

Research on the Construction of Lifelong Learning System in the Digital Era and Value-added Evaluation

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Abstract

In order to make the construction of lifelong learning system more perfect, it is necessary to start from the aspects of education policy, education technology, education content and learning form. When constructing a lifelong learning system, it is necessary to take the learner as the center, design the curriculum according to the different needs of the learners, and choose the suitable teaching methods according to the learning ability of the learners. This paper describes the significance of the integration of digital technology and lifelong learning, analyzes the limitations of the construction and development of the digital lifelong learning system, and puts forward an effective strategy for the construction of the lifelong learning system based on the digital era, and discusses in detail the value-added evaluation of the lifelong learning system and the prospects for the promotion of China's lifelong learning system, which provides a new way of thinking to promote the construction and development of China's lifelong education system.

Keywords

Lifelong Learning Systems; Big Data in Education; Value-Added Evaluation; Digital Age; Information Technology.

1. Introductory

In the context of today's digital age, the construction of lifelong learning systems and value-added evaluation have become crucial. The rapid development of digital technology has provided individuals with a wider range of learning opportunities and resources, as well as brand-new learning methods and tools. Quantitative and qualitative evaluation of the benefits of a digital lifelong learning system can not only objectively assess its actual effects, but also deeply explore its potential impact on individuals and society. In the future, with the continuous evolution and application of digital technology, the lifelong learning system will further demonstrate its great potential and play an important role in individual learning and social development. Therefore, it is of great theoretical and practical value to study in depth the construction and evaluation of the lifelong learning system and to look into its future prospects.

2. The importance of integrating digital technologies with lifelong learning

The deep integration of digital technology and lifelong learning has opened up a whole new field of learning for all mankind. First of all, digital technology has broken through the time and space limitations of traditional learning, making it possible to learn anytime, anywhere, as long as there is an Internet and equipment, greatly facilitating the public's learning activities and enhancing the efficiency of learning. Secondly, digital technology provides more abundant learning resources and more flexible learning methods for lifelong learning. Through digital technology, rapid sharing and wide dissemination of learning resources can be realized, breaking geographical boundaries and enhancing the utilization of educational resources and

the fairness of learning. At the same time, the use of digital technology can also meet the personalized learning needs of different learners, and enhance the interest and effectiveness of learning. Once again, digital technology has also changed the relationship between teaching and learning, realizing the innovation of learning mode. With the help of artificial intelligence and other advanced technologies, interactive learning between teachers and students and between students and students can be realized, as well as intelligent guidance and evaluation of the learning process, providing learners with more accurate and effective learning assistance. Finally, the introduction of digital technology provides a new path for the evaluation of lifelong learning. In the past, learning evaluation often stayed at a simple level such as examination results, while the use of digital technology can realize the all-round tracking and recording of the learning process and provide more comprehensive and accurate feedback on the learning effect, thus providing a basis for the further advancement of lifelong learning. Therefore, the deep integration of digital technology and lifelong learning not only brings new possibilities for the construction of lifelong learning system, but also provides new ideas for the evaluation of lifelong learning effects[1].

3. Limitations of the development of digital lifelong learning system construction

3.1. Geographic variation in access to digital devices

In some developed regions, high-speed network facilities, as well as advanced digital devices have penetrated into the daily lives of learners, facilitating lifelong learning. However, for some less developed regions, especially in rural areas, the low network coverage, the low penetration rate of digital devices, and the relatively low network quality of learners have constrained learners in these regions from accessing the digital learning system and enjoying the convenience of digital learning. Such geographical differences not only lead to the uneven distribution of educational resources, but also increase the learning gap between learners, posing a challenge to the realization of equitable education. At the same time, this geographical disparity also affects the general promotion and application of the digital lifelong learning system, and hinders the widespread dissemination and acceptance of the concept of lifelong learning in society as a whole.

3.2. Data preservation in a networked environment

The issue of data preservation in the network environment plays a key role in the construction and development of the digital lifelong learning system. The process of lifelong learning generates a large amount of data, covering learners' personal information, learning behavior, learning outcomes and other types of data. How to realize the safe storage, effective use and reasonable analysis of data under the premise of protecting learners' privacy is a problem that needs to be solved urgently. First, the safe storage of data faces external risks such as network attacks and data leakage, as well as internal risks such as equipment damage and operational errors. These risks may lead to the loss, tampering or illegal use of data, posing a threat to the privacy and security of learners. Second, the effective use of data is also a concern. How to transform a large amount of learning data into valuable information in order to provide learners with accurate learning advice and services while safeguarding privacy is a challenging issue.

