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Risks and Controls of Digital Textbook Content Construction in the Age of Digital Intelligence

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Abstract: *Textbooks are the crystallization of human knowledge accumulated over time. Its development has also been subjected to the great impact of the Digital Intelligence Era, especially in the selection of digital textbook content and changes in the organization and expression. The scope, object and method of selecting the content of digital textbooks in the age of intelligence have been greatly changed. But at the same time, digital textbooks also have their own unique characteristics compared to paper textbooks, but this characteristic and change will also cause certain risks. Placed in a huge and unpredictable Internet environment, intelligent digital technology embedded in multiple aspects, digital textbooks will face unknown risks, and its effective control needs to clarify the choice of content, optimize the content organization structure, and strengthen the content review.*

Keywords: *Digital Textbooks; Content Risk; Information Technology*

1. Introduction

Whether traditional paper textbooks or modern digital textbooks, the scope of their content is defined in strict accordance with the curriculum standards. Further, the knowledge and the way it is presented in the textbooks are carefully selected and integrated into the textbooks according to the specific needs of each discipline, following the established guidelines and logical rules in the vast body of knowledge. These carefully selected knowledge contents are further organized according to a certain scientific and reasonable order, so as to build up a clear and hierarchical knowledge structure system.Digital textbooks have undergone major changes in their basic building blocks due to the support of multimedia, cloud computers and cloud services, human-computer interaction technology, and big data analyzing technology, which has brought about changes in the selection and expression of textbook contents.[1]

1.1 Selection of digital textbook content

“As teaching books that seek to carry knowledge to disseminate science, textbooks can only carry part of the content for reasons that are obvious to all, and it is bound to give up a lot of content”. The selection of textbook content is never an arbitrary matter, and its main basis stems from three key dimensions: social needs, child development, and the logic of knowledge. However, no matter what subtle angle and scientific method we use to select textbook content, we must face and answer three fundamental questions: who can select, for whom, and what to select.

1.1.1 Who gets to choose: the convergence of editors and readers

The physical form of the traditional paper textbook is not an easy journey to reach the student's desk and into their hands; it has to go through a series of rigorous and indispensable steps, such as writing, careful review, precise printing, solid binding and wide distribution. The advent of digital textbooks, however, has been a breath of fresh air, revolutionizing the seemingly timeless process of producing printed textbooks. The revolution in physical form brought about by digital textbooks has naturally triggered a profound change in the subject of textbook selection. Therefore, we can say that the content of digital textbooks is actually shaped by both editors and textbook readers.[2]

1.1.2 Choosing for whom: taking students into account

The selection of textbook content is a purposeful process. The three core cornerstones of textbook content selection are: reflecting the mainstream values of society, following the internal logic of subject development, and adapting to the stages of students' physical and mental development. In this process, however, a phenomenon that deserves particular attention is that the ultimate reading object of

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textbooks, the learner, is often placed in a relatively secondary position in the process of content selection. Especially for those students who are struggling, they are repeatedly marginalized in the decision-making chain of "for whom the textbooks are chosen", and their voices and needs are often difficult to be fully listened to and considered. The emergence of digital textbooks not only enhances the relevance of textbooks, making them more relevant to the learning needs of different students, but also gives teachers and students an unprecedented degree of freedom - they can make use of advanced electronic editors to edit personalized textbooks to meet their own teaching or learning needs.[3]

1.1.3 What to choose: content selection for information technology-supported changes

In the long history of educational development, traditional paper textbooks have long occupied a dominant position, but their own limitations are becoming more and more significant. On the one hand, limited by the genre and presentation of paper, traditional textbooks appear to be relatively single in the presentation of knowledge. On the other hand, ideological factors also bring a certain degree of exclusivity to traditional textbooks. In different historical periods and different regional cultural backgrounds, textbooks sometimes tend to be conservative in content selection due to the guiding role of mainstream ideology. In sharp contrast, the open system constructed by digital textbooks is like a door to a new world of knowledge, injecting unprecedented vitality into education. In this system, learners are completely free from the shackles of passive knowledge acceptance and are no longer outsiders looking on from the sidelines. Instead, they are fully integrated into the system and actively "define" knowledge through a rich variety of practical activities.[4]

