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The Application and Prospect of Artificial Intelligence in Educational Publishing

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Abstract:

The combination of artificial intelligence technology and education publishing industry has injected new energy into the development of education publishing. Based on the theory of compensatory media, the application of artificial intelligence technology in educational publishing is examined from the diachronic and synchronic perspectives. The main domestic education publishing listed companies conform to the trend and have laid out the artificial intelligence market one after another, which makes the application of artificial intelligence in the field of education present the characteristics of three-dimensional content products, precise teaching services and intelligent education models. In addition, there are some objective problems that need to be paid attention to and solved urgently. In view of the above application analysis, it is proposed that future education publishing should be deeply integrated with artificial intelligence, build an autonomous and controllable intelligent platform for education publishing, realize the all-round upgrading of education publishing ecology, and meet the arrival of the 3.0 era of publishing with a new attitude.

Keywords:

Artificial Intelligence, Education Publishing, Compensatory Media, Technology

1. Introduction

According to the data released by the National Press and Publication Administration, the scale of the education publishing market accounts for more than 60 %, which is the largest category in the book market in China. It can be described as the 'iron rice bowl' of the book publishing market. The total scale of publishing has shown a steady growth trend. With the rapid development of Internet technology, emerging technologies such as big data, artificial intelligence, mobile Internet, and cloud computing are profoundly changing the form of education and boosting the

transformation of traditional education publishing models. At present, the education publishing market has basically formed three camp systems : traditional education publishing enterprises, Internet education publishing enterprises, and third-party enterprises. The third-party enterprises rely on the products and services of traditional education publishing enterprises, while the traditional education publishing enterprises use the channels of third-party enterprises to develop their business, forming a close relationship between the two. Internet education publishing also has this kind of cooperative relationship with traditional education publishing. Its competition and cooperation with traditional education publishing enterprises provides new growth space for the education publishing industry. Cooperation and development are the development trend of the current education publishing industry. How to better apply and develop new technologies such as artificial intelligence in the education publishing industry has become a new proposition in the era of Publishing 3.0. Therefore, based on the theory of compensatory media, this paper explores the application of artificial intelligence in educational publishing from the diachronic and synchronic perspectives respectively. Combined with the specific application cases of artificial intelligence in educational publishing, this paper summarizes its characteristics and analyzes the objective problems existing in the application of artificial intelligence in educational publishing, so as to provide some suggestions and thoughts for its future development.

2. Materials and Methods

In general, the current application scope of artificial intelligence in education publishing mainly includes content selection, test paper system, intelligent proofreading, online education, online marketing, intelligent automatic production and other fields, which greatly improves the service ability and service efficiency of education publishing. [1] (Figure 1)

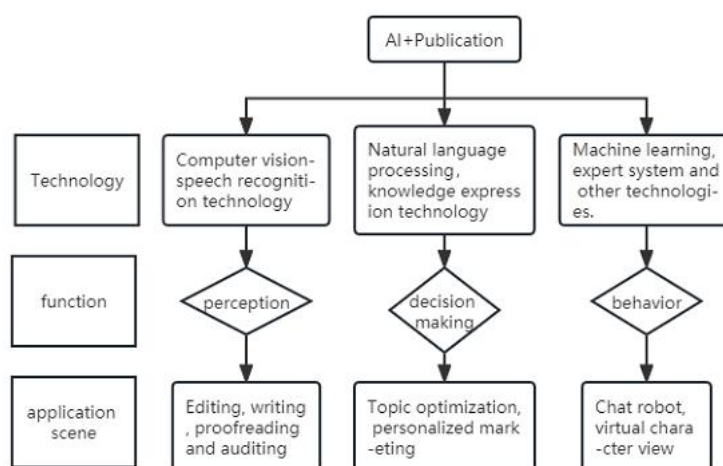


Figure 1. The technological path of AI-enabled publishing.

Major domestic education publishing listed companies have set foot in and developed digital education, digital content and other businesses, showing a sensitive “sense of smell” in the face of new technologies represented by artificial intelligence. Pay attention to artificial intelligence and other related technologies, and gradually expand the layout of digital and intelligent education. The following is a statistical analysis of the business scope of artificial intelligence applications of some education publishing listed companies. (Table 1)

