

# Analysis of the Development Trend of Ideological and Political Education in Experimental Courses in Colleges and Universities: Visual Analysis Based on CiteSpace

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**Abstract:** In order to deeply understand the status of ideological and political research on experimental courses in colleges and universities, the relevant literature collected by China National Knowledge Infrastructure (CNKI) was taken as the research object, and the analysis was carried out by using CiteSpace software. The results show that research authors of ideological and political education in experimental courses have not yet formed cross-regional cooperation, and there is no core author. The ideological and political construction of experimental courses mainly focuses on experimental courses such as medicine, chemistry, and physics. The research focus on ideological and political education in experimental courses focuses on the concept of educating people, the construction of teaching systems, teaching modes, and the combination of new experimental teaching methods and ideological and political elements. The ideological and political education of experimental courses needs more attention and support from colleges and universities.

**Keywords:** Ideological and political education; Experimental course; CiteSpace; Visualization; Bibliometrics

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## 1. Introduction

The primary task of colleges and universities is to cultivate people with virtue and cultivate new socialist talents with high-level professional knowledge and skills. With the development of China, the new situation puts forward new requirements for ideological and political education in colleges and universities. On China National Knowledge Infrastructure (CNKI), the topic search of “Course Ideological and Political Education” can retrieve 24,663 papers. There are 515 papers on “Ideological and Political Education in Experimental Courses,” accounting for only 2.1%, which shows that ideological and political education is mainly combined with theoretical courses at present. Thus, it is necessary to develop a combination of experimental teaching and ideological and political education.

Experimental teaching is an indispensable part of higher education, and it is also a necessary training link

for students to master science and engineering knowledge. In the teaching activities of experimental courses, students need to personally participate in all aspects of the course. Teachers can explore the ideological and political elements from all aspects of experimental teaching. Through the organic combination of experimental teaching and ideological and political education, students can truly turn ideological and political education into practical actions. In order to better promote the research and development of ideological and political education in experimental courses, it is necessary to understand the research hotspots and development trends of ideological and political education in experimental courses.

## 2. Methods

The research data source was the full-text database of CNKI in China, and 515 papers were retrieved. CiteSpace software developed by American Chinese scholar Dr. Chaomei Chen <sup>[1]</sup> was adopted in the study. CiteSpace can make diversified analyses of scientific literature, and identify and show hot keywords, research progress, and frontier direction in a certain field. After the format conversion of 515 papers, they were imported into CiteSpace software. After static clustering and displaying the whole network, 515 papers were clustered and visually analyzed, and the corresponding document data and networks were obtained.

## 3. Results

### 3.1. Author statistics and co-occurrence analysis

CiteSpace software was used to get the cooperative network of ideological and political research authors in the experimental course with 261 nodes, 446 connections, and 0.0131 density (**Figure 1**). As seen from the figure, several author cooperation groups have been formed, and the overall network is relatively loose. Most of the authors are limited to small-scale cooperation between the same institution or even the same tutor, and no cross-regional cooperation has been formed. According to Price's Law <sup>[2]</sup>, the number of articles published by core authors needs at least MP, and the calculation formula is:

$$MP = 0.749 * \sqrt{N_{PMAX}}$$

Where N<sub>pmax</sub> is the largest number of papers published by the author. Through further study of the literature, it is found that the number of papers published by the author with the largest amount is 2, and MP = 1.06. It can be seen that the core author has not yet been formed in the field of ideological and political education in experimental courses.

At present, the ideological and political development of experimental courses has a short time and a low scale. The author's research ideas mostly focus on the combination of his own experimental teaching and ideological and political elements, and the authors in different professional fields have low correlation, so the author cooperation network is loose. With the gradual maturity of ideological and political education in experimental courses, the interaction between authors in different professional fields will be significantly improved, the author cooperation network will also increase, and a nationwide research and cooperation system will be formed in the future.

CiteSpace, v. 5.8.R3 (64-bit)  
 November 2, 2021 3:59:25 PM CST  
 WoS: D:\实验课程思政关键词网络图\Hiddata  
 Timespan: 2016-2021 (Slice Length=1)  
 Selection Criteria: Top 5 per slice, LRF=3.0, L/N=10, LBY=5, e=1.0  
 Network: N=281, E=446 (Density=0.0131)  
 Largest CC: 14 (5%)  
 Nodes Labeled: 1.0%  
 Pruning: Pathfinder  
 Modularity Q=0.877  
 Weighted Mean Silhouette S=1  
 Harmonic Mean(Q, S)=0.9345

