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Visualization of Civics Research in College Mathematics Curriculum: Data Analysis Based on CNKI Literature

Chun Wu

Department of Information Engineering, Wuhan Business University, Wuhan, 430050, China

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Abstract: Based on the Chinese Knowledge Network Journal Database, this study conducts a retrieval and statistical analysis of the research output in the field of "Course Ideological and Political Education" in the "Advanced Mathematics" course, including the volume of publications, journal and funding support, distribution of research institutions, high-impact literature, and cited content. The results show that the quantity of research literature in this field has increased significantly since 2019. The research is largely supported by the National Natural Science Foundation and provincial teaching reform research projects, indicating that it has received attention from education departments in various provinces and cities. The research output of general undergraduate and vocational colleges is much higher than that of key undergraduate colleges, and the number of core journals in the publications is very limited. Currently, research on course ideological and political education in "Advanced Mathematics" mainly focuses on effective methods of integrating knowledge dissemination with moral education, educational objectives of course ideological and political education, strategies for integrating course ideological and political education into teaching, construction of resources for course ideological and political education, and school policy guarantee system.

1. Introduction

On May 28, 2020, the Ministry of Education issued the "Guidelines for the Construction of Ideological and Political Education in Higher Education Curriculum", aiming to integrate ideological and political education into the talent cultivation system and comprehensively promote the construction of ideological and political education in higher education institutions, so as to enhance the role of every course in fostering students and improve the quality of talent cultivation in universities. On July 28, 2022, the Ministry of Education and ten other departments issued a notification on the issuance of the "Work Plan for Comprehensive Promotion of the Construction of 'Big Ideological and Political Courses'", aiming to fully mobilize social forces and resources, establish a national teaching and research system for ideological and political courses in universities, set up a number of practical teaching bases, launch a batch of high-quality teaching resources, optimize a batch of brand demonstration activities, support the construction of comprehensive reform pilot zones, promote the integration of small-classroom ideological and political education with large-classroom social education, and promote all types of courses to move in the same direction with ideological and

political courses. Under the framework of "Big Ideological and Political Courses", as a public foundational course in universities, "Advanced Mathematics" covers students from all disciplines, such as science, engineering, economics, and management, and has a wide student base that can be integrated into ideological and political education. What is the current status of research on curriculum ideological and political education in "Advanced Mathematics" and what will be the focus of research in the next stage? This study uses bibliometric research methods to analyze and visualize the data of curriculum ideological and political education literature in "Advanced Mathematics" collected by CNKI, summarizes the current status of research on curriculum ideological and political education in "Advanced Mathematics", and provides decision-making references for scholars engaged in research on curriculum ideological and political education in "Advanced Mathematics", which is of great significance.

2. Data Sources and Processing

The search was conducted on the China National Knowledge Infrastructure (CNKI) with "Advanced Mathematics" as the main topic, focusing on academic journals. As of December 20, 2020, a total of 3935 data items were obtained for the five-year period from 2018 to 2022. Then, within these results, a further search was conducted with "ideological and political education in curriculum" as the main topic, resulting in 301 data items. This study employed bibliometric methods to analyze the Chinese literature in these 301 publications, including analysis of annual publication volume, distribution of journals, distribution of research institutions, analysis of high-impact literature, and analysis of cited content. The objective of this analysis is to provide an overview of the current development status and shortcomings of curriculum ideological and political education in "Advanced Mathematics" at the present stage.

3. Statistical Analysis of the Literature on "Ideology and Politics Curriculum" in "Advanced Mathematics" Based on CNKI.

3.1. Analysis of the Number of Articles Published Annually

The curve of the annual number of articles published in the literature is shown in Figure 1. Since the concept of "curriculum ideological and political education" was proposed in 2014, the research on the reform of curriculum ideological and political education in the "Advanced Mathematics" started relatively late, with no literature on curriculum ideological and political education in "Advanced Mathematics" published before 2018. During the five-year period from 2018 to 2022, only 301 research papers were published, which is far from sufficient in terms of both the total research quantity and the annual research quantity. In contrast, there were 3,935 research papers on the reform of the "Advanced Mathematics" curriculum published during the same period, with an average of nearly 800 papers per year, which is more than 13 times the number of research papers on curriculum ideological and political education in "Advanced Mathematics". Therefore, further efforts are needed to strengthen the research on ideological and political education courses in the "Advanced Mathematics".

