

Research on the Influence of Learning Analysis Technology on Teaching Mode Under the Background of Big Data

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Abstract. With the development of information technology, big data analysis applied in the field of education has become the development trend of teaching today. Learning analysis technology, as an emerging technology, has changed the empirical mode of traditional teaching. It can not only provide students with a high-quality, personalized learning experience, but also improve the teaching methods of educators, and improve the teaching process through information and data analysis. Based on the background of big data, this article explains how to improve the learning analysis technology based on the new situation, reform the teaching model, and highlight the significance of big data, to better serve students and promote the reform and development of the teaching model.

Keywords: *big data, learning analysis technology, teaching mode*

1. Introduction

With the popularization of information technologies such as the Internet, 4G, and 5G, and the increasing availability of open educational resources such as MOOCs, the channels for students to acquire knowledge have increased rapidly, and learning at any time and place has been basically realized. The change in learning methods has led to a change in the role of teachers. Teachers are no longer the sole imparters of knowledge, but have become interveners and guides in student learning. Teacher functions have changed from traditional classroom teaching to designing, organizing, helping, and guiding students. Learn. In this environment, the main task of the teacher is to tailor the most suitable learning environment and personalized guidance for students, which specifically includes two aspects: one is to design a student-centered teaching plan, and the other is to design a student-centered Teaching format. In order to accomplish this task, teachers must not only make full use of the structure and internal connections of knowledge, but also rely more on the understanding of students' conditions. Only by knowing the learning characteristics of students in advance can they make appropriate teaching designs. Therefore, learning analysis has become a necessary auxiliary means in modern teaching.

The era of big data provides a new way of thinking and methods for data analysis applications. In the era of big data with high capacity, high speed, and diverse data structures, not only can we use the cloud server to store massive amounts of structured, semi-structured, and unstructured data, but we can also use data analysis and data mining technologies from this Extracting information of great value from massive data has greatly promoted the development of various fields of society including education.

2. Overview of Learning Analysis Technology

Learning analysis technology is a new hot spot in the field of educational technology in recent years. In the first International Conference on Learning Analysis and Knowledge held in 2011, it was proposed to understand and optimize the learning environment of students by measuring, collecting, analyzing and reporting on student learning data. Higher education Informa ionization professional organizations believe that learning analysis technology is to collect and establish models to predict the learning characteristics of students and interfere with the learning process of students. In summary, learning analysis can be defined as a technology that collects a large amount of data generated during the learning process, then analyzes it to form an analysis report, and finally intervenes and adjusts the learning process.

2.1 Elements of Learning Analysis Techniques

Data collection: Data collection includes multiple collection methods, such as program background, code scripts, and other methods. The data comes from the learning platform where students learn, and a large amount of data is generated in the learning platform, which we also call big data. These big data often come in two forms, one is structured data, such as data in report logs, and the other is unstructured data, such as data in text, pictures, and audio formats.

Analysis: After data collection, select the corresponding data analysis software according to the type of data, and analyze the data in a combination of qualitative and quantitative data. After analysis, the analysis results will be presented in the data in the form of visual charts and other types. Analysis report.

Speculation: After analysis, we can know the progress of student learning through visual charts, including what students have learned, how to allocate learning time, and what areas are mainly used for learning energy.

Feedback: By clarifying the student's learning progress, the results are fed back to the teacher, and the teacher appropriately intervenes in the student's learning process based on the feedback results.

Intervention: Teachers appropriately intervene in the student's learning process through feedback information, provide personalized guidance to students, and develop personalized learning programs.

In summary, the five elements of learning analysis are composed of collection, analysis, speculation, feedback, and intervention. The process is mainly to collect data first, then analyze through analysis software to form a visual chart, infer the student's learning process, and feedback the results to the teacher. The teacher then appropriately intervenes in the student's learning process to form a personalized guidance mode.

2.2 Characteristics of Learning Analysis Techniques

From the perspective of the object that generates the data, the data sources for learning analysis include teachers, students, managers, decision makers and other learning stakeholders; from the perspective of the technology platform that generates the data, the data sources for learning analysis include online learning platforms and online teaching Platforms, online learning systems, social media, digital teaching materials in traditional classrooms, etc. .; from the perspective of the type of data generated, the data sources for learning analysis include learning behavior data, learning environment data, learner emotional state, and learner attention level Wait. Most of these data are unstructured or semi-structured data, which need to be comprehensively obtained using a variety of sensing devices, and big data processing technology is used to extract, clean, and standardize the data for further use by the learning analysis engine.