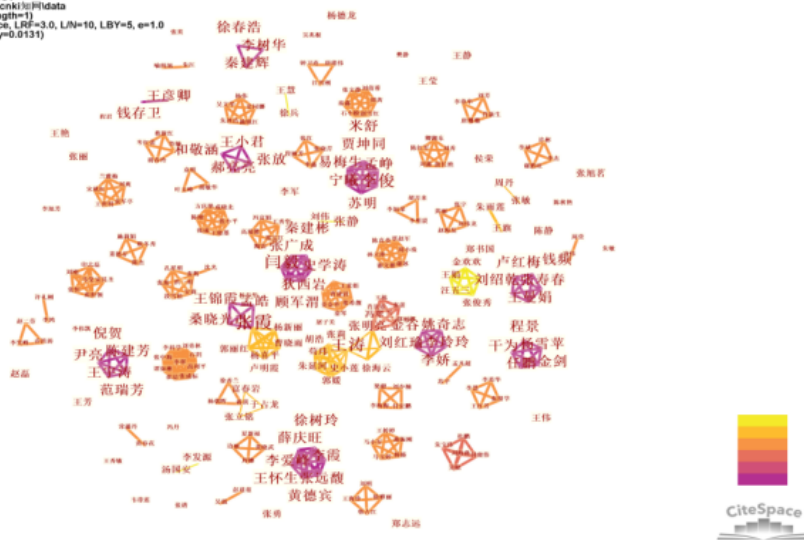


Figure 1. The cooperative network of authors of ideological and political education in experimental courses

### 3.2. The distribution of ideological and political subjects in experimental courses

After running CiteSpace software and selecting the LLR (log-likelihood ratio) algorithm to cluster the keywords, the words about subject categories were screened, and 96 subject keywords were obtained. They were sorted according to frequency to form the schematic diagram of the distribution of ideological and political subjects in experimental courses (Figure 2). The top five disciplines are pharmacological experiment, chemical experiment, physics experiment, inorganic chemistry experiment, and virtual simulation experiment, accounting for 5.06%, 4.43%, 4.43%, 3.80%, and 3.80% respectively. It can be seen from the figure that the current ideological and political construction of experimental courses mainly focuses on experimental courses such as medicine, chemistry, and physics. In addition, with the rise of virtual simulation technology and virtual instrument technology, virtual simulation experiments are gradually integrated into various experimental teaching, and the combination of virtual simulation experiments and curriculum ideological and political education has also attracted scholars' attention [3]. Other experimental courses in the figure account for 46.62%, including 74 subject keywords, each accounting for less than 1%, indicating that there are many types of experimental courses, and the educational concept of "all-staff, whole-process, all-round, and whole-course" has been preliminarily practiced.

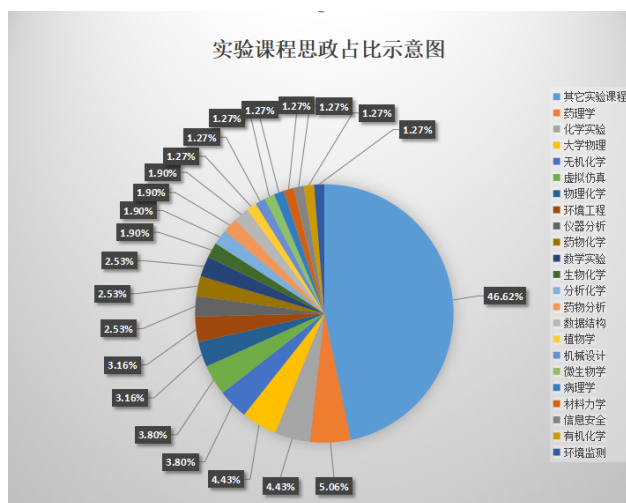


Figure 2. Distribution of ideological and political subjects of experimental courses

