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Implications of Motion Sensing Technology for Children' s Digital Publishing (Postprint)

Authors: Wu Maozi

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Abstract

In the context of the Internet, big data, artificial intelligence, and other macro-level technological environments, children' s publishing should keep pace with the times to cultivate talent reserves for building an innovative society. In 2020, the sudden outbreak of the COVID-19 pandemic expanded public demand for digital products and accelerated the transformation from traditional publishing to digital publishing. However, how to effectively utilize existing new technologies in children' s publishing has remained a focal point of scholarly research. This study aims to investigate the current status and constraints of motion-sensing technology application in children' s digital publishing, and to propose targeted strategies accordingly, in order to provide references for facilitating the smooth transformation of children' s digital publishing.

Full Text

Insights into the Application of Somatosensory Technology in Children' s Digital Publishing

Author: Wu Maozi (Guangdong Education Publishing House Co., Ltd., Guangzhou, Guangdong 510102)

Abstract: In the era of the Internet, big data, and artificial intelligence, children' s publishing should keep pace with the times to cultivate talent for building an innovative society. The sudden outbreak of COVID-19 in 2020 expanded demand for digital products and accelerated the transformation from traditional to digital publishing. However, how to effectively apply existing new technologies in children' s publishing has remained a hot topic among scholars. This paper examines the current status and constraints of applying somatosensory technology in children' s digital publishing, and proposes targeted strategies to provide reference for facilitating the smooth transformation of children' s digital publishing.

Keywords: Internet; big data; artificial intelligence; somatosensory technology; children; digital publishing

1.1 What is Somatosensory Technology?

Initially, somatosensory technology was primarily applied in 3D modeling, athlete training, special education, medicine, and gaming [1]. Somatosensory technology uses somatosensory cameras to capture color and depth image information, detect and judge human movements and postures, and interact with computer software. It represents a typical application of natural user interface technology and constitutes an important branch of artificial intelligence applications. In educational contexts, somatosensory technology—combined with virtual and augmented reality and integrated with appropriate learning content—can effectively construct learning processes featuring situational guidance, independent inquiry, and intelligent assessment, thereby enhancing student attention, engagement, and interest [2].

1.2 Current Application Status of Somatosensory Technology in Children' s Publishing

1.2.1 Late Introduction and Slow Development As an imported emerging technology, somatosensory technology has matured increasingly and, combined with gaming, entered large shopping malls and households, gradually gaining public understanding and acceptance. However, its application in children' s publishing remains in the preliminary exploration stage. Primarily integrated with AR and VR technologies, it has been used to develop interactive games for children—what we call somatosensory games.

1.2.2 Growing Attention to Somatosensory Technology Projects To excel in children' s digital publishing, content is fundamental while technology serves as the vanguard. Which advanced technologies are suitable for introduction into children' s digital publishing to break new ground for publishing institutions, and how to apply these technologies effectively, have become hot topics among publishers. Somatosensory technology, as an emerging advanced technology, has naturally attracted the attention of publishers and scholars.

In 2014, the Resource Research and Development Team of Nanjing Educational Technology Center, together with pilot schools, conducted research on developing somatosensory interactive learning resources. They created a series of safety education somatosensory interactive learning resources for use in kindergartens, primary schools, middle schools, and inclusive education settings, achieving initial success. This “Research on the Development of Somatosensory Interactive Learning Resources” became a key project in Jiangsu Province' s 13th Five-Year Education Science Plan [3]. In 2015, the Beijing Municipal Education Commission listed “Research on Children' s Game Experience Design Based

on Somatosensory Interaction Technology” as a funded project for its annual science and technology and social science plans [4]. That same year, Beijing Heiha Technology Co., Ltd. developed somatosensory games with educational and parent-child interactive functions. In 2016, Hunan Province’s Education Science Planning Project “Research on the Design of Children’s Learning Activities Based on Somatosensory Games” was approved [5]. Overall, however, successful cases of applying somatosensory technology to children’s publishing remain rare, with its use largely limited to research projects and gaming products.

1.2.3 Limited Scope of Application Research shows that current applications combining somatosensory technology with children’s games in children’s publishing concentrate primarily in two content areas: safety education and science popularization, with some serving cognitive development. The immersive, situational, and interactive nature of somatosensory technology offers clear advantages in safety education and science popularization, yet simultaneously limits its applicable domains to some extent. For instance, content related to fire escape, drowning rescue, space travel, and underwater exploration can be designed as somatosensory games to create immersive, highly effective experiences. However, children’s literature content, without careful design, struggles to leverage somatosensory technology’s strengths and instead increases production costs, affecting market acceptance and reducing competitiveness.

