

Ideological and Political Teaching Method of Database Courses Based on Knowledge Graph

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Abstract: Colleges and universities are the main positions for talent cultivation. In the current situation, the teaching design of database courses can only respond to the development of society through continuous reform and innovation. This project plans to propose an ideological and political teaching method for database courses based on knowledge graph (KG). KG can be utilized to integrate the ideological and political education with the database teaching, and a teaching model of the whole process of educating people can be built. The database course and the ideological and political theory course can go hand in hand to form a synergy effect and cultivate high-quality talents with “patriotism and love for the party and socialist core values”.

Keywords: Knowledge Graph; Database Course; Ideological and Political Curriculum

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With the development of artificial intelligence (AI), the Internet of Things (IoT) and big data technology, KG has the ability of multi-source and multimodal complex data storage, management, semantic mining and information interconnection. It can connect all kinds of relevant information into a semantic relationship network, with successful application in curriculum integration, which provides information for various links such as ideological and political curriculum, hierarchical teaching, discipline association and extension experiment, and assists teachers to efficiently analyze the knowledge evolution process of relevant knowledge fields, thereby greatly improving teachers' work efficiency.

General Secretary Xi Jinping has stressed that “the main channel of classroom teaching should be used, and all kinds of courses and ideological and political theory courses should be in the same direction, thus forming a synergistic effect, so as to achieve the whole education, all-round education”. The Ministry of Education's Guiding Outline of Ideological and Political Construction of Curriculum in Colleges and Universities has pointed out that “professional curriculum is the basic carrier of ideological and political construction of curriculum”. College teachers should deeply promote the close integration of professional education and ideological and political education in the teaching of professional courses, combine the characteristics, thinking methods and values of different courses, deeply explore the ideological and political elements of courses and organically integrate them into course teaching. “Ideological and political curriculum” has increasingly become one of the hot spots of researchers' attention with the high attention paid by the society to ideological and political education in colleges and universities, and has increasingly shown its importance in the construction of higher education teaching reform.

By using KG to establish a network structure knowledge model based on different knowledge points of the course and ideological and political elements of the course, integrating the ideological and political elements of the course into the teaching process of the database class and mining the association rules, the proper integration, dynamic update and continuous improvement of the professional knowledge points and ideological and political elements of the course can be achieved. This can not only organize and present complex and diverse ideological and political knowledge into a system, and push appropriate ideological and political elements to the appropriate knowledge points at the appropriate time, but also improve the efficiency and quality of ideological and political learning

in database courses, and cultivate qualified talents with all-round development.

1. Research Objectives of Ideological and Political Teaching in Database Courses

To construct the ideological and political education of database courses based on KG, it is necessary to associate different knowledge points and professional skills points of different learning stages of database courses with appropriate ideological and political elements so that the organic integration of professional knowledge points, ideological and political elements and professional skills can be achieved, thus providing teachers and students with diverse professional and curriculum ideological and political education content adapted to professional needs, and increasing the optionality of curriculum content.

2. Research Paths of Ideological and Political Teaching in Database Courses

Through the investigation of the field of adaptive teaching at home and abroad, the pedagogical theory, psychological theory and informatics theory and technology involved have been fully digested and absorbed. Then, on the basis of the characteristics and needs of college students' learning, combined with the relevant theories of database professional courses and ideological and political science, KG and big data and cloud computing technology, the actual situation and needs of Chinese college students in the research process, the implementation route of the project is formulated according to the scientific and rigorous principles, as shown in Figure 1.