1.2 Organization and presentation of digital textbook content

Textbook knowledge, because of its deep disciplinary qualities, naturally gives textbooks an important basis and potential possibility to become teaching resources. The pedagogical nature of textbooks lies not only in the teachability of their contents, but also in the fact that they provide a clear basis and strong support for the implementation of actual teaching activities, thus fully realizing the functional value of textbooks as teaching tools. When analyzed from the perspective of actual technical realization, digital textbooks show two distinct but complementary basic forms. The first is the webpage form, which takes full advantage of the compatibility and convenience of modern browsers. The second is the stand-alone software client, which focuses more on the personalization and interactivity of the user experience. The existence of these two forms not only enriches the presentation of digital textbooks, but also provides strong technical support for the effective organization and accurate presentation of its content. The careful organization and vivid presentation of digital textbook content is built on the basis of the close integration of these two forms, which jointly promote the vigorous development of the digital education era.[5]

2. Digital textbook content risk analysis

In today's era of rapid technological development and explosive growth of information, digital textbooks have emerged. It skillfully integrates video demonstration as an intuitive means, animation simulation as a dynamic way of presentation, and interactive games as a form of edutainment, thus realizing the transformation of the originally abstract, complex and difficult to understand knowledge content into lively, interesting, visual and easy to understand learning materials. However, while recognizing the positive changes and broad prospects brought by digital textbooks, we must also keep a clear mind and deeply recognize the limitations of this emerging product of the digital age. Although digital textbooks show infinite potential and hope, they are after all still in a primary stage of continuous development and ongoing exploration, and therefore inevitably suffer from developmental incompleteness and a certain degree of ahead of its time. These two characteristics undoubtedly bring many challenges and risks to the selection and expression of content in digital textbooks.[6]

2.1 Digital textbook content selection risk

In today's era of digitalization and educational change, digital textbooks have become the focus of much attention in the field of education. However, we have to face the complexity of the virtual world built by powerful computer and Internet technologies. As one of the core carriers of this digital education ecosystem, digital textbooks, with their unique ports and advanced linking technologies, can easily establish connections with the vast amount of external information. This seems to bring infinite possibilities for the expansion of educational resources, but in fact it means that the selection of

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textbook content will fall into a more difficult risk predicament.[7]

2.1.1 Fragmentation of digital textbook content

The trend towards fragmentation of content may cause significant damage to the disciplinary structure of textbooks. However, with the increasing prevalence of digital textbooks, the process of content selection and development is no longer as strictly limited as in the past to the linear arrangement of knowledge points in traditional paper textbooks. On the contrary, digital textbooks tend to break up originally coherent knowledge points in a meticulous manner. Although the original intention of such breaking up and editing may be to enhance the flexibility and diversity of the content, in practice, the fragmentation is very likely to weaken the integrity and internal logic of the knowledge. Worse still, students, in the absence of adequate guidance, are often unable to accurately judge the ways in which these knowledge points are linked and sequentially related, as well as how they expand in depth and breadth. Therefore, we can say that such digital textbooks have to a large extent lost the fundamentals and possibilities that they should have as teaching resources.[8]

2.1.2 Redundancy of digital textbook content

The significant increase in the amount of information will undoubtedly significantly increase the complexity and challenge of textbook content selection. Although digital textbooks have benefited from the rapid development of computer network technology, which has enabled them to achieve unprecedented expansion in content presentation and maximize their openness, this progress is also accompanied by a series of unforeseeable potential risks and challenges. In this key aspect of content selection, its effectiveness depends to a large extent on the construction and improvement of digital textbook content databases. However, in textbook content selection, the line between “should be selected” and “not selected” or “selected but modified” is not clear. This makes it very easy for the content selection of digital textbooks to be submerged in the vast amount of information on the Internet, and the main content of the textbooks is easily obscured by this unprocessed and mixed information.[9]

2.2 Confusion over the organization of digital textbooks

Computer and network technologies are developing at an unprecedented rate. The field of education is not immune to this wave and is undergoing profound changes. However, while digital technology has brought unprecedented opportunities and advantages to the field of education, it is also accompanied by certain ambiguities and uncertainties. Digital technologies also present potential risks when it comes to the organization of textbook content. The most prominent and low-lying of these risks are manifested in the following two specific scenarios.[10]

2.2.1 Organizational disorder of digital textbooks

In the dimension of exploring the textbook structure system, digital textbooks show their unique structural characteristics, which are specifically reflected in the coexistence of the three-dimensional mesh arrangement of the large structure and the cross-mixed arrangement of information sources in the small structure. It is worth noting that although this three-dimensional mesh structure can be clearly displayed in paper textbooks through the physical layout and visual design of the page, in digital textbooks, due to the depth of the intervention of digital technology, its presentation faces unprecedented challenges. While digital platforms provide richer and more diverse media forms and means of interaction, they may also be complicated by the complexity of technological implementation, poorly designed user interfaces, or irrational interaction logics. Therefore, when developing digital textbooks, how to effectively maintain and optimize their structural characteristics has become an important topic to be solved. During the reading process, readers should not only maintain local coherence, but also overall coherence, because text reading is a cyclic processing process.At the same time, this kind of hyperlinks is also easy to break the overall structure of the organization of textbook content established by students in the process of reading.