3.3. Accessibility of high-quality educational resources

At this stage, educational resources are abundant and diverse, but how to ensure that all learners have access to high-quality educational resources remains a serious challenge. The problems involved are not limited to the uneven distribution of educational resources, but also the threshold for their use and the ability of learners to identify, filter and utilize information.

For example, while educational resources on the Internet are plentiful, their quality varies, leaving learners often faced with information overload. For some learners in less economically developed areas, they may not be able to effectively access and utilize these resources due to limitations in the network environment, equipment conditions, and so on. In addition, even if learners have access to a large number of educational resources, they still need to have the appropriate abilities and skills to effectively utilize these resources for learning. This includes, but is not limited to, information recognition skills, learning strategies and skills, etc.

3.4. Lack of public awareness of lifelong learning

Although the concept of lifelong learning has been accepted by more people, it is not common for the public to actually put it into practice in their daily lives and work. The lack of understanding and emphasis on lifelong learning is one of the major reasons for this. Despite the fact that social progress and technological development have made learning necessary in a professional career, in the eyes of many people, learning is still seen as something for students or limited only to the stage of career development and career change. In addition, the public's confidence and ability to use digital learning tools affects their awareness of lifelong learning. While digital learning tools have great potential to improve learning efficiency and broaden learning paths, they also have problems such as difficulty in operation and information security risks, all of which may hinder the public's use of digital learning tools for learning.

4. Effective Strategies for Building a Lifelong Learning System Based on the Digital Era

4.1. Reducing geographic disparities in digital device access

The penetration of digital devices varies significantly from region to region, which poses a challenge to the implementation of lifelong learning. In order to effectively solve this problem, the following strategies are worthy of in-depth study and implementation. First, the construction of digital infrastructure should be strengthened. In remote and economically underdeveloped areas, the geographical differences in access to digital devices mainly stem from the imperfections in infrastructure. The government and relevant departments should increase infrastructure investment in these areas and enhance network coverage and broadband speed to ensure universal access to digital devices. At the same time, more digital learning centers and public computer rooms should be established to provide places for people without digital devices to learn and use. Second, digital literacy education needs to be strengthened. The digital era requires people to have certain digital skills and information literacy, which is crucial for successfully adapting to the needs of lifelong learning[2]. In view of the geographical differences in digital device access, extensive digital literacy training and education activities should be carried out to cover every corner. Especially for those regions that lack access to digital devices, systematic digital literacy training can be provided in the form of setting up training courses or mobile digital classrooms to help people master basic digital skills. Again, incentive policies need to be formulated to promote the popularization of digital devices. The government can introduce relevant policies to encourage digital equipment manufacturers to focus on areas with weak access to digital equipment, and launch low-cost, high-performance digital equipment adapted to local needs. At the same time, it can reduce the cost of digital equipment and increase the incentive for popularization by reducing or exempting taxes or providing financial support. In addition, enterprises and social organizations can be encouraged to actively participate in the donation and circulation of digital equipment to provide convenient access to those in need. Finally, cooperation and resource sharing should be strengthened. In the digital era, cross-regional cooperation and resource sharing are the key to solving geographical differences in access to digital devices. All parties,

including the government, schools, enterprises and social organizations, should strengthen cooperation and jointly establish digital learning resource libraries and platforms to integrate and share high-quality learning resources so that every region can fully benefit. At the same time, cross-regional teacher training and teacher exchange activities can be promoted to improve teachers' digital teaching skills and further facilitate the narrowing of geographical disparities in digital device access.

