



Research on Quality Evaluation of Vocational Education Based on Big Data Technology

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Abstract. The evaluation of pedagogical quality is the key to continuous improvement of the quality assurance system at school. Based on big data technology, the connotation, and characteristics of current pedagogical evaluation are analyzed in this paper, focusing on the management and measurement of daily teaching. From the perspectives of the organizational, institutional, and monitoring systems, a pedagogical quality evaluation system underpinned by process-oriented evaluation forms, distinctive evaluation criteria, diversified evaluation subjects, and modern evaluation methods is built up. In this paper, the challenges facing pedagogical evaluation in the big data era are summarized and corresponding countermeasures are proposed as well.

Keywords: Education Evaluation · Vocational Education · Big Data Technology

1 Introduction

As a powerful guide to education development, education evaluation remains the research focus of educational theories in various countries.

Education evaluation is of high practical significance in guiding the reform and development of vocational education. How to guide the development of vocational education through scientific evaluation? Extensive and in-depth research on vocational education evaluation is available at present. A representative view holds that the vocational education evaluation in the digital era should improve the evaluation ecology, and enhance the evaluation ability, governance, and technology. In addition, the quality evaluation of vocational education in different countries has been compared and analyzed through a number of studies, positively contributing to the development of vocational education.

However, the bottleneck in vocational education development and diversified development needs result in insufficient research results of the pedagogical quality evaluation to support the development of modern vocational education. With the rapid development of digital industrialization and industrial digitalization, digital technology has offered more possibilities for educational development, and the application of big data technology in education evaluation gains more extensiveness and a deeper depth. In this sense, the focus of education evaluation is transforming from empiricism to statisticism. Based on big data technology, this paper intends to study the evaluation of the pedagogical quality of vocational education in the digital era and attempts to build a pedagogical

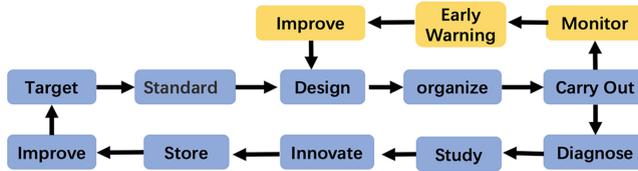


Fig. 1. Education Evaluation and Quality Improvement

quality evaluation system adaptive to the characteristics of vocational education in the new era.

2 Analysis of the Relationship Between Big Data Technology and Education Evaluation

Big data refers to a data set with massive, dynamic, diverse, and valuable characteristics, while big data technology is a means or method to obtain valuable information through data acquisition, mining, and analysis.

Educational big data is unprecedentedly affecting teaching and learning. The deep integration of education and digital technology has gradually shifted people's focus from educational results to the process. Data of multi-media learning resources, knowledge flow, data generated, aggregated, and searched in real-time, data interactively created by all users, distributed cognition, shared data, analysis, feedback, evaluation, and push data are found in every education scene.

The pedagogical quality evaluation is a student-centered teaching activity, covering the whole cycle of teaching preparation, implementation, evaluation, and improvement. The status data of various teaching resources and the behavior data generated in daily education activities set the important basis for the pedagogical quality evaluation based on big data technology. As was pointed out by Viktor Mayer-Schönberger in his speech entitled "Big Data and the Future of Education", the analysis of education data is the key to education. The analysis, feedback, and correction of the real-time generated education data transform education evaluation from being seen as antithetical to education to becoming a necessary and symbiotic part of the educational process, from the perspective of the former observer (Fig. 1).

3 Characteristics of Education Evaluation Based on Big Data Technology

3.1 Massive Data Processing

At present, many problems persist in the education evaluation of vocational colleges, such as the backward evaluation concepts, one-sided evaluation methods, monotonous evaluation content, and the singularity of evaluation subjects. The evaluation of students needs to be more positive, harmonious, and development-oriented, providing students with personalized and diversified development paths, and stimulating their potential

strengths, including knowledge and skills, moral quality, positive personality, and professional abilities. The evaluation mechanism should be improved by shifting from targeting “single” to “multiple” evaluation subjects, and multi-directional interaction needs to be realized. Schools can use big data technology to better classify, analyze and process massive educational data, and provide a data basis for education evaluation.

3.2 Predict Educational Behavior According to Data Trends

By monitoring the teaching data information and the basic teaching status data, the school can comprehensively obtain the daily teaching status, predict the development trend of the basic teaching status, identify problems and correct them in time, and improve management efficiency. As a result, all stakeholders in vocational education can acquire a more comprehensive understanding of the school’s operation. The government can also utilize the analysis results of phased educational data as the decision-making reference to improve the efficiency of macro-management. In addition, the general public can obtain more information resources related to the pedagogical quality of vocational education.

3.3 Data Analysis Improves the Quality of School Management

The analysis of education big data can provide multi-dimensional references for the decision-making of schools which are simultaneously data collectors, data users, and data beneficiaries (Fig. 2).

4 Establishment of a Pedagogical Quality Evaluation System

An effective organization with a clear division of labor lays the foundation. The recommended methods are put forward as follows: establish the leadership, management, and working organization of pedagogical quality evaluation; clarify the responsibilities of all parties concerned; and consolidate the organizational guarantee.

