Ergonomics in Design, Vol. 47, 2022, 725–732
https://doi.org/10.54941/ahfe1002003

Strategy of Interactive Information Visualization Publishing in Online Database under the Background of Design Thinking

Fang Li[1] and Ding Zhou[2]

[1]Beijing Institute of Technology, Beijing, China
[2]Academy Press, Beijing, China

ABSTRACT

Interactive Information Visualization is an innovative knowledge service form applied by publishing institutions in online database services, which has many advantages. At present, there are some difficulties in promoting the application of Interactive Information Visualization in China's online database publishing, such as insufficient awareness within the industry, insufficient reserves of relevant professionals, constraints on investment and scale, and high requirements for users' professional quality. Through analysis, this paper puts forward a variety of countermeasures to speed up the practice of interactive information visual publishing of online database.

Keywords: Online database, Interactive information visualization, Strategy

INTRODUCTION

With the rapid development of Internet technology, communication technology and information technology, and the promotion of all media practice, the digital transformation of traditional publishing industry is facing unprecedented opportunities and challenges. The online database gathers a large number of high-quality content resources of publishing institutions, and completes the resource reorganization and value-added service construction in the new form. The author combs the current situation of digital transformation of China's publishing industry and finds that the digital service concept of publishing institutions is undergoing a profound transformation from product content to user experience (Zhang Xinxin, 2019). How to provide better online database knowledge service experience has become an urgent problem to be solved in the digital transformation and development of the publishing industry.

Online database is built on the basis of Internet technology and information technology. Its essence is to transform traditional publishing resources into systematic online digital knowledge services through digital collection, sorting, processing, classification and indexing, knowledge mining and other means. This transformation has become a form of knowledge services favored by users in the new era. At the same time, under the background dominated

by visual culture, great changes have taken place in people's reading motivation, reading nature, psychological mechanism and reading value (Zhao Weisen, 2019), In the context of design thinking, presenting massive information content through information visualization helps users understand abstract and fuzzy information in an intuitive and concrete form. Information Visualization is a reconstruction method that visually presents abstract data on the basis of interdisciplinary fields such as graphics and image processing, artificial intelligence and social science. It uses simple and understandable visual language to express the real data content, Its application greatly improves the efficiency and level of users' understanding and cognition of information (Zhang Chenggang, 2017).

ADVANTAGES AND CHARACTERISTICS OF INTERACTIVE INFORMATION VISUALIZATION

Interactive Information Visualization (IIV) is an intelligent and real-time interactive presentation way to establish the value relationship between users and products or services through interactive means on the basis of information visualization. This way pays more attention to the precise and personalized needs of users.

Content Presentation Integration

The advantage of Interactive Information Visualization is that it is based on cognitive psychology and conforms to the psychological mechanism and law of human perception and thinking. The process of people acquiring knowledge is actually the process of information cognition and processing, including the process of information input, coding, memory and output. IIV not only has a scientific and systematic knowledge organization form of real-time composition and an integrated knowledge presentation, but also can dynamically and comprehensively convey the concrete position of specific information in the overall database to users, so as to enhance people's more comprehensive and in-depth cognition and understanding of data. Especially at present, fragmented and decentralized information is rampant, and the integrated knowledge information is decomposed into various information fragments, resulting in a series of problems such as incomplete information itself and incomplete internal logic, which makes it difficult for people to restore the overall map of a certain knowledge, and more difficult to conduct in-depth systematic thinking and exploration.

User Friendly Service

Traditional or early information visualization is a form of expressing abstract information by graphics and image technology and then guiding operation practice. Users are often lost and misplaced due to the complexity of information atlas. From the perspective of cognitive psychology and design thinking, Interactive Information Visualization is a set of visual scientific organization mode of information resources combining dynamic and static. This mode not only provides users with the visual form of real-time interactive information

resources on the basis of static image information, but also promotes the transformation of knowledge acquisition process from static to interactive multi sensory interaction, It can also inspire users to change from passive information receiver to active information creator, provide users with the choice of customized arrangement, filtering and screening information according to their own wishes, and master the laws and links between information in the form of overall or partial browsing. At the same time, it can also store its interactive data through real-time updated visual instructions and establish users' personalized information interactive memory, so as to provide users with more accurate, efficient and high-quality friendly knowledge service experience, effectively reduce users' reading pressure and stimulate users' innovative thinking. At the same time, it also plays a positive role in reducing barriers to cross-cultural understanding.

