

Research on the Perceptual Interaction Design of E-books Based on the Perspective of New Media*

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Abstract—With the development of information design, new media has become an emerging research object in the field of visual communication, which is a blend of information design, interactive design and user research. Its result depends on effectiveness evaluation of media information. E-book is exactly such a medium that focuses on information to reconstruct design elements. Based on the perspective of new media, it facilitates creation of easy-to-view and multi-dimensional reading experience, and to improve the interactive effects of new media e-book information to conduct research starting from the perception of users and construct emotional and contextual interactive design.

Keywords—new media; e-book; perception; interactive design

I. INTRODUCTION

With the advent of information age, new media has gradually rose, mainly including the new outdoor media, network video, digital interactive media and handheld media. The most significant difference between it and the traditional media is that the state of communication has changed from one point-to-multipoint to multipoint-to-multipoint[1]. It is based on human-machine two-way communication and interaction. Relative to traditional media or paper media, the emergence of new media that takes advantage of emerging technologies and popularization of network has led to the redefinition and re-writing of information communication environments and rules, and presents a constantly developing and ever-changing concept. Particularly, in terms of book reading, more and more young people have given up the paper media and began to acquire knowledge through e-books. This will gradually change the original bookbinding and paper information spreading pattern. E-book has become a new information channel and carrier.

The operable interface and adjustable binding design will bring about a novelty and different “reading” form. For readers, the form of words, images, sounds, animations, etc[2] using multimedia digital content as circulation media means the newer, more interesting and richer perceptual stimuli. Additionally, it means a more diversified and more profound mode of experience, and acceptance habits changing with

technological updates at any time. Undoubtedly, the effective conveying of book content serves as a criterion for measurement of spreading efficiency and interaction effects of e-books. Reconstruction of information perception based on the perspective of new media design will build a gratifying and satisfying mode of experience with the capability of constantly transcending. It will drive the e-book industry to enter a brand new stage of development.

II. PERCEPTUAL RECONSTRUCTION AND READING EXPERIENCE

Perception is a process to transform various information obtained from the environment, such as light, sound and taste through the five senses into experience about objects and events. And then judgment from unit to the whole area, from top to bottom and from fuzzy to clear will be made after cognition of individual attributes are produced. It is the reflection of comprehensive, integrated and empirical results of various attributes, various parts and their relationships with each other formed in the brains of human[3]. Perception is not only a combination of sensory receivers, but also a sensitive memory regeneration device that can reproduce various images in the mind according to memories stored[4]. In a sense, in order to obtain a good perceptual experience, it is necessary to increase and expand the past and present sensory contacts. All designs in the new media era are user experience-oriented. Good interaction is the purpose and driving force of technological development. The concept of reader experiences is introduced into the reading process of e-books, running throughout its primary fuzzy concept and confused cognition, precise search and accurate clicking in mid-term and personalized reading, pleasant experience and all aspects of electronic peripherals in late period. The purpose is to ensure that (i) true expectations are recognized;(ii)correct estimate is made in the initial period and in the process so as to grasp the design direction; (iii) the design is modified when the functional core can be modified at low cost[6]; (iv)the coordination between the functional core and the reader's perception and efficiency is improved; (v) “paper” emotions of traditional books that are not available in e-books can be compensated with perceptual reading experience.

On the one hand, e-book reading experience is reflected in the efficient completion of content and production. Software technology improves the visual aesthetic

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appearance of content presentation and the quality of interaction between it and readers: understanding, empathy, imagination, satisfaction, enjoyment, fun, fascinating, useful, inspiring, aesthetically pleasing, bringing sense of achievement and emotionally satisfied; On the other hand, the communication process between readers and book content is intelligent and diversified, showing an ascending standard from readable, easy to read and later extension. In other words, it ascends from the initial stage of gradual generation of passive consciousness, to the process stage of anticipated passive reception and generation of emotion, and to the advanced stage of communication with the designer under specific circumstances, that is, e-book contents are more easily perceived visually; the perceptual reconstruction design for the purpose of transformation from single vision sense to multisensory personalized experience seems particularly important.

III. E-BOOK PERCEPTUAL RECONSTRUCTION DESIGN METHOD

A. *E-book Perceptual Reconstruction Design Method*

1) *Easy visualization satisfaction reconstruction:* E-books based on mobile devices mainly achieve a series of actions including open, look up, search, browse, save, undo and close by touching actions like clicking and swiping. If we can say that touching is the means of information reading for e-books, the various contents shown on the display such as indicative symbols and identification graphs obtained by the visual sense organs will influence readers from aspects of visual perception, brain conscious judgment and final touching results of clicking, pressing and swiping by fingers, as well as the resulting differentiated reading experience. To be specific, it relies on readers' behavioral analysis and perception dimensions, establishes corresponding channel space, and conducts a series of implementable settings for effective and efficient information reading. Especially in information dissemination with feeling and perception as the core, its interaction process and post effects reflect the level and value of interactive design[5]. The reconstruction of visual satisfaction should be reflected in the following two aspects: the first is the adaptation to changing of reading habits from traditional books to e-books, that is, the combination of features of multilayer stacking of electronic screens, icon hiding, free composition and traditional typesetting will make it easier to read and manipulate the screen, and appropriate for both reading and use; the other is the psychological aspect of reading, that is, how to better realize the transition from soft paper to hard screen, creating a three-dimensional actual feeling on a two-dimensional screen, and satisfying easy perceptual visualization with visual psychology.