Guaranteed by the scientific and effective mechanism of the process, and based on the process, characteristics, diversification, and modernization, it is suggested that the existing pedagogical evaluation and supervision mechanism at school be improved, the operation of the evaluation process be supported, and the teaching department be guided to optimize the comprehensive management of teaching.

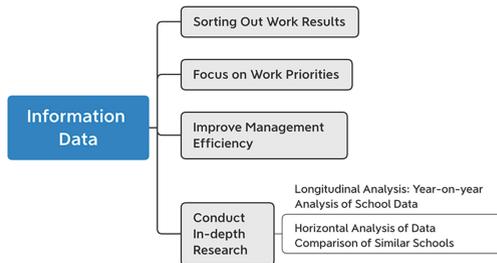


Fig. 2. Information data promotes the quality of teaching management

Building an evaluation and monitoring system with a process-oriented form, a characterized criterion, diversified subjects, and modernized means is considered a key approach.

The quality of classroom teaching is guaranteed through the implementation of the whole process, digital evaluation reform of teaching preparation, including talent demand research, professional demonstration, talent training program development, design of curriculum criteria, teacher allocation, teaching material preparation and selection, teaching environment, and resource construction, teaching and research activities, learning situation analysis, teaching design, teaching plan preparation, and other steps (Fig. 3).

The students' personality differences and practical ability variables will be taken into account throughout the evaluation process, and the key quality control points will be defined. An evaluation index system and scientific, effective, and distinctive evaluation criteria should be both designed based on quality control points (Fig. 4).

Taking into account the interests of students, industry enterprises, governments, schools, and other parties, the suggestive methods include: carrying out research and practices on multi-dimensional and whole-process multi-agent collaborative evaluation; improving the three-level pedagogical evaluation system of schools, departments, and teachers; establishing the evaluation mechanism of industry enterprises; building student evaluation channels; and entrusting a third party to carry out the evaluation to ensure the objectivity and comprehensiveness of education evaluation (Fig. 5).

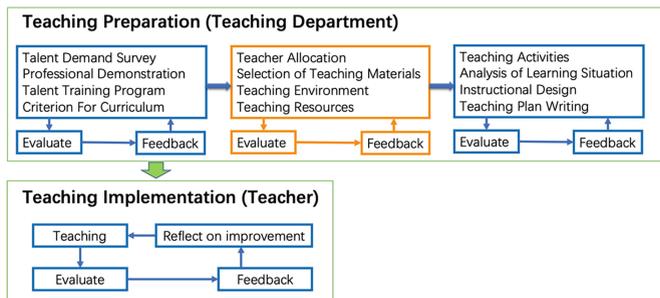


Fig. 3. Process Evaluation: Whole-process and Real-time Data Analysis and Feedback

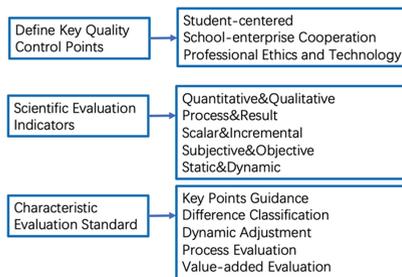


Fig. 4. Characteristic Evaluation Criteria: Student-oriented, in Close Relation to Career

in real time so that learning behavior and effects reflected by data from different sources can be analyzed through education evaluation, the problems can be timely identified, and corresponding solutions can be suggested.

5.2 Higher Requirements Should Be Proposed for the Data Literacy of Educators

It is a long-term and systematic project to combine the pedagogical quality evaluation of vocational schools with the help of big data technology. Schools should advocate more big data-oriented management and operation methods, actively cooperate with big data technology experts, and equip teachers and students with the awareness and ability related to big data. These endeavors can enable teachers and students to develop a digital thinking mindset and profoundly understand the connotation, role, and significance of big data.

5.3 Education Management and Teaching Platforms Need to Be Upgraded and Iterated

The pedagogical evaluation based on big data technology requires the support of information platforms that rely upon the school to build a digital management framework, timely introduce a third-party platform or system for big data analysis or cooperate with enterprises to develop a data analysis system. It is worth noting that data for the sake of data shall be resolutely avoided. However, traditional methods and means for pedagogical quality evaluation that prove mature and effective can still be used.

5.4 Education Data Needs to Be Standardized

The advantages and functions of big data in vocational education evaluation are not yet fully leveraged, partly explained by the inconsistent interpretation of education evaluation indicators and the non-uniform standards. This reason leads to a certain degree of distortion in the school's internal evaluation data and affects the analysis and comparison of the external evaluation. Therefore, it is necessary to establish and improve the evaluation index system of vocational education as soon as possible, and strengthen the reliability and validity of data analysis.

6 Conclusion

The scientific construction of the evaluation organization system and the definition of the relationship between all levels and boundaries of rights and responsibilities constitute the basis of the vocational pedagogical quality evaluation. The level and quality of pedagogical evaluation are determined by educators' cognition of responsibilities and professional abilities. Big data technology provides data support and technical means for evaluation, enabling more objective and comprehensive evaluation results, and more targeted feedback. Education evaluation faces a myriad of challenges such as personnel quality improvement, information platform establishment, and data standard unification.

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