Design Features and Creative Ideas for Short Videos in Multimedia Picture Books

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Abstract: With the development of the mobile Internet, the interactive multimedia of children's picture books have become an inevitable trend. In the interactive multimedia picture book, the short animation video is the core form of its presentation, playing a vital role and directly determining the success or failure of the picture book. Multimedia picture books rely on creative creation, big data, Internet technology, and micro-video platform, and the development of the situation is very good. The innovative excavation of content information, the integration and development of media forms, and the pro-people characteristics of morphology and language make the role of short videos in the growing life of young people also cannot be ignored, and its ideological and political educational function role is also developing while facing many problems and limitations. In this paper, we explore the characteristics and creative ideas of animated short videos in interactive multimedia picture books, sort out some commonalities and laws of interactive multimedia picture book creation, and promote their healthy development.
***Keywords*:** interactive multimedia picture book, short animation video, presentation form, characteristics, creation concept

With the development of the mobile Internet, the interactive multimedia of children's picture books have become an inevitable trend. This new form of picture books will break the limitations of the medium, with paper picture books as the core, with computers, cell phones, iPods and other multimedia terminal devices as an extension, combining children's literature, painting, animation, interactive games and other presentation methods, all-round stimulation of children's senses, support family reading and group reading, adapt to a variety of reading contexts. In the process of evolution of traditional picture books to interactive multimedia picture books, short animation videos will play a vital role, and the level of their production and presentation effect will directly determine the success or failure of the interactive multimedia picture books.

1. Short animation video is the core form of interactive multimedia picture book presentation

An interactive multimedia picture book, no matter what specific links it contains and how many different media forms it covers, is bound to take animation as the core presentation form. Recent studies at home and abroad have proved that the simple form of converting a paper picture book into an electronic version, adding sound and page-turning, not only fails to bring into play the advantages of multimedia but is even less stimulating and educational for children than traditional paper picture books. Therefore, the addition of animation and interaction has been an inevitable choice for the creation of multimedia picture books. However, the animation in interactive multimedia picture books has significant differences from the general animation works.

Firstly, the animation in an interactive multimedia picture book is fragment animation. Unlike traditional animation which needs to have rich characters and scenes, and needs to ensure the integrity and fluency of its own story, the animation in interactive multimedia picture books is based on one page of the picture unfolding. The integrity, fluency and logic of the story are expressed coherently through a different picture. Therefore, the requirement for animation is to accurately convey the content of a picture and to match the description of the picture. This requires the animation to focus only on one or a few key elements of the picture. Therefore, the creation of animation for picture books is more concerned with the wonderful expression of a story fragment, without deliberately pursuing the complete story interpretation - this is the advantage of short animation video.

Second, all the virtual interaction means of the interactive multimedia picture book are presented in the form of short animated videos. Both the general animation play and the interaction through interactive games are realized based on animation. Whether it is the change of the character's body and expression after touching and clicking, the transformation of the background environment, or the different reactions and actions made by the corresponding characters through interactive

commands; whether it is a simple back and forth page flip to zoom in and out, or in the augmented reality environment, rotating and adjusting the projected objects, all can be regarded as a kind of short animation video in essence.

2. The characteristics of animated short videos in interactive multimedia picture books

The animation in interactive multimedia picture books is a powerful supplement and expansion of the pictorial picture, a dynamic extension of the static content. Its focus is on the visualization and clarification of the abstract content. Therefore, the animation video in an interactive multimedia picture book focuses on action expression rather than plot description; focuses on content expansion rather than picture interpretation; focuses on using a variety of different production methods.

First, focus on the expression of the action itself. As the story of interactive multimedia picture books is told through different pictures with text descriptions, the short animation video is only responsible for explaining and expressing the content of each picture. Therefore, for the short animation videos in interactive multimedia picture books, the requirements of storytelling are weakened to a certain extent, but the requirements of the action itself have been enhanced accordingly. We should focus on the fluency and clarity of the action itself and improve the action performance effect. In an excellent interactive multimedia picture book, its short animation video needs to have clearer and richer movements than general animation series and animated movies. In the conception of the action itself, it should take "unexpected, reasonable" as the basic requirement, and give full play to the role of exaggeration, whether it is the character's body movement, expression action or the corresponding changes in the scene environment, both from the action magnitude and action effect are carefully designed to exaggerate the action. We should pay attention to the guidance and expansion of children's thinking in terms of visual perception of animation action content, and not make it become a restriction or substitute for children's independent thinking. Moreover, in view of children's strong ability to imitate actions, in the short animated videos of interactive multimedia picture books, dangerous actions should be avoided, and when similar content must appear, either a clear negative confirmation or a fictional omission should be made.