Table 1. *The business scope of artificial intelligence application in education publishing listed enterprises.*

corporate name	“AI + Education Publishing” business
China Science and Technology Publishing Media Co., Ltd.	For the field of higher education, “Zhongke cloud education platform”, for primary and secondary school K12 education, “champion sharing classroom” and so on.
phoenix media	The subject network (providing “online test paper”, “famous teacher resources “ application and content support, online school communication platform for Tencent Smart Campus), “Phoenix Cloud Classroom”, Phoenix Easy Education, Phoenix Chuangyi (providing technical services for education informatization 4.0), etc.
china south publishing & media group	Tianwen digital media AI classroom, shell network (smart campus products and smart learning products), school neighborhood APP, etc.
anhui new media	Cooperate with Tencent to build a smart book city, build a “smart education” cloud platform project, etc.
winshare	“Wen Xuan fun learning” teaching auxiliary APP, “Wen Xuan teach together “interactive homework APP, mobile teaching platform”, geography inquiry classroom teaching integration solution, etc.
changjiang media	Love Cube Education, Wisdom Education Application Data Platform
times publishing	Smart campus, dolphin baby kindergarten electronic courseware (the first set of kindergarten all-media electronic teaching materials based on touch sensing and intelligent interaction technology in China), etc.
city media	Layout virtual reality digital education, develop VR education and VR science popularization, and create “Qingyun online intelligent education ecosystem”: “Qingyun Education Assistant”, “AI Composition Review”, “Digital Textbook”, “Qingyun Guoxue Museum”, “Qingyun Ladder Online”, “Qingyun Title” and other products.
Central Plains Media	“Elephant Examination and Teaching Evaluation Service System”, “Smart Classroom for Secondary Education”, “Manual Non-genetic Inheritance and Publishing Integration Platform in Primary and Secondary School Labor Education” provide intelligent solutions for the integration of research practice, labor education and after-school delay service work in relevant areas of Henan Province.
Tianzhou culture	Independent research and development of AI education system, AI adaptive course
Chinese online	Primary and secondary school digital textbook teaching comprehensive service platform, primary and secondary school students’ autonomous learning platform, digital books and listening resources, AI video teaching, etc.
Palm reading technology	Focus on the K12 field of youth reading products palm reading extracurricular books, relying on “palm reading digital library “ to create a scholarly campus wisdom solutions, etc.

It can be seen from the above table that under the impact of technology, the main traditional education publishing listed companies are actively trying to combine artificial intelligence technology with education publishing, and develop digital textbooks, smart education online platforms, smart learning products and related services. In addition, the Internet education publishing enterprises represented by Chinese online and palm reading technology also extend their strategic layout to the market of smart education, and the future competition trend in this field will be more intense.

3. Results and Discussion

With the wave of “artificial intelligence craze”, the field of educational publishing is constantly trying to apply artificial intelligence technology to the production and service of educational content. As a result, a variety of educational publishing content products, hardware equipment for education and learning, and more intelligent teaching models have been born. At the same time, there are also some problems that need to be paid attention to and solved urgently.

3.1. Compensatory Functional Applications of Artificial Intelligence in Educational Publishing

Sensory function compensation: perceptual function application based on computer vision speech recognition technology

Due to the strong professionalism of traditional auxiliary teaching materials, children's books and other educational publications, their compilation and proofreading are time-consuming and labor-intensive. Artificial intelligence technology based on computer vision speech recognition system can not only improve the efficiency of manuscript review through image recognition and voice input. In addition, it enriches the content form of educational publications and realizes the secondary processing of traditional educational publications. For example, intelligent AI speech handouts, one-to-one question bank exercises, all-weather online Q & A, etc., mainly through voice recognition technology to input and compare the voices of students, parents or teachers, match with the keywords in the database, and process information to extract the corresponding features, so as to complete one-to-one voice answers, so as to more easily solve students' confusion or difficult problems, making educational publications more possible with the assistance of artificial intelligence technology.

Interactive compensation: application of decision-making function based on natural language processing and knowledge expression

The compilation of traditional educational publications is dominated by editors, lacking interaction with readers in topic selection, and it is difficult to obtain the use effect and feedback of publications, and it is difficult to provide high-quality publications that are more suitable for users' needs. Relying on natural language processing, adaptive analysis system, knowledge expression and other artificial intelligence technologies can help solve the above problems. For example, the domestic IFLYTEK group uses artificial intelligence technology to process its language book publications, making its teaching materials “intelligent” and truly realizing the integration of “editing, learning and feedback”. In addition, its speech recognition technology can not only enable readers to recite and play the content to be learned, but also feedback the pronunciation problems to readers in time. This part of the data is also transmitted to the background database and fed back to the publishing house. Based on the analysis of these data, the publishing house will also improve and optimize the written teaching materials in the future.

