Research on the Current Situation and Improvement Path of Information Literacy of University Teachers in the Digital Age

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Abstract: With the rapid iteration of digital technology, the information literacy of university teachers has become a key factor influencing the quality of higher education. This study, through analyzing the current situation of information literacy among university teachers, found that most teachers have capability deficiencies in obtaining digital resources, data analysis, and the application of teaching technologies, making it difficult for them to adapt to the demands of digital teaching. The research points out that the improvement of information literacy should start from establishing a digital education awareness and a lifelong learning perspective; building diversified and personalized learning paths; improving the training system and incentive mechanism; creating a smart teaching environment and sharing platform; and perfecting the evaluation standards and policy support system.

Keywords: Digital age; University teachers; Information literacy; Improvement path

I. Introduction

With the rapid iteration of digital technology and the integrated application of artificial intelligence, big data, 5G and other technologies, the teaching form in colleges and universities has transformed from traditional classrooms to intelligent ones, and the way of knowledge transmission has shifted from "teacher-centered" to "student-centered". In this process, the information literacy of college teachers not only concerns the improvement of their professional capabilities but also directly affects the quality of talent cultivation. However, in the current teaching practice, some teachers are still stuck at the application stage of "tool usage", lacking sufficient understanding of using digital technology to optimize teaching and mine educational data, and failing to actively pay attention to and learn digital resource technologies. Some teachers also have blind spots in information ethics, lacking systematic thinking on issues such as data privacy protection and online information screening. This has exposed the unevenness of teachers' information literacy - there are "digital natives" who can skillfully use live streaming technology and design personalized teaching through interactive platforms, as well as "digital immigrants" who are trapped in teaching predicaments due to unfamiliarity with online tools. These problems not only restrict the professional development of teachers but also affect the overall progress of the digital transformation of higher education. Against this backdrop, systematically sorting out the current characteristics of information literacy of college teachers in the digital age, analyzing the core problems existing therein, and exploring adaptive improvement paths is not only a response to the practical demands of the digital education strategy but also an inevitable choice

for promoting teachers' growth and enhancing the quality of talent cultivation.

II. Theoretical Framework of Information Literacy for University Teachers

A.The Connotation and Evolution of Information Literacy

Since the concept of information literacy was proposed in the 1970s, its core connotation has been continuously expanding with the advancement of technology and changes in educational scenarios. In 1989, the American Library Association (ALA) defined it as the ability to identify information needs, efficiently retrieve information, critically evaluate information, and legally and ethically utilize information. At this stage, it was more tool-oriented, emphasizing the ability to handle literature resources, and was suitable for the needs of teachers in traditional academic research scenarios.

Entering the digital age, technologies such as the Internet, big data, and artificial intelligence have restructured the logic of information production and application. The core of information literacy has evolved from a "single skill" to an integrated system of "knowledge - skills - attitudes", specifically covering five dimensions: digital tool application ability, information awareness, data literacy, information ethics, and collaboration and innovation ability. Through online collaboration platforms, teachers can jointly develop teaching resources with peers and innovate teaching models (such as flipped classrooms and project-based teaching) to transform information into teaching value.

B. Information Literacy Requirements for University Teachers

The transformation of university teaching from traditional classrooms to smart classrooms in the digital age places higher demands on teachers' information literacy that go beyond basic operation skills.

First, the acquisition and screening of information need to be upgraded to "cutting-edge and precise". Teachers should not only be able to use academic databases to obtain professional resources, but also possess the ability to quickly identify and distinguish false or outdated information from a vast amount of data. Secondly, the integration and innovative application of information have become core competencies. Course design in the digital age should deeply integrate various digital resources such as literature, videos, and data visualization with teaching objectives. Moreover, the use of digital teaching tools should shift from "being able to operate" to "being good at choosing and designing". Information ethics and security awareness are also indispensable bottom lines. Teachers must strictly abide by intellectual property norms, cite the sources when using digital resources, and avoid unauthorized reproduction or use of others' works. These requirements essentially aim to transform teachers from "users of digital tools" to "designers and guides of digital teaching", using information literacy to support the "quality improvement and efficiency enhancement" of teaching, and ultimately achieve the goal of cultivating high-quality talents who can adapt to the needs of the digital age.

III. Current Situation of Information Literacy of University Teachers

A. Overall Level Analysis

Overall, the general level of information literacy among college teachers is in a transitional stage from traditional to digital: basic information application has met the daily teaching needs, but the

ability to handle high-level information and digital ethics awareness still need to be strengthened. The improvement of teachers' information literacy requires a shift from "passively using digital tools" to "actively using digital thinking to optimize teaching", and from "focusing on information acquisition" to "focusing on critical evaluation and creative application of information", which is precisely the weakest link in the current overall level.