Three Dimensional Knowledge Structure

Interactive Information Visualization can not only organize the information content as a whole system, but also realize the multi-dimensional presentation of the knowledge connotation, structure and context behind the information resources according to the interactive data, which greatly enriches the comprehensibility of the information resources and improves the level of users' cognition, understanding and application of the information resources. The human perception system itself has a greater ability to perceive and grasp visual information than to process abstract symbols. Through efficient visual information channels, users can significantly improve their perception of abstract information. However, it should be noted that, Users' perception and understanding of visual information are two different stages (Hu Bojun, 2013), In other words, the connotation, method and significance behind visual information resources are not that rigid information graphics and images can be intuitively expressed and quickly recognized by users, but need to be fully digested after perception and recognition through the process of analysis and thinking. After establishing a virtuous circle of interaction with users and accumulating a large amount of interactive data, IIV can finally integrate more comprehensive perceptual content and multi-source data related to information, and build a multi-dimensional, dynamic and three-dimensional knowledge structure space, which is more conducive to users' rapid interpretation and understanding of the situation behind information, Form a user centered and efficient visual information interaction mode (Jin Xiaoxiao, 2017).

THE REALISTIC DILEMMA OF PROMOTING ONLINE DATABASE INTERACTIVE INFORMATION VISUAL PUBLISHING

Online database interactive information visual publishing plays a positive role in promoting the digital transformation and upgrading of the publishing industry. Based on its advantages in cognitive psychology and design thinking, it promotes the construction of user-centered knowledge service mode and improves knowledge service experience (Li Shuo, 2017), And in the pattern environment of information flooding, provide rational practical attempts for

the problems of reading fragmentation and lack of deep reading, which will help users break through the "information cocoon room" and guide people to establish a good digital reading mechanism. In the process of truly realizing Online Database Interactive Information Visualization Publishing, there are still many problems to face. The author will sort out from the aspects of publishing industry, digital practitioners and investment scale, and analyze the possible practical difficulties in promoting Online Database Interactive Information Visualization Publishing.

Lack of Awareness Within the Industry

From a theoretical perspective, the application of Interactive Information Visualization can provide users with better integrated content presentation and good interactive knowledge service experience. However, from the current situation of China's database publishing market, the main institutions that can lead the innovation and development of online database publishing are not traditional publishing houses with rich content resources, but often scientific and technological companies with digital technology. In the era of increasingly prominent awareness of knowledge service, although traditional publishing institutions have huge information resources, they lack a keen sense of smell and accurate grasp of the development and application of information technology. It is inevitable that they can not timely capture the changes of user needs and the rhythm of changes in the times. At the same time, due to the uncertainty of online database publishing institutions about whether they can bring innovative innovation to the form of knowledge service through the application of IIV technology, As a result, the recognition of online database interactive information visual publishing is not enough within the publishing industry (Li shijuan et al, 2016).

Insufficient Reserve of Relevant Professionals

Online Database Interactive Information Visualization Publishing is a new online data platform presentation mode that adds user interactive experience on the basis of information visualization technology. Although it has high requirements for digital technology, it does not require editors to learn and master digital technology in essence, but editing combined with the content resources of publishing institutions, Establish a corresponding concept of overall "information construction", be familiar with digital development technology, and be able to uniformly plan, guide and manage systematic platform design, including the organization and presentation of knowledge, screening, sorting, analysis and utilization of first-hand user information data, and need to establish comprehensive balance capabilities such as risk control. Although there are many embedded or outsourced data visualization tools or professional services of interactive charts in the market, if we want to truly meet the long-term development needs of the product business of higher data level such as the online database of publishing institutions, we also need to realize the transformation of "information construction" from the aspects of the thinking consciousness and professional ability of professional editors. Therefore, Lack of digital publishing content editing, digital publishing

technology editing and digital publishing operation and maintenance editing (Han Shenghua, 2016), It is also one of the main difficulties in promoting the visual publication of interactive information in online database.

