

Research on Chinese University Students Learning Evaluation Based on Big Data

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Abstract. There were a series of problems in the Chinese university students' learning evaluation, which were not conducive to the development of students and the cultivation of talents. In based-on Internet course education process, such as MOOCS (massive open online courses), micro class, flipped classroom and so on, a large amount of data has been produced. Big data technologies provided a new evaluation method, technique and means for learning evaluation. Through literature analysis, studied the connotation of education big data evaluation, the relations between big data characteristics and learning evaluation principle, and learning evaluation challenges, trends and countermeasures and other issues in the big data era. Provided a reference path for the university students' learning evaluation reform, the cultivation of the individualized and innovative talents.

Introduction

There were many problems in the Chinese university students' learning evaluation process, such as focusing on the evaluation of test subjects, book knowledge, written form, quantity target, rote memorization, summative assessment, score, rank, uniform standard, etc..., but ignoring non-test subjects, non-book knowledge, non-written form, non-quantity target, ability, formative assessment, starting point, the progress, personalized teaching and so on [1]. These problems affected the cultivation of students' thinking ability, application ability and innovation ability, which was not conducive to the healthy development of Chinese higher education. Learning evaluation is student learning guide, should pay more attention to the learning process evaluation and students' development, and should be to promote students' progress and improve the learning ability as the goal, cultivate individualized talents according to the foundation and starting point of students.

Based on Internet education forms, such as Moocs (massive open online courses), micro courses and flipped classroom, can record all the data in the learning process, through data mining and analysis, can find that the students' current learning problems, guide students' further learning direction. For just entering a certain discipline students, they can be carried out by diagnostic tests, understood their learning basics, make up individualized teaching strategy for them. Through carrying out academic summative assessment, judge students' learning result [2]. Based on the evaluation of the whole learning process data analysis, it is conducive to the cultivation of innovative talents, and provides the vitality for the prosperity of higher education.

In this paper, studied the connotation of education big data evaluation, the relations between big data characteristics and learning evaluation principle, and learning evaluation challenges, trends and countermeasures and other issues in the big data era.

The Connotation of Education Big Data Evaluation

Big data in the field of education has broad and narrow sense. Broad education big data generally refers to all data derived from the data of human behavior in daily educational activities, and narrow sense education big data refers to the learners' behavior data, it mainly comes from the student management system, online learning platform and curriculum management platform. In this paper, used narrow educational big data.

Learning evaluation is taking students as the evaluation object, evaluators evaluate student development process in according to a certain standard in the basis of systematic, scientific and comprehensive investigation, sorting, processing and analysis students' data. Learning evaluation

aims to promote teaching reform and the students' all-round development. Learning evaluation includes students' academic achievement, moral, behavior, physical, interest, attitude, psychological characteristics of personality evaluation and so on.

In the big data era, learning evaluation can be carried out in the guiding of big data thinking and the support of big data technology. Through data mining, analysis, visualization and other technologies to show the value of education big data, to promote the development of educational innovation, improve the quality of education and teaching, and promote the development of students' personality and comprehensive progress. [3]

The Relations between Big Data Characteristics and Learning Evaluation Principle

The Objectivity of Education Big Data to Ensure the Scientific Nature of Learning Evaluation

The education big data can be collected from the real education environment, student management system, online learning platform and other systems, including learning behavior data, learning content, learning management data and study result data, really recorded students' learning process. Through technology and method of data mining, to process and analyze education big data, find correlation between students' learning results and learning content, learning resources and teaching behavior variables, forecast learning trend of students in the future, to guide the students' learning direction. The real objective of education big data sources and analysis, laid the scientific nature of learning evaluation.

The Diversity and Dynamics of Big Data Can Promote Students' Individualized Development

The difference of education big data refers to the relevant data of individual students, including students' personality (interest, hobbies, needs, beliefs) and personality (ability, temperament and character), other students' attribute data (age, gender, ethnicity, urban and rural areas, the cognitive reserve and intelligence type, learning style and learning attitude, etc.) and all kinds of data in the process of learning. The dynamics of education big data refers to automatically collect students' all learning data with the student education platform, resulting in data volume growth and changing.