B. Comparison of Differences among Different Groups

In the teaching and research scenarios of the digital age, the information literacy of university teachers varies significantly due to their different group characteristics. This variation stems from their growth environment, professional demands, and is closely related to their career development stages.

From the perspective of teaching experience, young teachers, who grew up in the native environment of the Internet, are more proficient in information search, short video editing, and the use of online teaching platforms, and can quickly integrate multimedia information into classroom teaching. However, when faced with a vast amount of information, they often struggle with the lack of in-depth judgment on the credibility of sources and the authenticity of data, thus getting trapped in the dilemma of information discrimination. In contrast, senior teachers, despite having a higher learning cost for information tools, can rely on their teaching experience to integrate traditional literature and digital resources into a systematic knowledge system. However, they are more dependent on traditional teaching methods in terms of information dissemination and less likely to use online interactive tools. The differences in the disciplinary dimension are more in line with the essential needs of the profession. Teachers in the liberal arts (such as literature and linguistics) focus on "content interpretation," while those in science and engineering (such as computer science and mechanical engineering) are more focused on "technical practice." The differences in the dimension of professional title point to the task emphasis at different career development stages. Assistant professors and lecturers, as the front-line teaching force, have their information literacy concentrated on "teaching application," while associate professors and professors are more concerned with "innovation and integration." These differences reflect the "stratified demands" of university teachers' information literacy: young teachers need to make up for the deficiency in "information discrimination," senior teachers need to enhance their "technical application" capabilities; liberal arts teachers need to strengthen "technical practice," and science and engineering teachers need to improve "content interpretation"; front-line teachers need to deepen their "educational value" thinking, and senior scholars need to expand the boundaries of "innovation and integration."

C. Existing Problems and Constraints

In the digital age, the information literacy problems of university teachers are first reflected in their weak information awareness. Many teachers, although in an information-based teaching environment, still teach in the traditional way, lacking sensitivity to the acquisition of digital resources. They fail to actively obtain, screen, integrate and transform the massive information into teaching and research materials. Secondly, the insufficiency of information processing and application capabilities is another prominent issue. Most teachers' application of digital technology is still limited to basic operations. They are generally not proficient in the online classroom interaction

functions required for blended teaching, the course production on MOOC platforms, and the data visualization tools essential for research. In the practice of blended teaching, some teachers are unable to accurately use the teaching feedback functions of the platform, making it difficult to dynamically grasp students' learning situations. In research, non-computer science teachers, due to the lack of programming or statistical knowledge, are often reluctant to use big data analysis and AI-assisted literature screening technologies, which hinders the efficiency and innovation of research results. At the same time, information security and information ethics are also worthy of attention. Many teachers lack awareness of data encryption and information norms, and occasionally cause the leakage of personal research data or unauthorized citation of others' digital academic achievements, or randomly forward unverified academic information on the Internet.

The factors restricting the improvement of teachers' information literacy are multi-faceted. At the institutional level, most universities have not incorporated information literacy into the teacher evaluation system. The promotion of professional titles still mainly relies on traditional indicators such as papers, research projects, and skills competitions. The achievements in information literacy, such as online course construction and digital teaching cases, have not received sufficient attention, which leads to a lack of motivation for teachers to improve. Meanwhile, the construction of digital resources lags behind. In some universities, the database coverage is incomplete, and the compatibility between teaching platforms and educational administration systems is poor, increasing the burden on teachers to use digital tools. In terms of the training system, the current training mostly focuses on theoretical explanations and does not design specialized content based on the characteristics of different disciplines. At the individual level, the heavy teaching and research tasks leave teachers with little time to learn digital information technology. Some teachers are intimidated by the rapid iteration of information technology. In addition, the traditional teaching and research model in universities has a limited acceptance of digital innovation. The skepticism of senior teachers towards online teaching, along with the cultural atmosphere that values experience over innovation, also hinders the improvement of information literacy.

IV. The Pathways for Enhancing Information Literacy of University Teachers in the Digital Age

A. Conceptual Renewal: Establishing Digital Education Awareness and a Lifelong Learning Outlook

The educational ecosystem in the digital age is undergoing profound changes. Technologies such as big data and artificial intelligence not only reconstruct the way knowledge is transmitted but also drive the transformation of educational concepts from "teaching-centered" to "learning-centered". For university teachers, this transformation requires them to break free from the cognitive limitation of regarding digital technologies merely as "information tools". They need to start from the logic of nurturing students and understand the deep reconstruction of the entire teaching process and evaluation system by digital information technology: tracking students' learning trajectories through data analysis, precisely identifying individual differences to provide personalized support; breaking the limitations of time and space through virtual simulation

experiments, transforming abstract professional knowledge into perceptible and interactive practical teaching; and building cross-disciplinary teaching communities through online collaboration platforms to promote the development of students' cognitive thinking and cooperative abilities.