### 3.3. Research topics and hotspot evolution

In CiteSpace software, the LLR algorithm was selected to generate a keyword clustering analysis map (Figure 3). It is found that the research on ideological and political education in experimental courses mainly focuses on the following four aspects. The first aspect is the educational concept of ideological and political education in experimental courses, including Sanquan education and moral cultivation [4]. The first task of experimental teaching is to cultivate students' ideological and moral character, condense experimental professional knowledge and skills in value communication, and emphasize value guidance in knowledge and skills communication. The second aspect is the construction of the teaching system of ideological and political education in experimental courses. According to the characteristics of experimental teaching, all disciplines combine their professional characteristics and advantages, deeply explore the ideological and political elements, and explore the methods and realization paths of combining ideological and political elements from the aspects of the design of experimental teaching syllabus, the formulation of teaching objectives, the implementation process of experimental teaching, and the evaluation of teaching effect. Among them, many experimental courses such as pharmacology, microbiology, inorganic chemistry, and physics are combined with ideological and political research, which provides reference value for subsequent research. Thirdly, the teaching mode of ideological and political education in experimental courses, and the methods of integrating various experimental teaching modes with ideological and political education are discussed. Xue and others realized the seamless connection between professional knowledge and ideological, political, and moral education in the comprehensive chemical experiment of "scientific research infiltration," and cultivated students' love for basic subjects and innovative spirit of exploration [5]. Liu and others introduced the ideological and political elements into the online and offline mixed experimental teaching mode, and constructed an experimental teaching system with the professional knowledge of organic chemistry experiments as the main body and the traditional Chinese ideas of the integration of man and nature and dialectical treatment as the leading factor [6]. The last aspect is the combination of new experimental teaching methods and ideological and political elements. After the outbreak of the COVID-19 epidemic, many new teaching methods, such as virtual simulation experiments and live broadcast teaching, have attracted more scholars' attention. Jiang and others reported that the incorporation of ideological and political elements in the virtual simulation experiment based on the wet spinning of seaweed fiber can cultivate students' awareness of green production and improve their sense of responsibility for environmental protection [3].

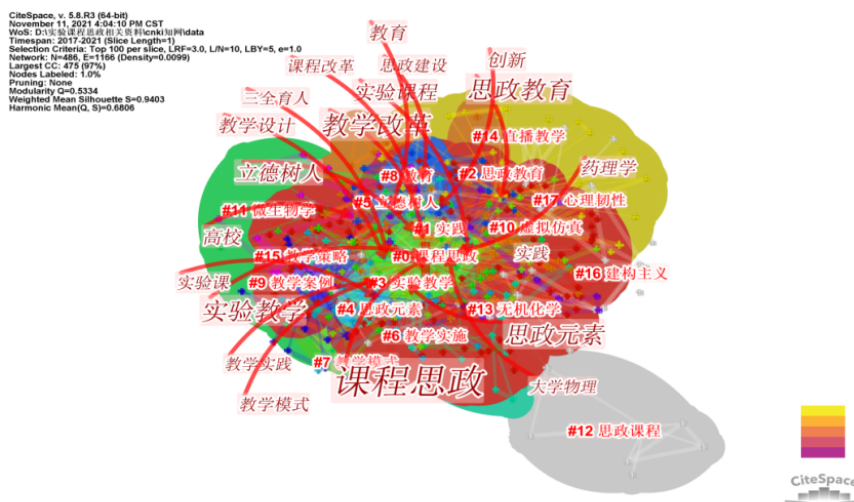


Figure 3. Cluster analysis of hotspots in ideological and political education in experimental courses

## 4. Discussion

Ideological and political education in experimental courses is relatively new, and the current research focuses on the specific application level, lacking basic theory research. Theory is the forerunner of practice, “only a clear theoretical analysis can point out the correct path in the complicated facts” [7]. To strengthen the research of basic theory, we should not only build the theoretical framework of ideological and political education in experimental courses as a whole but also enrich the specific theoretical content of ideological and political education in experimental courses. Colleges and universities should strengthen the theoretical construction of ideological and political education in experimental courses, improve the top-down design, and answer the questions of how to do ideological and political education in experimental courses, so as to be more conducive to the bottom-up interpretation of ideological and political education in experimental courses of various majors.

As seen from the statistical results of literature, ideological and political education in experimental courses accounts for a relatively low proportion compared with ideological and political education in theoretical courses. At present, the supporting objects of ideological and political education in colleges and universities focus on theoretical courses, and there is still a teaching concept of attaching importance to theory and neglecting experimental teaching. It is necessary to increase the investment in the research and construction of ideological and political education in experimental courses, improve the system of ideological and political education in experimental courses, and construct the educational pattern of “all staff, whole process, and whole course” [8].

## 5. Conclusion

Ideological and political education in experimental courses is an important part of course ideological and political education, which has its unique advantages. However, the integration of experimental teaching and course ideological and political education also faces many problems, which requires colleges and universities to further strengthen their attention to experimental courses in ideological and political education. Under the guidance of the Guiding Outline of Curriculum Ideological and Political Construction in Colleges and Universities of the Ministry of Education, colleges and universities should strengthen the research on ideological and political education of experimental courses, fully utilize the ideological and political education resources contained in experimental courses of various majors, and improve the construction of ideological and political system of experimental courses, so that all kinds of experimental courses and ideological and political courses go hand in hand and can better serve the country.

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## Disclosure statement

The authors declare no conflict of interest.

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