

Research on the Improvement of Digital Literacy of College Teachers

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Abstract: With the rapid development of digital technology and artificial intelligence, higher education is facing profound changes. College teachers, as the core force of education, the improvement of their digital and intelligent literacy is crucial for adapting to the educational needs of the new era, improving teaching quality and cultivating innovative talents. This paper deeply explores the connotation of college teachers' digital and intelligent literacy, analyzes the current situation and challenges of college teachers' digital and intelligent literacy, and then proposes a series of strategies and approaches to improve college teachers' digital and intelligent literacy, aiming to provide useful references and references for the professional development of college teachers and the process of educational modernization.

1. Introduction

In the current digital and intelligent era, emerging technologies such as big data, cloud computing, and artificial intelligence are widely applied in various fields of society, and higher education is no exception. These technologies have not only transformed the teaching environment and means but also had a profound impact on teaching concepts, teaching models, and talent cultivation objectives. As purveyors of knowledge and guides for students' growth, college teachers need to possess corresponding digital and intelligent literacy so as to better play their roles in this educational transformation, provide high-quality educational services for students, and cultivate innovative talents who can adapt to the future social development. Therefore, exploring the improvement of college teachers' digital and intelligent literacy has extremely important practical significance.

2. The Connotation of Digital and Intelligent Literacy

In the era of artificial intelligence, the digital and intelligent literacy of college teachers is rich in connotation, featuring multi-dimensionality and interdisciplinarity. It mainly includes four aspects: digital literacy, data literacy, intelligent literacy, and ethics and security literacy.

Digital literacy encompasses teachers' basic understanding of digital technology, operational abilities, and application awareness^[1]. Specifically, it is manifested as the ability to skillfully use digital tools such as computers, network devices, and teaching software; master the skills of information retrieval, screening, integration, and analysis; possess the ability to create and manage digital resources; and have the ability to communicate and collaborate effectively by using digital technology. For example, teachers can use online teaching platforms to conduct course teaching, enrich teaching content with the resources of digital libraries, and interact and communicate with students through social media.

Data literacy refers to teachers' understanding of the value of data, as well as their abilities to collect, sort out, analyze, and interpret data, and they can make teaching decisions based on the data results. During the teaching process, teachers can analyze students' learning characteristics and needs by collecting data on students' learning behaviors, academic achievements, etc., discover the problems existing in teaching, and then adjust teaching strategies, optimize teaching content, and design personalized learning guidance plans in a targeted manner. For example, by analyzing data

such as students' login time on the online learning platform, learning duration, and homework completion status, teachers can understand students' learning progress and difficulties, so as to provide precise tutoring for students.

Intelligent literacy is mainly reflected in teachers' understanding and application of artificial intelligence technology. Teachers should recognize the application potential of artificial intelligence in the field of education, such as intelligent teaching systems, intelligent tutoring tools, intelligent evaluation, etc^[2]. They should be able to integrate artificial intelligence technology into teaching practice, optimize the teaching process and improve teaching efficiency with the help of intelligent technology, and cultivate students' artificial intelligence thinking and innovative abilities. For example, teachers can use intelligent grading systems to quickly grade students' homework, use intelligent recommendation engines to recommend personalized learning resources for students, and guide students to participate in artificial intelligence-related practical projects and competitions.

In the digital and intelligent environment, college teachers also need to possess ethics and security literacy. This includes understanding the ethical and moral norms in the application of digital technology and artificial intelligence, such as issues like data privacy protection, algorithm fairness, and intellectual property rights^[3]. Teachers should educate students to correctly use digital resources, guard against security risks such as online fraud and information leakage, guide students to establish correct values and moral concepts, and ensure the legal, compliant, and ethical application of digital and intelligent technologies in education and teaching. For example, when using student data for teaching analysis, relevant data protection regulations should be followed and the data should be anonymized.

3. The Current Situation and Challenges of Digital Literacy among College Teachers

Some teachers have begun to actively explore the application of digital and intelligent technologies in teaching. For example, they use online teaching platforms to conduct blended teaching and utilize multimedia resources to enrich the content of classroom teaching. Some colleges and universities have also organized relevant training and teaching and research activities, which have improved teachers' digital and intelligent literacy to a certain extent. However, on the whole, the level of teachers' digital and intelligent literacy is still uneven. Older teachers may be relatively slow in accepting and applying digital technologies, while although younger teachers have a stronger ability to accept new technologies, they still have deficiencies in deeply integrating digital and intelligent technologies into teaching and making data-driven teaching decisions^[4].

Digital and intelligent technologies are constantly emerging and being updated, with new teaching software, platforms and intelligent tools emerging in an endless stream. College teachers need to keep learning and adapting to these new technologies, which poses a huge challenge to their learning ability as well as time and energy.

