulate the nerve, improve children's coordination ability to a certain extent.

(4) Make full use of animation. At present, many interactive apps designed for children on mobile terminals are simply the materials of paper publications with music, sound effects and page-turning interaction included, or traditional publications with the interactive label imposed without considerations for the characteristics of interactive design. Therefore, designers should make full use of animation to help children better understand the content of the story and improve the interest of the product, so as to extend the time line for children to remember knowledge points, to play a role in the deepening of memory, and to realize the residing of teachings in fun.

Based on the above analysis, the following design model is obtained:

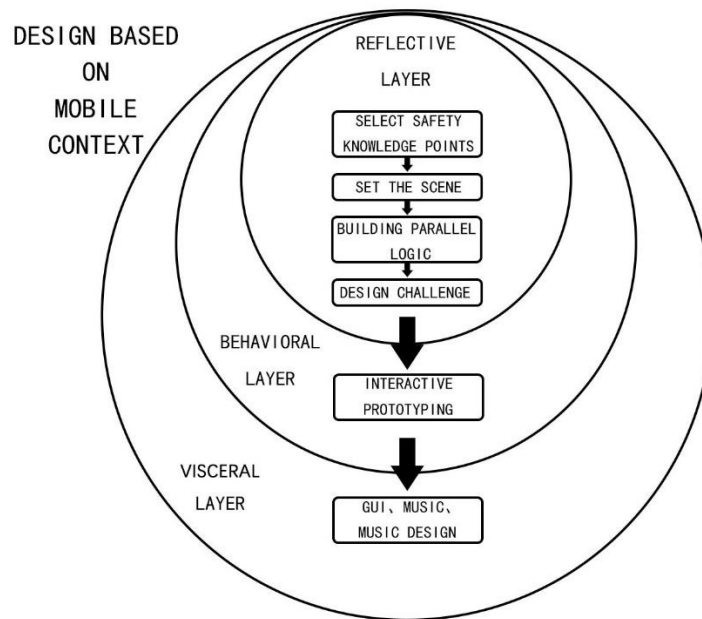


FIG. 4 interactive application design model for children's safety education

5. Interactive design example of home safety education for children -- 'Today I am in charge'

5.1 Product introduction

'Today I am in charge' is an interactive home safety education app for preschoolers aged 3-6 years. Children are most familiar with their home and spend most of their time at home, but there are also a lot of subtle safety risks there. Using 'hide and seek' as its story background, this product is divided into four scenes: living room, bedroom, kitchen, and toilet. It helps children troubleshoot safety risks at home.

5.2 Design analysis

5.2.1 Reflective level design

This research used the research methods of interviews and hidden observation to check and sort out the hidden safety risks in the family. Efforts in organizing knowledge points about home safety reveals that they are scattered, not systematic, and thus require a flexible story to accommodate in. The story of 'Today I am in charge' is set during a summer vacation when Sensen invites to his home three friends. It includes storylines such as 'tidy up the toys', 'don't open the door to strangers' and 'hide and seek', with safety knowledge throughout.

SNIPPETS	STORYLINE	TASK SETUP
1	SENSEN INVITED THE KIDS OVER	
2	SENSEN TRIPPED OVER A LITTER OF TOYS ON THE FLOOR	ORGANIZE THE MISLAID TOYS AND BOOKS
3	THERE'S A KNOCK AT THE DOOR. SENSEN WANTS TO OPEN IT	MAKE SURE THE PEOPLE OUTSIDE THE DOOR
4	LET THE CHILDREN HAVE CAKE	WASH YOUR HANDS BEFORE YOU EAT
5	WATCH TV	ADJUST POSITION TO PREVENT MYOPIA
6	HIDE AND SEEK	FIND THE KID
7	EVERYBODY'S HAVING A GOOD TIME	

Figure 5 'Today I am in charge' story scenario

As can be seen from the above, the writing of the whole script should follow a linear narrative structure. However, in order to make the story more interesting and more flexible, with more appropriately included knowledge points, the plot of 'hide and seek' is designed to have a narrative structure with parallel logic. 'Hide and seek' a games that children often play in their life, so children have instinctive understanding of and expectation for the plot of 'hide and seek'. The game mechanics intrinsic to 'hide and seek' also makes its plot very suitable for a parallel logic construction, in which children can search any scenario in any order for any number of times. This episode is also designed with some plot interactions and hidden surprises to deepen its users' memory.

