

Research on Optimization Strategies for Online Learning Space

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Abstract: In the process of educational informatization, online learning space has become a research hotspot and has significant implications for promoting educational development. By reviewing relevant literature on CNKI, it was found that its research covers basic concepts, empirical evidence, design applications, and evaluation mechanisms, and the number of publications has been increasing with policy promotion. However, there are problems with poor connectivity, low applicability, and weak intelligence in the construction and application of online learning spaces. To this end, it is necessary to promote normalized construction and integrate its use into daily teaching; Promote intelligent development and utilize technology to achieve personalized services; Enhance professional development, strengthen teacher skills training and technical support; Strengthen integrated development, integrate diverse learning environments, meet the needs of various learners, and promote the overall progress of educational cyberspace.

Keywords: Online learning space; Educational informatization; Problem analysis; Optimization strategy

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1. Introduction

In the context of the deep integration of information technology into the field of education, online learning spaces, as a key carrier of educational informatization, are reshaping the educational ecology and learning models. With the acceleration of digital transformation in education, online learning spaces have become a hot topic in educational research and practice due to their unique advantages, such as resource integration, convenient interaction, and unlimited time and space. It not only carries a massive amount of educational resources but also provides a platform for communication, collaboration, resource sharing, and personalized learning for teachers, students, educational administrators, and various learners. It has profound significance in promoting educational equity, improving educational quality, and promoting educational innovation.

In recent years, research on online learning spaces has continued to heat up both domestically and

internationally, with results emerging continuously. However, in the process of its construction and application, many urgent problems have also been exposed that need to be solved. From a theoretical perspective, there is still controversy surrounding the fundamental concepts and classification systems of online learning spaces. From a practical perspective, problems such as poor connectivity, low application, and weak intelligence seriously constrain the effective functioning of its functions. Therefore, a thorough review of the current research status of online learning spaces, accurate analysis of existing problems, and exploration of practical development strategies not only helps to improve the theoretical system of educational technology, but also provides scientific guidance for educational practice, which has important theoretical and practical significance for promoting the sustainable development of educational informatization.

2. The current research status of online learning space

Using the “online learning space” in the CNKI database of China National Knowledge Infrastructure, a topic search was conducted with the subject classification set as “education”, and a total of 1571 Chinese literature were retrieved.

From **Figure 1** combined with the release of relevant national policies and regulations, it can be seen that on May 28, 2012, Vice Minister of Education Du Zhanyuan first proposed the concept of “three connections and two platforms” at the symposium on educational informatization pilot work, and pointed out that the key to promoting educational informatization is the three major tasks and two platforms, which are the core goals of educational informatization during the 12th Five Year Plan period ^[1]. Since then, the academic community has begun to conduct research on online learning spaces, and the number of publications has been increasing year by year since 2012. In February 2016, the Ministry of Education issued the “Key Points for Education Informatization Work in 2016”, emphasizing the vigorous promotion of “universal access to online learning spaces” ^[2]. From **Figure 1**, it can be seen that the number of publications has shown a linear growth trend since 2016. With the gradual popularization of “broadband network school-to-school communication and high-quality resource class-to-class communication”, the realization and in-depth application of “network learning space for everyone” has become an important lever to leverage the comprehensive efficiency of educational information environment and resources. In 2018, the Ministry of Education issued the “Guidelines for the Construction and Application of Online Learning Spaces”, further standardizing the construction and application of online learning spaces ^[3]. In 2019, the “Guiding Opinions of the Ministry of Education on Strengthening the Construction and Application of Online Learning Spaces” proposed that the construction and popularization of online learning spaces should promote the transformation of education and teaching models ^[4].

