

Exploration of the Reform of Teaching Quality Evaluation in Application-Oriented Undergraduate Colleges and Universities in the Internet Era

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Abstract—With the development of the times, the educational environment and students' needs are also undergoing important changes, how to use artificial intelligence, big data, the Internet, etc. to promote the reform of teachers' teaching quality evaluation is a powerful starting point for improving the teaching effect. This paper analyzes the background and existing problems of teacher teaching evaluation in applied undergraduate colleges and universities under the background of the Internet, and explores the reform of the teaching quality evaluation system from multiple perspectives from the perspectives of teachers, students, and teaching resources, and puts forward corresponding countermeasures and suggestions. It is hoped that the teaching quality evaluation effect of local application-oriented undergraduate colleges can be improved.

Index Terms—Internet Age; Application-oriented; Teaching Quality Evaluation; Blended Teaching

I. INTRODUCTION

In the Internet era, people are exposed to more progressive resources, methods, and ideas, and how to use this advantage to conduct in-depth exploration of education has become one of the missions of education. In recent years, application-oriented undergraduate colleges and universities have developed rapidly, and are committed to creating application-oriented talents needed by society. How to make teaching more targeted and scientific is one of the problems that must be solved in the development of application-oriented undergraduate universities. This paper will explore the reform of teacher quality evaluation in application-oriented undergraduate universities.

II. THE BACKGROUND

The existence of the Internet allows students to independently explore and integrate knowledge, and at the same time, it also breaks the limitations of paper materials and can carry out independent teaching, and teachers and students form a good interaction in teaching. In the context of the Internet era, the teaching mode has changed from a transitive teaching model to an inquiry-based teaching model. However, the new changes in the teaching mode are not limited to the teaching process, but also pay attention to the innovation of teaching quality evaluation methods, which is the value of the construction of teaching evaluation system.

In the context of the Internet era, colleges and universities are seeking reform and innovation, and application-oriented undergraduate colleges and universities should take the opportunity to find a breakthrough and create a teaching model suitable for their own development in combination with the teaching goal of cultivating application-oriented talents. At present, the online and offline hybrid teaching mode has been widely promoted, which can make up for the shortcomings of the pure online or offline mode, but in terms of effect, the use of the hybrid mode in some colleges and universities still tends to be superficial. The excavation of online resources and the excavation of teacher-student interaction modes in the online and offline process still lack depth, which makes it easy for students to mistakenly think that online teaching is only carried out in a specific environment, or that it is a supplementary function for offline, and do not really realize the advantages of this model and the interactive form of offline and offline modes. Therefore, how to make the online and offline models more scientific and reasonable, so as to help improve the quality of teaching, colleges and universities need to further explore.

III. THE CURRENT PROBLEMS

As one of the important means to ensure the quality of talent training, the evaluation of teaching quality reflects the school's education and teaching philosophy, school-running characteristics and quality culture. Although colleges and universities have generally established a teaching quality evaluation mechanism, due to the differences in the implementation of university managers and the different cognitive levels of participants, the goal achievement is generally unsatisfactory, especially in the new application-oriented undergraduate universities, the function of teaching quality evaluation has not played its due role, and the reasons are mainly manifested in the following aspects:

(1) Quantitative indicators

Qualitative evaluation index is a subjective judgment of the evaluator, whether it is the evaluation of students, or the evaluation given by leaders, peers and supervision experts, the design of the evaluation index system is usually based on subjective feelings, and the evaluation results are difficult to convince the evaluated teachers, resulting in most teachers not agreeing with the qualitative evaluation results. However,

it is difficult to determine quantitative indicators due to differences in disciplines, individuals and teaching styles, which makes it difficult for colleges and universities to pay attention to and guide the evaluation of teachers in practice.