Anthropomorphic compensation: behavioral function application based on machine learning expert system and other technologies

Machine learning, as the core of artificial intelligence, mainly studies how to use computers to simulate or realize human learning behaviors to acquire new knowledge and skills, and constantly improve its own performance. In the field of educational

publishing, chat robots and virtual character videos are developed with the help of artificial intelligence technologies such as machine learning and expert systems, so as to carry out accurate book marketing and provide personalized services for readers. Intellogo Inc. masters the theme, style, emotion and so on of its books through machine learning, and combines it with the research of readers' related behavior data to analyze readers' preferences and biases, and continuously and accurately recommends books to readers 24 hours in a targeted manner. Its innovation lies in the natural dialogue between users and machines. In this process, readers can ask questions about robots, and robots will also ask further questions based on their own understanding and dialogue scenarios. In the end, the robot will feedback the most appropriate and unique book to the reader and inform the reason for recommending the book. If the user is still not satisfied, the robot will repeatedly talk with the user to improve the recommendation reason. [2]

In addition, with the rise of the concept of meta-universe in the post-epidemic era, the tracking and supervision of learning behavior in the virtual teaching scene will be a major trend in the future integration of education and publishing. [3] Foreign Meta company (formerly Facebook) launched the main virtual reality meta-universe platform Horizon Worlds at the end of last year. As the world's first listed meta-universe company Roblox, it is also a UGC game creation platform that is compatible with virtual worlds, casual games, and self-built content, allowing players to create and develop digital content such as 3D and VR. [4] It has also been used as a "game + education" platform. There are also Internet technology companies in China to develop meta-universe-related products, such as Baidu's first domestic meta-universe product "Xirang". Based on its leading artificial intelligence technology, it has created a multi-person interactive virtual world that spans virtual and reality and has identity. Baidu's smart classroom is an AI smart education platform that deeply integrates artificial intelligence technology with educational learning scenarios. In the future, it is also hoped to build a meta-universe school in the "Xirang" space, which also provides an imaginary space for educational publishing under the concept of meta-universe. With the help of artificial intelligence, 5G, 3R and other technologies, the field of education and publishing can develop virtual character video, build AI teaching classroom, and realize immersive intelligent teaching across time and space. While enhancing classroom interest and on-the-spot authenticity, both teachers and learners can obtain real-time interactive feedback with the support of artificial intelligence technologies such as image recognition and facial recognition, and realize the whole process tracking and dynamic monitoring of students' learning behavior and intelligent analysis of learning situation, so as to meet students' personalized learning needs and achieve the purpose of intelligent teaching.

3.2. Problems

Two-way barriers hinder the intelligent transformation of education publishing

Although China's traditional education publishing enterprises have natural advantages in the publication of teaching materials, there are "congenital deficiencies" at the technical level. The development of artificial intelligence education is inseparable from "algorithm + computing power + data". For traditional education publishing enterprises, these three are all short boards. If they want to develop "AI + education" by themselves, they will face huge investment costs and unknown investment returns. [5] In contrast, other third-party technology companies do not

have the qualifications and distribution capabilities for educational publishing, and lack corresponding publishing professionals. There are high barriers to entry in the field of educational publishing, which inevitably leads to an embarrassing situation. Therefore, the two-way barrier between traditional education publishing enterprises and third-party technology companies has also become an obstacle that cannot be ignored in the intelligent transformation of education publishing.

Publishing technology and content need to be deeply combined.

Although artificial intelligence technologies such as computer vision speech recognition, machine learning, natural language processing, and adaptive analysis have been widely used in the publishing field, there are also problems in blindly pursuing the use of technology and ignoring the adaptability of technology and publishing content, resulting in some educational publishing products. It is difficult to truly capture users and retain users. In addition, some educational publications are superficial in the combination with artificial intelligence technology, only presenting the content in a different way, lacking deep thinking in the combination of technology and content, and it is difficult to produce truly high-quality innovative educational publishing integration products.

Taking “English Start Line” and “Word Intelligence” as examples, both of them only wear relevant reading tapes, have nothing to do with artificial intelligence technology, but are branded with artificial intelligence publicity gimmicks. [6] There are also some educational publications that simply combine text and voice and present them on electronic devices, and simply electronicize the content resources of educational publications. This product is superficial, not really intelligent, let alone the deep integration of content and technology.

Non-human factors in the publishing process need to be vigilant

The application and continuous improvement of artificial intelligence technology have made some machine-generated content comparable to human mental achievements, and it is even difficult to distinguish whether the creative subject is human or machine. However, automated content production that relies entirely on machines in unsupervised situations is where we need to be vigilant. Especially for educational publishing that disseminates knowledge and cultivates the pillars of the motherland, we need to think about whether the topic is important and valuable, and whether it can truly meet the needs of students, teachers and parents. Before we can completely entrust trust to technology, the production of educational publications still needs manual intervention.

The short story “When One Day the Computer Wrote the Novel”, which was completed by the cooperation of artificial intelligence and human beings, has successfully concealed the review of “Japanese Economic News” and “Star New-Literature Award” and successfully passed the preliminary examination. Microsoft’s intelligent robot “Microsoft Little Ice” spent 100 hours to create the “sunshine lost the glass window”, which was officially published in 2017. This is also the first collection of poems created entirely by artificial intelligence. The content of machine automation production in the publishing field has been recognized and applied on a considerable scale, but this fast and convenient machine production is actually contrary to the precipitation of culture and the accumulation of knowledge. [7] The process of education publishing is more professional, serious and complex. The hidden dangers of one-sided pursuit of scale benefits, homogenization of content, and

lack of flexibility in wording under the guidance of machines are problems that education publishers cannot ignore.