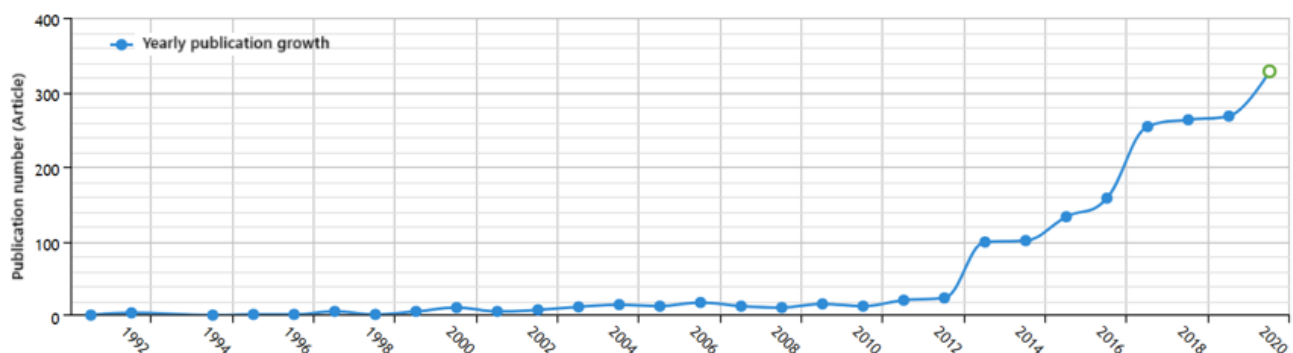


Figure 1. Yearly publication number (1991–2020)

Through classroom learning and further analysis of retrieved literature, it can be summarized that current

research on online learning spaces can be roughly divided into the following aspects.

Firstly, research on the fundamental concepts of online learning spaces. Guo Jiong et al. explained the background and basis for the introduction of the “Guidelines for the Construction and Application of Online Learning Spaces” from the perspectives of policy basis, theoretical basis, and meeting the demands of educational reform. They also analyzed the definition and ownership of online learning spaces in the Guidelines, the relationship between personal space, institutional space, and public application services, and the key points of innovative modes of educational resource supply, educational teaching, interactive innovation, and management mode supported by online learning spaces. Xie Quanfeng analyzed the characteristics of online learning space based on the space of the World University City, including the adoption of real name system, lifelong use of accounts, universal ownership of space, innovative use of resources, and strong organizational functions ^[5]. Hu Yongbin and others explored the essential characteristics and analytical framework of online learning spaces. Then, by reviewing the development process of spatial classification in online learning, the necessity of its classification was analyzed. Then, by summarizing and analyzing cases in the practical field, five types of online learning spaces were proposed, and finally, four inspirations for the classification of online learning spaces in the practical field were put forward ^[6].

Secondly, empirical research based on online learning spaces from different perspectives. To study the subjective and objective influencing factors of collaborative teaching and research supported by online learning spaces, Wu Lei et al. conducted a questionnaire survey of 277 primary and secondary school teachers on collaborative teaching and research supported by online learning spaces, and verified the impact of different factors on teachers’ collaborative teaching and research supported by online learning spaces ^[7]. Yong Wenjing conducted a study on student learning satisfaction in vocational education online learning spaces, using quantitative research methods to investigate student learning satisfaction and its influencing factors. The research results show that students generally have a high level of learning satisfaction. Among them, students’ information technology skills, network learning space system design, network learning space course design, and network learning space expansion resources can all positively predict students’ learning satisfaction ^[8]. Zhang Si proposed a model and research hypothesis on the influencing factors of knowledge sharing in online learning spaces from the perspective of social exchange theory and verified the research model and hypothesis using a questionnaire survey method ^[9].

Thirdly, research on the design and application of online learning spaces in different educational contexts. For example, Yang Yubao and others creatively put forward five innovative application models of online learning space from the perspective of ubiquitous learning by taking ubiquitous learning as a new perspective of the “Internet plus” era and using literature research and case study methods ^[10]. Based on the practice of developing and applying online learning spaces, Liang et al. proposed a design scheme for an experiential online learning space based on virtual environments, using experiential learning as the foundation. The main features, technical architecture, and functional composition were discussed in detail ^[11]. From the perspective of self-directed learning, Pan Xingzhu et al. designed an online learning space with functions such as planning, learning, assessment, and reflection based on three dimensions: personal attributes, autonomous processes, and learning contexts. Finally, using quasi-experimental methods, questionnaire surveys, and interviews, the effectiveness of self-directed online learning spaces was analyzed from the aspects of academic performance, self-directed learning ability, self-efficacy, and functional satisfaction ^[12].

Fourthly, research on relevant evaluation mechanisms in the context of online learning space. Based on the characteristics of spatial teaching research interaction, Zhou Peng et al. constructed an evaluation model for spatial

teaching research interaction from the dimensions of knowledge and emotion. Then, starting from the evaluation process of spatial teaching research interaction, they elaborated on the calculation process of the evaluation method for spatial teaching research interaction^[13]. Li Yubin et al. designed a teacher online learning space evaluation structure model from the perspective of utility, with four elements as the core: “deep integration with teaching, achieving diversified interaction, promoting professional development, and assuming social responsibility”, and constructed an evaluation index system using the AHP method^[14]. Li Yunzhen constructed a two-dimensional and multi-level interactive evaluation framework based on the interactive system in the online learning space^[15].

