

Changes and Development of Teaching Patterns in Basic Education in the Network Era

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Abstract: Against the backdrop of highly developed information technology in the Internet age, the shape of basic education teaching and learning has undergone systemic changes, contributing to the rise of online education and education digitization. Based on the network era's background, this paper first examines the teaching characteristics of basic education in the network era from the three perspectives of teaching time and space, teaching resources, and teaching information, including the learning mode of inter-temporal learning, massive teaching resources, and rapid updating of educational information. Subsequently, the article provides a detailed exposition of the framework for developing the pedagogical model of basic education, examining this process through the integrated lenses of teaching spaces, pedagogical agents, and instructional methodologies. Finally, three strategies for advancing and reforming teaching and learning patterns are proposed: innovation and improvement of the teaching and learning evaluation system, professional development support and training for teachers, and development and sharing of teaching and learning resources. These measures are intended to adapt basic education practices to the needs of the network era and to ensure their adaptation to the rapidly evolving digital environment.

Keywords: Network era, teaching patterns, basic education, online education

1. Introduction

Because of the widespread use of the Internet and the deep penetration of digital technology, information technology has become the primary force driving societal development in the network era, and it has had a far-reaching impact on all aspects of human society. The widespread use of smartphones and the Internet has resulted in significant changes in people's lifestyles, work modes, and learning approaches. The Internet era, particularly in the realm of education, has fueled the growth of online education, resulting in a significant transformation in the framework of basic education teaching and learning. This shift has introduced previously unseen challenges while also paving the way for novel avenues of educational development. According to statistics, the online education market's revenue is expected to reach \$166.6 billion in 2023, with a market size of \$257.7 billion by 2028, demonstrating the global online education market's rapid growth and enormous potential [1].

The teaching patterns of education are extremely important in practice. The evolving blended learning model is rapidly advancing in an era marked by the widespread dissemination of the Internet and digital technologies. This paradigm shift not only changes the teaching process, methodologies, and environment for educators, but it also introduces new challenges and demands to the entire

educational system. Using the outbreak of novel coronavirus pneumonia at the end of 2019 as an example, countries closed schools to slow the spread of the epidemic. The Chinese Ministry of Education has proposed using online platforms for teaching to ensure that classes are closed without stopping schooling [2]. The implementation of this measure marked the beginning of the largest online education practice worldwide [2]. In the process, it not only demonstrated the great potential of education in the network era and the challenges it faces, but also exposed the shortcomings of the existing education system. Consequently, exploring the transformations in the teaching and learning paradigms of basic education is of paramount importance for enhancing educational quality and fostering equity in the educational landscape.

This study aims to analyze in depth the deep impact of digital technology on basic education, provide a comprehensive perspective on the transformation of education, and explore the technological advances and pedagogical adjustments that are required in this context, with a focus on the changes and developments in the teaching and learning patterns of basic education in the network era.

From a theoretical standpoint, this research aims to enrich the comprehension of educational technology integration, innovative pedagogical methodologies. Furthermore, this study offers fresh perspectives and empirical underpinnings for advancing educational theories.

2. Characteristics of Teaching and Learning in Basic Education

2.1. Definition of the Network Era

The network era refers to the era in which people transfer, exchange, and cooperate with information through the Internet and other digital technologies in the context of highly developed information technology. People can realize various activities such as instant communication, access to huge amounts of information, online shopping, and browsing social media through the Internet. The network era is also known as the era of information explosion and digital transformation, which has profoundly altered people's lifestyles, working styles, and social structures. While network technology is rapidly changing the world, education is also evolving in the direction of informatization, digitization, and globalization.

2.2. Definition of the Basic Education

Basic education is the initial, fundamental stage of education for children and adolescents aimed at developing their basic knowledge, skills and values. According to the International Standard Classification of Education (ISCED), basic education usually consists of two stages: primary education and secondary education [3]. Language, math, science, social science, art, and physical education are common subjects studied in school, as are the development of creativity, critical thinking, communication skills, and teamwork.