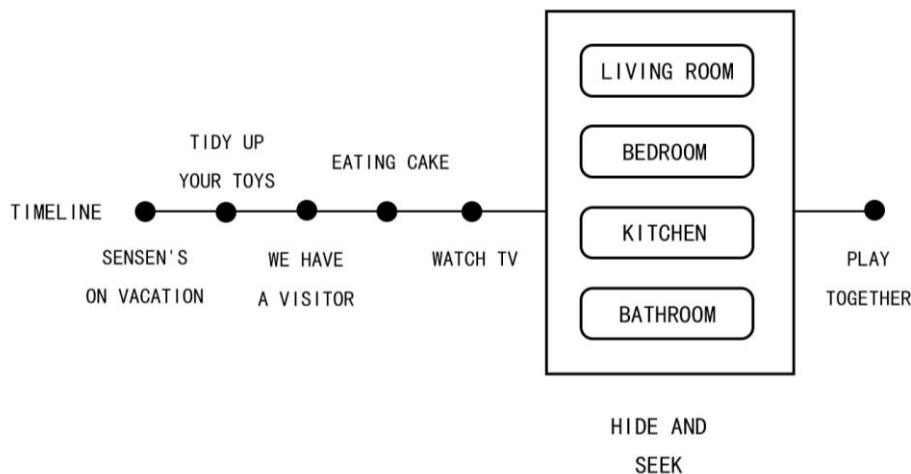


FIG. 6 parallel structure design of "hide and seek"

5.2.2 Behavioral level design

The interaction design of 'Today I am in charge' is age appropriate. Its interaction are mainly clicking and sliding. At the same time, it integrates daily life movements into the design, making the interactions easy to understand, strongly operable. With relaxed and happy background music and sweet voice interaction, its usage process is euphoric and immersive for children. For example, the design of segment 2 first plays an animation showing Sensen tripping over toys and books scattered carelessly on the floor. Then, a voice prompt "Children, let's help Sensen put the toys in order!" prompts users to slide toys scattered on the floor to their original place marked on screen by dotted lines. Afterwards, voice and animation provide encouraging feedbacks, as shown in figure 7.



Figure 7 Fragment 2 interaction design schematic diagram

In addition, the interactive design of "Today I am in charge" also fully satisfies the curiosity of children. Most objects in the picture can be interacted with, and touching them triggers short animations. On this basis, safety education is carried out to deepen children's memory. Take the sitting room scene in the "hide and seek" plot as an example. Clicking on the door make the door open with the voice prompt "don't clip your hands when opening or closing the door!" Clicking on the drawer makes the drawer open. In the drawer, there are drugs, scissors and other items with hidden safety risks for children, and they again will conduct safety education through voice interaction.



FIG. 8 interaction design diagram of living room scene

5.2.3Visceral level design

Three aspects of visceral level design of 'Today I am in charge' are discussed below: scene design, character design and UI design.

Firstly, the scenic design of "today, I take charge of" fully revives scenes from children's lives, with four main scenario designs: sitting room, bedroom, kitchen and toilet. Its graphic design is based on a partial realistic style which cartoonized by color brightness and saturation enhancements to catering to children's preferences of color.

Then, there are two considerations for selected Chinese cabbage for personification into cartoon character: Chinese cabbage is a common thing in children's life and children will not find it strange as personified because a natural sense of affinity is there for it. Also, the round, fat, green and lovely characteristics of cabbage itself are very suitable for the development of a cartoon character for children.