4.2. Enhancement of data preservation capabilities in a networked environment

In the Internet era, the issue of data preservation in the lifelong learning system is becoming increasingly prominent and will directly affect the efficiency and effectiveness of the lifelong learning system. In the online environment, user data are exposed to risks such as leakage and misuse. Technical and policy support for data preservation in lifelong learning systems needs to be further strengthened. First of all, network security awareness and education should be strengthened. Users generate a large amount of personal and sensitive data in the process of lifelong learning, including learning records, personal information and so on. Strengthening cybersecurity awareness and education is the first line of defense to protect these data. Users need to understand the basic concepts of cybersecurity, common threats and protective measures, as well as to master correct network behavior and operating habits. Relevant departments can carry out network security education activities and provide online tutorials and training courses to help users improve their network security awareness and skills. Second, the research and application of data protection technology needs to be strengthened. In the network environment, data security and privacy are key issues in the lifelong learning system. Related technologies include data encryption, authentication, access control, etc.[3]. Researchers and technologists should work on developing and improving these technologies to provide more reliable and efficient data protection programs. Again, a sound legal and regulatory framework should be established. Lifelong learning in the digital era involves a large amount of personal and sensitive data, so a sound legal and regulatory framework is needed to protect users' data rights. The government should formulate relevant privacy protection laws and regulations, clarify the responsibilities and obligations for data protection, and set up specialized regulatory bodies to monitor and enforce the law. At the same time, the government should also strengthen international cooperation and promote the development of rules and standards for cross-border data flows to ensure the safe and legal flow of data globally. Finally, user participation and control should be strengthened. Users should retain the right to participate in and control their own data during the lifelong learning process. Governments and enterprises should formulate clear privacy policies and user agreements that clearly inform users of the purpose, scope and manner of data collection and use, and obtain their explicit consent.

4.3. Enhancing the accessibility of high-quality educational resources

High-quality educational resources are an important condition for realizing the construction of a lifelong learning system. In the digital age, traditional educational resources can no longer meet people's needs for educational resources. In order to improve the accessibility of the lifelong learning system, the development and sharing of educational resources should be strengthened, and cross-border cooperation and resource integration should be promoted, so as to build more targeted and higher-quality digital educational resources (as shown in Table 2). First, the development and sharing of digital educational resources should be strengthened. The digital era provides a wealth of educational resources, including online courses, teaching videos, e-books and so on. Educational institutions and educators should strengthen the development and production of these resources to provide high-quality digital education content. The government and relevant organizations can provide financial and technical

support to promote the development and sharing of digital educational resources in order to improve the accessibility of high-quality educational resources. Second, cross-border cooperation and resource integration need to be promoted. Access to high-quality educational resources needs to cross the boundaries of different disciplines and fields. Educational institutions, enterprises, social organizations and other parties should strengthen cooperation to jointly integrate and develop educational resources. Again, personalized and customized learning resources should be provided. Learners have different needs and interests, so there is a need to provide personalized and customized learning resources. Educational institutions and educators should understand the needs and background of learners and provide learning resources that meet their characteristics. Lastly, attention should be paid to the issue of digital divide. In the digital era, there are differences in the degree of penetration of digital technology, and some learners face the problem of digital divide. In order to enhance the accessibility of high-quality educational resources, the digital divide problem needs to be addressed. The government and relevant institutions should increase the popularization of digital technology, provide support for digital equipment and networks, and narrow the digital divide.

Table 1 Different types of educational resources in the digital age

Resource type	descriptive	Application Examples
online course	Created by an educational institution or professional, it can be accessed from anywhere at any time.	Various courses are offered through MOOCs (Massive Open Online Courses) platforms such as Coursera, edX, etc.
Instructional Videos	Instructional content provided in video format, either as part of a course or as separate learning materials.	Youtube teaching channels, such as Khan Academy; and online class sites, such as Youku Academy.
e-book	Digitized book resources, which can be textbooks, research papers, or other learning materials.	Digital libraries such as Project Gutenberg, major ebook platforms such as Amazon Kindle, etc.
Online Forum	Provides a platform for online communication and discussion where learners can ask questions, share ideas and solve problems.	Knowledge, academic forums such as ResearchGate, etc.
Personalized Learning Tools	Provide personalized learning resources and pathways based on learners' needs and interests.	Personalized learning platforms such as Knewton, AI Assistants, etc.

4.4. Strengthening public awareness of lifelong learning

Building a lifelong learning system in the digital era requires strengthening the public's awareness of lifelong learning. The enhancement of public awareness of lifelong learning is crucial to realizing the goal of lifelong learning. To realize this goal, the following strategies are key. First, raise the awareness of lifelong learning. The public should recognize the importance of lifelong learning for personal development and social progress, as well as the opportunities and challenges that the digital era offers for learning. The government, educational institutions and the media should work together to convey positive ideas and concepts of lifelong learning through publicity and educational activities. Second, promote the cultivation of a learning culture. The public should develop a positive attitude and culture of learning and regard learning as a continuous way of life. The government, schools and families should work together

