

Research on Visualization Design of Cultural Relic Information under Narrative Thinking

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Abstract. The study intervenes narrative thinking in visualizing cultural heritage information. It explores the possibility of applying narrative thinking in the visualization design of cultural heritage information and constructs a model for the visualization design of cultural heritage information under narrative thinking. The introduction of narrative thinking provides new ideas and methods for research and design related to cultural relics information visualization, effectively enhancing the narrative ability and communication ability of cultural relics information, making cultural relics information visualization design more intuitive and easy to understand, and more compelling.

Keywords: Narrative thinking, cultural relics, information visualization design.

1 INTRODUCTION

Heritage information visualization is a primary means of conveying information about cultural relics and promoting the dissemination of their stories. It is also an effective way to improve the utilization rate of museum relics and enhance public cultural literacy [1]. In October 2018, the General Office of the CPC Central Committee and the General Office of the State Council issued "Several Opinions on Strengthening the Reform of the Protection and Utilization of Cultural Relics[2]." They emphasized that the excavation and interpretation of cultural relics' value and the dissemination and utilization should be strengthened, and the unique advantages of cultural relics [3]. The development of cultural relics has received increasing attention, and more cultural relics with their information are displayed to the public in the form of exhibitions. However, most of the current visualization of cultural relics information presented away from the cognitive needs of the audience, the lack of rigorous information logic and emotional expression, it challenging to form a broad communication surface. This paper examines the possibility of applying narrative thinking to the visualization design of cultural relics, constructing a visualization design model for cultural relics, and promoting the dissemination of cultural relics and information through the form of "stories" that allow cultural relics to "speak."

2 Research related to narrative thinking and heritage information visualization design

2.1 Definition of narrative thinking

As the name implies, narrative refers to narrating, stating things, and stories and was originally a style of writing in literature [4]. Narrative can refer to both the content of the story itself and as a way of understanding the world and telling it. Narrative thinking is using narrative to communicate information [5]. At the end of the 20th century, the narrative was gradually extended from the realm of narratology to the design field [6]. The combination of narrative and information visualization design has become one of the hot research topics in recent years. The narrative in information visualization design contains three elements: the narrator (information designer), medium (information content), and receiver (information audience) [5]. By organizing information content and constructing information structure, information designers transform information into intuitive, clear, and beautiful visual expressions to infect audiences and enhance their understanding and awareness of information.

2.2 Research related to the visualization design of heritage information

Cultural relics are symbolic and material objects, including all valuable, movable and immovable "tangible cultural heritage" from ancient times to contemporary times, and an abstract "intangible cultural heritage," a time or civilization. It carries information about an era, civilization, culture, etc. [6] [7] Information on cultural relics includes original information on the state, changing characteristics, and spatial and temporal characteristics of cultural relics formed in the process of discovery, excavation, organization, research, utilization, and protection, or information processed at a later stage, which is usually recorded or described in different forms such as language, text, diagrams, audio, and video [8]. Information visualization design, as one of the forms of expressive information, can convert complex and tedious information about cultural relics into easily understandable, usable, and engaging infographics, which pay more attention to information organization and logical arrangement compared with other forms such as illustrations and images, and is an effective way to promote the development of cultural relics, restore their stories, and present their history.

3 The possibility of applying narrative thinking in the visualization of heritage information

3.1 The historical narrative of cultural relics

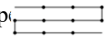

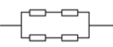

Cultural relics are the carrier of historical narrative. In addition to physical information such as shape, pattern, and color, artifacts contain much abstract historical information, including the era, nation, culture, and civilization to which they belong [9]. These characteristics make cultural relics have a dual language: the first language expresses the concrete phenomenon of history; the second language expresses the abstract nature of history [2]. The dual nature of the historical reflection of cultural objects makes them embody narrative characteristics. The use of narrative thinking on cultural relics for information visualization design can tap the pro-

found value and meaning of cultural relics and historical information, making them specific cultural symbols to achieve the value of cultural relics story dissemination.