The traditional teaching concept focuses on the imparting of knowledge, while the digital and intelligent era emphasizes student-center, personalized learning and data-driven teaching. Teachers need to fundamentally change their teaching concepts and reconstruct teaching models and teacher-student relationships, which is a relatively big impact on the long-established teaching mindset. For example, in data-based personalized teaching, teachers should shift from focusing on the common teaching of all students to paying attention to the individual needs of each student, which requires teachers to carry out comprehensive changes in aspects such as teaching design and teaching evaluation.

In addition, the training system for improving teachers' digital and intelligent literacy in colleges and universities is still not perfect enough^[5]. The training content may lack systematicness and pertinence, and the training methods are single, mainly in the form of short-term intensive training or lectures, making it difficult to meet teachers' diverse needs and requirements for continuous learning. Moreover, the follow-up guidance and practical application support after training are insufficient, resulting in teachers having difficulty effectively applying what they have learned to teaching after training. In the teacher evaluation and assessment system of colleges and universities, there is also a lack of sufficient attention and incentives for the achievements and contributions

related to digital and intelligent literacy. The efforts made by teachers in the process of improving their digital and intelligent literacy and the achievements obtained have not been fully reflected in aspects such as professional title evaluation and performance rewards. To a certain extent, all of these have affected teachers' enthusiasm for actively improving their digital and intelligent literacy.

4. Strategies and Approaches for Improving the Digital and Intelligent Literacy of College Teachers

4.1. Enhancement of the Training System

Enhancing the training system is a vital aspect in promoting teachers' digital and intelligent literacy. Among which, establishing a scientific and rational curriculum system is the base. By creating a multi-level training curriculum framework that caters to teachers' diverse proficiency levels and requirements, we can subsequently make innovations in training modalities and achieve the maximization of training results. Meanwhile, in order to ensure that the training can truly help to effectively improve teachers' digital and intelligent literacy, the follow-up and support after the training should also be strengthened to form a complete and sustainable training closed loop.

4.1.1. Establishment of a Multi-level Training Course Framework

Design basic, intermediate, and advanced digital and intelligent literacy training course based on teachers' diverse levels and requirements. The basic courses center around the fundamental operations and applications of digital technologies, such as computer essentials and the utilization of common teaching software. The intermediate courses place emphasis on data literacy and the application of intelligent technologies in teaching, including data collection and analysis and the employment of intelligent teaching tools. The advanced courses zero in on the in-depth fusion of digital and intelligent technologies with teaching innovation, as well as the cutting-edge research in educational artificial intelligence. For instance, provide basic online teaching platform operation training courses for novice teachers, teaching strategy optimization courses based on data mining for teachers with some experience, and seminars on innovative applications of educational artificial intelligence for key teachers^[6].

4.1.2. Diversification of Training Approaches

Adopt a hybrid training mode integrating online and offline training. Online training can take advantage of online course platforms to offer a wealth of learning resources, like video tutorials, electronic documents, and online tests, which enables teachers to engage in self-directed learning and arrange study time flexibly. Offline training, through means such as workshops, hands-on practices, case studies, and group discussions, bolsters the communication and interaction among teachers and hones their practical application capabilities. For example, hold online lectures on the rudiments of artificial intelligence and organize teachers to conduct practical operation drills of intelligent teaching tools and engage in discussions on teaching cases offline.

4.1.3. Reinforcement of Post-training Follow-up and Support

Establish a post-training follow-up service mechanism to regularly evaluate the situation of teachers' application of digital and intelligent technologies in teaching and provide them with technical consultation, teaching guidance, and problem-solving assistance. Teachers can be grouped into a learning community to promote their sharing of experiences and the cooperation and mutual assistance through online communication platforms or regular offline gatherings. For example, establish a dedicated team of tutors for digital and intelligent literacy training to offer one-on-one coaching and support to teachers in dealing with the technical and teaching issues that crop up during teaching practice.

4.2. Driving Innovations in Teaching Practice

4.2.1. Initiating the Reform of Teaching Modes Integrating Digital and Intelligent Technologies

Encourage teachers to explore novel teaching modes underpinned by digital and intelligent technologies, such as teaching models that amalgamate flipped classrooms, project-based learning, and inquiry-based learning with intelligent teaching systems. For instance, by implementing the flipped classroom approach, students can get the learning resources ahead of time with an intelligent learning platform, which allows them to engage in self-directed learning. While during the class, intelligent interactive tools are then utilized for group discussions, addressing questions, and broadening knowledge horizons^[7].