Investment and Scale Constraints

Online Database Interactive Information Visualization Publishing requires the systematic reorganization and presentation of huge data and information resources. This structured reconstruction process has high requirements for digital technology and needs to invest a lot of capital and labor costs. On the one hand, this cost investment conforms to the scale effect, that is, the technical requirements of large-scale and small-scale transformation are completely different. Under large-scale conditions, it will not only greatly reduce the infrastructure cost, but also reduce the labor cost and management cost. On the other hand, under the guidance of the general trend of intelligence in the future, the application scenario of Online Database Interactive Information Visualization Publishing is to realize high-performance operation, in-depth analysis and active linkage with other databases under massive and complex data types and conditions. It is necessary to establish a set of database intelligent control system to manage the resource consumption of the database in real time, Therefore, both horizontal expansion and vertical development need the continuous promotion of human, material and financial resources, but its possible benefits can not be measured.

High Requirements for Users' Professional Quality

Online database interactive information visual publishing has high requirements for users' cognitive ability, knowledge reserve and knowledge structure in specific professional fields. Without sufficient knowledge, reasonable knowledge structure and scientific knowledge literacy as the premise, it is difficult to match the acceptance and application ability of the knowledge service form of "interactive information visual publishing", That is, it has higher requirements for users' professional quality, and focuses more on providing Online Database Interactive Information Visualization knowledge services for professional researchers or professional practitioners. It serves professional users, not ordinary people. Therefore, from the perspective of users, the problem facing the promotion of online database interactive information visual publishing is that it has high requirements for users' knowledge level and professional quality.

STRATEGIES TO PROMOTE THE INTERACTIVE INFORMATION VISUAL PUBLISHING OF CHINA'S ONLINE DATABASE

At present, many publishing institutions at home and abroad are exploring the path and mode of Online Database Interactive Information Visualization Publishing. However, in the face of endless challenges, how to promote the realization of IIV, an application with great potential, still needs us to find answers in continuous exploration. In view of some practical difficulties

analyzed above, the author tries to put forward several reference suggestions to promote the visual publication of interactive information in online database.

Build a Systematic Knowledge System, Correlation System and Presentation System

Online database interactive information visual publishing should first refer to the classification of different disciplines, build the systematic knowledge system of different disciplines based on knowledge elements, and carry out hierarchical reorganization, classification, association and visual presentation of different forms of knowledge resources, such as text, picture, audio and image. This requires publishing institutions to build different levels of knowledge elements according to the knowledge logic of different disciplines, such as conceptual knowledge element, case knowledge element, factual knowledge element and so on. Second, we should build a knowledge system as the basis and reference for knowledge indexing, so as to lay a good foundation for scientific research institutions and relevant staff to provide knowledge services that meet their needs. Third, the realization of general user portrait, etc. accurately analyze the user characteristics, provide users with personalized and customized knowledge solutions, and establish a knowledge indexing system that can cover all attributes of online database knowledge resources and various related external resources, so as to stimulate the continuous interaction of knowledge and information. Fourth, through rich visual representation types, such as ordinary text, graphics and charts, static images, shooting video, animation video and virtual reality, establish the visual presentation system of knowledge and people, people and people, so as to design the visual presentation scheme of knowledge description, logical presentation, situation creation, pragmatic presentation and cultural display.

Create Characteristic Business Cards and Improve the Recognition of the Industry

Firstly, we should improve the recognition of IIV within the publishing industry, build an intelligent, interactive, efficient and convenient knowledge service experience from the practical needs of users, configure personalized knowledge services for users with different needs, and create a characteristic business card of IIV application in online database, In this way, more users can rely on the presentation of IIV. As a widely recognized way of knowledge acquisition in the era of digital survival, it can be widely recognized and concerned by the whole society. Only in this way can we fundamentally stimulate the attention and investment of publishing institutions, employees and even capital, and enable publishing institutions to strengthen the demand side management of their publishing applications. At the same time, it is also necessary to gradually penetrate from local modular practice cases, improve the information dissemination rate and knowledge conversion rate through

the application of small-scale IIV knowledge service mode, and further promote the reform of knowledge service experience supply level from bottom to top after being tested and recognized by more and more users.