According to the *2018-2019 China Digital Publishing Industry Annual Report*, by 2018, China’s digital publishing industry had reached an overall revenue of 833.078 billion yuan, representing 17.8% growth from 2017. Although many parents still prioritize paper books or physical resources when selecting learning materials for their children, the vast children’s publishing market provides a substantial stage for children’s digital publishing. To leverage its advantages and pursue high-quality development, children’s digital publishing must not only adhere to the principle that “content is king” but also harness advanced technology as its vanguard.

2. Factors Constraining the Application of Somatosensory Technology in Children’s Publishing

To leverage somatosensory technology’s advantages in children’s publishing, we must identify the constraints hindering its application. The author identifies at least four key factors:

2.1 High R&D Costs and Funding Shortages in Children’s Publishing Institutions

Applying somatosensory technology to children’s digital publishing primarily yields somatosensory interactive games, which involve programming, interactive game design, 3D modeling, interface design, and audio-video production—

the latter including video planning, character design, 2D and 3D production, post-production compositing, and AR/VR interactive production. All these require substantial funding. Financial gaps in author fees, technical production costs, testing and promotion expenses, and technical production fees represent common challenges for most children' s publishing institutions.

2.2 Lack of Systematic, High-Quality Content Resources and Serious Homogenization

The quality of somatosensory games varies considerably, with game design often failing to match children' s age characteristics and developmental levels. Issues such as unclear instructions, unsmooth operations, and strong frustration during children' s experiences are common, reducing children to mere participants and experiencers. To lower R&D costs and achieve quick economic returns, many publishing institutions adopt imitation and follow-the-trend business models, resulting in concentrated content segments and serious homogenization. Most existing somatosensory games focus on safety education and science popularization, rarely exploring other areas of children' s digital publishing. Moreover, their content generally overemphasizes cognitive development while neglecting children' s emotional cultivation and personality shaping. This wastes valuable development opportunities, creates chaos in publishing and the market, and confuses consumers.

2.3 Private Technology Companies Controlling Discourse Power; Publishing Institutions Lacking Interdisciplinary Talent

Currently, R&D using somatosensory technology in China concentrates primarily in private technology companies, which hold absolute discourse power. When children' s publishing institutions develop related products, they typically must collaborate with professional technology companies, outsourcing technical components throughout the publishing process. Consequently, digital products derive content from authors and technology from tech companies, with publishing institutions serving as intermediaries. Once authors and technology companies cooperate directly, publishing institutions face an awkward partnership situation or even risk being eliminated from the market.

2.4 Lack of "Internet Plus" Platform Support and Dispersed Publishing Strength

Applying somatosensory technology to children' s publishing also requires support from Internet, artificial intelligence, and big data platforms. Most publishing institutions and technology companies focus on software development, often lacking the human and material resources for service platform development. Even in software development, enthusiasm typically runs high in early stages but wanes later. Numerous children' s publishing institutions adopt a wait-and-see attitude, with few truly investing in publishing projects. While well-known children' s publishing institutions possess their own content resources and flagship

products, they compete individually, resulting in dispersed publishing strength that struggles to provide a high-quality, rich content resource library for children' s digital publishing.

3. Strategies for Applying Somatosensory Technology in Children' s Publishing

3.1 Securing Support from Relevant Departments and Institutions

First, to avoid scattered efforts in children' s digital educational publishing and reduce redundant publishing, relevant authorities should strengthen macro-level management, optimize the allocation of scarce children' s digital publishing resources, leverage the advantages of experienced publishing institutions, concentrate core content competitiveness, and integrate suitable projects across regions, fields, and institutions to guide them toward high-quality development.

Second, when necessary, relevant departments and institutions should provide technical support and funding for key projects and quality topics. For example, they should create opportunities for children' s publishing institutions to integrate technological resources, help build large-scale data platforms for resource sharing, and enable publishing institutions to maintain absolute copyright over digital publishing products through closed publishing loops. Additionally, they could increase the number of approved multimedia integration projects and funding in special cultural industry development funds.

3.2 Using Games as Fundamental Content to Create Quality Products

3.2.1 Establishing Children' s Games as King and Striving for Excellence Children' s digital publishing must pursue high-quality development by focusing intensively on children' s games as the “king of content.” Somatosensory technology can innovate classic children' s games, enabling better inheritance of excellent traditional games while keeping pace with the times. It can be used to tell Chinese stories and inherit Chinese culture effectively—for instance, by presenting the production processes of China' s Four Great Inventions, ceramics, silk, and the Four Treasures of the Study through somatosensory technology, allowing children to experience and deeply appreciate outstanding Chinese civilization. Children' s publishing institutions should thoroughly explore children' s games and strive to create products belonging to contemporary children.

