Research on Practical Dilemmas and Countermeasures of Improving University Teachers' Digital Literacy under the Background of Educational Digitization

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Abstract: With the continuous progress of educational informatization, the digital literacy of university teachers becomes an important factor influencing the teaching quality, academic innovation and talent training. This paper intends to investigate the actual difficulties that university teachers meet in enhancing their digital literacy and put forward corresponding countermeasures. By means of literature survey and theoretical consideration, it is found that the present problems mainly consist of the lack of awareness of digital transformation, the uneven digital skills, the poor combination of technology and education, the insufficient institutional assistance and the imperfect evaluation systems. In order to solve these problems, universities should reinforce the digital literacy education, perfect the platform construction, adjust the incentive schemes and promote the comprehensive integration of digital technology into teaching, research and administration. The study shows that improving the digital literacy of university teachers is not only a technical issue but also a comprehensive reform covering concepts, abilities, resources and governance.

***Keywords*:** educational digitization; university teachers; digital literacy; teaching innovation; higher education reform

1. Introduction

Educational digitization has become an important trend in the reform of higher education worldwide. Various technologies such as digital platforms, artificial intelligence, learning analysis, virtual simulations and online teaching materials modify the methods of knowledge creation, transmission and assessment. During this change, university teachers are not only knowledge conveyors but also designers of digital learning conditions, managers of blended teaching both online and offline, and mentors of students' digital learning. Nevertheless, there are still several practical problems in enhancing the digital literacy of the teachers. Some teachers lack understanding of the digital transformation, some do not receive adequate systematic training and some apply the digital tools in a superficial manner. Hence, it is essential to investigate the practical issues and corresponding measures for improving the digital literacy of university teachers under the context of educational digitization, in order to promote the high-quality development of higher education.

2. The Connotation and Value of University Teachers' Digital Literacy

University teachers' digital literacy means the overall skill to comprehend, choose, use, assess and innovate digital techniques in teaching, investigation, academic exchange and educational administration. It is not only about operating digital instruments or programs, but also involves digital awareness, information manipulation capability, digital teaching plan ability, awareness of digital ethics, communication ability in the Internet and the ability for lifelong professional improvement. In the educational process of informatization, the teachers should convert digital devices into valuable educational materials instead of merely considering technology as an additional aid.

The benefit of enhancing teachers' digital competence is shown in many respects. It enables teachers to make improvements in teaching materials, to widen teaching techniques and to offer students more varied learning opportunities. It also promotes individualized learning, since teachers can utilize the learning information to know the progress of the students and to modify the teaching approaches. In scientific investigation, digital competence assists teachers in making better use of databases, academic websites, analysis software and cooperative networks. At the administrative level of the university, digitally competent teachers can take an active part in curriculum reform, teaching assessment and quality control. Thus, digital competence is a crucial professional ability for university teachers in the current development phase of education.

3. Practical Dilemmas in Improving University Teachers' Digital Literacy

3.1 Insufficient Awareness of Digital Transformation

Some university teachers regard digital technology as an additional means instead of a necessary component of

educational reform. In their teaching practices, digital media are mostly applied for uploading teaching materials, assigning homework or informing about information, however, the significant roles such as evaluating learning, discussing, organizing resources and assessing the process are not fully exploited. This shows a discrepancy in principle: although the teachers employ digital tools in their job, they have not formed a digital teaching concept yet.

The insufficiency of awareness also results in the inactive involvement in digital construction. During the promotion of online courses, smart classrooms or digital resource websites by the universities, some teachers merely comply with the administrative instructions and do not show active investigation. Consequently, the digital teaching becomes formalized and cannot greatly enhance the teaching effectiveness.

3.2 Uneven Digital Competence among Teachers

There is a great difference among university teachers in respect to their age, academic field, teaching experience and availability of training resources, resulting in varying degrees of digital competence. Some young teachers are skilled in using digital aids, however they might be insufficient in applying them to achieve the educational objectives. On the other hand, some experienced teachers possess good academic and teaching skills but find it difficult to cope with the new systems, intelligent devices and data-oriented teaching assessment.