Since ideological and political education was included in the education system reform as a national strategic deployment in 2017, the number of publications on this topic in the field of advanced mathematics curriculum has shown an increasing trend. The number of publications increased from 4 in 2018 and 2019 to 23 in 2020, and then to over 100 in 2021 and 2022. The changing trend of annual publication volume indicates that the reform of ideological and political education course in Advanced Mathematicsis still a hot research topic.

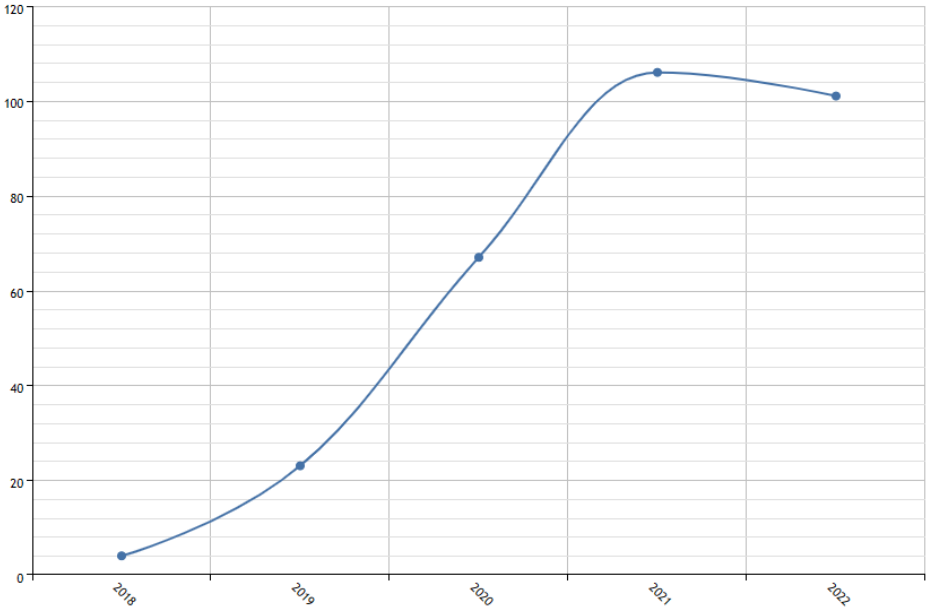

Figure 1: Annual Trend of Publications on Ideological and Political Education Course in Advanced Mathematics

3.2. Journals and Funding Support

Among the journals publishing articles, the journal Education and Teaching Forum has the highest number of articles with 22 publications, ranking first in terms of journal publications, while other journals have published less than 10 articles (Table 1). This indicates that there are multiple journal platforms that focus on research related to curriculum ideological and political education) in advanced mathematics, but the overall quality of these journals may not be high, as only 4 out of the top 10 journals in terms of publication volume are related to education, teaching, and mathematics education. From the perspective of the disciplines of the journals publishing articles, the focus is mainly on mathematics and higher education. From the perspective of whether the journals are included in the core journals of the North Literature and Information Center (NLIC), only 3 articles have been published in core Chinese journals. This indicates that further research on the educational and teaching aspects of curriculum ideological and political education in Advanced Mathematicsis still needs to be conducted at a deeper level of theory and practice. In addition, among the funded papers on curriculum ideological and political education research in Advanced Mathematicsis, 5 papers are supported by the National Natural Science Foundation, while over 50 papers are supported by provincial-level teaching reform research projects. This indicates that the research on curriculum ideological and political education in Advanced Mathematicsis is highly valued by education departments at the provincial and municipal levels.

3.3. Distribution of Research Institutions

From the perspective of publishing institutions, the institution with the highest number of publications is Luoyang Institute of Science and Technology, with 5 publications (Table 2). Among the top 10 institutions in terms of literature research, there are 7 undergraduate colleges and universities, and 3 vocational colleges. Among all the publishing institutions, the majority are second-tier colleges and vocational colleges, with 5 publications from 985 universities. Among them, University of Science and Technology of China published 4 papers, Ocean University of China published 2 papers, and Sun Yat-sen University, Xi'an Jiaotong University, and Northwestern

Polytechnical University each published 1 paper. These publications are mainly in two mathematical journals, Journal of University Mathematics and Advanced Mathematics, which indicates that general undergraduate colleges and vocational colleges (non-211 universities) are more concerned about the reform and research of "Course Ideological and Political Education" in Advanced Mathematics compared to key undergraduate colleges and universities. This may be related to the evaluation index system of teachers in various universities.