In the application of multimedia e-books, the visual range is wide, and the relative visual intensity is small. To achieve a good visual communication effect, it is necessary to first establish a interface framework with clear hierarchies,

guidable operating path and font, line spacing and other layout suitable for electronic media reading. In e-book entitled *The Hunger Games 2: Girl on Fire*, in order to enhance the reader's reading experience, based on contents of the article, the font is set to be highly recognizable Founder Lanting black, and the font of text of mobile phone e-book is little five. The screen display typeface line spacing is increased. The total number of lines on a page is 20 and the single-pass column has 16 words [7]. On the whole, the single page structure is complete. The guiding symbols are available on the right side of the screen, which is suitable for right-handed one-handed operation. The touching symbols, fonts, backgrounds are accurately displayed in relation to subject information. The interface details are converted in position, which satisfies information capture by visual sense organs and makes it easy to identify, view, perceive and convey contents of e-books.

Amazon launched the Kindle e-book reader. This is a device that makes use of electronic ink technology. The display screen can be visualized by reflecting ambient light, and it visually presents as a paper-like effect. To some extent, it caters to the reader's pursuit of a paper-based reading experience, and realizes leap from paper books to electronic books. On the other hand, three-dimensional design is added to the two-dimensional plane of some children's e-books. The book content on a single-page screen will be set as a three-dimensional background scene. Items and characters will be separately presented in three-dimension positions, showing different depth angles of items and characters so as to enhance the three-dimensional effect of e-book "entity-like". It is a three-dimensional model extension of e-books on a rigid plane.

2) *Comprehensive sensory diversified satisfaction reconstruction:* It is the core of achieving multidimensional reconstruction of satisfaction to conduct analysis of text content, create a full range of multi-channel perception experience based on visual sense organs, and thus to guide reading results. It not only can give full play to e-book's media characteristics but also span different cultures and language backgrounds, adapt to different environments, time and population. Additionally, it can better adapt to the "reading" habits of the "fast-food" era. This includes imitative sounds and specific atmosphere-building animations, exaggerated and eye-catching interactive situation and sense of vision and touch formed through visual sense. After the brain selects, organizes, disperses, reorganizes, combines, interprets, and analyzes information about the existing content and past knowledge, reading desire is generated through stimulating sensory points. Through fictitious spatial imagination, guided pleasure and relaxed and curious satisfaction, readers integrate into the information interactive atmosphere. They can also conduct a conversation surpassing their own environments, real identities and set interactive behaviors and scenarios, and participate in the development process of narrative events [8]. Or even, they actively connect the existing experience with new information to personally experience the

expressing intentions and strengthen their emotions and cultural value.

Touchoo in Israel is a company that specializes in developing e-books for children. Children's e-books developed by it have attributes setups for children in terms of icons and symbols. All touch key-press in all interfaces are designed in the form of touch analog. When clicking the buttons for actions of open, search and close, there will be a corresponding decline, rotation and other exaggerated dynamic responses, thus creating a real sense of touch, to meet behavior feedback after use. The children's e-book Chicken Jojo uses language to guide children in reading. The master chick guides children to listen to stories while reading books in the form of self-introduction [9]. Additionally, it asks questions about contents of stories and the design of plots using voices. The auditory design of voice not only sorts out contents and development sequence of the story but also leads reading and thinking very well, resulting in a very good audiovisual experience and reading experience.

On the other hand, animations that mobilize multi-sensory attentions can make full use of multimedia technology and increase the interactive effect of e-books. The children's e-book entitled Vincent Van Gogh is unique in its combination of the static works with digital technology, allowing the picture that has been appreciated for over 100 years to "move". One of the oil paintings called Backyard in Antwerp draws the backyard of Antwerp's old house in the snow. When we look through the pages, bits and pieces of snow will fall through air. As time goes by, the snow will slowly accumulate on the platform of the roof[10]. The whole picture seems remarkably true to life and has a sense of space. It seems that readers have entered the pictures and placed themselves in a real sense, so that they can better understand the unique charm brought by Van Gogh's works. These designs allow the cold screens to respond warmly under touch and clicking. Particularly, the dynamic images, tactile designs, and various background, items and sounds received by the visual organs enhance the clear, vivid and specific perceptual experience of readers. It not only enriches level and method of e-book design but also creates a rich, realistic reading experience, thus achieving a diversified contextual reading.

