Research on the Connotation of Digital Empowerment Classroom Teaching Evaluation

Lei Zhai [1,a], * Wei Lu[2,b]

[a]376515521@qq.com, [b]luwei@gupt.edu.cn

[1]Guangzhou Xinhua University, Department of Teaching and Research of , Medical Public Courses, Guangzhou,China
[2]Guangdong Vocational College of Post and Telecom, Communication and Information Engineering Institute, Guangzhou,China

Abstract—Facing the national education strategic deployment, exploring the classroom teaching evaluation in the context of the digital transformation of higher education in China is a forward-looking research. Digitalization provides a major development opportunity for the innovation and transformation of teaching evaluation, promoting the collaboration between teachers and students and the organic combination of multiple subjects in terms of evaluation concepts, the process and dimensions of digital technologies such as virtual reality, artificial intelligence, and machine vision to assist in evaluation, and the digital transformation of teaching evaluation from behaviors, resources, and concepts in terms of evaluation content. According to the characteristics of classroom teaching, the analysis of teaching evaluation, and the rethinking of the essence of education, the personalized development needs of students, and the reshaping of students' ideological value, this study clarifies the key elements of digitally empowered classroom teaching evaluation, and constructs a digital classroom teaching evaluation model of "multi-driven, feedback decision-making" through innovative evaluation concepts and rich evaluation methods.

Keywords-component; Digitalizationl; Teaching Evaluation; Multiple Drives; Feedback Decisions

1. INTRODUCTION

The classroom is not only a physical space, but also a social environment for students and teachers to communicate, cooperate and interact. Teachers play a role of guidance, support, and feedback in the classroom, helping students understand knowledge and concepts, guiding them to think and analyze problems, and providing targeted guidance to facilitate student learning and development through effective instructional design, appropriate instructional strategies, and advanced teaching resources.

With the rapid development of information technology and digital technology, it is a great challenge for teachers and educators to effectively use technology to improve teaching experience, teaching effectiveness, and teaching evaluation. Speaking at the 2022 Transforming Education Summit, UN Secretary-General António Guterres said: "The digital revolution is one of the most powerful tools for teachers to teach and students to learn, and we must democratize digital literacy for education and other enabling goals, with a special focus on nurturing and

ITEI 2023, November 24-26, Zhengzhou, People's Republic of China

DOI 10.4108/eai.24-11-2023.2343687

supporting teachers to use technology effectively[1]. Huai Jinpeng, Minister of Education of China, also pointed out at the 2023 World Digital Education Conference that a new round of scientific and technological revolution and industrial transformation is developing in depth, and digital technology has increasingly become a leading force driving fundamental changes and all-round reshaping of the way of thinking, organizational structure, and operation mode of human society, and digital transformation is an important carrier and direction of education transformation around the world [2].

In summary, how to reconstruct the development ecology of higher education with digitalization has become the core content of digital transformation of higher education. In view of the digital transformation and upgrading of higher education, the Ministry of Education has established three main directions, among which "adhering to education-oriented and empowering high-quality development" aims to promote the digital transformation of higher education forms, teaching methods and talent training, realize the leap from large-scale standardized training to large-scale personalized training, cultivate technical and skilled talents with digital thinking and capabilities, and serve the high-quality development of local and regional economies and societies. At present, the training system of various professional talents in China tends to be similar, the classroom teaching evaluation system ignores objectivity and process, and the investment in talent training and evaluation system improvement of colleges and universities in various regions also lacks scientific basis, which is not conducive to the rational allocation of resources, and cannot well serve the digital transformation and regional economic development. This paper will make a reasonable plan from how to build a sound and scientific classroom teaching evaluation system, and take professional courses as an example for analysis.

2. ANALYSIS OF CLASSROOM TEACHING EVALUATION SYSTEM

2.1 Reflections on the traditional teaching evaluation system

The classroom teaching evaluation system is a mechanism used to evaluate the quality and effectiveness of teaching, and it plays a vital role in the quality assurance and continuous improvement of classroom teaching. The teaching evaluation system of the traditional classroom mainly evaluates from five aspects: student evaluation, peer review, teaching achievement evaluation, administrative and management evaluation (teaching supervision) and student performance, and finally evaluates the teaching effect of a course through comprehensiveness, including the completion of teachers' teaching implementation, the achievement of teaching goals, and the acquisition of students' knowledge. There are certain drawbacks and problems in the actual operation of the above-mentioned classroom teaching evaluation mode:

- The evaluation system is teacher-led. In traditional classroom teaching, teachers indoctrinate one-way, students passively follow, and cannot actively participate in knowledge construction and try to solve problems, and the cultivation of thinking ability and exploration spirit cannot be implemented [3]. This system can easily lead to students' passive acquisition of knowledge and passive acceptance of ideas, ignoring the cultivation of students' active learning, innovative thinking and critical thinking, and the above abilities are the core qualities of talent training recognized by international higher

education. In 2022, the Ministry of Education issued the Several Opinions on Deepening the Construction of World-class Universities and First-class Disciplines, emphasizing the need to focus on the cultivation of critical thinking and innovation capabilities, and to cultivate high-level interdisciplinary talents for high-level scientific research and innovation[4]. Scholar Yao Sui et al. also believe that critical thinking education for college students is not only the acquisition of technical level, but also the primary criterion for cultivating students' moral spirit and thinking habits of self-criticism, openness and rationality, truth-seeking practice, prudence and meticulousness, dialectical tolerance, and innovation and development [5].

- Formative assessment is outcome-oriented. In classroom teaching, process goals help students clarify their learning tasks, and achieve self-regulation and self-supervision according to their own characteristics and learning progress. When students have a clear goal, they will stimulate their internal motivation to drive themselves to take action, so as to narrow the gap with the goal and finally achieve the learning goal. However, the "process evaluation" practiced by most universities in China is mainly based on the scoring of tests in the learning process, and the scores are included in the overall evaluation of students' grades, and the purpose of evaluation is still to judge the learning results rather than to promote teaching and learning [6].

- The application of digital technology is not accurate. With the blowout development of digital and intelligent technologies such as big data, artificial intelligence, and machine vision, a large number of new applications have been implanted into various educational links such as education and teaching evaluation. For example, the blind introduction of digital technology and the construction of VR/AR, PAD and other types of smart classrooms, but the teaching process and evaluation mode are still unchanged, resulting in the teaching quality completely falling short of expectations; the widespread application of big data technology also restricts the thinking of some teachers, and directly adds data analysis on the basis of no reasonable teaching design and personalized teaching activities, which solidifies the teaching evaluation.

2.2 The motivation of the digital empowerment of the teaching evaluation system

With the in-depth exploration and extensive attempts of various universities in China to empower the application of digital technology in education. Scholars Liu Baocun tried to apply digital technology to learning situation analysis and early warning, video behavior analysis, and electronic files, scholars Qian Mingxia and Zhao Leilei established a multi-evaluation mechanism based on human-computer collaboration through multimodal data collection, effectively paid attention to the growth needs and academic development of different individuals, and promoted human-computer collaboration among multiple subjects such as schools and society, and scholars Mao Gang, Zhou Yueliang, and He Wentao tried to build an evaluative learning model based on big data application to collaborate on teaching evaluation, teaching activities, and teaching design. Scholars Wang Huashu and Liu Shijie reconstructed the teaching evaluation logic, introduced big data and virtual reality technology, and established a holographic evaluation map to realize the full tracking of the student evaluation process. From the above cases, we can see that the application of digital technology to teaching evaluation has many special advantages:

- Improve the teaching effect and students' academic level: Through digital means, students' academic performance can be evaluated more comprehensively and accurately, and educational institutions can better understand the teaching effect. This helps to improve the academic performance of students and the overall quality of teaching and learning.
- Personalized learning support: The digital evaluation system can provide personalized learning support and suggestions according to the learning characteristics and performance of individual students. This individualized feedback helps to meet the learning needs of different students and promotes the holistic development of each student.
- Real-time monitoring and timely feedback: Digital evaluation can provide a real-time learning monitoring and feedback mechanism, so that teachers can keep abreast of students' learning progress and problems. This helps to adjust teaching strategies in a timely manner and improve the flexibility and relevance of teaching.
- Data-driven decision-making: The digital evaluation system provides more accurate information for education managers to support decision-making by collecting and analyzing a large amount of learning data. This helps to optimize the allocation of resources, improve the teaching process, and improve the efficiency and effectiveness of the overall education management.
- Development of intelligent evaluation tools: Using artificial intelligence and big data technology, more intelligent evaluation tools can be developed, which can more comprehensively analyze students' learning status, weaknesses and potential. This will help to establish a more scientific and comprehensive evaluation system.

To sum up, the advantages of the digitally empowered teaching evaluation system are combined with the application of digital technology to realize a more scientific, personalized and real-time evaluation and support mechanism in the education system, so as to promote the development of education in a more modern, innovative and efficient direction.