Build an Innovative and Compound Talent Team

Building a publishing and editing talent echelon with "information construction" awareness and professional ability is the key factor and long-term layout to promote the realization of IIV in online database. In terms of improving the comprehensive ability of editors in traditional publishing institutions, editors not only need to have the sense of innovation of the times, take the initiative to break through the bottleneck of traditional publishing thinking and establish a user-centered knowledge service orientation, but also need to understand the business architecture, data architecture and The compound ability of grasping and planning of application architecture and technical architecture. Only in this way can we make better use of IIV to improve and solve practical problems such as social information flooding and information anxiety; On the other hand, set up an innovative compound talent team, set up a special digital publishing department, train digital publishing content editors, technical editors and operation and maintenance editors, and attract a group of new technical talents such as data architecture personnel or interaction design practitioners in the fields of information system development, big data mining and artificial intelligence. At the same time, Publishing institutions can also carry out joint training with relevant professional colleges and universities at home and abroad, establish high-end talent training bases or scientific research stations in the direction of IIV technology, and fundamentally solve the shortage of compound talents based on the professional information construction of IIV practice.

Establish a Multi-Channel Financing Model

The construction of IIV of online database is a project with long investment cycle and slow return. Before the formation of large-scale market, it undoubtedly needs continuous capital investment, while publishing institutions have to face the situation of only investment and no return. In fact, the capital problem is often the most difficult problem encountered in the process of digital transformation and upgrading of publishing institutions, although the national competent department of press and publication has assisted the development and construction of key enterprises and key projects through a number of policies (Chen Lihong, 2020), Promote the development of cultural scientific and technological innovation and cultural communication system, but the promotion of visualization also depends on the support of enterprises' own funds to a large extent. Therefore, it is necessary to establish a multi-channel financing model to promote the application of IIV in online databases.

CONCLUSION

From the perspective of promoting the industry's three-dimensional structure and interactive service, it has some advantages, such as insufficient

recognition of the industry's three-dimensional information reserve and interactive service, but it has some difficulties in promoting the industry's three-dimensional knowledge reserve and interactive service The establishment of innovative compound design talent team and multi-channel financing mode can provide a great driving force for the realization of Interactive Information Visualization application. As a humanized way of presenting knowledge information, Interactive Information Visualization provides people with a new perspective of cognition, understanding and thinking about information (Wang Jing, 2018), It enhances the relevance and affinity behind information, and will become a mainstream form of knowledge service in the future.

ACKNOWLEDGMENT

The authors would like to acknowledge the helpful comments of Zhang Fan, Sun Yuanbo, Yang Jianming, Hong Wenxiong.

REFERENCES

Chen Lihong. (2020) On the publishing ideas of database products, Media Forum, Volume 3 No. 5, pp. 83–84.

Han Shenghua. (2016) Research on the improvement of editors' digital ability in traditional publishing institutions, China publishing, Volume 3, pp. 16–19.

Hu Bojun. (2013) Research on man-machine interface design of Internet dynamic information data visualization application, Nanjing University of Aeronautics and Astronautics.

Jin Xiaoxiao. (2017) Research on visual design of interface information based on user experience, Popular literature and art, Volume 21, pp. 106–107.

Li shijuan, Zhang Pengyi, Huang Wenbin. (2016) On the digital transformation of publishing institutions in China – Based on the investigation and analysis of three publishing houses, Publishing Science, Volume 24, NO. 1, pp. 96–98.

Li Shuo. (2015) Research on universal recognition of public information design, Grand View of fine arts, Volume 5, pp. 142–143.

Wang Jing. (2018) New trend of international interactive data visual reporting – Taking the winning works of international data news competition as an example, Chinese reporter, Volume 5, pp. 117–119.

Zhang Chenggang. (2017) Information visualization in the "image age": context, progress and limits, Decoration, Volume 4, pp. 12–15.

Zhang Xinxin.(2019) Ji guangpianyu: Publishing transformation in the era of artificial intelligence, Beijing: Tsinghua University Press.

Zhao Weisen. (2003) The evolution of human reading behavior in the era of visual culture, Academic forum, Volume 3, pp. 127–131.