B. Summary of Perceptual Reconstruction Design Methods for E-books

Under the circumstances of great changes in the Internet, science and technology and reading environment, realize the transformation from paper books to virtual screens gradually and orderly, warmly and smoothly. The reconstruction design based on new media environment is a kind of cognitive consciousness established to search for intersection between the interaction mode and content presentation of e-books and increase the perceptual experience, which is clearly distinctive from the one-way and complex information transmission of previous e-books, and increase the multipoint and diversified communication mode. Its design method is summarized as follows: (1) lay emphasis on application of new media technology platform. With the rapid development of information technology, importance is

attached to the rapid and iterative update of new media technologies. Particularly, technological and constitutive increase or decrease occurs to reading contents with change from application of paper book to new media technologies. The first is that technology should match with reading habits and situations; The second is that the chapters, catalogues and prefaces that constitute the article should be combined with the screen display form. This requires us to find out new media presenting modes that are seamlessly connected to e-reading on the basis of technological updating. (2) Transformation from paper-based sentimental entity reading to electronic convenient virtual reading. In the diversified dissemination of e-books, it is necessary to put an end to a single skill-showing, piled-up and forced screen display reading mode. It should lay emphasis on the essence of book reading from the very beginning of design and accept the irreplaceability of e-books in paper-based reading. (3) People-oriented, to improve the electronic screen display reading from the perspective of experience. E-reading is an innovation from paper reading to virtual screen display, which relies on technical means. And technology in turn serves book text. It is "people" oriented. The perceptual reconstruction design of reading experience is the innovation and application of visual design rules. It is the summarization and perfection of interactive experience perception. It is the feature and extension of changing of user research from being implied to express. It is the result of definition of comprehensive interdisciplinary and multi-field research. The purpose is to find a barrier-free, universally applicable experience method to increase the value of book information dissemination. This is not only the upgrading of design techniques on the technical level, but also the guidance of existing reading methods, habits, cognition and aesthetics.

IV. THE SIGNIFICANCE AND PROSPECTS OF PERCEPTUAL DESIGN OF E-BOOKS TAKING NEW MEDIA AS THE CORE

A. Significance of Perceptual Reconstruction Design of E-books

In a sense, the emergence of new media has facilitated changes in existing reading methods. On the one hand, with the rapid development of Internet, the transformation and sublimation of information acquisition and transmission methods positively push the rapid development of the publishing industry in the "fast food" era. "The form is the outward manifestation of internal implication". The design orientation of books should be based on the careful analysis and overall understanding of text of the book. The external writing and paper full of ink smell is subject to the internal book contents. And the screen adjustable reading enables internal form to be presented in a more direct, realistic and vivid manner so as to shorten the time from text conception to screen display. On the other hand, it is a consequence caused by readers' dissatisfaction with the existing paper media characters, and the boring, static and delayed reading methods, as well as their dissatisfaction with shortcomings of existing e-books due to limitations of technical level and design thinking, such as redundant composition, complicated operation and weak interaction. It fully reflects their demands to capture information deep, interact in a wider

range, participate according to their personal preference and experience, express themselves in a brand new way, establish information level and acquire the information they desire most.

In the era of rapid development of new media technologies, the significance of e-book perceptual reconstruction lies in the following two points. The first is trans-positional consideration of the publishing industry. From the reader's point of view, more consideration is given to the effect of acquisition of information that is contacted by sense organs and received by perception in the multi-point transmission of "publications". For example, rapid and accurate acquisition of information in the diversified presentation modes; In the electronic screen display reading, multi-sensory multi-angle capturing of sensory points and deep understanding of textual connotations is a problem about how to improve application efficiency and create an appropriate reading experience. The second is to promote and guide readers' new reading perspectives and views. In the process of visual materialization and visibility, externalized invisible perception results are achieved, and new aesthetic values are created for book works, presenting a state of communication, resonance and sublimation. Achieve digitalization, multimedia and interaction with the perceptual forms easier for read, being multisensory and functional.

B. Prospects of Perceptual Reconstruction Design of E-books

From a realistic point of view, e-books have not completely departed from the conventional mode of paper media in terms of realistic market applications. First, from the design point of view, visual perception is difficult to break away from the previous, present and future trends. It is the "electronic" version of paper-based book from the aspects of book cover to ordering of inner pages or layout and design of a single page, or chapter logic. On the other hand, in the rapid transformation of paper-based books to e-books, the publishing industry has not been adequately prepared and lacked sufficient success experience and technology accumulation. There is a lack of rational research on the estimated strategic level of readers' reading trends, the technical level of e-book application form hierarchical structure and the emotional distance from the traditional paper-based book full of ink smell to the cold and hard electronic screen reading, resulting in rational deviation and blindness of individual design case.

V. CONCLUSION

Driven by the wave of information revolution, only the practical and functional design concepts that can not only satisfy the basic visual reading demands but also realize sensory interactive intuition making use of the advanced technology can bring a different experience for readers. It is a change from reading to "pleasant reading". Design and technology serves the reading results of readers, but not limited to results, it can extend feelings of the author. The e-books that can realize both text reading and perceptual "pleasant reading" will become a feasible direction for deep research of e-book designer and the publishing industry in

the future. Therefore, readers' reading habits are gradually changing in the era of image reading with visual ahead. E-books that are easy to view, diversified, interactive, concise, clear, logical, experiential, and even unfinished and participatory will become potential and hidden demands. In the rapid development and upgrading of information technology, designers need to rely on the constantly developing intelligent technology and persistent attitude to explore design that can capture reader's perceptual experience.

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