Quest Journals
Journal of Research in Environmental and Earth Sciences
Volume 7 ~ Issue 12 (2021) pp: 27-31
ISSN(Online) :2348-2532
www.questjournals.org

Research Paper

Research on innovation platform of education based on TRIZ

Ma Yanfei Zhi Liping Yu Juan

Anyang Normal University, Anyang, China
Correspondence: Ma Yanfei, Anyang Normal University, Anyang, China. Tel: 1-359-811-4693.

Abstract: *Human society has entered the era of big data that promotes the transformation of human work, life and thinking, and all social fields are bound to be strongly impacted by big data. And great influence on the education field of big data is becoming a driver education system reform and innovation of strong power, and efficient education management using big data resources cannot leave a powerful platform for support. It is very important to keep pace with the reform and innovation of education system and establish education innovative platform guided by TRIZ theory. This article first expounds the TRIZ theory and education related concepts of big data, and then analyses the architecture model of education big data platform, and then analyzes the application of TRIZ theory in the innovative platform construction, finally discusses the important role in constructing the platform RIZ theory.*

Keywords: *TRIZ theory; Education big data; Platform construction; application*

R*eceived 08 Dec, 2021;* ***R****evised 21 Dec, 2021;* ***A****ccepted 23 Dec, 2021* © *The author(s) 2021.*
P*ublished with open access at* ***www.questjournals.org***

I. INTRODUCTION

In 2015, in order to promote the construction of big data, China established research institutions such as China Education Big Data Research Institute and National Engineering Laboratory of Education Big Data Application Technology. Big data has become a new driving force to promote the education system and innovation. Big data has become a new driving force for education systems and innovation. As a world-class innovation method, TRIZ theory has been widely used in both technical and non-technical fields. Taking it as a guide to build an innovative platform can help people efficiently use big data to provide better services for educational activities, thus promoting the innovation and development of education system.

II. TRIZ THEORY

2.1 define

"TRIZ" is a Russian acronym for "Inventing problem solving theory." Theory of Inventive Problem Solving(TIPS) But the word TRIZ is so old that it still stands for "inventing problem solving theory." Since 1946, the world high level through some innovative experts research millions of patent document, found that sums up the internal rules of patent document in which "all technical problems encountered in the development of has its specific solution model, we can analyze extracted one of the high quality of the patent problem solving model, provide a reference for our study. So we can improve our ability to invent and innovate." Experts collected, classified, analyzed, compared and summarized information for a long period of time, and a set of relatively systematic and practical solutions to invention problems was born, forming the TRIZ theory or TRIZ method, which is now famous in the world.

2.2 Theoretical Connotation

Every invention patent is basically solving innovative problems. TRIZ believes that the technical system is developing in the direction of eliminating conflicts and increasing ideals by introducing at least external resources. TRIZ theory considers problems in a dialectical way, rather than simply focusing on the cause and effect of problems themselves. In order to better understand the problems, ordinary problems are regarded as a technical system with an evolutionary trend. When it looks at solving problems, it first defines the goal of solving problems, finds the perfect solution, that is, the final ideal solution in TRIZ theory, and then tries to solve related contradictions and conflicts according to the goal. The classical RIZ method has a set of tools

and methods for problem analysis and solution, innovative thinking methods and theoretical structure based on scientific knowledge, which constitute a relatively complete TRIZ innovation theoretical system. People use it as a theoretical guide to discover and dig out some scientific principles or laws that are based on or followed in the process of inventing and solving technical problems. At present, the TRIZ method is highly appraised in the world, and it is called "the three evolution theories of mankind" by virtue of its unique technological system evolution law, Biological evolution theory of Darwin and human social evolution theory of Marx.

III. BIG DATA IN EDUCATION

3.1 Concept

At present, the definition of big data in education is not clear enough. In The Blue Book of Big Data Development in China's Basic Education in 2015, big data in education is interpreted as a large collection of high-value data generated in all educational activities. Dr. Yang Xianmin et al. in China believe that the so-called education big data refers to all the data sets generated in the whole educational activities and collected according to the needs of education that can create huge potential value for educational development .