2.3. Characteristics of Teaching and Learning in Basic Education in the Network Era

Unlike the traditional education model of unchanging teaching methods, a single course content, "indoctrination" form of teaching, limited teaching resources [4]. This study believes that the network era of basic education has the following characteristics: the teaching mode of teaching mode to break through the limitations of time and space, rich teaching resources, and rapid update of educational information [5].

2.3.1. Cross-Temporal Learning

Teaching in the network era removes time and space constraints. Students can learn whenever and wherever they want using Internet platforms, and they are no longer restricted by traditional classrooms and schedules. Because of the growing popularity of online education, students are no longer required to attend classes at a specific time and location, but instead have more opportunities for fragmented self-learning. Fragmented learning is defined as the disassembly and reconstruction of knowledge, as well as the integration of disparate pieces of knowledge into a systematic knowledge system, and it is also the embodiment of personalized, precise, and independent learning [5]. The fragmented learning mode makes up for the shortcomings of insufficient classroom teaching hours [5]. At the same time, in the network era, students can communicate and collaborate with students and teachers all over the world, overcoming geographical and cultural barriers.

2.3.2. Abundant Teaching and Learning Resources

In the network era, basic education has unprecedented rich teaching resources. The vast amount of educational resources can meet the needs of students of all groups and ages [4]. Unlike traditional text-based teaching methods, educational resources in the Internet era seamlessly combine text, images, videos, and other forms and present them to students in an understandable manner. Online courses, teaching videos, e-books, and learning software are examples of teaching resources. Students can use these resources to personalize their learning and improve their learning efficiency on their own.

2.3.3. Rapidly Updated Educational Information

As a relatively open platform, the network is distinguished by its extensive information, rapid dissemination, frequent updates, and diverse information acquisition methods [4]. In contrast to traditional teaching methods, in which knowledge is transmitted through repetitive classroom lectures by teachers--a time-consuming process--the network era has changed this dynamic. Now, fresh educational content can be swiftly disseminated through internet platforms, significantly aiding teachers and students in quickly learning and mastering new educational material.

3. The Construction of a New Teaching Pattern of Basic Education in the Network Era

In the network era, the new form of basic education teaching leverages the advancements in information technology. This approach integrates artificial intelligence, big data, and other information technologies into basic education, transcending traditional teaching spaces. It facilitates a blended model of online and offline education and fosters diverse and innovative teaching methods. This strategy is aimed at promoting the holistic development of students, reflecting a significant shift in educational paradigms. This study analyzes the construction path of the new teaching form of basic education in the network era from the three dimensions of teaching space, teaching subject and teaching process.

3.1. Reconfiguration of the Teaching Space

A pedagogical space is a social space where human relationships are woven as well as a place or environment dedicated to teaching and learning [6]. Teachers and students share the same physical space in the traditional classroom teaching model, facilitating communication primarily through direct, face-to-face interactions. Simultaneously, the interpersonal physical distance of the teaching location influences the sparsity of teacher-student interactions [7]. Students seated in the front of the classroom usually receive more attention from the teacher if the teacher is always standing at the

podium. Students seated in the back of the classroom receive less attention from the teacher. Seating arrangements are irrational, resulting in differences in learning efficiency between students living in the front and back sections. There are also spatial constraints in student-to-student interactions: desk spacing impedes human interaction. It is evident that spatial limitations significantly influence classroom teaching and learning. This constraint notably affects the dynamics of communication between teachers and students, as well as among students themselves, often leading to disparities in the educational experience [7]. In addition, in the traditional classroom teaching model, the teacher is more similar to the monitor and controller of the students, dominating the whole classroom order [7]. This greatly reduces the frequency of interaction between teachers and students. The advancement of information technology has disrupted the traditional classroom teaching mode's spatial and temporal pattern. Online education was popular during the new crown pneumonia epidemic. Teachers and students are not in the same room during the teaching process, but they can still engage in a variety of teaching activities. The teaching environment, liberated from physical constraints such as podiums, desks, and blackboards, fosters a more natural and enriching interaction between teachers and students. Consequently, the mode of communication has evolved from traditional face-to-face exchanges to a more spatially dynamic dialogue. In addition, the teacher is no longer the student's monitor, but rather is co-located with the student in a virtual space. Physically meaningful places, such as the centers and edges of traditional instructional spatial structures, are missing from instructional spaces [7].