3.2 Narrative cues of heritage information visualization

There is a logical correspondence between information construction and narrative clues in heritage information visualization. The design of heritage information visualization using narrative thinking can build a well-structured information framework and a strict information hierarchy through clear narrative clues. Narrative clues refer to the structure of a narrative, which is used to connect the story content logically. In this paper, according to the characteristics of cultural relics information, combined with information graphics design narrative logic structure summarized the narrative structure applicable to the visualization of cultural relics information [10], including four categories of chronological, spatial relational, inferential, and systematic organization, and can be mapped to the corresponding visualization forms. The specific contents are shown in Table 1.

Table 1. Types and forms of narrative structure

Narrative structure category	Information type	Visual form	Examples
Temporal structure	Time series type 	Timeline, river map, calendar axis, etc	Historical evolution, unearthed time, museum collection time
Spatial relational structure	Spatial type 	Regional map, geographical heat map, route map, etc	Excavation location and collection institution
Pushover structure	Trend type 	Flow chart, Sange chart, funnel chart, etc	Development of historical stories of cultural relics, production process and restoration process
Systematic organizational structure	Constitutive relation type 	Sunrise diagram, tree diagram, rectangular tree diagram, relation diagram, etc	Systematic cultural relics information

(1) The chronological structure is a chronological-based narrative structure that can be used to describe the tim like information of cultural objects, including the abstract time that indicates the age of cultural objects and concrete time that indicates modern times [11], such as information on the historical evolution of cultural objects, the time of excavation, and the time of museum collections. The visualization forms that can be applied are timeline, river map, calendar axes, etc.

(2) Spatial relational structure highly abstracts the spatial location of information according to a specific ratio and can be used to describe cultural relics with information of spatial nature.

The spatial information of cultural relics includes excavation location, collection institutions, structural proportions, dimensions, etc., reflecting in-depth information such as historical stories, everyday communication activities, and artistry of cultural relics, which have high research value [12]. Typical forms of visualization include regional maps, geographic heat maps, and path maps.

(3) Deductive structures describe the trends and logical changes of information and events, which can be applied to the visualization design of information such as historical story development of cultural relics, craft production process, and restoration process. Standard forms are flowcharts, Sankey diagrams, funnel diagrams, etc.

(4) Systematic organizational structure describes the relationship between the whole or parts of information and consists of information with constituent relationships. It can be applied to constructing the knowledge map of cultural relics to present the information about cultural relics in an all around and systematic way. The common forms of visualization are sunburst diagram, tree diagram, rectangular tree diagram, relationship diagram, etc.

3.3 Graphic narratives for visualizing heritage information

Cultural relics and graphic narratives have a deep origin. Graphic narratives can be traced back to the earliest cave paintings and living artifacts in the primitive period with the carved graphic symbols to express the ideas and will of primitive humans; it is an effective means of information exchange, or as the decoration of objects, has a very high artistic and aesthetic line. For example, the stork, fish, and stone ax pottery jar of Yangshao culture is a simple depiction of a stork, fish, and stone ax to depict a significant historical event in which a tribal leader fought a rival clan to the death and won a victory, see Figure 1. The graphic symbols on the artifacts found now can reflect the daily state and life scenes of primitive humans as part of the information of artifacts and have significant academic research value.

The use of graphic symbols is also one of the prominent features of information visualization. Graphic symbols reflect the characteristics and laws of information with geometric lines and symbols and have specific symbolic meanings [13], making the graphic symbols have an intense narrative color. Graphic narrative in the visualization of heritage information can not only intuitively express the connotation of heritage information and convey the main idea but also make the visualization of heritage information more beautiful and deepen the audience's understanding, cognition and memory.



Fig. 1. Stork fish stone axe painted pottery jar

4 Narrative thinking in the visualization of heritage information design model construction

4.1 Construction process

Based on the discussion of the possibility of applying narrative thinking in the visualization design of cultural relics, this paper proposes a method for constructing a visualization design model of cultural relics under narrative thinking. The research is carried out sequentially from three levels: perspective layer - story layer - narrative layer, and the specific framework shown in Figure 2.