3.2 classification

Education in the field of big data is divided into broad and narrow two kinds of different types, broad education big data refers to all data comes from everyday education activities and human behavior, it has the level, timing and situational characteristics, and special education big data refers to learners' behavior, it mainly comes from the student management system, online learning platform, and course management platform, etc. Categorizing education big data type, is based on structure and on the content of two points: first, the structure is divided into main divided into structured data, unstructured data and real-time data on three types: secondly, the content is divided into class teaching resources, the education teaching management, teaching behavior and the education teaching evaluation four categories.

3.3 Important Functions

The country attaches great importance to the construction of big data in education, and educational informatization development institutions all over the country will also vigorously develop big data, which is an important content of the 13th Five-Year Plan, and all sectors of society have also paid extensive attention to the construction of big data in education. Wu Dihua, a scholar, believes that the construction of big data in education will help people break the traditional thinking mode of education when making educational decisions, break free from the assumption and subjectivity of educational thinking mode, and make more scientific and objective educational decisions. Chinese scholar Tonses and others also put forward that big data of education will promote significant changes in the educational process, decision-making, mode and management. The first change is in the education process, which will produce huge and complex teaching and learning behavior data, these information will be accurately recorded through the platform of big data, so as to achieve quantitative management; The second change lies in educational decision-making. Through the reliable analysis of educational information on big data platform, it helps people make more scientific educational decisions and makes up for the disadvantages of making wrong decisions with experience. Three education mode is the change, the ancient great educator Confucius, the man claims according to their aptitude, this point of view in the new era we are more applicable, teachers use differentiation to the student of science and technology information for precise analysis of individuation, better able to meet each student's true ability, the students according to their aptitude, help students better development; The fourth change lies in educational management, which makes the management of education more intuitive, accurate and efficient by using scientific and high technology to systematically analyze a large number of complex educational resources and business management.

IV. STRUCTURE OF EDUCATION BIG DATA PLATFORM

Educational big data platform is an important foundation for the collection and integration of educational big data, mass storage, efficient computing, in-depth analysis and mining, and the development and operation of educational applications.

4.1 the data layer

The division of educational big data can be divided into different types according to different standards. According to the storage structure, it can be divided into structured data, unstructured data and real-time data. Secondly, the data can be divided into four categories according to the content types, including teaching resource data, education and teaching management data, teaching and learning behavior data and education and teaching evaluation data. Structured data mainly includes students' school roll, grades, Internet access, one-card and other educational and teaching management data. Unstructured data includes data of teaching resources

such as media materials, question banks, courseware and cases, and data of teaching and learning behaviors such as explanation and demonstration, q&A and guidance. The real-time data includes the data of learning behavior generated after information retrieval, processing and publishing as well as in communication, as well as some data about evaluation such as academic level test and comprehensive quality evaluation of disciplines.

4.2 Data Acquisition Layer

The collection of data is particularly important for us to process them and discover the underlying patterns. When we collect education big data, we often need to input some log file data collected, some database record traces, necessary file information, and data generated when using the Internet, etc. These operation methods belong to the form of batch collection. The other is mainly dependent on professional network technology, for example, the Agent technology is widely used to collect and import some online behavioral data at any time. In order to obtain some educational data generated in the offline traditional education mode, we can use some professional acquisition technologies such as dot matrix digital pen and image recognition, which are real-time education big data acquisition methods.

4.3 Data Storage Layer

The diversification of information carrier also makes data storage very convenient and quick. The preservation of all kinds of educational big data obtained by different acquisition methods requires differentiated storage methods, such as message system, file system, memory storage system, data warehouse, database and other commonly used storage methods. These storage methods are also to meet the storage requirements of massive and intensive educational big data. At the same time, the data storage layer in the data warehouse mainly storage management mode, including big data warehouse, operational data warehouse, temporary storage area, and data mart four layer structure, together to complete a large number of complicated analysis and mining difficult tasks, so as to facilitate efficient management of storage data.

