The Application and Potential of Artificial Intelligence Participating in College Teaching Evaluation

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Abstract: The dominance could be applied to many more areas as new artificial intelligence (AI) advances. There are great defects in the traditional evaluation methods of higher education. The evaluation of people is dominant, resulting in excessively subjective results and wasting human resources. These issues adversely affect many stakeholders. Therefore, the combination of the objectivity of artificial intelligence and the traditional method of teaching evaluation has an exploratory significance for the development of teaching and emphasizes the technical ability that the new artificial intelligence can realize. The purpose of this study is to explore the potential of a new method for artificial intelligence in higher education evaluation. Based on the analysis of existing experimental case reports and related studies by the method of literature synthesis, it is certain that the new artificial intelligence will help improve the quality of teaching evaluation in higher education. This has a positive impact on all fields, including schools, teachers, and students. The teaching objectives of the school can be better and more efficiently accomplished under the evaluation system. This study confirms the feasibility of incorporating artificial intelligence into university evaluation.

Keywords: education evaluation, artificial intelligence, higher education

1.   Introduction

Teaching evaluation is of great significance to the development of education, which helps improve teaching efficiency and map teaching problems. This is also an important criterion for evaluating teachers' competence. For a long time, the standards of the higher education evaluation system have had problems such as unclear and unified standards, strong subjectivity during evaluation, cumbersome processes, and high labor costs. Based on the latest development results of artificial intelligence, it is of research significance and practical value to study the possibility of incorporating artificial intelligence into the teaching evaluation system. Statistical capabilities, big data mining and analysis capabilities, etc., all of these characteristics help to make more timely and targeted assessments. At the same time, artificial intelligence can be used to improve the accuracy of graphical analysis and obtain personalized teacher teaching feedback. At present, the application of artificial intelligence in teaching evaluation is still in the preliminary exploration stage. The emergence and wide application of the latest artificial intelligence provide more possibilities and favorable effects for the design and planning of teaching evaluation systems.

China has already issued a guideline for deeper reform of its education evaluation systems in 2020. The guideline, jointly issued by the Communist Party of China Central Committee and the State Council, stressed the need to innovate evaluation tools and use modern information technologies such as artificial intelligence and big data during teaching [1]. Research on how artificial intelligence empowers the higher school teaching evaluation system is also emerging. For example, Wang Yaping proposed a system for evaluating teachers' competence based on artificial intelligence and big data using information data on teachers' daily and teaching activities [2]. The regional education monitoring and evaluation system of Luohu District of Shenzhen studied by Zhang Haiyang et al. can share the teaching evaluation data of schools in the region and solve common problems [3].

The paper mainly focuses on solving the problem of how to effectively combine the new artificial intelligence with the higher school teaching evaluation system, to increase its objectivity, promote its intelligence, and rebuild its structure.

From both perspectives of application and potential, this study reviews the feasibility and method of incorporating artificial intelligence into teaching evaluation systems. It also concentrates on the potential benefits and drawbacks of the combination.

2. The Application of Artificial Intelligence Participation in College Teaching Evaluation System

2.1. Technical Feasibility of the Combination

Artificial intelligence is a product of scientific and technological development. Therefore, the priority for exploring whether artificial intelligence can be integrated into the college teaching evaluation system is to study and solve technical problems. Through careful study of past research, the study finds that the technical feasibility of integrating artificial intelligence into the college teaching evaluation system has been widely verified. For example, in the study published in 2021, Huatao Zhou described the technical means of integrating artificial intelligence into the teaching review system in detail [4]. Other studies on this subject are similar to this methodology. This shows that the technical possibilities and methods of integrating artificial intelligence into the teaching evaluation system have been generally agreed upon by the academic community. The combination needs a basic logic and an expression model of artificial intelligence for teaching evaluation. Then an evaluation index is supposed to be constructed to help artificial intelligence evaluate the information it receives. And at last, the evaluation results are calculated through a hierarchical crossover algorithm.

The principle and basic method of model construction is roughly the same, but the evaluation index system is different. Jingjing Hu's research has constructed an evaluation index system that pays more attention to the teaching effect of teachers [5]. The evaluation index system she built consists of teaching objectives, teaching method, teaching content, teaching attitude, teaching effect, and business level six parts. In addition, some scholars determine the evaluation index system based on student performance and response [6]. Zhou comprehensively considers the evaluation index system established by both teachers and students [4].