Disciplinary differences also affect the growth of digital literacy. Teachers in engineering, computer science and related disciplines may have better technical adaptation, while teachers in humanities and some traditional subjects need more help in selecting suitable digital tools. This difference results in the difficulty for universities to implement a consistent method in the digital transformation.

3.3 Weak Integration between Technology and Pedagogy

A important issue is that some educational methods based on technology neglect the teaching techniques. Teachers may apply video lessons, online tests, virtual classes or intelligent systems, however, these means are not always associated with the teaching aims, individual differences of the students and the evaluation of teaching. If technology is detached from the teaching techniques, the classroom communication may be divided and the students may suffer from information overload.

Effective teaching by means of digital methods needs the teachers to modify the teaching procedures. Before the class, digital materials should assist students in previewing and inquiring; during the class, technology should facilitate interaction, solve problems and build up knowledge; after the class, the system should give feedback and help in individualized learning. But, many teachers have not been trained thoroughly in the digital instruction design, which reduces the educational significance of the technology.

4. Causes of the Practical Dilemmas

4.1 Training Systems Are Not Sufficiently Targeted

Despite the organization of digital teaching training in many universities, some activities are still vague and scattered. They mainly concentrate on the operation of the platform or the introduction of software, but ignore the disciplinary features, teaching situations and the practical difficulties of the teachers. The teachers might gain knowledge on using a certain tool in a brief period, however, they may not be aware of its application in curriculum planning, classroom discussion or evaluation.

In addition, the training is usually discontinuous. Digital literacy cannot be acquired by means of a single lecture or short-term workshop. It needs continuous practice, communication with peers, teacher's reflection and professional advice. If the training is not linked to the daily teaching work of the teachers, it is hard to achieve lasting results.

4.2 Institutional Support and Resource Allocation Are Inadequate

The enhancement of teachers' digital ability is based on the institutional assistance. If only the universities make the teachers use digital media without offering continuous technical help, sufficient educational materials and teaching assistants, the teachers' interest will be decreased. In some universities, the platform features are too complicated, the technical assistance is too slow and the data systems are not linked properly, which makes the teachers' work load heavier rather than lighter.

Resource allocation is important for enhancing digital literacy. Adequate high-quality digital teaching needs intelligent classrooms, online information banks, data processing systems and expert assistance groups. If there are not enough resources, the teachers may be eager to apply new methods, but will lack the necessary facilities. Consequently, the problem is not only due to the individual teachers, but is closely connected with the university administration and resource building.

4.3 Evaluation and Incentive Mechanisms Are Imperfect

In the present evaluation system of some universities, the achievements of teachers are mainly evaluated based on the

quantity of research work instead of the innovation in teaching. The advantages of digital teaching methods, the construction of online resources, the combination of different types of courses and the analysis of learning data may not be sufficiently taken into account in the evaluation of their performance, in the promotion for professional titles or in awarding teaching prizes. Such a condition prevents teachers from dedicating time and energy to improve their skills in using information technology.

At the same time, some evaluation systems emphasize the quantitative criteria like the quantity of online materials, the frequency of platform login or course clicks, but neglect the teaching quality, the students' progress and the learning efficiency. If the evaluation procedures do not show the true worth of digital teaching, the teachers might concentrate on the surface data rather than on effective educational enhancement.

5. Countermeasures for Improving University Teachers' Digital Literacy

5.1 Building a Hierarchical and Continuous Training System

Universities ought to set up a stratified training program according to the different abilities and requirements of the teachers. The beginners need to be trained mainly on the fundamental operation of the platforms, information search, online discussion and digital resource organization. For those with some skills, the training should concentrate on the combination of traditional and new methods of teaching, the analysis of learning data, the evaluation using digital means and the implementation of interactive teaching techniques. For the experienced teachers, the university could offer further training in artificial intelligence, virtual reality, the construction of digital curricula and interdisciplinary teaching reform.