What the differences and dynamics of the education big data promote students' development mainly refers three aspects. Firstly, with the support of big data technology, students' individual development can be visualized directly, so that everyone can see the possibility of the development of the students and meet the needs of the development of the students. Secondly, on the basis of data analysis, teachers can design individualized teaching according to different students' needs and learning styles, to promote every student's learning. Thirdly, the dynamic education big data can guide learning evaluation follow educational psychology "recent developments" point of view, let teaching go in front of the current development level of students, respect differences of students, help to achieve the goal of promoting students' development. [4]

The Complexity of the Education Big Data Means the Diversity of Learning Evaluation

The contents of education big data include the learning basis, learning behavior, learning process, learning interest, learning attitude, learning style, learning strategies, learning outcomes and so on. Educational big data types include structured, semi-structured and unstructured data. The sources of education big data include teaching data, management data, research data and service data. The segment of data generation can be divided into process data and result data. The data level can be divided into basic layer data, state level data, resource layer data and behavior layer data. The scale of education big data is large, the type is complex. The complexity of the education big data reflects the comprehensiveness of learning evaluation content, requires the diversity of learning evaluation methods, subjects and results. [5]

The Whole Data Model with "Sample=Overall" Consistent with Learning Evaluation of all the Students

Big data technology can achieve the collection and processing of all specific target data, that is, the realization of the 'sample' and 'overall' equivalent. This means that we could use all the data within a

certain range, not just rely on a small part of the data. The application of big data technology in learning evaluation is in conformity with the principle of all students' learning evaluation. Learning evaluation should be geared towards all the students and promote the development of all the students.

The Whole Process of Learning Evaluation Can Be Tracked by the Education Big Data

The tracking of education big data refers to the use of data collection, mining and analysis technologies, carry out fact judgment and value judgment on learning behavior of students, and improve students' learning and teachers' teaching. From the time and function of learning evaluation implementation, the diagnostic assessment can be used to understand the basic situation and the actual level of students, the formative assessment can be used to clear the problems in the learning process and methods of teaching improvement, the summative assessment can be used to understand students' learning results. Learning evaluation runs through the whole process of student learning, and covers monitoring, diagnosis, feedback and optimization. [6]

Early Warning of Education Big Data to Ensure the Timeliness of Learning Evaluation

Early warning of education big data refers to in the students' normal state, according to predefined criteria, when students' real-time learning behavior data significantly changed, warning through a certain mechanism, to remind the teacher to analyze student's learning situation, and intervene the student's learning activities, help them solve the problem in time, improve the student's learning state. The early warning function of the education big data provides the possibility for the timeliness of learning evaluation.

The Intuitive of Education Big Data to Make Students' Personalized Evaluation Easier

In the context of big data, the data of learning process and results can be presented in an intuitive and visual dashboard, make students' learn data transfer, representation and interpretation can be more intuitive, make learning evaluation more convenient and easy.

The Challenges of Learning Evaluation Reform in the Era of Big Data

Thinking challenges

The education big data includes the data of students' learning basis, learning interest, learning attitude, learning effect and so on. The ideas of learning evaluation in the era of big data is based on the collection and analysis of the data in the students' daily life and learning. Whether evaluator could form a big data thinking and regard students' learning as the existence of a multidimensional data source, is a challenge to thinking.

Talent Challenges

Using big data technology to carry out learning evaluation, not only need for professional analysis talent, but also requires teachers with teaching experience.

Education big data analysts should have education, psychology, sociology and other disciplines of knowledge, at the same time with big data thinking, to find out problems and solve the problems from the perspective of students. The complex and interdisciplinary characteristics of professional data analysts increased the shortage of big data professionals.

In the era of big data, teachers should have the concept of big data and can use big data related practical methods and techniques. However, most teachers' understanding to big data is still in the conceptual stage. From the concept stage to the application stage, it means that the majority of teachers not only need to study in theory, but also need regular training and practice.

Ethical Challenges

Like all technologies, big data technology itself does not matter good or bad, so it is ethically neutral. Educational data mining is often decided by teachers or educational institutions. In a sense, students lose the right to control their own learning data. At the same time, although the development path of big data analysis can bring the best rational development path to the students, but also destroy the

non-rational infinite possibilities of students' development. If the forecast of education big data appear this situation, to the students, will not be development but restrict. Therefore, in the learning evaluation based on education big data, the problems of invasion of students' privacy and affection of students' development should be good tackled. [7]

Policy Challenges

In September 2015, the Chinese State Council issued a notice of promoting big data development scheme, proposed to accelerate the development of policies and mechanisms to improve the development of big data. However, to the development of education big data, the overall plan has not been developed. Due to the strategic value, uniqueness and complexity of the big data, it is urgent to make up the development and application overall plan for providing guidance and norm to the development and application of educational data. Education data governance policy frameworks include education data collection system, education data standard system, education data management system, education data sharing and exchange mechanism, education data security management mechanism, education quality management mechanism, education data open operation mechanism, education data performance evaluation mechanism and so on. The establishment of an effective policy management framework of education big data still needs time.