(1) The perspective layer refers to the narrative perspective of the heritage information, the perspective of looking at the story. The narrative perspective includes the information designer and the audience in information visualization design. The information designer is the storyteller; the audience is the receiver of the story; from the audience's point of view, information visualization design, more helps to strengthen the audience's comprehension of heritage information and enhance awareness. The perspective layer construction method mainly includes heritage information acquisition and audience demand mining.

(2) Story layer for heritage information collation and integration stage. Around the core needs of the audience to determine the theme of information visualization; the original information extraction and classification of cultural relics, as well as standardization, scientific organization, and integration, to get the practical information of cultural heritage information visualization practice; based on the four narrative structure, the practical information for logical and orderly processing, to build a clear, logical framework of information.

(3) The narrative layer is the stage of narrative expression of cultural relics information through information visualization design, divided into narrative structure mapping and graphic narrative translation. According to the constructed information logic for visualization structure mapping, and then graphic narrative to give a visual representation of heritage information form. Graphic symbols enhance the accuracy and aesthetics in the visualization of cultural relics information, to scenario-based graphics on the hidden story behind the cultural relics to reproduce the scenario to create an imaginative space for the audience.

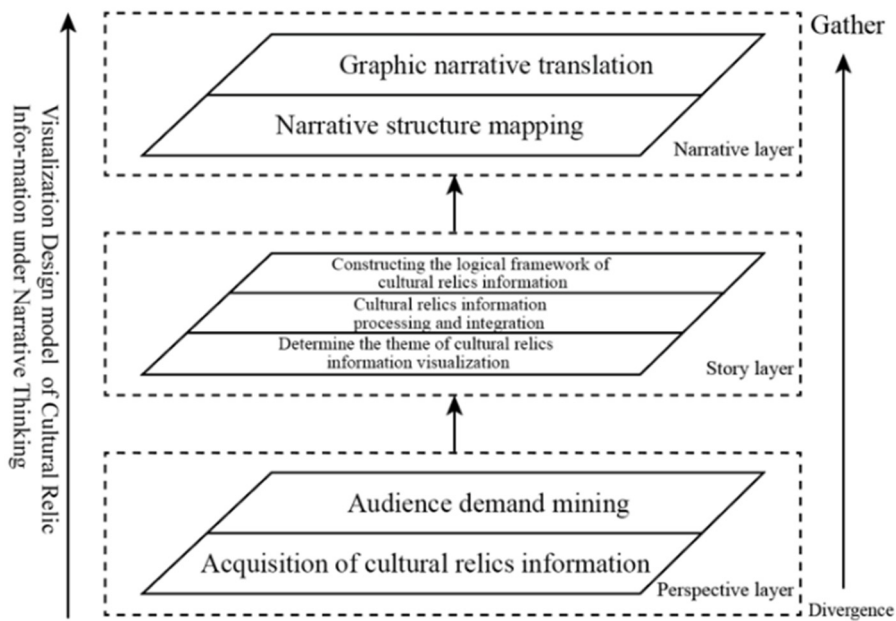


Fig. 2. Visualization Design model of Cultural Relic Information under Narrative Thinking

4.2 Main construction methods

In constructing the information visualization design model of cultural relics under narrative thinking, the unfolding of the research level involves specific links and methods, mainly including the following parts.

(1) Audience demand mining: information demand mining usually uses questionnaires, user interviews, and other methods to understand the audience's problems in accessing heritage information and to explore their urgent cognitive needs. Only information visualization design of cultural relics with audience needs as the core can improve their comprehension and awareness of cultural relics information and improve the efficiency of disseminating information features such as connotation, culture, and spirit of cultural relics.

(2) Information visualization theme determination: the standard methods to determine the theme are user demand analysis method, literature review method, industry research, etc. The theme defines the core information and visualization objectives of cultural relics. Based on information demand mining, the theme and design objectives are sorted out around the infor-

mation already collected from cultural relics so that the core content of the visualization expression of cultural relics information is more precise and explicit.