4.2.2 Optimizing the Teaching Process with Digital and Intelligent Technologies

Teachers may capitalize on digital and intelligent technologies to optimize every aspect of teaching. In the lesson planning stage, big data is employed to dissect teaching materials and gauge students' learning status to precisely ascertain teaching aims and pinpointing the key and difficult points in teaching. In the classroom teaching process, a diverse range of teaching presentations and interactions can be actualized via intelligent teaching apparatuses. For example, intelligent whiteboards and interactive screen-casting tools can be utilized to augment the visual appeal and engaging nature of teaching. In the after-class tutoring segment, intelligent tutoring software can be enlisted to offer students personalized learning guidance and correct their homework. To illustrate, teachers can avail themselves of intelligent lesson preparation systems to expeditiously formulate personalized teaching plans and make timely adjustments to the teaching tempo and methods in light of students' classroom performance data.

4.2.3. Encouraging Teachers to Engage in Research on Digital and Intelligent Education and Teaching

Colleges and universities ought to buttress teachers in undertaking research projects related to digital and intelligent education and teaching and inspire them to probe into the ramifications and transformations that digital and intelligent technologies bring about in teaching theories, methods, and evaluations. Through research endeavors, teachers can acquire a profound comprehension of the essence and practical value of digital and intelligent literacy, channel the research outcomes back into teaching practice, and enhance both teaching quality and their own digital and intelligent acumen. For example, projects such as research on the efficacy of artificial intelligence application in subject teaching and the construction of teaching evaluation models predicated on big data can be launched, and corresponding research funds and platforms can be furnished to support teachers.

4.3. Improving the Motivation System and Strengthening School-Enterprise Cooperation and Exchanges

The indicators of digital and intelligent literacy need to be incorporated into the teacher evaluation system. Specifically, teachers' levels of digital and intelligent literacy, the effectiveness of the application of digital and intelligent technologies in teaching, and the outcomes of their participation in digital and intelligent education and teaching research are all taken into account in the teaching evaluation, professional title assessment, and performance appraisal systems. This comprehensive approach ensures a more accurate and holistic evaluation of teachers' capabilities and contributions in the context of digital and intelligent education. For example, in the teaching evaluation, teachers' abilities to conduct teaching activities by using digital and intelligent technologies and to make teaching decisions based on data will be examined, along with students' satisfaction with teaching based on digital and intelligent technologies.

Meanwhile, a special award fund for the improvement of digital and intelligent literacy should be set up to reward teachers who have outstanding performances in enhancing their digital and intelligent literacy. For instance, those who have achieved remarkable results in innovating teaching through the application of digital and intelligent technologies or those who have actively

participated in digital and intelligent literacy training and obtained excellent grades will be rewarded, aiming to stimulate teachers' internal motivation to improve their digital and intelligent literacy.

Colleges ought to enhance their collaboration with technology enterprises and initiate training and practical programs. Enterprise technical experts should be invited to provide digital and intelligent technology training for teachers, which helps teachers stay informed about the latest technological advancements and application scenarios in the industry. Additionally, practical projects need to be carried out, where teachers can get involved in the research and development of digital and intelligent education products of enterprises and the construction of educational informatization projects. Through such practical experiences, teachers' digital and intelligent literacy can be effectively enhanced. For example, partner with AI enterprises to organize training sessions on AI application for teachers, jointly develop intelligent education curriculum materials, and get involved in the construction and optimization projects of school intelligent teaching platforms. Furthermore, arrangements should be made for teachers to attend academic conferences and seminars dedicated to digital and intelligent education. Teachers ought to be actively encouraged to engage in various academic gatherings, including domestic and international conferences, seminars, and forums that center around digital and intelligent education. Through such participation, exchanges and collaborations between teachers and their peer experts and scholars can be effectively enhanced. This, in turn, allows teachers to gain insights into the forefront research achievements and advanced practical experiences within the domain of digital and intelligent education. It serves to stimulate their critical thinking and consequently elevate their digital and intelligent literacy levels as well as their pedagogical competencies.

5. Conclusion

The improvement of digital and intelligent literacy among university teachers is the key to adapting to the needs of the times and promoting the transformation of higher education. By thoroughly understanding the connotations of digital and intelligent literacy, comprehensively analyzing the current status and challenges regarding the digital and intelligent literacy of college teachers, and adopting a variety of strategies and approaches such as improving the training system, driving innovation in teaching practice, establishing an incentive mechanism, and strengthening cooperation and exchanges between schools and enterprises, the digital and intelligent literacy of college teachers can be effectively enhanced. This will not only contribute to improving the teaching quality and professional development level of college teachers but also lay a solid foundation for cultivating high-quality talents with an innovative spirit and digital and intelligent capabilities, thus facilitating the modernization process of higher education. Colleges should attach great importance to the work of improving teachers' digital and intelligent literacy, integrate resources from all parties, and continuously promote the implementation and improvement of relevant strategies to cope with the ever-changing educational environment and social demands.

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