to create an environment and atmosphere that encourages learning and promotes the importance and value of learning. Again, learning opportunities and resources are provided in abundance. The public needs learning opportunities and resources that are diverse, flexible and accessible. The government, schools, enterprises and social organizations should work together to provide online learning platforms, community learning centers and training courses to meet the public's learning needs. Finally, the autonomy and initiative of learners should be strengthened. The public should actively participate in lifelong learning and exercise their ability to choose and plan their own learning. The government, schools and social organizations should provide guidance and support to help learners formulate learning goals and plans, and cultivate their habits and abilities of independent learning[4]. To strengthen the public's awareness of lifelong learning, it is necessary to raise the importance of lifelong learning awareness, promote the cultivation of a learning culture, provide abundant learning opportunities and resources, as well as enhance learners' autonomy and initiative. The implementation of these strategies will promote the active participation of the public in lifelong learning and enhance their learning motivation and effectiveness. This will promote lifelong learning and development of individuals and knowledge innovation and sustainable development of society.

5. Value-added evaluation and outlook for the lifelong learning system

5.1. Quantitative and qualitative assessment of the benefits of the digital lifelong learning system

With rapid technological advances, a digital lifelong learning system is gradually taking shape and being widely used, and its benefits can be assessed from both a quantitative and a qualitative perspective. First, from the perspective of quantitative assessment, the benefits of the learning system can be objectively assessed by setting a series of quantifiable indicators, such as the number of learners, the length of time spent on learning and the effectiveness of learning. For example, the flexibility of digital learning makes it possible for more people to access learning, the length of learning time is also enhanced because of flexibility, and the effectiveness of learning can be assessed by means of examination results and project completion. These indicators can be used not only to assess a single learning system, but also to compare different learning systems in order to identify the most effective model. Secondly, from the perspective of qualitative assessment, the effectiveness of digital learning systems can also be assessed through learner satisfaction, participation in learning, and innovation in learning. For example, satisfaction can be obtained through questionnaires and interviews, participation can be observed through classroom interactions and online discussions, and innovativeness can be assessed through learners' innovative works and new learning methods. These qualitative indicators, on the other hand, can reflect the deep-rooted benefits of the learning system, such as learners' interest, motivation, and change in their way of thinking. However, there are some limitations to both types of assessment. Quantitative assessment may overlook factors that are not easy to quantify but are important, such as learners' emotional experience, the social impact of learning, and so on. Qualitative assessment, on the other hand, may be affected by subjective factors, and the results may be influenced by the assessor's viewpoints, attitudes, and other factors. Therefore, these factors need to be fully taken into account when conducting assessments to ensure that they are fair, scientific and comprehensive.

5.2. Trends and prospects for lifelong learning in the digital age

Against the backdrop of the current rapid development and wide application of digital technology, lifelong learning is showing a series of new development trends and prospects. First, the digital era provides a wider range of learning resources and opportunities for lifelong

learning. Through the Internet and digital technologies, individuals can access a wealth of learning content anytime and anywhere, be it online courses, open educational resources or learning communities on social media. This enables learners to choose learning paths and learning resources that suit them and personalize their learning according to their interests and needs.

The digital age offers more diverse learning methods and tools. Traditional face-to-face lectures are no longer the only way of learning, and digital technology provides learners with a variety of learning modes such as online learning, distance education and virtual reality. At the same time, learning tools are also being constantly innovated, such as smart phones, tablet computers, virtual assistants, etc., which enable learners to access and manage learning resources more conveniently and improve learning efficiency and effectiveness. Third, the digital era promotes interaction and cooperation among learners. Through social media, online learning platforms and learning communities, learners can communicate and cooperate with other learners from different regions and backgrounds. Such interaction and cooperation not only promote knowledge sharing and exchange, but also stimulate learners' innovative thinking and problem-solving ability, and cultivate a sense of cooperation and team spirit. Fourth, the digital era emphasizes the importance and continuity of lifelong learning. With the rapid progress of science and technology and the updating of knowledge, individuals need to constantly update their knowledge and skills to adapt to the changes and development of society. The development of digital technology provides individuals with more opportunities and tools for lifelong learning, emphasizing the continuity and long-term nature of learning.

6. Concluding

In the digital age, the construction of a lifelong learning system is a complex and arduous project, which requires not only making full use of modern information technology to realize the informatization and intelligence of lifelong learning, but also giving full play to the main roles of various types of educational institutions in the lifelong education system, at all levels, as well as of different types and levels of learners, so that learners of different types, at different levels and at different levels are able to make full use of all kinds of learning resources and achieve self-development in the effective use of all kinds of learning resources and the flexible organization of all kinds of learning activities.

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