The Reform Trends of Learning Evaluation in the Era of Big Data

The Development of Learning Evaluation Function, Non Selection

The development function of learning evaluation is to use learning evaluation, to find the students' learning problems, and according to the feedback information, take the proper intervention on the behavior of students, improve teaching methods, improve teaching effect, promote the better development of students. Learning evaluation should be viewed from the perspective of development, not only to see the students' past and present, but also to see the future of students. At the same time, the students' current development level must be recognized, and the development potential of the students should be seen. We should pay attention to the development of students' skills, emotion and so on. Finally, the collaborative development can be realized through learning evaluation. [8]

The Difference of Evaluation Criteria, Non Uniform

In the learning evaluation, teachers should respect the students' personality differences (interest, hobbies, needs, motivation, etc.), students' psychological characteristics differences (ability, temperament, character, etc.), students' variable difference (cognitive reserve, learning strategies, etc.), students' invariable difference (gender, cognitive style, intelligence type, etc.). The evaluation criteria should have some flexibility to respect students' individual differences and promote the continuous progress of students.

The Comprehensiveness of Evaluation Contents, Non One-sidedness

Students are the whole person, the development of students perform in all aspects. To promote the all-round development of students is not only the goal of education, but also the purpose of learning evaluation. Learning evaluation should pay attention to the students' academic achievements, ideological character and development of ability, not only pay attention to the evaluation of students' cognitive aspects, but also the evaluation of students' non cognitive aspects.

Diversification of Evaluation Methods

The diversification of evaluation methods is the combination of quantitative evaluation and qualitative evaluation. The common method of quantitative evaluation is to test. Through ensuring the validity, reliability, difficulty and discrimination of the test, so as to reflect the objectivity, standardization, accuracy and simplicity of quantitative evaluation. Through authentic assessment, performance assessment and portfolio assessment, qualitative evaluation carry out comprehensive analysis on various characteristics of the students, including students' emotion, attitude, finding problem, innovation consciousness, spirit of solidarity, adaptable abilities and so on. Only

combination of quantitative evaluation and qualitative evaluation can ensure that the evaluation results are objective, comprehensive and scientific. [9]

Pluralism of Evaluation Subjects

Firstly, teacher is a dominator of students learning evaluation. The roles and responsibilities of teachers in the teaching activities determine that teachers play an important role in learning evaluation. Teachers as the executor of teaching activities, have more understanding to the students' individual difference of intelligence, personality, attitude, etc., is helpful to the evaluation smoothly, to ensure an objective and impartial evaluation results. Secondly, students' self-evaluation and mutual evaluation. Students are the main body of evaluation, students' self-evaluation is the process of self-learning, self-education and self-reflection. Students' mutual assessment helps students learn from each other, communicate with each other and inspire each other. Thirdly, parents participate in learning evaluation, can expand the field of learning evaluation, so that learning evaluation more comprehensive, objective and true. Finally, Students as a social person, must have the social basic human values and behavior, in the process of growing up, universities and various social institutions need to participate in learning evaluation, make students form conforms to the social requirements value and behavior. [10]

The Formation of Evaluation Process, Non-Summative

Through the formative evaluation, teachers analyze students' learning behavior data at the current stage, examining students' achievements and progress, identify students' the distance and deficiencies with their learning target, adjust teaching and learning, to promote students' development. The combination of formative assessment and teaching is always in the teaching process. In the evaluation based on education big data, the formative evaluation is the main, and the final evaluation is supplemented. [11]

Strategies of Learning Evaluation Reform in the Era of Big Data

Establish a Rational Concept of Big Data, Return to the Development of Learning Evaluation

Big data rational view, in addition to recognizing the characteristics, role, value and many challenges of education big data in the learning evaluation, also means understanding of education big data comprehensive, in-depth and objective. The concept of developmental learning evaluation is a kind of value orientation for the learning evaluation. To promote the development of students is the ontological function and internal function of learning evaluation. To promote the development of learning evaluation, it is necessary to baton into server, not the evaluation direct to teaching, but the evaluation serve for teaching. The concept of developmental learning evaluation is not about how to deal with the evaluation, but how to generate the value and how to promote the development of students. [12]

Develop Education Big Data Technology, Improve the Educational Data System

The technology system of education big data includes data acquisition, data storage, data process, and data visualization technologies. The technical system of education big data has the characteristics of complexity, innovation and high input, and its development needs the cooperation of government, all kinds of schools and enterprises. In the development of big data technology, Government needs to provide policy guidance, funding, supervision, and coordination responsibilities. Universities with big data technology research and development basis needs to increase R & D efforts to carry out technical challenges, to promote the application of education big data technology, leading the development of education big data technology. In the big data technology research, develop, promotion and application, enterprises has the characteristics of flexible, efficient, and pursuit of economic interests, need to follow the principle of market competition, focus on specific aspects of education big data applications, develop series of hardware and software products, to promote the development of the core technology of big data. The education big data system include the state, province, county and the school level data information system, include the education big data

warehouse, education big data service platform etc., such as data collection system, data management system, data service scheduling management system and intelligent analysis system.