(2) Human evaluation

The results of students' evaluation of teachers are quite different due to the differences in students' personal awareness, cognitive level, learning ability, class style and department quality culture, therefore, students' evaluation of teachers is mixed with a lot of personal factors, especially individual students can not treat the evaluation correctly, there are perfunctory, retaliation against teachers, and inaccurate understanding of indicators. If noise data cannot be eliminated, the results of student evaluation cannot objectively and fairly reflect the teaching level of a teacher.

In order to overcome the disadvantages of student evaluation, most colleges and universities adopt multiple teaching evaluation models, such as integrating peer evaluation and supervision evaluation. To a certain extent, the results of diversified teaching evaluation can reflect the teaching level of teachers more truly, but peer evaluation is also limited by personal teaching style and mindset due to the influence of humanistic care, intimacy between colleagues and different focuses in their respective research fields, which leads to the fact that no matter how the teaching manager designs the proportion of comprehensive evaluation, the evaluated teacher cannot be convinced, which is the pain point of evaluation.

(3) Management lag

Teacher evaluations are often scheduled at the end of the course or at the beginning of a new semester, and such feedback is no longer relevant to the teaching and learning of the semester in which the course is held. Supervisors and peer evaluations often lag behind feedback due to poor ability in the application of information technology, and hinder teachers' ability to provide honest and timely feedback on teaching deficiencies. In most cases, supervisors and peer evaluations mainly play the role of supervision, and the effect of improving teaching is not very good, and the purpose of prompting teachers to improve teaching in a timely manner is not well achieved.

IV. REFORM MEASURES AND METHODS

Combined with the development of the Internet era and the actual teaching situation of local application-oriented undergraduate universities, the construction of blended teaching evaluation is of great help to teachers' teaching reform and students' enthusiasm for learning. How to make the evaluation more scientific can be carried out the following reform measures:

(1) Differences: students are very different, so high-quality teaching must consider the difference between them, according to students' hobbies, learning interests, areas of concern about current affairs, understanding of their own majors, etc., so in the process of evaluation, we should fully consider whether the teaching reflects the differences.

(2) Multiple subjectivity: The traditional teaching evaluation is basically the teacher's self-evaluation, expert

evaluation, etc., which is a single subject and cannot reflect the teaching quality more comprehensively. Therefore, in the context of the new era, with the help of the Internet, we can consider integrating multiple subjects, such as the evaluation between teachers, the evaluation of teachers by department leaders, the evaluation of teachers by school-level supervisors, and the evaluation of teachers by parents, so as to understand the quality of teachers' teaching process from the perspective of different subjects more comprehensively.

(3) Whole-process nature: The traditional evaluation method takes the final examination results as the main evaluation basis, which leads to the fact that most students do not participate in the learning process, do not pay attention to their usual performance, and seriously lack learning motivation. Blended teaching should not only introduce process assessment, but also increase its weighting and highlight the importance of process learning. Blended teaching includes three learning links: before, during and after class, and the evaluation of the whole process should also be reflected in the quantitative evaluation of these three learning links.

In view of the problems faced by teachers in the evaluation of teaching quality, the following methods can be adopted:

(1) Establish an information platform to reduce human disadvantages: make full use of information technology means to carry out information technology application training for supervisors and leading cadres; adopt anonymous evaluation to avoid the problem of not being able to evaluate objectively and truthfully due to the situation, and achieve class evaluation and feedback. At the same time, the application of smart teaching platform will be increased, the learning channels of students will be expanded, the interaction between teachers and students will be strengthened, and the feedback of students at the end of the semester will be transformed into feedback on the learning process of students, so as to ensure the timeliness and effectiveness of teaching feedback. Train a group of supervisors who are good at evaluating lessons and guiding under the condition of informatization, and combine supervision and guidance to truly achieve the purpose of promoting the improvement of teachers' teaching quality.