2.2. The Construction of a Teaching Evaluation Framework after the Integration of Artificial Intelligence

College teaching evaluation involves a variety of quantitative, variables and complex relationships between quantitative, variable, and results. And the design of an AI-based college teaching evaluation system is conducive to structuring, logical, and abstracting the relevant elements in the evaluation system to highlight the main factors and important content, so that the evaluation is based on rigorous data statistics and theoretical derivation [2]. But at the same time, unrestrained, excessive, and wrong use of artificial intelligence may make the evaluation results unreliable. So balancing the weight

between artificial intelligence and the original university teaching evaluation system, and exploring how to establish a new and artificial intelligence-involved college teaching evaluation framework has become a top priority.

On one hand, teaching evaluation cannot rely too much on AI. The status of artificial intelligence in the university teaching evaluation system must be clarified. The role of artificial intelligence should not be ignored, but it is also not advisable to let artificial intelligence dominate, completely replacing student evaluation, peer evaluation, and expert evaluation. Self-decision-making of artificial intelligence is based on intelligent system data. Its analysis results are too objective and rigid and may lack humanistic care. Combined with other old-fashioned evaluation methods, more humanistic evaluation results can be given based on empirical judgment and emotional factors [7]. On the other hand, the strengths of artificial intelligence need to be harnessed. Based on artificial intelligence, a multimodality application framework for teaching intelligent evaluation should be constructed. One of the great advantages of artificial intelligence lies in its modal recognition ability, data collection, and behavior analysis ability. For example, the in-depth recording system can be used in the classroom or even after class to collect the voice emotion, facial expressions, head gestures, gestures, and position information of teachers and students, and establish a classroom teaching behavior assessment data set to help carry out the process evaluation of teachers' classroom teaching behavior [8].

2.3. Application Case Analysis: Take Guangdong University of Technology as an Example

Hu Qintai's team from Guangdong University of Technology measured the artificial intelligence teaching evaluation system they designed. After the trial, the team conducted experiments and questionnaires. The questionnaire was designed by a Likert scale to analyze the evaluation and intervention effect of education diagnosis. It was obvious that the students in the experimental group were more satisfied with the teaching evaluation and intervention model than the students in the control group. Through questionnaires and practical tests, their system was proven to be effective [7].

It can be seen that the integration of artificial intelligence into the teaching evaluation system of colleges is feasible and beneficial. Compared with traditional college evaluation systems, the artificial intelligence teaching evaluation system is more personalized, fair, real-time, and inclusive. Even if the research is a little ill-considered, artificial intelligence does make up for the shortcomings of traditional college teaching evaluation systems in terms of algorithms, structures, models, and teaching feedback.

3. The Potential of Artificial Intelligence to Participate in College Teaching Evaluation System

3.1. The Potential Benefit for Students

The potential of incorporating artificial intelligence as part of teaching evaluation is multifaceted. It has the potential to benefit students, teachers, and schools in several ways. For students, artificial intelligence can be used to provide feedback on their performance and help them learn more efficiently. It is expected that the new kind of artificial intelligence will be able to capture the micro-expressions of students during class and use them to provide feedback about the quality of the teaching process, in addition to guiding teachers to adjust the teaching arrangements promptly based on the feedback from students. Nevertheless, it is more helpful to pay attention to the emotional changes that students are undergoing during the educational process. To develop a well-rounded understanding and fundamental characteristics, a comprehensive assessment process can be implemented with guidelines for classroom decorum and obedience. This will help to ensure that both students and teachers abide by the same behavioral standards and will ultimately lead to an improved

educational experience [9]. The coverage of artificial intelligence evaluation is wider, and the evaluation process will focus on all students instead of some students in the past, and it will be accompanied by more personalized strategies. According to the feedback from the student questionnaire, the students are relatively satisfied with the teaching evaluation system that incorporates artificial intelligence in the experiment. Under the theory of artificial intelligence, there is no difference between good and bad students, which is more conducive to improving the overall self-confidence of students and enhancing the quality of quality education [4].

3.2. The Potential Benefit for Teachers

An improvement program that is designed to improve the behavior of teachers will be able to boost the efficiency of teaching if it is developed from the teacher's perspective. For teachers, artificial intelligence can be used to identify teaching gaps and help them improve their teaching style. Ultimately, schools can take advantage of artificial intelligence to monitor student progress and gain invaluable insight into teaching excellence. In short, artificial intelligence has the potential to revolutionize teaching evaluation and help all parties involved make the most of their education. The research found that by improving teachers' facial expression management and language use, the level of interaction between teachers and students will increase, which leads us to the conclusion that artificial intelligence should be used as a method to evaluate teaching performance. Part of it can improve teachers' teaching ability on the original basis, and improve the efficiency of teachers' teaching improvement, which is more efficient than traditional teaching evaluation methods [10]. From the school's point of view, the current domestic and foreign trends in using artificial intelligence to improve teaching evaluation are relatively clear, and there is an environment that supports the establishment of a new type of teaching evaluation. The establishment of an artificial intelligence-guided teaching evaluation system can promote the construction of a teacher team, and incorporate teachers' professional experience into the assessment criteria, which is conducive to the establishment of a better-disciplined teacher team, thereby promoting the development of teaching. The artificial intelligence-based teaching evaluation method reduces the impact of subjectivity on evaluation fairness and also reduces the disadvantages of only quantifying achievement evaluation while ignoring the teaching process. Teaching evaluation needs to be carried out for a long time, and implicit observation needs to obtain and process comprehensive data through artificial intelligence [10].