3.2. Reconstruction of the Teaching Subject

The subject of teaching refers to the person or organization that plays a leading role in the teaching and learning process, and is responsible for designing, organizing and implementing teaching and learning activities to guide students' learning and development. Traditionally, the subject of teaching is usually the teacher, who imparts knowledge through teaching activities and controls the manner and pace of teaching. Teachers are active knowledge transmitters in this process, while students are passive receivers. In the current network era, characterized by a plethora of learning resources, students are encouraged to transition from being passive recipients of knowledge to active, independent learners amidst a diversity of learning channels. This shift necessitates a reconfiguration of the traditional teaching paradigm, effectively inverting the roles of teachers and students. The student-centered classroom teaching model, aligned with the human-centered ethos of quality education, represents a crucial approach to fostering independent learning and inquiry skills among primary and secondary students [8].

With the development and popularization of information technology, the role orientation of students should be changed into independent learners. With the rise of various social networking media, teaching resources are all over the network. Teachers are no longer the only way to acquire knowledge. Therefore, students should exercise the ability of independent learning, and stop being passive receivers in classroom teaching, but rather questioners and sharers of knowledge. Through frequent communication with teachers and students, the independent learning process is promoted. In the network era, the teacher's role shifts to that of a guide and companion to students' independent learning, as well as the designer of teaching activities. Teachers are no longer unilateral knowledge transmitters as students' subject positions improve, and the guiding role of teachers in the process of students' learning is becoming increasingly important [8]. The Internet platform provides students with a huge amount of teaching resources, and teachers should screen out quality teaching resources for students to read and study outside the classroom, and guide and accompany students to learn efficiently.

3.3. Reconstruction of the Teaching and Learning Process

The teaching and learning process is defined as an interaction between teachers and students that aims to impart knowledge, develop skills, and shape attitudes. It includes the instructional design of the teacher, the selection of teaching methods, the learning activities of the students, and the assessment of teaching and learning. First and foremost, the scenario-based teaching mode, which combines reality and fiction, can be used to reconstruct the teaching process. Teaching mode is the result of the interaction of various teaching elements, as well as the teaching operation mechanism and the kernel of teaching form [9]. Innovative teaching modes have distinguished network-enabled classroom teaching in the network era. Synergistic teaching is carried out through the Internet platform between online master teachers' live broadcasts and offline teachers' professors. At the same time, teachers monitor students' learning processes via the Internet platform. Furthermore, using the Internet platform's big data analysis, students, teachers, and parents can better track students' learning processes and research learning conditions. The transformation from the original single school offline education to the deep integration of online education and school offline education. Based on the innovation of teaching mode, developing and applying digital teaching resources, forming the environment of digital classroom teaching and promoting the learning process of students [9].

Secondly, the reconstruction of the teaching process can be realized by reconstructing the teaching content to develop students' innovative and problem-solving abilities. The rapid development of digital technology in the network era has raised the bar for students' innovation and problem-solving abilities. As a result, the teaching content should include instructions on how to solve practical problems using what they have learned. Basic programming education and technology education, for example, are carried out to assist students in developing creativity and problem-solving abilities while practicing science and technology.

Finally, the teaching process can be reconfigured by reimagining the teaching environment and infrastructure. The development of a digital teaching and learning process is dependent on a specific teaching and learning physical environment as well as information technology support [10]. Basic education teaching in the context of the network era relies on the integration of virtual and real teaching environments, personalized teaching activities and highly interactive communication and collaboration. A diverse learning platform has been built to facilitate students' efficient learning through the improvement of the teaching and learning environment and the construction of new infrastructures.

