
Research on Ideological and Political Teaching Method of Database Course Based on Knowledge Graph

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Abstract – With the development of artificial intelligence (AI), Internet of Things and big data technologies, people are faced with the challenge of how to organize, store and utilize the constantly updated massive data. As an important part of artificial intelligence, knowledge graph (KG) is capable of multi-source and multi-modal complex data storage, management, semantic mining and information interconnection and can connect various related information into a semantic relational network. Has been Internet giants such as Google, Sogou, Baidu successfully applied in the search field and intelligent q&a, etc., KG now emerged many industries, such as medical KG, financial KG, electricity KG and industrial products, etc., have been successfully used in the curriculum integration, for education, hierarchical teaching, subject associated with experiment and so on each link to provide information, Assist teachers to efficiently analyze the knowledge evolution process of relevant knowledge fields, thus greatly improving teachers' work efficiency.

Keywords – Ideological and Political Education, Knowledge Graph, Multi-Modal Complex Data.

I. RESEARCH STATUS OF IDEOLOGICAL AND POLITICAL EDUCATION

General Secretary XiJinping stressed that “we should make good use of the main channel of classroom teaching, and all kinds of courses and ideological and political theory courses should work in the same direction to form synergies, so as to realize whole-process and all-round education”. The Guidance outline for Ideological and Political Construction of Courses in Colleges and Universities issued by the Ministry of Education pointed out that “professional courses are the basic carrier of ideological and political construction of courses”. College teachers have promoted the close integration of professional education and ideological and political education in the teaching of specialized courses, combined with the characteristics, thinking methods and values of different courses, deeply explored the ideological and political elements of courses and organically integrated them into the teaching of courses. As the society attaches great importance to the ideological and political education in colleges and universities, “curriculum ideological and political” has become one of the hot spots that researchers pay more and more attention to, and it is more and more significant in constructing the teaching reform of higher education.

II. SIGNIFICANCE OF THE TOPIC

To become a socialist builder and successor, we must establish a correct world outlook, outlook on life and values, and closely link the realization of personal values with the future and destiny of the Party and the country. Persisting in moral education and ideological and political education is the key to cultivate socialist builders and successors [1, 2].

Colleges and universities are the main field of talent training. Under the current situation, the teaching design of database courses can adapt to the development of society only by continuous reform and innovation. This

project intends to propose a method of ideological and political teaching for database courses based on KG [3-5]. KG is used to integrate ideological and political teaching with database teaching, and build a teaching model of educational pattern in the whole process. Database courses and ideological and political theory courses are in the same direction, forming a synergistic effect, and cultivating high-quality talents who “love the country and the Party and have socialist core values” [6-9].

III. RESEARCH ON IDEOLOGICAL AND POLITICAL TEACHING METHOD OF DATABASE COURSE BY KG

Use KG, based on different knowledge and course of ideological element mesh structure knowledge model, the ideological elements into database class teaching process, and association rule mining, realizes the professional knowledge and course of ideological elements properly fusion, dynamic update, and constantly improve, to complex ideological instruction in a wide range of knowledge into system, push the right ideological and political elements to the right knowledge points at the right time, improve the efficiency and quality of ideological and political learning of database courses, and cultivate qualified talents with all-round development [10, 11].

Research Objectives: KG based database class course education, the database classes of different learning phase of the knowledge and professional skill points associated with appropriate education elements, implementation to knowledge in the entire area, the professional knowledge, education and professional skills of organic integration, to provide teachers and students with appropriate to the professional requirements, the diversity of professional education teaching content and course, Increase the selectivity of course content.

Research contents: The research ideas and contents are shown in Fig. 1.