Corresponding to the digital education awareness is the reshaping of the concept of lifelong learning. The iteration speed of digital technology far exceeds the update cycle of traditional educational knowledge, which puts dynamic requirements on the knowledge structure of university teachers. Lifelong learning is no longer just a slogan but an inevitable choice for teachers to cope with professional challenges. It is not centralized general training but regular learning integrated into daily teaching and research. The value of this concept update lies in the improvement of information literacy. If technical operation is the "manifest ability" of information literacy, then digital education awareness and the concept of lifelong learning are the "underlying logic" - only by recognizing the value of digital education in promoting students' all-round development will teachers actively explore the deep integration of information technology and teaching; only by regarding lifelong learning as an intrinsic need for career development can teachers remain sensitive in the face of technological iterations and avoid falling into the trap of "using new technologies with old thinking".

B. Personal Development: Building Diversified and Personalized Learning Paths

In the digital age, the improvement of information literacy among university teachers should be based on their individual professional needs to build an adaptive learning framework. Teachers with different disciplinary backgrounds and teaching experiences have significantly different demands for information skills: young teachers urgently need basic abilities such as "introduction to digital teaching tools + classroom interaction design"; senior teachers focus on advanced applications such as "teaching data analysis + interdisciplinary integration projects"; teachers in the liberal arts need to master "integration of digital humanities resources", while those in science and engineering need to be proficient in "virtual simulation experiments, cloud collaboration of engineering software (such as online CAD)". This demand difference requires learning resources to shift from "standardized supply" to "diversified configuration": on the one hand, integrate online platforms, school-based training, and enterprise practices to form a full-chain resource pool of "online learning theory, offline practicing skills, and enterprises for deepening"; on the other hand, generate teachers' personal learning portraits through information literacy diagnosis and precisely recommend "step-by-step" learning content: for teachers with "weak information integration ability", recommend courses such as "classification and copyright management of digital resources"; for teachers with "insufficient innovative application", guide them to participate in "smart classroom transformation" projects and learn in practice to track students' learning data with Python and develop experimental courses with VR.

Diversified and personalized learning paths represent a return to "teacher-centeredness"—respecting the disciplinary characteristics, teaching experience differences, and demand diversification of teachers, and transforming information literacy from a "technical indicator" into a "teaching innovation tool". When teachers learn according to their own needs, practice in response to their own problems, and create in their own ways, information literacy in the digital age can truly be internalized

as a core ability that "empowers teaching and nourishes students".

C. Organizational Support: Improving Training Systems and Incentive Mechanisms

The enhancement of information literacy among university teachers in the digital age cannot be achieved without systematic support at the institutional level. Among these, improving training systems and incentive mechanisms are the core approaches. In terms of training system construction, it is necessary to break away from the general training model and shift towards a precise design based on "needs and classification". For teachers of different disciplines and teaching experience, a gradient training content should be set: new teachers focus on the basic application of digital tools, young teachers emphasize the deep integration of digital technology and courses, and senior teachers aim at the design of cross-disciplinary digital project-based learning. In terms of form, a "online + offline", "theory + practice" hybrid model should be adopted: online, an "autonomous learning system" should be built relying on MOOCs and school-based micro-lesson platforms, allowing teachers to select courses based on their needs; offline, workshops, teaching salons, and cross-school joint discussions should be held.

The incentive mechanism is to transform information literacy from an "optional ability" to an "essential requirement" and bind it to teachers' professional development. On the one hand, information literacy should be included in the performance assessment, job appointment, and title evaluation index system for teachers, with specific requirements for "digital teaching workload" and "digital output" (such as the number of online courses built). On the other hand, the title of "Information Literacy Model Teacher" should be established, and teachers who perform outstandingly in digital teaching should be given rewards such as training and further education opportunities. At the same time, a "results display platform" should be built, and "Digital Teaching Open Day" and "Smart Classroom Case Exhibition" should be held regularly to make the application results of teachers' information literacy visible, and to stimulate their intrinsic motivation through peer observation and student feedback. In addition, the organization needs to establish a closed-loop mechanism of "demand research - training implementation - effect evaluation - iterative optimization". Through questionnaires and interviews, the pain points of teachers in digital teaching should be collected to adjust the training plan for the next year; the effect should be evaluated through student satisfaction surveys and teaching data statistics; the implementation effect of the incentive mechanism can be tracked through the "Teacher Information Literacy Enhancement Index" (such as the usage rate of digital tools), and if the attractiveness of a certain type of reward decreases, it should be adjusted to a form that better meets the needs of teachers (such as converting material rewards into "academic leave + digital information teaching project funding").