Second, focus on the expansion of content. The rich content expanded based on interactive operation can significantly promote the synergy of children's thinking ability, expression ability and communication ability, which is the biggest advantage of interactive multimedia picture books compared with traditional paper picture books and non-interactive multimedia picture books. This rich interactive content needs to be supported by a corresponding library of short animated videos, which requires the short animated videos of interactive multimedia picture books to focus on the expansion of picture book content.

The expansion of the picture content in interactive multimedia picture books includes three aspects of interaction, interaction process and interaction results. First, the expansion of the interaction mode refers to the viewer's indifferent interactive operations, which will produce different animation effects. Take the picture book "Dot Dot Dot Dot" as an example, we can design the click operation to produce a gravitational animation effect: a gravitational core will appear at the center of the point clicked or pressed by the finger, and the surrounding points will be attracted; the scratch operation will produce an elastic animation effect: the finger slide will produce a scratch and bounce off all the touched points. Secondly, the extension of the interaction process refers to the fact that when the viewer adds multiple elements to the interaction operation, the process animation will have different changes accordingly. Take the picture book "The Hungry Snake" as an example, it allows the operator to set the forward animation of the snake: draw different trajectories by hand, and the snake will move along the trajectory it draws. Third, the extension of the interaction results refers to the content of the original picture book to produce a variety of different subsequent results. This kind of extension is the core content of animated short videos in interactive multimedia picture books, including different effects produced by the same interaction model and different effects produced by corresponding different interaction modes. Take the picture book "My Dad" as an example, one of the pictures is "He is a great dancer", in the animation of interaction design, you can specify different dance forms for this father, such as ballet, tango, samba and so on. When the specified content is the corresponding dance type, the specified animation will be played; when there is a dance type that does not exist in the present, another animation short video will be activated - dancing haphazardly.

Third, focus on the use of a variety of different production methods. The production method of short animation videos in interactive multimedia picture books is the same as the production method of ordinary animation works. In order to pursue the best presentation effect, according to the different styles of the corresponding picture books, the short animation videos in interactive multimedia picture books can be produced in two-dimensional, three-dimensional, stop-motion and other different production methods. In an interactive multimedia picture book, one of them can be used alone, or a mixture of production methods can be used. Generally speaking, in order to pursue the consistency of picture style, most of the short

animation videos in interactive multimedia picture books are more suitable to use the expression and production means of 2D animation, but in view of the many limitations of 2D animation in the production cycle, work intensity and production cost, using 3D production with 2D rendering is also a more suitable production scheme.

According to the story content, action requirements and drawing style of the picture book, it can be broadly divided into three cases. When a picture book's story content, drawing style and action requirements are more complex, unless the budget and production time are very ample, it is not recommended to use two-dimensional production, such as picture book "reveal the sea" and other very complex scenes, characters, action is also a very complicated picture book, should consider the use of three-dimensional production or directly in the three-dimensional production based on the real shooting. When a picture book's story content and action requirements are relatively simple but draw more complex, you can consider using two-dimensional production. Because today's 2D animation production is also based on digital printing technology, which supports the copying and adjustment of images, when there is no overly complex motion design and camera movement, most of the 2D animation work can be achieved by copying and adjustment, without a lot of hand-drawing. For example, in the picture book "My Dad", most of the movements can be made by copying images with local adjustments. When the picture book has a clear production style, priority should be given to using the corresponding style for the production of short animation videos. Even if there are limitations in terms of cost or production cycle, other means should be considered to simulate the style. For example, the picture book "The Hungry Caterpillar" is undoubtedly the most suitable for production by stop-motion animation. However, depending on its style and content, the cost of such a production would even exceed that of a 2D production method. Therefore, we can consider the production method of component animation in 2D animation: the actual parts of the caterpillar are created, the photos are taken and imported into the corresponding program for processing, and then the corresponding animation components are created. This can save some time and cost.

3. The idea of creating short animated videos in interactive multimedia picture books

Based on the above characteristics and according to the cognitive characteristics of children, the creation of animation short videos in interactive multimedia picture books needs to comprehensively consider the plot setting, action design, production method and other aspects. Now let's talk about the specific idea of animation short video creation in interactive multimedia picture books in combination with the picture book "Do You Know What I Ate?".

First, plot settings. The plot of the picture book "Do You Know What I Ate?" is very simple: a monkey ate six kinds of fruits: banana, orange, apple, pineapple, grape and persimmon. The first five kinds were very delicious. The last raw persimmon was very astringent. After eating it, the monkey was very uncomfortable and shouted to find the ripe sweet persimmon. Through exaggerated and humorous expression techniques, the picture book conveys the taste, taste, image and other characteristics of different fruits to children, aiming to make children understand the knowledge of basic fruits through laughter. Therefore, the animation short video creation of this picture book needs to set the plot from two aspects: basic animation plot and interactive animation plot, continue the consistent assumption of the picture book plot, and further extend and strengthen children's understanding of fruit. The picture book "do you know what I ate" adopts a circular structure in the plot, with one cycle for each kind of fruit. The basic composition is "close up of monkeys eating fruit" — "monkeys evaluate the fruit and ask 'do you know what I eat'" - "show the fruit eaten by monkeys".