(2) Reduce the non-objectivity of teaching quality evaluation caused by doping personal factors: the sense of acquisition of learning is high, and the students themselves have the most right to speak, but the teaching effect is affected by many factors, and it is still changing, and some evaluation content is difficult for students to grasp, so in addition to the large proportion of student evaluation, multi-subject evaluation methods should also be adopted. In practice, multi-subject includes students, peers, supervisors, and leaders. In terms of methods, a hybrid of online and offline evaluation methods can be adopted, and open online evaluation can urge teachers to continuously optimize teaching resources, actively participate in interaction, and promote the improvement of teaching quality due to its wide participation and diverse content. A multi-subject and multi-mode evaluation mechanism can be established, and big data technology can be used to collect multi-subject and multi-

mode data, and the trend chart of quality improvement can be obtained, so as to reduce the pressure on teachers caused by specific scores. [6] examined the development and refinement of possible mathematical models for the intellectual system of career guidance. Mathematical modeling of knowledge expression in the career guidance system, Combined method of eliminating uncertainties, Chris-Naylor method in the expert information system of career guidance, Shortliff and Buchanan model in the expert information system of career guidance and Dempster-Schafer in the expert information system of career guidance method has been studied. The algorithms of the above methods have been developed. The set of hypotheses in the expert system is the basic structure of the system that determines the set of possible decisions of the expert system. This set, which is crucial in decision-making, should be sufficiently complete to describe all the possible consequences of situations that arise in the subject area. Therefore, it is important to improve the mathematical models of the intellectual system of career guidance.

(3) Establish a competition and appeal mechanism: The purpose of establishing a competition mechanism is to reward attendance and punish laziness, so that teachers can form a sense of crisis and worry, and maintain the vitality of teaching. Of course, for teachers to recognize rewards and punishments, it is necessary to let them have the right to know the evaluation results of each indicator, and establish channels for them to defend their rights and communicate with each other. Schools should establish a system of mutual recognition of credits, increase the opportunities for students to choose courses and study online across schools, and improve students' right to choose learning; the distribution of teachers should be linked to the number of students who choose courses, and the promotion of teachers' professional titles should be linked to the evaluation of teaching quality, so that students should be kept busy not only but also teachers, so that the role of teaching and learning can be realized.

(4) With the help of the concept of credible interval, the two-headed data should be removed to ensure the objectivity and fairness of the evaluation as much as possible: in application-oriented undergraduate universities, for students, it is necessary to try to avoid indicators such as "scientific and correct teaching content" and "reflecting the latest research results of the discipline", because it is difficult for most students to make reasonable judgments on these indicators. Because some courses have very little content on the board, the harvest of supervision cannot represent the harvest of students. According to the credibility interval, a certain proportion of overly absolute evaluations are eliminated to improve the credibility of the evaluation, the confidence interval is 95%, then the inferior data is 5%, and the poor evaluation data can be considered to be filtered out for 3%-4%, and the excellent data for 1%-2%.

(5) Increase the proportion of quantitative indicators, reduce the proportion of qualitative indicators, and improve the credibility of evaluation results: in the quantitative indicators, the students' class status reflects the teacher's classroom attractiveness and charisma to a certain extent;

from the distribution of students' homework scores and final examination scores, the acquisition of students' course learning can be analyzed; the interaction between teachers and students can be understood by means of information technology, and these indicators can be quantified by using tools such as rain classroom and Xuetong. Therefore, students' attendance, grade distribution, teacher-student interaction, and online teaching resources can be used as quantitative indicators for teaching quality evaluation, and the total score of the evaluation can be calculated according to the corresponding weights through information technology, so as to improve the credibility of the evaluation results. [7] discussed that according to the observations in this paper, an existing mathematical model of banking capital dynamics should be tweaked. First-order ordinary differential equations with a "predator-pray" structure make up the model, and the indicators are competitive. Numerical realisations of the model are required to account for three distinct sets of initial parameter values. It is demonstrated that a wide range of banking capital dynamics can be produced by altering the starting parameters. One of the three options is selected, and the other two are eliminated. The model is generalized taking into account fractional derivatives of the bank indicators for time, reflecting the rate of their change. Based on numerical calculations, it is established that reduction of the order of derivatives from units leads to a delay of banking capital dynamics. It is shown, that the less the order of derivatives from the unit, the more delay of dynamics of indicators. In all analyzed variants indicators at large times reach their equilibrium values.