3.3. The Potential Benefit of College

Implementing an artificial intelligence-based teaching evaluation system at universities and colleges can lead to the creation of an artificial intelligence-based intervention system. Based on the student's learning status collected by artificial intelligence, it will push more favorable decisions for teachers in real time, so that teaching evaluation can be operated on a more objective standard. By adding artificial intelligence to the teaching evaluation system, colleges, and universities can utilize fragmented information to conduct comprehensive teacher evaluations that utilize more fragmented information. Compared to using human evaluations, schools can save money on personnel expenditures, and they can also customize promotion plans to suit individual teachers better. Various personal adjustments can be made. From a sociological standpoint, the use of an advanced evaluation system incorporating artificial intelligence algorithms has bolstered the advancement of education and encouraged the enhancement of educational integrity and morality. The analysis of existing experimental cases has demonstrated that the integration of artificial intelligence into the review process is feasible. However, it is important to note that such a process may not be able to provide the same level of humanistic care that is found in a traditional review process. This is an important

consideration when deciding whether or not to incorporate artificial intelligence into the review process.

4.   The Risk of Artificial Intelligence Participating in Teaching Evaluation

4.1.   Challenges and Threats During the Evaluation Process

The participation of artificial intelligence in the process of college teaching evaluation systems will also bring many shortcomings. The use of artificial intelligence will lead to the addition of many advanced equipment to college. These advanced smart devices do bring a variety of conveniences. But, at the same time, some new security issues have been exposed. The effective planning of various lines on campus, the increasing power consumption, and the different requirements of teaching equipment will affect the fire safety of the campus to a large extent. Artificial intelligence equipment has relatively certain security risks. If a fire or electricity leakage occurs, it will inevitably affect the life safety of teachers and students [11].

At the same time, allowing artificial intelligence to participate in college teaching evaluation may bring hidden dangers of personal privacy and information leakage of teachers and students. For example, when the emotional recognition data of teachers and students is leaked, it is equivalent to the leakage of their facial recognition information. This can easily be used by some criminals to threaten their property safety and even personal safety [12].

4.2.   Challenges and Threats on Evaluation Consequences

Because of the learning characteristics of artificial intelligence itself, its self-iteration ability is extremely strong. In the evaluation process, AI slowly learns about human flaws, such as discrimination against more challenging courses as not teaching value. The resulting evaluations will make the advanced courses worse [13].

In addition, the absolute fairness and rationality of artificial intelligence will bring some inappropriate and impersonal results to teaching evaluation. A teacher feels unwell during the lesson, so he sits down and continues the lesson. However, the AI will not understand this behavior and give this teacher a low score as an evaluation consequence.

4.3.   Challenges and Threats on Evaluation Subject

For teachers, the participation of artificial intelligence in teaching evaluation may bring a more uncontrollable impact to teaching, and the feedback given by artificial intelligence may be contrary to the teacher's intention. The participation of artificial intelligence in teaching evaluation should be based on the premise of assisting teachers to teach better.

For students, AI does not take into account how students feel in class. Teaching evaluations by AI can lead to classroom evaluations that students experience first-hand being ignored. Improved classrooms based on AI evaluations are not necessarily suitable for students.

For administrators, communication problems may arise. Because it is difficult to interpret AI-based predictions, some data-based feedback can be confusing. This can create and widen the disconnect between teachers, students, and administrators [13]. Additionally, the purchase and maintenance of AI equipment is also expensive, which is not affordable for ordinary colleges.

5.   Conclusion

In the evaluation of college teaching, artificial intelligence can play a major role, but to be effective, an evaluation system that involves students, teachers, experts, and artificial intelligence must complement, check, and balance each other. Compared with the present college teaching evaluation

result, the advantages of artificial intelligence will greatly enhance the teaching effect by obtaining a more objective and comprehensive result. Classroom quality can be continuously improved with timely feedback on teaching evaluations. The integration of artificial intelligence into college teaching evaluation brings benefits but also raises some problems. Potential safety hazards, information leakage, and increased management difficulty -- such problems caused by the integration of artificial intelligence into the teaching evaluation system should not be ignored. In further studies, it is necessary to discuss how to address these pitfalls.

However，due to the time of the emergence of new artificial intelligence, there are few research and experiment cases in universities at present.

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