3.2.2 Clarifying Somatosensory Technology' s Positioning to Promote Diversified Development Somatosensory technology' s outstanding advantages—its strong sense of immersion, situationality, and interactivity—work well with children' s games to create innovative, attractive combinations that capture children' s attention and stimulate their interest in exploration. Without children' s games, somatosensory technology would be like cooking without rice. Therefore, somatosensory technology must clarify its role as a behind-the-scenes booster that helps children' s games achieve intended goals and functions.

Meanwhile, as a new media convergence technology, children's publishing professionals should promote its diversified development, maximize its functions, continuously explore its application in promising fields, and pursue innovative uses.

3.3 Establishing Industry-University-Research Bases to Cultivate Interdisciplinary Publishing Talent

To advance children's publishing toward digitalization and explore new product forms, embracing somatosensory technology represents a positive attempt. Since content and technology are the two main components, publishing institutions must avoid having two separate teams working in isolation and should consciously form publishing closed loops. To further develop children's publishing, cultivating interdisciplinary publishing talent is imperative. The author recommends three approaches:

3.3.1 Embedding Innovation Concepts Deeply in Publishing Talent Development Plans As executors of children's digital publishing, publishing institutions should systematically formulate and implement comprehensive interdisciplinary publishing talent development plans, embedding innovation concepts deeply in every staff member's mindset. To some extent, concepts guide behavior and determine its direction and outcomes. To cultivate qualified, excellent interdisciplinary publishing talent, innovative concepts must come first, serving as a direction marker that constantly guides publishing staff forward and inspires them to surpass themselves.

3.3.2 Collaborating with Higher Education Institutions to Establish Industry-University-Research Bases To address the shortage of digital publishing talent, children's publishing institutions should strengthen cooperation with higher education institutions, especially those with programs in publishing, game design, and artificial intelligence, to establish industry-university-research bases that enable automatic transformation and seamless integration between theory and practice. On one hand, publishing institutions can learn about the latest research findings through university education and research and transform them into market-needed products. On the other hand, universities can adjust their talent cultivation programs according to the actual needs of children's publishing institutions, better preparing students for society and aligning them with social demands.

3.3.3 Conducting Two-Way Training to Cultivate Interdisciplinary Publishing Talent Technical editors should learn about children's physical and mental development theories and practices through study and training, deeply acquiring professional knowledge in child physiology and psychology. Planning editors should have a basic understanding of product application technologies, know fundamental operations, and embrace advanced science and

technology. Publishing professionals should maintain a learning attitude and passion, staying sufficiently sensitive to new things and learning from each other for self-improvement. Meanwhile, children's publishing institutions should adhere to a "bringing in, going out" cultivation approach—introducing outstanding talent from technology companies to inject fresh blood, while actively encouraging publishing staff to "go out" to places serving children for more exchanges and learning to broaden their horizons and increase their knowledge.

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Author Profile: Wu Maozi (1988-), female, from Ganzhou, Jiangxi, intermediate-level publishing professional. Research focus: preschool education.

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3.2 Multi-Dimensional Connections for Face-to-Face Interaction

Technology has enriched user connection and interaction methods. Early interactions were text-based, but multimedia interaction is now fully realized. With the arrival of 5G technology and to meet audience expectations, online dramas have begun experimenting with interactive experiences where viewers can choose protagonists' fate according to their preferences, increasing engagement and experience quality. As artificial intelligence technology develops, immersive viewing has become the goal for online dramas. Future attempts may involve integrating VR/AR formats, allowing audiences to dialogue with characters through VR/AR technology, with plots unfolding based on viewers' lines to achieve immersive viewing experiences and real-time interactive storylines that enhance audience experience.

3.3 Role Substitution, Diversified Presence, and Agency

VR/AR technology is changing the relationship between people and content—from reading and watching to entering—and simultaneously transforming how people connect with each other [6]. Social interaction based on virtual reality is becoming possible. The booming development of short-video platforms on new media has unleashed audiences’ performance potential, enabling everyone to play different roles well. Good film and television works require not only refined production but also content that resonates with audiences. Based on audiences’ performance potential and content resonance, online dramas can attempt to use this substitutive technical experience to provide more authentic, immersive experiences. Viewers can customize character personalities and behaviors according to personal preferences and participate in situational performances and dialogues based on plot needs, allowing them to perform while watching and thereby experience characters’ feelings.

From art to technology, collaboration across different fields produces different works. The development of online dramas results from continuous collisions between technology and art. Technological development brings more achievable functions to online dramas, while artistic creation makes them more compelling under technology’ s halo, continuously elevating audience experience. Chinese online dramas will undergo a series of explorations, developments, and attempts, gradually moving toward a more refined path.

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Author Profile: Zhang Yao (1992-), female, master’ s degree in radio and television, master’ s student. Research focus: film and television directing.

Note: Figure translations are in progress. See original paper for figures.

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