In summary, the following teacher teaching quality evaluation system is proposed.

(1) Network evaluation module: This module has seven sections: chapter table of contents, learning materials, homework release, online test, discussion and Q&A, visits, and characteristic innovation. The chapter table of contents section involves clear levels, complete knowledge systems, and scientific teaching progress design. The learning materials section covers audio, video, extended materials, and learning tasks. The assignment release section involves chapter tests, teaching activities (discussions, peer assessments, etc.). The discussion and Q&A section involves online Q&A and interaction. The Visits section relates to the number of logins of teachers and students. The characteristic innovation section involves the use of tools such as Xuetong and Rain Classroom to carry out in-class or extra-curricular interaction between teachers and students, including live broadcast, sign-in, voting, answering questions, and selecting people.

(2) Student evaluation module: This module sets up four sections: teaching attitude, teaching content, teaching method and teaching effect. The teaching attitude section involves pre-class preparation and learning guidance, and in-class value guidance involves teaching content preparation, pre-class learning guidance, classroom management, and after-class Q&A counseling. The teaching content section involves prominent and difficult points, the amount of information is rich and moderate, the content is scientific and reasonable,

the knowledge and skills are taught consistently, and the knowledge before and after is properly connected. The teaching method involves the reasonable use of board books, courseware and teaching aids, the language is vivid and concise, the examples are appropriate and natural, and the teaching is not based on the book or the screen. The teaching effect section involves whether it triggers students' desire, enthusiasm and action for further learning, whether students can use the basic theories and principles of the knowledge they have learned to analyze and solve practical problems, whether they improve their ability to learn and work, and whether they enhance their critical and innovative thinking and confidence and ability to deal with new problems.

(3) Peer evaluation module: This module consists of five sections: Appearance and Teaching Style, Classroom Management, Teaching Content, Teaching Methods, and Teaching Effect. The Appearance & Posture section involves a dress code, proper manners, natural manners, and adequate preparation. The classroom management section involves scientific and orderly classroom organization and accurate time grasp of each teaching link. The teaching content section involves scientific and reasonable teaching design, prominent key and difficult points, proficient content, accurate teaching, moderate progress, substantial and moderate content, focusing on the combination of theory and practice, clear concepts, rigorous argumentation, correct explanation, teaching closely related to the syllabus, rich information, and teaching content can reflect or connect with new ideas, new concepts and new achievements in the development of disciplines. The teaching method section involves the reasonable use of board books, courseware, and teaching aids, the language is vivid and concise, and the examples are appropriate and natural. The teaching effect section involves an active classroom atmosphere, high student participation, wide participation, and active interaction between teachers and students, which reflects the teaching concept of "student-centered".

V. RECOMMENDATIONS

The construction of the teaching quality evaluation system should consider the characteristics of index comprehensiveness, scientific methodology, subject plurality, etc., and the actual situation of the school should also be considered in the construction process, for example, different schools have different talent training goals and different teaching environments, and the following suggestions are put forward for this problem:

(1) The use of evaluation effect: the establishment of an effective teaching quality evaluation system, can be more comprehensive to observe the effect of the current school teaching model, but how to use this result to feed back teaching is more important, so the school should be combined with the actual situation to establish an evaluation effect of the use of the program, so that the problems and experience reflected in the form of diversified feedback to the teaching process, this is the teaching - evaluation - feedback - teaching improvement - evaluation - evaluation - A virtuous cycle of

feedback plays a role in the true value of the evaluation system.