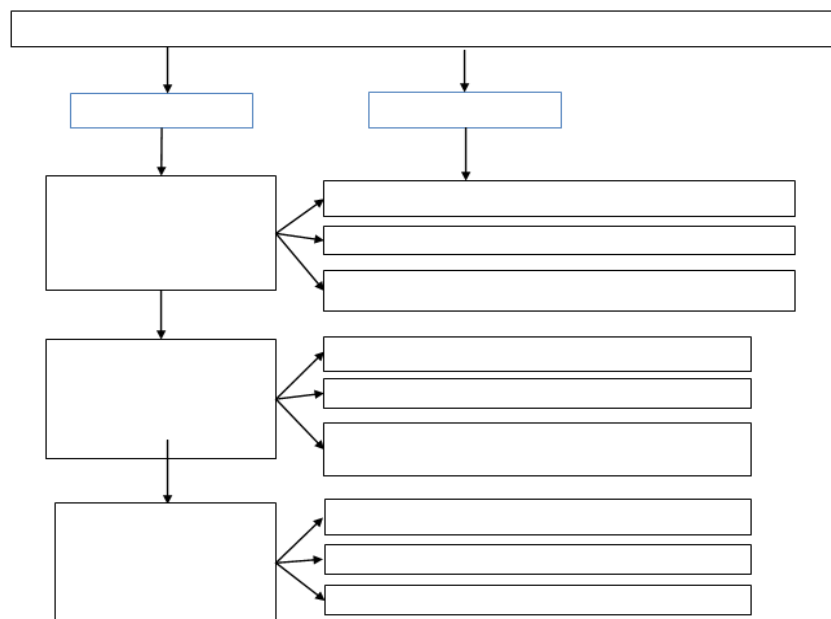


Fig. 1. The research ideas and contents.

The main research contents are as follows:

- (1) Acquisition and preprocessing of knowledge point data. To collected in CNKI database on January 1, 2015 to 2021 on July 24, about the database classes during ideological education teaching method research of

academic periodicals as the research object and knowledge extraction, mining database class curriculum ideological education teaching research focus, professional knowledge and their corresponding education knowledge and the possible development trend. The KG related to ideological and political education and teaching methods of database courses is constructed. Cite Space is used to draw the atlas of institutional cooperation, author cooperation, keyword co-occurrence, keyword clustering and time zone, and the KG results are analyzed to provide a theoretical basis for quantitative analysis of the in-depth research on curriculum ideological and political education and teaching methods. This research mainly extracts semi-structured data from Baidu Encyclopedia in ideological and political field and pure text unstructured data from current political websites. For Baidu encyclopedia semi-structured data, its data structure has certain rules, directly use Scrapy self-built data wrapper from the encyclopedia information box to crawl out ideological and political knowledge triplet. For unstructured information in ideological and political field, crawler technology combined with regular expression is used to obtain unstructured pure text data from “Learning Power”, “Xinhuanet” and other websites, and the part with high ideological and political relevance in the obtained text is retained by keyword filtering technology as the text data for subsequent knowledge acquisition. Then we obtain knowledge acquisition, including entity recognition, relation extraction, knowledge fusion, knowledge representation and storage.

- (2) According to the teaching method KG of ideological and political education of database courses, design a hybrid teaching method in line with the actual situation of ideological and political education of database courses, and apply it to the teaching practice of ideological and political education of database courses. In relation extraction, the natural language processing module in the language technology platform of Harbin Institute of Technology is used to process the database courses and ideological and political data, and then the dependency parsing method is used to get the relationship between entities. In the knowledge fusion stage, a double-layer filter is used to check and fuse each entity. The knowledge representation and storage stages are completed by combining RDF triplet representation with Neo4j graph database.
- (3) Practical verification. Using a variety of methods to evaluate the teaching effect, verify the feasibility and effectiveness of database courses and ideological and political mixed learning method applied to teaching practice. Using database classes ideological education teaching method research hot spot and the forefront of this field of research results, considering the database classes students characteristics, design suitable for the actual status of the database class curriculum education teaching method, hybrid for a semester of teaching practice, show the class teaching design and the implementation process, testing of students in the class learning.

Research hypothesis: Although KG to integration of different disciplines, different areas, and constantly update knowledge, show the correlation between different, and different fields of knowledge course, but compared with the database class field, education field is more serious, there is no specific information platform, education information scattered and grows, especially in China is rich in ideological content, the category contains a variety of relations, therefore, it is not easy to extract relations in ideological and political field by means of restricted relations. Due to the political education news mostly is given priority to with the text, some articles contain more basic education of proper nouns, and due to the road of socialism with Chinese characteristics is different from other country’s national conditions, political activity practice much and strong pertinence, ideological knowledge is fragmented, artificial way to ideological instruction information time-

consuming and no clear effectively reflect the education information of the main links, lack of structured ideological and political knowledge browsing platform. Knowledge graph is a semantic relation network connecting nodes with relation lines. It describes various relations by graph structure, which is intuitive, natural and efficient. Therefore, this project plans to combine professional knowledge with ideological and political knowledge by using knowledge atlas, which can accurately and quickly reflect the semantic relationship between professional knowledge points and ideological and political knowledge points.