(3) Information processing and integration: information processing and integration are essential to obtain the basic elements of information visualization. Around the theme of cultural relics, the information is effectively screened, disassembled, and categorized, and finally get valuable and practical information that can reflect the cultural connotations of cultural relics and describe critical historical stories.

(4) Information logical structure: the narrative expression of information in the visualization design of cultural relics requires a complete series of clues, that is, the logical structure of cultural relics information. Orderly visualization expression can be heritage information regulations, clearly presented, and more aligned with the audience's cognitive needs.

(5) Information visualization expression: information visualization expression is an integral part of the use of narrative thinking in the visualization of heritage information design, including the mapping of heritage narrative structure and graphic narrative translation. Cultural heritage narrative structure mapping is the process of selecting the visualization form corresponding to the narrative structure, such as the chronological structure can be selected as the primary narrative framework to express heritage information in the form of a timeline or river map; graphic narrative translation is a graphical interpretation method, the use of semiotic principles to convert information into easily understood graphic symbols, so that heritage information is more intuitive, clear, and enhance the cognitive efficiency of the audience.

5 Conclusion

At present, the study of cultural relics lacks the visualization of the culture, story, civilization, and other information behind the visualization, and the study of information visualization design is mainly at the practical level, how to involve new ways of thinking in information visualization design and expand new design ideas and methods has become an important research direction. Based on the solid historical narrative characteristics of cultural relics and the characteristics of information visualization, this paper concludes that narrative thinking in information visualization design is more feasible and has obvious advantages; on this basis, it proposes a model of information visualization design for cultural relics using narrative thinking, which provides a paradigm for information visualization design and research of cultural relics to refer to and learn from.

Acknowledgements

This work is funded by Research on the core symbol system of Hubei in the context of regional culture and contemporary brand construction project (14D025), Theory and Practice of Synergistic Innovation between Art and Design Education and Hubei Cultural Industry project of Hubei Province (2014B064).

References

- [1]Zhang, J. W. & Guo, M. T. (2021). Research on the. development path of information visualization of cultural relics under the threshold of digital humanities. *South. Culture* 5, 162-168.
- [2]China government website. http://www.gov.cn/xinwen/2018-10/08/content_5328558.htm?_zbs_baidu_bk
- [3]Cui, Y. (2021). From fullscene visual news to the digital. culture industry. *Media* 24, 19-21.
- [4]Pam, R. (2011). *Display design*, China Youth Press. Beijing.
- [5]Zhang, X. F., Dong, C. & Zhao, X. (2008). The expression of narrative thinking in recent expo architecture. *Urban Archit.* 9, 13-14.
- [6]Liu, Y. (2016). The change of "cultural relics". *South. Culture* 1, 6-14.
- [7]Li, X. Y. (2021). Reconstructing the narrative of cultural. relics in museum exhibits: an interpretation of the exhibit based on the "Copper Drum Culture Exhibition" of Guangxi Nationalities Museum. *J. Neijiang Normal Coll.* 36, 121-125.
- [8]Xiao, H. & Liu, C. N. (2012). Classification and. characterization of cultural relics information resources. *Modern Intell.*10, 11-23.
- [9]He, R. K. & Ge, S. (2017). Research on information. communication design of financial products based on narrative theory. *Pack. Eng.* 38, 105-109.
- [10]Chen, H. (2020). The graphic narrative of "function-flow-form" is a study of information graphic design based on three principles. *Art Design* 11, 122-123.
- [11]Su, D. H. (1986). The duality of cultural relics in display. *Chinese Museum* 1, 42-46.
- [12]Gao, J. S., Zhang, Q. & Li, S. K. (2022). Knowledge. graph construction and associated data storage of movable cultural relics: the case of Hubei Provincial Museum. *Modern Intell.* 42, 88-98.
- [13]Wang, F. (2017). The use of graphic symbols in modern. graphic design. *Pack. Eng.* 38, 290-292.