3. Existing problems in online learning spaces

Through classroom learning and relevant literature reading, the author believes that there are still the following problems in the current application of online learning space teaching.

3.1. Poor connectivity in online learning spaces

The existing platforms can be roughly divided into four categories: online learning spaces based on university learning platforms, teaching spaces built by education administrative departments in various regions, online learning spaces built by private enterprises using websites as platforms, and personal online learning spaces based on various communication tools. Previous studies have confirmed that there is a lack of corresponding flexibility and liquidity among diverse platforms. On the one hand, the platforms used by different regions and schools are not the same, and teaching resources and data cannot be connected and shared; On the other hand, from the perspective of the user subject, the interpersonal communication between educators, learners, and managers cannot achieve the expected results, and the situation of “spatial isolation” is serious.

3.2. Low application of online learning space

Under the promotion of national policies, the construction of online learning spaces in various regions and schools is booming. However, in practical applications, although the number of resources and registered users on most platforms has reached a certain scale, the actual number of active users is very small, and the degree of practical application is also relatively low.

3.3. Weak intelligence in online learning space

Under the trend of empowering educational applications with artificial intelligence technology, intelligent technologies such as data mining, learning analysis, data visualization, and IoT perception have not yet been substantially applied in spatial platforms. Therefore, the vast majority of intelligent applications on platforms need to be developed. The learning space is unable to accurately analyze users’ learning behavior records, learning styles, provide intelligent feedback such as personalized learning resource push, and cannot provide diversified demand services based on individual differences.

4. Strategic suggestions for online learning spaces

4.1. Promote the normalization of online learning space construction

Through various forms of activities, vigorously promote the use of online learning spaces and encourage their normalization. Education administrative departments in various regions should closely grasp the spirit of the

“Guidelines for the Construction and Application of Online Learning Spaces” and the “Guiding Opinions of the Ministry of Education on Strengthening the Construction and Application of Online Learning Spaces”, accelerate the development of standards for the construction of online learning spaces, and implement the guiding opinions in practice. At the school level, online teaching activities can be utilized to promote the normalization of its development. In addition to developing relevant training and exchange activities, factors closely related to teacher development such as professional title evaluation, performance assessment, and selection should be combined to encourage teachers to use online learning space platforms more to assist teaching; In addition, without increasing students’ learning burden, incorporating students’ online learning ability into the evaluation mechanism enables the online learning space to truly realize its educational value.

4.2. Promote the intelligent development of online learning spaces

The era of intelligent education is gradually approaching with the deep integration of artificial intelligence technology and education. In the future, the network learning space service platform will use the research results of brain cognition and learning science, as well as artificial intelligence technology, on the basis of data analysis to accurately grasp the learning needs of each learner, design personalized learning paths, evaluate and diagnose knowledge defects, warn of learning crises, and push the most suitable learning resources. At the same time, educators can also use the results of intelligent data analysis to make the entire process of teaching activities intelligent and precise and form diagnostic evaluations. This teaching model is more conducive to improving the learning effectiveness of learners. In addition, managers can intelligently regulate learning dynamics based on technology to form more scientific educational decisions.

4.3. Enhance the professional development of online learning spaces

Previous studies have shown that a teacher’s personal information literacy ability is directly related to their willingness to use network technology to assist teaching activities. Undoubtedly, many subject teachers nowadays lack the basic knowledge and abilities to proficiently use online learning spaces and are unable to integrate subject knowledge well with online learning space resources, lacking design and application experience. In addition to organizing frontline teachers to participate in relevant skills training, education administrative departments or school management can introduce professional technical personnel to provide daily guidance to teachers and provide timely assistance when teachers encounter technical application difficulties, forming a professional usage system. At the same time, eliminate teachers’ fear and resistance towards technical barriers at the psychological level.

4.4. Strengthening the integrated development of online learning space

The online learning space effectively integrates online and offline learning, overcoming the limitations of virtual learning spaces and creating an integrated learning environment for schools, communities, families, social venues, and other learning places, promoting further integration of formal and informal learning. In addition to students and teachers, it can meet the learning needs of various learners. Through efficient and in-depth communication, educators aim to build an integrated educational network space that promotes the intelligent growth of every educational stakeholder.

Disclosure statement

The authors declare no conflict of interest.

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