In terms of the basic animation plot setting, for the first part, clear chewing actions should be designed to reflect the changes of the face (mouth shape, face shape, eye shape and even head outline) when chewing fruits of different textures, together with corresponding chewing sound effects to convey clear, explicit and highly recognizable stimulation signals to children watching the picture book from both visual and auditory aspects. For the second part, we should focus on the design of the process of picking up the fruit by the monkey, reflecting the differences in volume, size and eating methods (peeling, spitting out the seeds, leaving the core and holding) of different fruits. For the third part, the focus should be on the display of the fruit itself. Different ways of appearance can be designed for different fruits, such as falling from the top of the screen, rolling in from the side of the screen, being pulled into the screen by the monkey, etc. Through the interaction between the fruit and the table in different ways of appearance (bouncing, rolling, shaking, etc.), the difference in volume and texture between various fruits can be shown.

In terms of the plot setting of the interactive animation, for the first part, an interference link should be designed for the chewing process of the monkey. For example, if you click on which side of the monkey's face, the monkey will chew on that side; if you click on the monkey continuously, it will chew faster, but if it eats too fast, it will choke, etc. For the second part, different interactions should be designed according to different fruits to further strengthen the difference between various fruits in terms of consumption. For example, the peeling process of bananas and oranges should be broken down, and the

peeling action can be demonstrated by clicking on the screen step by step; which hand of the monkey is dragged toward the fruit, the monkey will use that hand to get the fruit; tapping on the blank part of the screen during the monkey's eating process will cause the monkey to be distracted, and if it is distracted in the process of sending grapes and oranges to its mouth, it may cause the fruit to fall down, etc. For the third part, interactive content should be designed to show the fruit's own characteristics. For example, by sliding the fruit can be shaved open to see the horizontal and vertical cuts, thus showing the composition structure of the fruit; introducing the content of augmented reality, the pictures of the physical picture book will appear as three-dimensional fruit by shooting the mobile multimedia terminal such as cell phone and iPad, supporting various angles of rotation and zooming operations [6].

The second, the action design. It mainly includes the design of action style, action rhythm and time to grasp the two aspects.

The core of action design is the design of action style. The basis of animation action poses, a set of poses arranged in a logical order and played will form action, and the character's pose must conform to the character's setting. Therefore, when designing the action style, the interpretation of the character's setting is needed first. In the case of the picture book "Do You Know What I Ate?", the prerequisite for designing the monkey action style is to summarize, deduce and draw the corresponding character setting diagram through the picture book drawings, including the three views, the proportional diagram of the position of the five senses, and the color designation diagram. Then, after the role setting is confirmed, we read and analyze this work and the author's other picture book works, and gradually complete the design of the monkey's movements in this work by combining the movements of monkeys in reality and the movements of people when they eat the corresponding fruits, making sure that the monkey's basic movements are in line with the author's depiction in the picture book drawings: the monkey's body movements should be clear and definite, and the mouth movements in peeling the fruit and asking questions are The expressions of the monkeys should be more exaggerated than the physical movements to fully highlight their "funny" role and attract children's attention.

Another element of action design is the rhythm of action and action time. First, the rhythm of action. The same action of the same character can produce very different effects under different rhythms of movement. In the case of the picture book "Do you know what I ate", it is necessary to design a variety of movements with different rhythms, and these movements need to correspond to different interactive commands. These movements cover four different rhythms: slow, normal, fast, and high-speed, including the monkey's chewing, grasping, holding, and running. The movements at slow and normal speeds should be clear and accurate, and tend to be realistic; the movements at fast and high speeds are allowed to break the limits of form and basic movement rules, and dynamic lines and other auxiliary means are added appropriately to pursue the exaggerated effect of the action performance. Second, is the action time. The control of action time should be pursued short and concisely. Simple process action without circulation (picking or holding the fruit and sending it to the mouth) 2-3 seconds, complex process action (peeling bananas or oranges) 4-6 seconds, simple circular action (chewing food) should not exceed 5 seconds. These short-length actions can, on the one hand, more stimulate the interactive needs of viewing children and increase the time and frequency of interactive operations; on the other hand, they can also reduce to a certain extent the time children spend fixedly focusing on the screen, which is conducive to the protection of children's eyesight.

Finally, the production method. In the case of the illustrated book "Do You Know What I Ate?", two-dimensional and three-dimensional production methods are suitable: the overall production is done in two-dimensional animation, and the part involving the use of augmented reality for fruit display is done in three-dimensional animation [7].