4. Change and Promotion of New Teaching Patterns in Basic Education

Based on the foregoing analysis, when teaching pedagogical practices in the context of the network era, a new environment for intelligent learning is created, the roles and responsibilities of teachers and students are reversed, and the barrier of the original teaching space is removed. To realize the comprehensive digital transformation of teaching and learning, this study proposes three strategies to promote the new teaching form of basic education in the network era: innovation and improvement of the teaching evaluation system, support and cultivation of teachers' professional development, and development and sharing of teaching resources.

4.1. Innovation and Improvement of Teaching Evaluation System

The use of digital technology in educational assessment has greatly improved assessment comprehensiveness and accuracy, providing teachers and students with more in-depth insights into learning and teaching. Using digital technology to empower teaching evaluation makes teaching evaluation more comprehensive and accurate. In the network era, artificial intelligence and big data comprehensively analyze students' knowledge mastery, learning process, and classroom learning

behavior. Borrowing high-definition camera equipment and other Internet online clips, teachers can implement the observation of students' learning trends and record students' learning performance. Data analysis provides data support for accurate and personalized learning. To complete the evaluation of students' homework, use homework data collection, homework correction, and grading; use data collection of students' skills to analyze students' mastery of classroom knowledge, to help teachers understand the effect of classroom teaching, and to timely adjust strategies; use data collection and analysis of teaching quality to complete the evaluation of teachers' teaching quality [11].

4.2. Support and Nurturing of Teachers' Professional Development

To meet the basic education teaching needs in the network era, teachers must constantly upgrade their IT skills and teaching abilities. The government and schools should provide appropriate training and support to assist teachers in adapting to the network era teaching environment. First of all, the Government and schools can organize IT training for teachers to improve their IT skills. Teachers can learn how to use online platforms for the development and sharing of teaching resources and how to utilize online technology to improve teaching effectiveness. In addition, the Government and schools can provide appropriate teaching software and hardware equipment to help teachers make better use of network technology in teaching.

Second, the government and schools can collaborate to provide teachers with training in teaching methods to improve their teaching abilities. Teachers can learn how to create innovative teaching activities and guide students in their independent learning. In addition, the Government and schools can organize teaching observations and exchanges for teachers to promote mutual learning and reference among teachers.

4.3. Development and Sharing of Teaching Resources

In the age of the Internet, teachers can develop and share quality teaching resources through online technology, which in turn improves teaching effectiveness and students' interest in learning. Teaching resources can even be shared through synchronized online classes. This has resulted in the optimization of educational resources in schools in remote areas where educational resources are scarce and has assisted remote areas in resolving issues such as a lack of teachers and uneven distribution of educational resources. Teachers can use the network platform to digitize their teaching resources and create rich and diverse teaching courseware and teaching videos. These resources can be shared among teachers via the network, allowing them to learn from one another and improve their teaching skills.

At the same time, network technology also provides teachers with access to global quality teaching resources. Teachers can access teaching resources from all over the world through online platforms to enrich their teaching content and methods. Famous teachers from all over the world, for example, can conduct online teaching lectures using the Internet platform. Teachers can learn advanced teaching skills and methods, as well as update their knowledge in a variety of disciplines, by watching these excellent teaching videos. In addition, teachers can communicate and cooperate with other teachers through the online platform to jointly develop teaching resources and improve the quality of teaching. The creation and sharing of teaching resources help to connect teachers and students from various regions.

5. Conclusion

To summarize, in the context of the network era, the construction and evolution of basic education teaching patterns are critical. Highly developed information technology has reshaped traditional basic

education teaching methods, modes, and resources, causing revolutionary changes in the field of basic education teaching. Teachers and students should always maintain a forward-thinking attitude, promote the realization of independent learning for primary and secondary school students using the technological benefits of the Internet. What's more, they should realize the innovation of the traditional teaching mode by integrating information technology into teaching practice. However, research on the pedagogical form of basic education in the context of the Internet is still in its early stages, and the use of online education poses new challenges and higher standards for teachers' instructional design, teaching methods, and assessment techniques. Future research needs to still need to find further breakthrough points in theory and practice, such as the landing and application of the teaching evaluation system and the innovation of teacher technology.

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