4.4 Efficient computing layer

Powerful computing engine provides rapid thinking in universities. Computing ability is a strong support for the value mining of big data in education. For example, stream computing engine, batch computing engine, graph computing engine, in-memory computing engine and so on are a large number of important computing engines commonly used in analyzing data. A convective computing engine, which we use primarily to process the real-time data generated; We use batch computing engines to run in parallel massive, complex, massive amounts of historical data; In large-scale data processing, some graph data must be processed, and graph computing engine is playing a role in this. Massive data processing requires high speed of data calculation. The emergence of memory computing engine meets the requirement of improving the speed of data processing and makes use of memory space for data calculation.

4.5 Analyze the mining layer

At present, our research on the educational application of big data mainly involves two aspects: one is about educational data mining, which mainly focuses on the construction of some new algorithm models; On the other hand, learning analysis is used to solve problems or contradictions in the process of education. Although the two have different emphases, some analysis and mining techniques are similar, including association rule mining, cluster analysis, trend prediction, time sequence analysis, regression analysis, emotion analysis, semantic analysis, social network analysis, etc. It is helpful to think out effective solutions to educational problems to combine these general algorithms with the characteristics of various fields.

4.6 Actual Application Layer

The application of data analysis and mining technology can fully analyze both learners and teachers, which is helpful to improve the level of learners. One is using the analysis of data mining technology, through to the learner's style category, the learner's current knowledge level, the learner's cognitive ability, learners' behavior patterns, and the law of learning and so on carries on the detailed analysis, can draw learners digital portrait, then using digital portrait to accurately predict the future of learners to learn; The system will realize the personalized recommendation function for learners, and give scientific and effective guidance to students who have been warned. Secondly, in the aspect of teaching, teachers' teaching behavior can be diagnosed so that teachers can adjust their teaching model and teaching plan. Through the analysis of teaching resources, a knowledge map reflecting the internal logical relationship of subject knowledge can be constructed.

V. APPLICATION OF TRIZ THEORY IN INNOVATIVE PLATFORM

"Smart Campus" uses flexible data to assist in intelligent monitoring of campus facilities and management. Many colleges and universities have become more and more aware of the importance and necessity of building a smart campus system. It can be seen that universities attach great importance to the construction of smart campus by investing a large amount of material resources and financial resources. Many schools have increased their investment in education big data platforms and promoted the construction of smart campuses to varying degrees. Meanwhile, schools have made significant breakthroughs in hardware and network resource construction, software resource construction, information resource construction and intelligent services, and achieved good results. The following takes the smart campus education big data platform as an example to analyze the application of TRIZ theory in innovative platforms.

5.1 S-curve of technical system

The evolution of a technological system must follow certain objective development rules, and its evolution trend follows the S-curve, which can be divided into four stages: infancy, growth, maturity and decline. It is similar to human evolution, in that each stage has a driving force behind the engineering system to keep it at a certain stage and has corresponding characteristics.

There are three shortcomings in the development of smart campus theory: (1) The smart campus theory is in the exploratory stage; ② The theory is not mature enough and clear; (3) There is no mature practical system model for the construction of smart campus system. We can get a lot of inspiration and help from TRIZ's s-curve evolution method of technical system. When promoting the construction of smart campus system, schools can accurately use the S-curve evolution rule of technical system according to TRIZ's guiding theory, which can divide the development process of smart campus system into four periods: infancy, growth, maturity and exit, which is more conducive to analyzing the growth and development of the system. At the same time, each unit should be realistic, recognize the limitations of their own actual needs, resources and capacity, and formulate the development goals and directions of each stage of the system. According to the development conditions of the theory and technology of the smart campus system, the system should be updated or upgraded to improve its applicability and meet the needs of the platform development.

5.2 Rule of improving ideality

Achishuler pointed out that the ideal law of TRIZ technology system refers to the realization of a certain function of a system, accompanied by both beneficial and harmful results. The definition of ideality of technical system refers to the ratio of useful functions and adverse functions brought by system implementation, and the continuous improvement of technical system is to continuously improve the ratio of ideality, so as to improve the level of ideality and get the results we want.