The three-stage plot unit structure of this picture book should be produced in different ways and with different emphases. First, in the series of monkey chewing, because the picture book itself is a circular structure, the same production method can be used except for the sixth picture "chewing persimmon" which has different chewing results. As shown in Figure 1, the four pictures on the third page of "Do You Know What I Ate?" are numbered, and the keyframes and complementary frames are set in the order of 1-2-3-4 for the first picture, 2-3-4-1 for the second picture, 3-4-1-2 for the third picture, and 4-1-2-3 for the fourth picture, to complete the chewing action in a different order. For the interaction command to change the chewing order by clicking on one side of the face, the order of the four pictures can be adjusted. For the interaction of clicking to speed up the chewing, we can increase the frame speed (from 8 frames per second to 12, 14 and 18 frames per second) and add the action of choking on food after the chewing action at the highest frame speed. Secondly, the monkey picks up the fruit and puts it into his mouth, which is the most complicated part of this picture book and requires several sets of follow-up actions for different interactive scenes. These actions require extra attention to the trade-offs between realism and exaggeration: when it comes to specific eating actions such as peeling the fruit, the action data need to be collected by means of real-life photography to ensure the accuracy of the action [8]. The frame rate of such actions should also be one step higher than the general action, at least 12-16 frames per second, to ensure the consistency and smoothness of the action. In addition, there are

some actions in this series that can be simplified, such as dragging the monkey's arm and tapping the blank screen after the monkey's reaction action can be reused with only local adjustments. Thirdly, in the fruit action production, when using 2D animation, the main focus is on the effect of different fruits when shaving and the display of the cutting surface. While using 3D animation to produce fruit display animation, the 3D model needs to be animated and rendered to ensure the consistency of the picture presentation effect as much as possible.

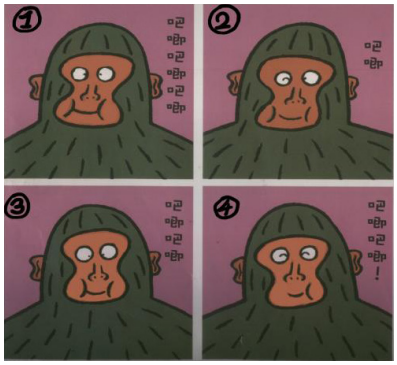

Figure 1. Do you know what I ate?

Today, as traditional picture books gradually develop into interactive multimedia picture books, the role of short animated videos becomes more and more prominent. The short animated video is not only the basis and carrier of all the functions of interactive multimedia picture books but also directly affects the artistic level and value of interactive multimedia picture books. Therefore, the designers of interactive multimedia picture books must pay full attention to the creation of short animation videos in picture books, and constantly expand the content of animation-related knowledge in their own learning system. In the creation of specific interactive multimedia picture books, the premise should be to fully express the basic content of the picture book and focus on enriching the content of the short animation video of the interactive aspect of the picture book. The short animated video is not only the cornerstone of the interactive multimedia picture book but also can be edited and organized into a promotional video of the picture book and a corresponding non-interactive multimedia picture book, forming a "physical picture book — non-interactive multimedia picture book — interactive multimedia picture book". Interactive multimedia picture book" is a complete work structure, and even become the pioneer of picture books to cross over to the field of cartoons.

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References

[1] Ji Young Choi,James Elicker,Sharon L. Christ,Jennifer Dobbs-Oates. Predicting growth trajectories in early academic learning:Evidence from growth curve modeling with Head Start children[J]. *Early Childhood Research Quarterly*, 2016, 9(36).
[2] Cheng Wenting, Wang Jun. Research on the reading differences between electronic picture books and paper picture books from the perspective of parent-child reading[J]. *Library and Information Work*, 2015, 59(22).
[3] Fang Rui, Zhang Shasha, Wei Xueqi. Research on the Design of Electronic Picture Books and Paper Picture Books Based on Children's Reading Differences[J]. *Publishing Science*, 2019, 27(5).
[4] Zhu Qiying. Research on the Design of Children's Dynamic Picture Books Based on Experience [J]. *Art Baijia*, 2012(5).
[5] Sun Ping. Research on the cross-media reading path of children's picture books[J]. *Modern Publishing*, 2012(4).
[6] Yang Yang, Shi He, Sun Minghui. Design and practice of children's electronic picture book based on iPad[J]. *Science and Technology and Publishing*, 2014(10).
[7] Xu Zhiwu. Research on Digital Narrative in Electronic Picture Books[J]. *Publishing Science*, 2018, 26(6).
[8] Wang Yu. Research on Interactive Narrative Structure of Electronic Books[J]. *Publishing Science*, 2018, 26(4).