(2) Combined with the school teaching environment: the realization of the blended teaching mode in the context of the Internet era has technical advantages, and also has an important driving force for the operation of its quality evaluation system, but whether the school's software and hardware facilities are in line with the actual situation is an inevitable problem to be considered. For example, schools can use the Internet to get in touch with parents, so that they can evaluate the growth of students, so as to reflect the quality of teaching, then whether the quality of such evaluation subjects is reasonable, whether the evaluation equipment is matched are issues to be considered.

(3) Combined with application-oriented development: As an important driving force for the improvement of local economic and cultural strength, local application-oriented undergraduate colleges should gradually realize transformation in combination with policies to achieve better teaching reform. Only in this way can we lay the foundation for the improvement of the quality of talent output. As a key measure to supervise the improvement of teaching quality, the teaching evaluation system must also be combined with application-oriented development to examine whether the selection of teachers, students and teaching resources is in line with the transformation idea and talent employment, so as to feed back the improvement of teaching quality.

(4) the use of Internet resources: the Internet era teaching resources are no longer limited to textbooks or handouts, teachers or students can collect more diversified and comprehensive materials through the Internet, such as course-related videos, pictures, etc., for a certain knowledge point can also be found through the network to find a more in-depth answer, so as to expand students' knowledge, but whether teachers or students can really tap the high-quality resources of the Internet, overcome the addiction to the Internet, Relying on the bad habits of the network are all problems that need to be paid attention to in the process of building a teaching quality evaluation system, and how to correctly lead teaching through evaluation is the key.

VI. CONCLUDING REMARKS

In the context of the Internet era, the teaching of colleges and universities has undergone a great transformation and improvement from content to method to form. Teaching quality evaluation is a process of diagnosis and improvement of the whole process of teaching, which is related to the talent training and future development of application-oriented undergraduate colleges. This paper explores the reform of teachers' teaching evaluation indicators from multiple perspectives, hoping to provide ideas for constructing a scientific and reasonable teaching quality evaluation system, so as to make teaching evaluation more comprehensive and in-depth, and the evaluation results more applied, so as to greatly improve the teaching quality.

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REFERENCES

- [1] Yan Jiaoyun, An Junli, Sun Guohong. Reconstruction of classroom teaching quality evaluation index system. *Chinese University Teaching*, 2023, (12): 74-78+91.
- [2] Zhu Yanhua, Wang Chengfei, Cheng Haifeng. Construction and practice of SPOC-based evaluation index system for mixed teaching quality of higher vocational English. *Journal of Xiangyang Vocational and Technical College*, 2023, 22(06): 7-11.
- [3] Zhao Guanghuai, Zhou Jianwei. Research on the Construction of External Evaluation System for Teaching Quality in Local Colleges and Universities. *Journal of Linyi University*, 2023, 45(06): 147-155+184.
- [4] Wu Xiaoling, Lin Hanning. Research on the quality evaluation of online and offline blended teaching based on teacher-student satisfaction model. *Journal of Higher Education*, 2023, 9(29): 1-6+10.
- [5] Jin Yimeng. The strategy of building a comprehensive online teaching quality monitoring and evaluation system in colleges and universities—A case study of local application-oriented undergraduate universities. *Shanxi Youth*, 2023, (18):54-56.
- [6] Christo Ananth, A.R. Akhatov, D.R. Mardonov, F.M. Nazarov, T. AnanthKumar, “Possible Models and Algorithms for the Intellectual System of Professional Direction”, *International Journal of Early Childhood Special Education*, Volume 14, Issue 05, 2022,pp. 4133-4145.
- [7] Christo Ananth, N. Arabov, D. Nasimov, H. Khuzhayorov, T. AnanthKumar, “Modelling of Commercial Banks Capitals Competition Dynamics”, *International Journal of Early Childhood Special Education*, Volume 14, Issue 05, 2022,pp. 4124-4132.

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