2.2.2 Hierarchization of digital textbook content

Under normal circumstances, digital textbooks contain content with relatively clear and stable boundaries. This is mainly due to the fact that textbooks inherently carry a limited amount of information, which must be filtered, organized and integrated in strict compliance with curriculum standards. Similar to traditional paper textbooks, which are limited by their physical size, e-textbooks face constraints of screen size and the way the pages are presented, which do not allow them to present all the content at once and in its entirety, as is the case with paper versions. Digital textbooks significantly demonstrate the characteristics of streaming media, which incorporates dynamic media

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elements, allowing users to personalize the content according to actual needs and set up interactive features to adapt to the specific requirements of different media playback and display. This design not only enhances the flexibility and interactivity of digital textbooks, but also opens up a broader space for its application in the field of education. Digital textbooks are richer than traditional paper textbooks, and they contain more than paper textbooks. In addition, network convergence also makes the resources of digital textbooks easy to access and diverse. All of these characteristics give digital textbooks the potential for unlimited layering of content.

3. Risk Prevention and Control of Digital Textbook Content

As an emerging educational tool, digital textbooks are gradually changing the traditional teaching mode. However, in the process of its development, it has also exposed many problems that can not be ignored. In the face of these problems, there is an urgent need to explore effective solutions. We will start from the three key aspects of textbook content selection criteria, content organization and content review to avoid the above risks.

3.1 Clarify the criteria for selecting the content of digital textbooks

In view of the limitations of traditional paper textbooks in terms of content capacity and the limited learning time of students, each subject has to strictly filter and streamline the knowledge points when arranging teaching materials. Compared to paper textbooks, digital textbooks offer a significant increase in storage capacity, making it possible to accommodate more content. However, even so, the content that goes into a digital textbook should still be thoughtful and carefully selected core knowledge points. When selecting such content, textbook compilers should not only consider the systematic and coherent nature of knowledge, but also closely integrate the textbook content with the political background, economic development, cultural trends, social changes and psychological characteristics of the era in which it is written, so as to comprehensively take into account the overall needs of society.

3.2 Optimize the content organization of digital textbooks

The content organization of textbooks is usually divided into two core aspects: disciplinary logic and psychological logic. These two constitute the basic consideration framework in the process of textbook writing. Specifically, disciplinary logic emphasizes that content organization must strictly follow the structure of the disciplinary knowledge system. Psycho-logic, on the other hand, focuses on the fact that the content of textbooks should be compatible with the natural sequence of children's psychological development, i.e., the content should be organized in accordance with the psychological characteristics and learning habits of students of different ages. This pair of categories is not only extremely common in textbook content organization, but also constitutes a pair of basic contradictions in textbook design, reflecting the tension between educational theory and practice. When we turn our attention to digital textbooks, in addition to the disciplinary and psychological logics mentioned above, we must additionally consider a crucial factor - the user's logic of use. This additional dimension is determined by the “digital” nature of digital textbooks.

3.3 Strengthening the Censorship of Digital Textbook Content

Any textbook, as an important carrier of education and knowledge dissemination, is undoubtedly a profound reflection of the will of the state. Because of this, as long as the state as a form of social organization continues to exist, the will of the state embedded in textbooks will be as solid as a cornerstone and cannot be shaken. In order to ensure the accuracy and appropriateness of textbooks and their conformity with national educational goals, governments often organize professional review bodies composed of educational experts, historians, jurists, and other scholars in various fields, who review and evaluate textbooks one by one according to strict review processes and standards. With the advancement of technology, although digital textbooks are gradually coming into their own, the experience accumulated and the review mechanism established for paper textbooks still provide valuable lessons and references for the development of digital textbooks.

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4. Conclusion

At a time when digital technology is deeply reshaping the educational ecology, the content construction of digital textbooks presents distinctive characteristics of the times. Its content selection breaks the traditional boundaries, realizes the integration of editors and readers, takes students' needs as the core, and dynamically adjusts the scope of content with the support of information technology; at the level of organization and expression, the multimodal and interactive presentation gives new vitality to the dissemination of knowledge. However, behind the technological empowerment there are risks that cannot be ignored. Therefore, the construction of a scientific risk prevention and control system has become inevitable. Only by implementing risk prevention and control throughout the entire chain of digital textbook content construction can we give full play to its advantages in the era of intelligent education, help the high-quality development of education, and provide students with high-quality and orderly learning resources.

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