Continuous training is necessary. Universities can establish a teacher's learning group, conduct periodic seminars, promote peer evaluations, and offer professional advice. The teachers not only need to master the use of electronic devices but also consider the influence of technology on the objectives of teaching, the involvement of students and the assessment of learning. Thus, the digital literacy training can be improved from the aspect of operational techniques to that of professional growth.

5.2 Promoting Deep Integration of Digital Technology and Teaching Practice

The improvement of digital literacy should be carried out according to practical teaching cases. Universities should encourage teachers to adjust their lessons according to the digital learning principles. Teachers can provide preparatory study materials via the internet, use classroom communication tools to promote discussions and questions, and apply learning analysis to understand the students' difficulties. The digital technology should help to accomplish the teaching purposes and facilitate the students' progress rather than replace the teachers' educational judgment.

Teachers must consider the coordination between the use of electronic materials and personal contact. The application of educational technology does not indicate that teaching is completely automatic. University teaching still needs the supervision of academics, emotional exchange, moral education and training in logical thinking. The electronic devices should assist the teachers in establishing more comprehensive learning conditions, instead of reducing the intensity of the teacher-student relationship.

5.3 Improving Institutional Support and Evaluation Mechanisms

Universities ought to give substantial assistance to the enhancement of teachers' digital literacy. This involves establishing reliable digital systems, enhancing the technical service network, developing common teaching materials and reducing excessive administrative work. Expert groups should assist teachers in overcoming technical difficulties, setting up digital courses and examining learning data.

Evaluation systems ought to be revised. Universities should take into account the electronic teaching methods, the significance of internet resources, the assistance provided to the students during their studies, the enhancement of teaching strategies and the digital ethics education in assessing the teachers. Moreover, the reward schemes should motivate the teachers to implement the electronicization of teaching. If increasing the digital skills is associated with their professional growth, the teaching evaluations and institutional aids, the teachers will be more probable to participate in the educational transformation towards informatization.

6. Ethical and Sustainable Development of Teachers' Digital Literacy

The improvement of university teachers' digital literacy should consider the ethics and sustainability. During the digital teaching process, teachers frequently collect, analyze and use the students' learning information. Therefore, they must be aware of data confidentiality, information security, academic honesty and fair algorithms. The teachers should avoid

depending too much on digital media and should teach the students to make proper use of the digital resources.

Sustainable development requires that digital literacy be included in the continuous professional improvement of teachers. With the fast progress of artificial intelligence and educational technology, the digital competence of teachers needs to be updated constantly. Universities should establish an open and favorable environment, motivating teachers to investigate new technologies at the same time as preserving the rationality of education. Only by integrating technology, pedagogy, ethics and humanistic concern, can digital literacy effectively assist in the high-quality development of higher education.

7. Conclusion

Due to the trend of educational informatization, it is an important issue in the higher education reform to enhance the digital literacy of university teachers. This research indicates that the teachers now encounter difficulties like low digital awareness, different levels of ability, insufficient integration of technology with teaching methods, lack of institutional assistance, and imperfect assessment systems. These issues are not independent but are closely connected with the teacher's development, university administration, resource distribution and educational atmosphere.

To accomplish these tasks, universities need to establish a hierarchical and continuous training system, integrate digital technology into teaching practice deeply, enhance institutional assistance, modify the evaluation and incentive systems, and strengthen the education of digital ethics. The significance of our research is to recognize that the digital literacy of teachers is not only a technical skill, but a comprehensive professional quality including educational ideas, teaching plan designing, data consciousness, innovative ability and ethical obligation. Further studies may investigate the specific digital literacy standards for each discipline and create more efficient assessment tools to promote the lasting professional development of university teachers.

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