Speed up the Training of Big Data Personnel

In the development of big data professionals, need to do the following works. Firstly, need to recognize the current status, do a good plan. Secondly, through professional training to ensure personnel quality. Universities should make professional adjustment, set up big data disciplines, to educate big data personnel. Thirdly, through the cooperation of university and enterprise, pay attention to practice. To the problems of the teachers' lacking of big data related knowledge, skills and experience of learning evaluation, supporting the establishment of the teacher training system, improve the consciousness and ability of teachers to use big data to carry out the learning evaluation.

Following the Principles of Educational Ethics

For students, the collection and use of education big data is not only related to their privacy, but also related to their long-term development. Therefore, in the process of collecting and using educational data, should follow the principle of students' right to learn the truth. In addition, the students are the main producer and providers of education big data, they should have a certain autonomy to their own education related data.

Improve Education Big Data Policy, Promote Education Big Data Legislation

September 2015, the Chinese State Council issued the action outline of promoting big data development. January 2016, the Guizhou Provincial People's Congress passed the promotion ordinance of Guizhou provincial big data development and application. The introduction of these big data policies and regulations, to some extent, make up for the lack of big data development top-level design flaws, to fill the gaps in the existing policies and regulations. However, there is a lack of clear and effective policies and regulations to guide and protect the development and application of big data. Therefore, it is necessary to establish and improve the policy system of education big data. Firstly, should set up a whole plan for the development and application of education big data. In the overall goal, use the opportunity of Chinese government promote education informationization and education management information system construction, build a national big data system to be covered by individual level data, school level data, regional level data and national level data, to promote the depth integration of education big data and education management information system, to achieve the targets of education management, decision-making, scientific research and evaluation through education big data. Secondly, set up the opening and sharing policy for education big data, to achieve data integration, eliminate Data Island. Thirdly, set up the policies of education big data collaborative development, to promote cooperation in government, universities and enterprises. Fourthly, set up the big data security law, to ensure the safety of individual, institutional and national education big data.

Summary

There are the important roles in the learning evaluation reform in Universities based on big data. Firstly, can reform the current status of university teaching evaluation count against the cultivation of individual talents and innovative talents. Secondly, strengthen the monitoring of students' learning process, and effectively promote the progress of students from different learning starting point. Thirdly, to promote the universities, teachers, students, social parties to participate in the evaluation of students learning, to provide guarantee for cultivating society urgent personnel.

The research of this paper provides a reference path for the reform of Chinese university learning evaluation.

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References

- [1] Zhang Jing, Yang Yong. Obstacles of Applying Development Evaluation on Classroom Teaching Quality in Universities and Relative Countermeasure. *Education and Teaching Research*, 2016, 30 (1): 67-70.
- [2] Yang Yan. Research on the Flipped Classroom Teaching Mode under the Information Environment. *Journal of Higher Education*, 2016.5:34-36.
- [3] GUO Ling, GUO Zerui. Evaluation and Optimization of Online Course Learning Based on Big Data Analysis. *Journal of Shenzhen Polytechnic*, 2017, 16(1): 45-51.
- [4] Wang Liangzhou, Yu Weihong. A Review of Learning Analysis from the Perspective of Big Data. *Distance Education in China*, 2015.3: 31-37.
- [5] Xiao Yiping. Exploration on Teaching Reform of Innovative Talents Cultivation in the Era of Big Data. *Journal of Higher Education*, 2016.1: 67-68.
- [6] Jin Xuqiu. Research on the Construction of the Formation Evaluation System of the Thematic Task. *Journal of Taizhou University*, 2016, 38(3): 72-77.
- [7] Huang Jincheng. Alert to the ethical risk of big data Education. *Journal of Curriculum and Instruction*, 2015.5: 90-92.
- [8] Ding Nianliang. Predicament and outlet of formative assessment in Chinese educational context. *Contemporary Education Science*, 2016.22:28-31.
- [9] Zhou Xianglin. Research on the Innovation of College Teachers' Teaching Evaluation Method Based on Student Learning. *Modern University Education*, 2017.1: 93-97.
- [10] Wang Ying, Xiao Hongwei, Xu Yang. A Study on the Performance Evaluation Model for Online Learning based on Mobile Internet. *China Educational Technology*, 2017.3:132-137.
- [11] LI Shuilan, MA Jun. Evaluation of the Application Effect of Online Formative Assessment in Distance Open Education. *Journal of Hunan Radio & Television University*, 2016.2: 1-6.
- [12] Zhu Xinzhuo, Yan Rui, Liu Hanyue. Research on Educational Quality Based on Process and Its Evaluation. *Journal of Higher Education*, 2015.5:78-85.