Implementation plan and process: Through the research in the field of adaptive teaching both at home and abroad, of which involves the theories of pedagogy, psychology and informatics theory and technology fully digesting and absorbing, and then based on the characteristics and needs of the college students' learning, based on the relevant theory of database course and education, combined with KG and big data and cloud computing technology, during the research process, the implementation route of the project is formulated according to the actual situation and needs of Chinese university students and the scientific and rigorous principle, as shown in Fig. 2.

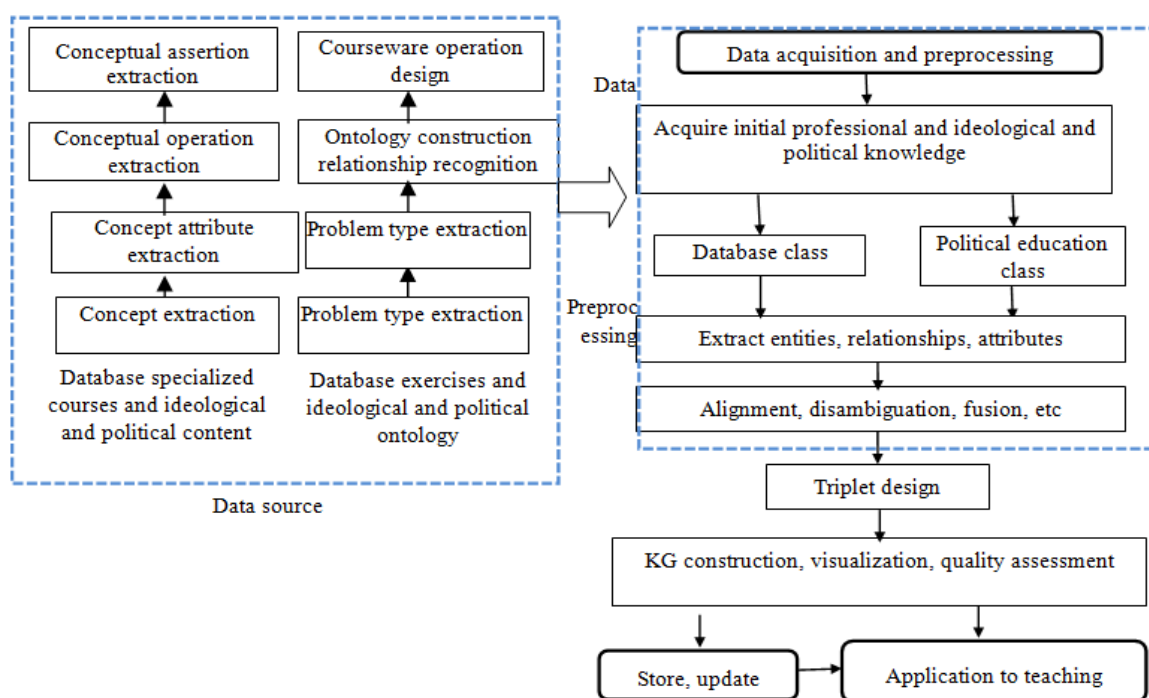


Fig. 2. Implementation roadmap.

Main process description: determine database knowledge and ideological and political field, and extract entity, relationship and attribute of knowledge data in this field to form unstructured data. Among them, database knowledge and ideological and political domain knowledge model includes three elements: discipline, course and learning object. In the ideological and political recommendation, the system uses the improved D-S evidence theory to transform the feature vector of ideological and political knowledge into three-dimensional heterogeneous evidence, and achieves the goal of more accurate recommendation of ideological and political knowledge to the database technical expertise through evidence fusion. The accessibility of professional knowledge points and ideological and political knowledge points refers to the integration of heterogeneous evidence that reflects students' knowledge level, learning style and learning ability using D-S evidence theory to predict the achievement degree of ideological and political knowledge points on database technology.

IV. CONCLUSIONS

The application for the provincial brand major of Computer Application has been publicized. The constructed database application course KG has been successfully tested in 8 classes of the three majors of Computer Science and Technology, Internet of Things Engineering, data Science and Big Data Technology of our school, which shows the feasibility of this project. On the one hand, KG and parameters are modified and improved according to the investigation and evaluation of the learning effect size and the rate of change of grades. On the other hand, feedback from students and teachers was collected to improve and adjust the KG function and application implementation mode. The self-adaptive learning system is a new educational environment centered on college students, which is promoted to other courses and majors and promotes the universalization of intelligent self-adaptive learning in colleges and universities.

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