D. Environmental Creation: Building a Smart Teaching Environment and Sharing Platform

In the digital age, smart teaching environments and sharing platforms are important physical and digital carriers for enhancing the information literacy of university teachers. The core lies in integrating the cultivation of information literacy into all scenarios of teachers' daily teaching and professional development through the empowerment and resource linkage of digital information technology.

From the perspective of the hardware environment, the construction of smart teaching

Spaces should follow the principle of "sufficiency and applicability", avoiding the accumulation of technology. For instance, smart classrooms can capture real-time interaction data between teachers and students during the teaching process through devices such as interactive whiteboards, smart desks, and classroom behavior analysis systems. By viewing the "teaching behavior portrait" generated by the system, teachers can quickly grasp the teaching effect and then learn to optimize teaching design with data-driven thinking. This kind of "perceivable and feedable" environment not only lowers the threshold for teachers to use information technology, but also guides teachers to actively apply data to enhance the pertinence of teaching, gradually forming the information literacy habit of "data-driven teaching". In the construction of the shared platform, design "personalized and interactive" functions, integrate high-quality digital resources within the region, and build a "Smart Teaching Resource Sharing Center", integrating MOOCs and micro-lessons. Virtual simulation experiments and information tool tutorials are classified and marked by subject, educational stage and application scenarios. Teachers can quickly obtain the resources they need through keyword search. In addition, establishing a "teacher collaboration space" and supporting cross-school and cross-disciplinary teaching and research communities to carry out online activities can help teachers break through individual cognitive limitations and enhance their information exchange and innovation capabilities.

The core objective of the smart teaching environment and sharing platform is to create a "practical field" for teachers - so that the improvement of information literacy does not rely on "training courses", but on "daily use". When teachers optimize teaching with data in smart classrooms, collaborate and innovate with peers on shared platforms, and solve practical problems through personalized recommendations, information literacy will transform from a "skill" to a "thinking", truly supporting high-quality teaching in the digital age.

E. Institutional Guarantee: Improving Evaluation Standards and Policy Support System

The enhancement of information literacy among university teachers in the digital age requires a solid institutional foundation, with the improvement of evaluation standards and policy support systems being a key link. It is necessary to establish an evaluation index system that is stratified and categorized, and closely aligned with digital teaching practices: for young teachers, the focus should be on their proficiency in using digital teaching tools, their ability to design digital lesson plans, and their capacity for interaction with students through social media; for senior teachers, attention should be paid to their performance in the co-construction and sharing of digital resources and the innovation of cross-disciplinary digital teaching models. At the same time, the evaluation approach should shift from a "result-oriented" to a "process + result" model, using learning analytics technology to track the application of digital technologies throughout the entire process of lesson preparation, classroom implementation, and post-class feedback.

The improvement of the policy support system should focus on top-level design, incentive mechanisms, and dynamic adjustment. In terms of top-level design, educational administrative departments should incorporate information literacy into the framework of the "Digital Education Strategy Action", issue specialized guiding opinions, and clearly stipulate that information literacy is a necessary condition for the evaluation of university teachers' professional titles and

performance appraisals; at the school level, detailed implementation rules should be formulated, integrating the improvement of information literacy into teachers' development plans, and setting up special funds for digital technology training and teaching innovation project support. In terms of incentive mechanisms, teachers with outstanding performance in digital teaching should be given both material and spiritual incentives. This institutional design not only clarifies the "evaluation yardstick" for information literacy but also stimulates teachers' intrinsic motivation to improve their information literacy through policy guidance, while taking into account the development needs of different teachers, truly integrating the teaching requirements of the digital age into the entire process of teachers' professional development.

V. Conclusion

In the current digital era, the information literacy of university teachers generally shows the feature of "basic skills being up to standard but insufficient in-depth application". Most teachers can skillfully use common digital tools to complete regular teaching tasks, but they have obvious deficiencies in high-level skills such as data mining, processing, analysis, and integration, which cannot support the demands of personalized teaching and precise research. Meanwhile, there are significant differences in information literacy among different professional groups of teachers. To address this situation, improving the information literacy of university teachers requires the establishment of a path system characterized by "demand orientation, full integration, and multi-faceted support". Firstly, it is necessary to promote stratified and categorized training, designing differentiated contents based on teachers' disciplinary backgrounds and teaching experience stages. Secondly, information literacy should be integrated into the entire process of teaching and research, promoting practical improvement through "project-driven" approaches. Thirdly, the evaluation and incentive mechanism should be improved, incorporating the performance of information literacy into the indicators for professional title evaluation and teaching assessment to stimulate teachers' subjective initiative. Fourthly, a supportive environment should be created by integrating online and offline digital sharing resources and building digital communication platforms to facilitate the exchange of experience and collaborative improvement.

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