3 THE CONSTRUCTION OF A DIGITALLY EMPOWERED TEACHING EVALUATION SYSTEM

Based on digital technologies such as big data, digital twins, and digital badge authentication, this study innovates evaluation concepts, enriches evaluation methods, and constructs a digital classroom teaching evaluation model of "multi-driven, feedback decision-making". As shown in Figure 1 below, the research focuses on the core goal of talent training, anchors the design idea of integrating evaluation methods and digital technology, and combining qualitative and quantitative evaluation, and introduces machine evaluation on the basis of traditional student evaluation, teacher evaluation, and supervision evaluation, and forms an effective closed loop by establishing evaluation objectives, designing evaluation content, implementing evaluation plans, and feedback evaluation opinions, so as to optimize and adjust the problems found in real time.

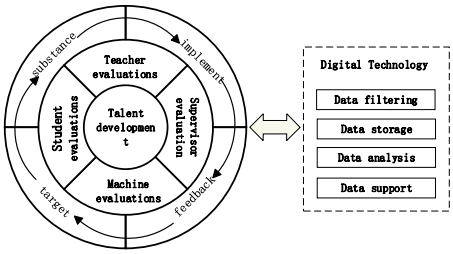

Figure 1. "Multivariate-driven, feedback-based decision-making" teaching evaluation model

3.1 Innovative evaluation concept

The goal of traditional evaluation is to promote teaching and learning through evaluation, and it has been found in long-term practice that evaluation is an effective process to promote literacy improvement and knowledge internalization. With the support of digital technology, the evaluation process and teaching process tend to be visualized and diversified, so it is necessary to update and iterate the evaluation concept to adapt to this background. As a guide, teachers participate in the construction of the evaluation system with students through classroom design, so as to stimulate students' individual learning behaviors, clarify learning goals, and improve learning outcomes. Teachers, students, supervisors, and machines promote each other and organically combine with each other, colliding with a new spark of digital evaluation concepts.

3.2 Expand the means of evaluation

With the help of digital intelligent technology, the evaluation methods are diversified and the evaluation tools are intelligent. For example, scholars Deng Juntao uses WEB technology and VR technology to create practical scenarios of course projects to enhance students' interest and sense of experience; scholars Fan Jiarong and Zhong Shaochun use artificial intelligence technology to analyze and predict learning data to help students build their own knowledge base, evaluate students' knowledge acquisition through relevant algorithms, and then effectively and reasonably distribute the group situation to achieve the goal of complementing each other's advantages; Scholars Wang Huashu and Liu Shijie use the concept of the metaverse to create a remote multi-person synchronous communication learning platform for English speaking courses, so as to provide more accurate and comprehensive evaluation.

In this study, a digital micro-authentication system for the evaluation of students' skill acquisition was designed with the help of WEB technology and digital twin technology, based on the demand for vocational skills, combined with work scenarios and project tasks, with the help of WEB technology and digital twin technology, combined with work scenarios and project tasks, as shown in Figure 2. The system can not only help students become familiar with technical needs and work environment, but also effectively help students build skill confidence through reward and feedback mechanisms, and at the same time clearly recognize their own knowledge and skill weaknesses.

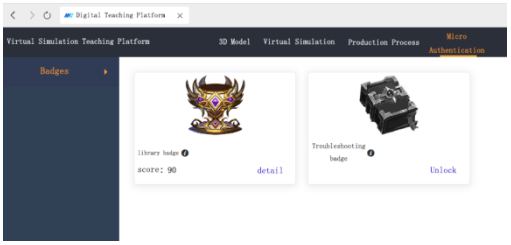

Figure 2. Course micro-certification system

3.3 Enrich the content of the review

Teaching evaluation can refer to the observation of classroom behavior, capturing the nuances of teaching behavior in a descriptive way, and obtaining empirical data, which is often used in classroom practice research, curriculum evaluation, and teacher development evaluation [7]. The content of teaching evaluation can be summarized from three aspects: behavior, resources, and concepts. In terms of resources, it mainly refers to students' task completion, homework completion, assessment records, etc.; in terms of concepts, it focuses on the cultivation and evaluation of students' professional quality, ideological and political literacy, and digital literacy; in terms of behavior, it not only includes the monitoring and evaluation of classroom interaction behaviors and classroom concentration behaviors, but also includes the comprehensive evaluation of students' physiological state, learning trajectory and learning habits.