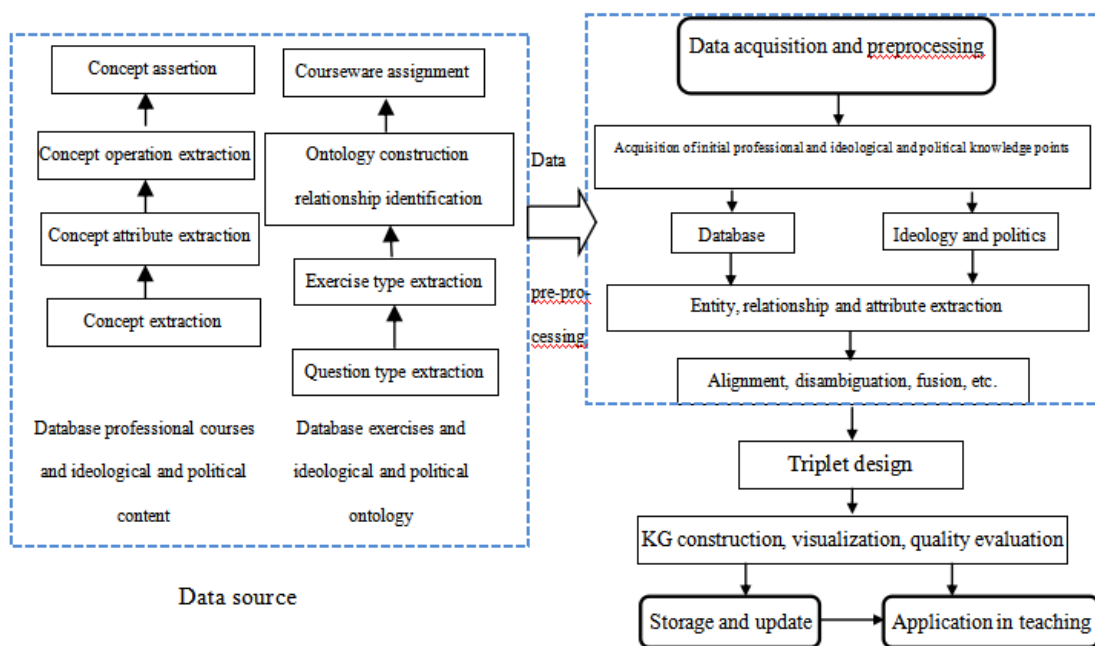


Figure 1. Research roadmap

3. Research Content of Ideological and Political Teaching in Database Courses

3.1 Data acquisition and preprocessing of knowledge points

Taking the academic journals on the research of ideological and political education teaching methods of database courses from 2015 to 2021 included in the CNKI (China National Knowledge Infrastructure) database as the research and knowledge point extraction objects, the research hotspots, professional knowledge points and corresponding ideological and political knowledge points and possible development trends in the field of ideological and political education of database courses are mined. The education and teaching methods related to the ideological and political education of database courses are built, and Cite Space is used to draw the organization cooperation map, author cooperation map, keyword co-occurrence map, keyword clustering map and time zone map. The analysis of the KG results provides a theoretical basis for quantitative analysis for the in-depth study of the teaching methods of ideological and political education.

The research mainly extracts semi-structured data from Baidu Encyclopedia in the field of ideological and political affairs, and pure text unstructured data from current political websites. For the semi-structured data of Baidu Encyclopedia, there are certain rules for its data structure. It directly uses the self-built data wrapper of Scrapy to crawl out the triple of ideological and political knowledge from the encyclopedia information box. For unstructured information in the ideological and political field, crawler technology and regular expressions are used to obtain unstructured pure text data on "Learning Power", "Xinhuanet" and other websites. The text with higher ideological and political relevance is retained through keyword screening technology as the text data for subsequent knowledge

acquisition. Then there is knowledge acquisition, including entity recognition, relationship extraction, knowledge fusion, and knowledge representation and storage.

3.2 Teaching practice design of ideological and political education in database courses

According to the teaching method of ideological and political education of database courses, KG, a mixed teaching method that conforms to the actual situation of ideological and political education of database courses is designed and applied 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 database courses and ideological and political data, and then the dependency syntax analysis method is used to obtain the relationship between entities. In the knowledge fusion stage, each entity is checked and fused by using a double-layer filter. The knowledge representation and storage stage is completed by combining RDF triple representation with Neo4j diagram database.

3.3 Practical verification

Various methods are used to evaluate the teaching effect and verify the feasibility and effectiveness of the hybrid learning method combining database courses with ideological and political education in teaching practice. Based on the research hotspots of the teaching methods of ideological and political education in database courses and the frontier results of the research in this field, taking into account the characteristics of the students in database courses, a hybrid teaching method that conforms to the actual situation of the ideological and political education in database courses is designed, and a semester of teaching practice is carried out. The teaching design and implementation process of one of the classes is showed, and the learning effect of the class is tested.

4. Research Results of Ideological and Political Teaching in Database Courses

In the phase of entity recognition, the training model based on bi-directional long and short term memory model and conditional random field (BiLSTM-CRF) is studied, and it is used for database class expansion and ideological and political entity extraction experiments. In the construction of the knowledge graph, the random forest model is used to endow the knowledge point with 8-dimensional attribute values for observation ability, abstract ability, induction ability, memory ability, analysis ability, calculation ability, imagination ability and logic ability, which represent the learning ability required for the learning of the knowledge point and the requirements for the learning ability of each dimension. The system provides a more accurate basis for calculating the degree of knowledge point achievement in the adaptive learning path recommendation based on knowledge graph and college student model.

After the teaching practice is completed, the teaching evaluation is used to analyze the students' achievements, and then the teaching data is collected through the questionnaire. SPSS software is used to analyze the data from three aspects of students' liking for teaching methods, the class links students like and the changes of students' abilities according to the credibility of the current research focus and research frontier of the teaching methods of ideological and political education in database courses and the feasibility and effectiveness of innovative hybrid learning methods.

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