Smart campus system is an important part of the construction of big data platform for school education. It involves many aspects, such as various units and groups in the school, and also involves other different elements, such as network, big data and Internet of Things, forming a huge and complex system. The complexity of the aspects involved will encounter all kinds of conflicts and problems when promoting, which will bring negative effects on the other hand while realizing functions on the one hand. According to this law, the school authorities in the implementation of intelligent system of the construction of the campus at the same time, also must take a long-term view and a subsystem of the conflict between of them, solve the conflict of discovery to find the answer to the ultimate ideal solution, implementation of the method on the one hand, can be certain functions in the system transfer other systems, On the other hand, it can be done by leveraging existing resources within or outside the system.

VI. TRIZ THEORY PLAYS AN IMPORTANT ROLE IN PLATFORM CONSTRUCTION

6.1 Provide the basis for analysis and parameter setting

A technical system is composed of subsystems with multiple functions, which are closely related to each other. They are sensitive to the change of parameter information and will be affected in different degrees. In the process of solving system problems, when the characteristics or parameters of one subsystem are improved, the characteristics or parameters of other subsystems in the system will have different changes. Achishuler extracted 39 parameters with typical system characteristics from many system conflicts, created a contradiction matrix, and clearly presented the relationship between system conflicts. Aiming at the education problem, several variables with typical educational system characteristics should be summarized from the options of miscellaneous contradictions. Thus, it provides theoretical support for the construction of big data platform and provides basis for analysis method and parameter setting of the system.

6.2 Promote the continuous improvement of the platform system

The system is evolving towards a completely ideal state in order to adapt to the development of technology and meet the needs of human life, which is a distinct point of view always put forward by TRIZ theory. As we know, it is impossible for the development of anything to reach a perfect state, and of course, it is impossible for the system to reach a perfect perfect state, but it is very possible for the system to develop towards an ideal direction. In this way, the idealization level is changed from qualitative to quantitative analysis, which improves the innovation level and increases the measurement of qualitative change. The theory holds that in order to promote the development of a system and achieve the purpose of realizing certain functions, it is necessary to adjust and optimize the methods and means of the system. It is based on this that the big data platform will evolve and optimize towards the ideal state and constantly improve to adapt to the rapid development of society.

REFERENCE

[1]. Zheng Chengde.TRIZ Theory and Its Design Model [J]. Journal of Management Engineering,2003,(01):84-87.
[2]. Ding Junwu, Han Yuqi, Zheng Chengde. Science of Science and Management of Science and Technology,2004,(11):53-60.
[3]. Chen Minhui, Jiang Yanping, Lu Jianqiu. Research status, existing problems and countermeasures of TRIZ at home and abroad [J]. Science and technology management research,2015,35(01):24-27.
[4]. Li Zhen, Zhou Dongdai, Liu Na, Dong Xiaoxiao, Zhong Shaochun. Modern education technology,2018,28(01):100-106.
[5]. Yang Xianmin, Tang Sisi, Li Jihong. Developing big data in education: Connotation, Value and challenge [J]. Modern Distance Education Research,2016,(01):50-61.
[6]. Xu Peng, Wang Yining, Liu Yanhua, Zhang Hai. Analysis of learning change from the perspective of big data: Interpretation and enlightenment of the American Report on Promoting Teaching and Learning through Educational Data Mining and Learning Analysis [J]. Journal of distance education,2013,31(06):11-17.
[7]. Wu Dihua. Research on Educational Innovation in the Era of Big Data [J]. Education Exploration,2016,(04):120-123.
[8]. Cheng WENliang. Research on smart campus based on TRIZ technology evolution in the context of big data [J]. Theory of China, 2016 (23) : 164-165.
[9]. Peng Maoxiang, Li Hao. Science & technology progress and countermeasures,2017,34(07):139-145.
[10]. Zhou Lin. Research on solving model of university education innovation problem based on TRIZ [J]. Hubei Sociology,2015,(12):158-163.]
[11]. Chen Chunhui. A Study on the Characteristics of TRIZ knowledge Demand of College students -- Taking Engineering Department of Fujian Institute of Technology as an example [J]. Innovation Science and Technology,2017,(05):61-63.
[12]. Ren Chunhua, PANG Da. Journal of weinan normal university,2016,31(22):79-83.
[13]. Peng Maoxiang, Li Hao. Research on intelligent Development and Operation Mode of patent technology based on Big data and TRIZ Theory [J]. Library and Information Knowledge,2016,(06):80-87.]