4 IN-DEPTH THINKING ON THE TEACHING EVALUATION SYSTEM EMPOWERED BY DIGITALIZATION

With the deepening of digital empowerment, teaching evaluation is no longer just a simple statistics of traditional exams and assignments, but involves a wider range of process data, more complex individual differences, and more diverse learning situation construction. Rational use of artificial intelligence, big data, virtual reality and other means to build a more comprehensive, objective and personalized teaching evaluation system, so as to improve the quality of teaching and optimize the learning effect of students. Through diversified evaluation tools, real-time data analysis and feedback, personalized evaluation program design, data-driven teaching decision-making and other means, the depth and breadth of teaching evaluation are expanded. While digital technology brings advantages, it may also lead to problems such as data security leakage and lack of data literacy. Therefore, when constructing the evaluation system, we should take the improvement of students' learning experience and teaching effect as the starting point, pay attention to the overall quality of education, and comprehensively consider the following factors, which can better promote the development of the digitally empowered teaching evaluation system and provide useful reference for reform and innovation in the field of education.

1)Balancing technology and human care

The introduction of digital technology has opened up more possibilities for teaching evaluation, but there are also risks associated with over-reliance on technology. When constructing a

digitally empowered teaching evaluation system, it is necessary to balance the use of technology and the consideration of humanistic care. Technology should be used as an aid, not as a substitute for the caring and humane guidance of teachers. The teaching evaluation system should comprehensively consider students' personality and emotional needs, advocate a warm teaching atmosphere, and make evaluation more humane.

2)Gatekeeper data privacy and security

With the widespread application of digital technology in teaching evaluation, data privacy and security have become issues that cannot be ignored. Educational institutions need to establish strict data management and protection mechanisms to ensure that students' personal information is adequately protected. At the same time, educators should transparently explain to students and parents how data is collected and used, and maintain the legitimacy and fairness of the evaluation process.

3)Focus on the personalization of reviews

One of the key goals of the digitally enabled teaching evaluation system is to achieve personalized evaluation. Through learning analytics and big data technology, teachers can get a more complete picture of each student's learning style, progress, and pain points. Therefore, the introduction of personalized evaluation elements into the evaluation system, such as personalized homework and differentiated feedback, can better meet the diverse learning needs of students and improve the accuracy of evaluation.

4)Pay attention to the fairness and legitimacy of evaluation

In the process of constructing a digitally empowered teaching evaluation system, it is necessary to pay attention to the issues of fairness and legitimacy. Digital technologies can introduce bias in some ways, such as the implicit discrimination in the design of algorithms. Therefore, the construction of the evaluation system should carefully consider the differences of different types of students to ensure that the evaluation is not affected by factors such as race, gender, and socioeconomic status. In addition, the evaluation process should comply with laws and regulations to ensure the legality and compliance of the evaluation.

5. Conclusions

Teaching evaluation is a systematic project, which needs to adapt to the development of the digital age, and university education is a complex and long-term educational process, which requires a correct and reasonable evaluation model to guide students to establish correct values, and emphasizes "moral education" on the basis of "cultivating talents" and "cultivating abilities". Digital empowerment is not only the application of technology, but also the rethinking of the essence of education, the respect and care for students' individual differences, and the guidance and shaping of students' ideological values.

Funding: This work was supported by Guangdong Province Education Science Planning Project (No.2022GXJK538); and Guangdong Provincial Higher Education Teaching Management Society (No.GDZLGL2304); and Scientific research planning project of Guangdong Vocational and Technical Education Society (NO.202212G143).

REFERENCES

[1] B. Audrey and M. Yoko, "Crisis transformationism and the de-radicalisation of development education in a new global governance landscape". Policy and Practice: A Development Education Review, vol.36, pp. 51-76, 2023.

[2] Huai Jinpeng, "Deepening Digital Transformation, Building A Bright Future of Education". World Digital Education Conference Digital Transformation and Future of Education, China, February 2023.

[3] Xiaoyan Li. "Exploration and Practice of Undergraduate Classroom Teaching Reform Centered on Student Development". Journal of Contemporary Educational Research, vol. 5, pp. 68-72, May 2021.

[4] Ministry of Education of the People's Republic of China. "China to further promote the Double First-Class Initiative". Communiqué of the Ministry of Education of the People's Republic, China, February 2020.

[5] J. Southworth, "Bridging critical thinking and transformative learning: The role of perspective-taking". Theory and Research in Education, vol. 20, pp. 44-63, 2022.

[6] SH. Jin, K. Im and M. Yoo, et al.. "Supporting students' self-regulated learning in online learning using artificial intelligence applications". International Journal of Educational Technology in Higher Education, vol. 37, 2023.

[7] TM. Hora, AK. Oleson and JJ. Ferrare, et al. "Teaching Dimensions Observation Protocol (TDOP) User's Manual". Wisconsin Center for Education Research University of Wisconsin-Madison[EB/OL], 2013.