The results of the learning analysis have a clear direction, the purpose of which is to understand the current state of the learner's learning behavior, evaluate the learning performance of the learner, optimize the learning process, and perform the learning behavior result based on the stage evaluation results and prediction models. Predict to identify potential problems early and learn from them. This is also the key difference between learning analysis and educational data mining and academic behavior analysis.

The visual presentation of learning analysis results is an important part of the practical application of learning analysis. Visualization tools can make the results of learning analysis concise and easy to understand. Different users can analyze and judge aspects related to themselves based on the visualized results. And make targeted adjustments, such as learners adjust learning strategies and methods, teachers adjust teaching content and teaching methods.

Learning analysis has application characteristics. It does not focus on the production of learning and teaching theories, but rather understands educational data under relevant models based on existing educational teaching theories, and provides learning, teaching and management support. Therefore, learners are the first service object of learning analysis, both the starting point of learning analysis and the ending point of learning analysis. Second, learning analysis serves the

results of data analysis required by teachers, teaching managers, and decision makers in the teaching process. There is a difference in granularity.

3. Learning Analysis Technology Model

3.1 Data Collection

Learning analysis technology requires a large amount of data as a support. It is not enough to rely on structured data alone. Unstructured data in different systems must be collected at the same time to ensure the accuracy, consistency and integrity of the analysis results. Currently, a large amount of student information has been accumulated in the education system. Information such as student information, course information, and teacher information in the information system can be used as one of the data sources for learning analysis; the course management system and learning management system also contain a lot of information that can be mined, including interactive information in the course, Learning performance information, and behavioral information; meanwhile, curriculum guidelines based on teacher experience, teacher observation, and teacher intuition are also an essential part of forming a decision tree analysis.

3.2 Data Processing

The consideration of structured data is difficult to reflect how much knowledge a student has absorbed in a class, but its behavioral response in the system can be transformed into quantifiable data to analyze its learning process. For example, in online courses, the performance of students can be tested in multiple aspects: such as the time spent on the website compared with classmates; the frequency of logging in to the website; the probability of repeating mistakes after making the same mistake; staying in a subject Time and so on. By comprehensively analyzing these data, we can have a deeper understanding of students' learning behaviors, and thus understand students more microscopically.

3.3 Software Analysis

Learning analysis software is divided according to professional level, which can be divided into two kinds of special tools and general tools. "Special tools" are generally the core analysis tools in a learning analysis project. It is designed and developed specifically for the specific requirements of a project. During the project implementation process, this tool is used to collect and analyze learner data to guide teaching.

3.4 Behavioral Intervention

The learning analysis results can be used to evaluate student performance and provide timely feedback. At the same time, according to the learning effect of the student, the learning content and methods can be adjusted in a targeted manner to provide guidance and help for students and improve their learning ability.

4. Impact of Learning Analysis Techniques on Teaching Models

4.1 Personalized Teaching Mode

The application of learning analysis technology can provide a personalized learning environment for each student. For example, if a student takes far less time to solve a problem than other students, the system analysis results will automatically give tips and clues to promote the student's enhanced learning. This immediate reminder was an impossible task in the past. Students wait at least several days until their work is graded. At the same time, after using the learning analysis technology for a period, teachers can track and analyze information to determine whether their teaching methods are effective and adjust accordingly. As a result, each student can have their own personalized learning curriculum tailored to them.

4.2 Changes in Teacher Roles

The application of learning analysis technology will make the teacher not only a "teacher", but also assume the role of analyst. Teaching in the traditional sense is mainly empirical. Teachers rely on their own subjective judgments to choose the content and method of teaching courses, and then verify it through repeated practice. And the learning analysis technology in the era of big data helps teachers to be liberated from this traditional teaching mode. The decisions made by teachers will no longer be purely empirical judgments, but will be based on data analysis.

4.3 Improve the Learning Platform

The collection of data must depend on the learning platform. Therefore, the quality of the learning platform determines whether the data collection is accurate. Therefore, the functions of the learning platform should be effectively improved to diversify the data collected. Attention should also be paid to the tolerance of the amount of data, and whether the learning platform can accommodate a large amount of data for effective analysis, to avoid the phenomenon of incomplete data collection, which has tested the stability of the data processing platform.

5. Summary

Big data technology can process complex massive data of different structures at high speed and in real time, and conduct in-depth and complex analysis of a large amount of irrelevant information, which can help promote personalized and adaptive research in teaching. As an emerging technology, learning analysis technology also faces many challenges. It may have a long way to go before its large-scale application. It requires in-depth research by researchers to further develop the service objects and application scenarios of the technology. The role of learning analysis technology in the context of big data is to analyze the data generated in student learning activities and understand the true learning status of students, so that teachers can choose and design teaching content according to the needs of learners, and improve teaching quality.

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