Finally, the design of the user interface adopts the design method of "de-UI-ization". The considerations behinds this are the operational characteristics of children using mobile devices and preschool children's weaker logical thinking compared to image thinking. This so-called "UI removal" means that there is no obvious navigation or button interaction on the interface. Most navigational aids or buttons mainly rely on text and abstract icons to convey information, which makes them very difficult for children to understand. In addition, children conducting interactive operations tend to inadvertently touch these components and interrupt their understanding and experience of content. Therefore, "Today I am in charge" is design with no navigational aids or buttons; it relies on the internal logic of the story situation for its UI design; for example, the sitting room is the main scene. Through sliding around, children can browse the whole picture of the sitting room; they can also, of course, see each door of the room. Clicking on different "doors" results in entering the differnt rooms accordingly, While browsing each room, users also can always click on the "door" of the room to go back to the sitting room as the main scene.

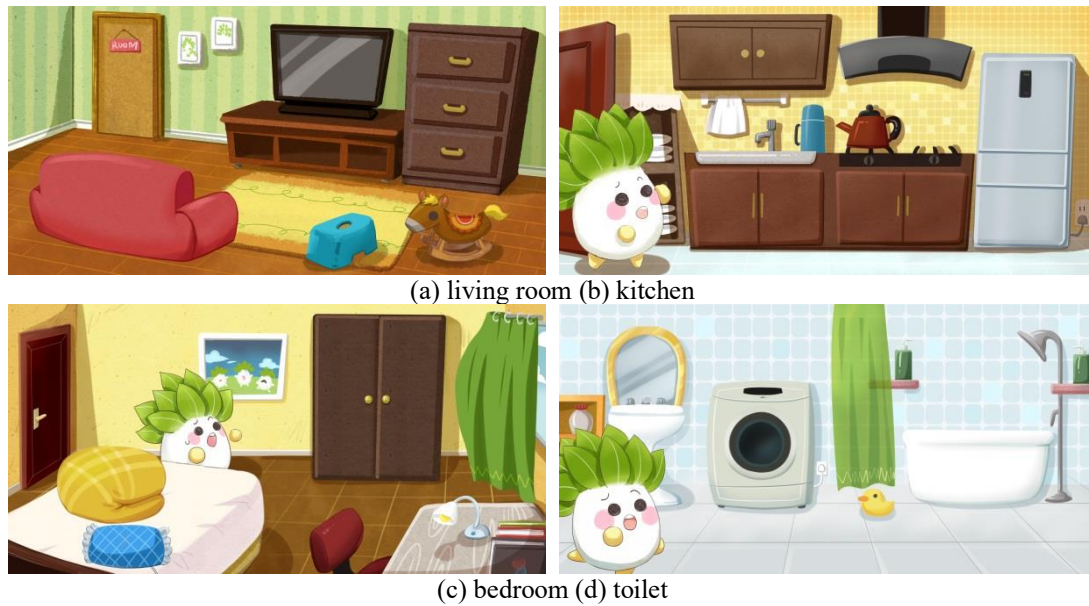


FIG. 9 interface design of "Today I am in charge"

In conclusion, new media technology development and popularization of mobile terminal equipment bring with them a new publishing model. It brings new opportunities and challenges to the development of edutainment products for children. Designers and developers should not only make full use of new technology, but also respect children's cognitive characteristics. They should strive to study design strategies appropriate for children's age, individualized development, and socio-cultural backgrounds.

Acknowledgement

This research was financially supported by “the Fundamental Research Funds for the Central Universities”.

References

- [1] Bredekamp, S. Developmentally appropriate practice in early childhood programs serving children from birth through age 8[M]. Washington, DC: National Association for the Education of Young Children,1998:34
- [2] Charlesworth, R. Response to Sally Lubeck’s “Is developmentally appropriate practice for everyone?” [J]. Childhood Education,1998,74:293-298
- [3] Bredekamp, S. & Copple, C. Developmentally appropriate practice in early childhood programs [M]. Washington, DC: National Association for the Education of Young Children,1997:43
- [4] National Association for the Education of Young Children. Developmentally Appropriate Practice in Early Childhood Programs Serving Children from Birth through Age 8(Adopted 2009) [EB/OL].
- [5] Vygotsky, 1978, p. 86). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press. 2018.