Emotional elements under machine intelligence need to be paid attention to

Artificial intelligence technologies such as image recognition, speech recognition, machine learning, and expert systems can help the education publishing industry to better understand the needs of students, teachers, etc., by mining and analyzing the collected massive data through algorithms. However, it is impossible to establish an emotional bond between students and publishers. In addition, cold intelligent robots cannot replace parents as companions on the way of children's learning and growth. Although artificial intelligence technology can be continuously upgraded and improved, and robots can increasingly have human characteristics, machines will never replace humans in the face of emotional temperature. This means that in the face of machine intelligence, we should not be over-dependent and over-excited, and its potential emotional relationship issues still need our attention.

Some AI education products, such as Alpha Egg · S, an artificial intelligence robot launched by IFLYTEK for children, have won praise for its ability to break the boundaries of space, make up for the regret of children's lonely growth, and help children learn English better. From the perspective of parents, this product is indeed beneficial to solve the contradiction between parents' work and family, but the emotional connection between parents and children is a cold machine that is difficult to fill. Over time, the feelings between parents and children may be difficult to bridge, which is a problem that we should be cautious about.

The laws and regulations of education publishing industry need to be improved

The application of a new technology will also promote the establishment and improvement of laws and regulations in the field. At present, the application of artificial intelligence technology in education publishing is still in the developing stage. With the further development of artificial intelligence technology, the related application norms and new disputes will gradually increase, and the current law has not been able to respond in time. There have been many cases of copyright disputes over artificial intelligence publishing works in China, such as the copyright ownership of artificial intelligence products in Tencent v. "Net Loan Home". When seeking deep integration with artificial intelligence, educational publishing must pay attention to copyright management. The copyright infringement in the production process of educational publishing content, as well as the balance between the use and protection of consumer data privacy in the marketing process, are the focus of the industry in the future. How to resolve disputes and create a good development environment for educational publishing requires the improvement and guidance of the law.

4. Conclusions

The combination of education publishing and artificial intelligence should not stop at the upgrading of technology and equipment. In the future, the ecology of education publishing should also adapt to the trend of intelligence and realize the all-round innovation of industry ecology. Based on this, the future education publishing can create an independent and controllable intelligent platform integrating "technology", "publishing", "culture" and "supervision", and promote the upgrading and reconstruction of the production and dissemination mode of education publishing content. The construction of an autonomous and controllable intelligent platform for

educational publishing can be regarded as a qualitative transformation of the production and dissemination of educational publishing knowledge by artificial intelligence technology, truly realizing the deep connection between educational publishing content and user needs, and promoting the humanized development of technology.

The latest artificial intelligence regulations launched by the EU can provide reference for the improvement of relevant laws on the application of artificial intelligence technology in China. Based on the development trend of artificial intelligence, the new regulations issued by the EU classify the application of artificial intelligence technology according to the level of risk, including unacceptable risk, high risk, especially all remote biometric identification systems, limited risk, and minimum risk. In addition, spontaneous codes of conduct can be developed for non-high-risk AI systems, and regulatory sandboxes can be established to promote innovation.

The emergence, development and application of any emerging technology that brings about change or disruptive change will go through a long process of being accepted and recognized by the market. [8] Although educational publishing has achieved good results in the combination with artificial intelligence technology, it still needs to achieve qualitative breakthroughs in artificial intelligence fields such as computer speech recognition, natural language processing, and machine learning. For example, in the field of online education publishing, if the technology of speech recognition, intelligent dialogue and so on, such as students' composition marking, automatic translation, one-to-one answer, can not be highly accurate, the significance and value of the publishing product itself is not so great, and it is difficult to be widely applied in breadth and depth. In addition, the current education publishing industry is also facing the shackles of the system. Due to the professionalism and seriousness of education publishing, traditional education publishing houses hold the core content resources, and some technology companies that want to lay out the field of education publishing will be limited by the threshold, making the intelligent transformation of education publishing difficult to carry out. From the perspective of compensatory media, the freedom, deconstruction, equality, diversification and creativity brought by emerging media have changed the original thinking characteristics of publishers, content creators and other related subjects. [9] In the future, traditional education publishing enterprises should innovate the concept of education publishing, actively layout the field of artificial intelligence, attach importance to the deep cultivation of technology, strive to break through the bottleneck of technology or seek cooperation with other technology companies. In short, technology should be used as a driving force to promote the transformation of the education publishing industry, and meet the arrival of the era of intelligent education with an open and inclusive attitude.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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