Table 1: Distribution of journals on curriculum ideological and political education in advanced mathematicsis (Top 10 in terms of quantity)

Ranking	Name of Journal	Number of Publications
1	Education and Teaching Forum	22
2	Studies in College Mathematics	10
3	The Guide of Science & Education	10
4	Science & Technology Vision	9
5	Industrial & Science Tribune	8
6	Education Modernization	8
7	Modern Business Trade Industry	7
8	The Theory And Practice Of Innovation And Entrepreneurship	6
9	Science & Technology Information	6
10	Scientific Consultation (Educational Research)	6

Table 2: Top 10 institutions in research on "curriculum ideological and political education" in advanced mathematics

Ranking	Name of Research Institutions	Number of Publications
1	Luoyang Institute of Science and Technology	5
2	Shanghai University of Medicine and Health Sciences	4
3	Tongling University	4
4	National University of Defense Technology	4
5	ChongQing City Management College	4
6	Hebei Petroleum University of Technology	3
7	Henan University of Animal Husbandry & Economy	3
8	Shanghai University of Electric Power	3
9	Nantong Normal College	3
10	Anhui University Of Science & Technology	3

3.4. Analysis of High-Impact Literature and Citation Content on "Curriculum Ideological and Political Education" in Advanced Mathematics

The number of downloads and citation frequency of literature largely reflects the influence of the literature, and highly cited and highly downloaded literature often reflects high attention and academic impact in terms of both quantity and quality.

The paper titled "Curriculum Ideological and Political Education in Advanced Mathematics: A Case Study" by Professor Liu Shuqin from Guilin University of Technology, published in the Education and Teaching Forum in December 2018, ranks first in terms of both citation and download frequency, with 127 citations. This paper is an earlier research paper on "Curriculum Ideological and Political Education" in advanced mathematics, and it integrates moral education with knowledge teaching, combining knowledge points, mathematical history, allusions, etc., to combine knowledge

transmission with value guidance, guiding students to be morally upright and academically accomplished, and promoting their comprehensive development.

The top 10 highly cited literature is mainly published before 2019, and the research focus is primarily on effective methods of integrating knowledge transmission with moral education, strategies for integrating curriculum ideological and political education into teaching, construction of curriculum ideological and political education resources, and research on school policy guarantee system. The specific content cited mostly focuses on the integration strategies of curriculum ideological and political education goals, elements, and content in Advanced Mathematics.

4. Conclusion

This article is based on the data analysis of journal papers collected from the China National Knowledge Infrastructure (CNKI) database, focusing on the topics of "Advanced Mathematics" and "Ideological and Political Education in Curriculum". Through the analysis of existing literature data, the current situation and characteristics of research and implementation of ideological and political education in the "Advanced Mathematics" course at this stage are objectively evaluated systematically.

1) The research on ideological and political education in the "Advanced Mathematics" course started relatively late, with the first related research papers published in 2018, and only four literature in that year. However, since 2019, the number of related research papers has increased significantly, with over 100 papers published annually, indicating that scholars are actively carrying out research on ideological and political education in the "Advanced Mathematics" course under the guidance of national policies and the promotion of provinces and universities. In the foreseeable future, the reform of ideological and political education in the "Advanced Mathematics" course will remain a focus and hotspot of research.

2) From the distribution of journals, it can be seen that the number of research papers on ideological and political education in the "Advanced Mathematics" course included in core journals is relatively small, indicating that further in-depth research is needed in theoretical and practical aspects of the educational and teaching research of ideological and political education in the "Advanced Mathematics" course.

3) From the perspective of research institutions, general undergraduate colleges and vocational colleges (non-Project 211 universities) show higher attention to the reform and research of ideological and political education in the "Advanced Mathematics" course compared to key undergraduate colleges, and key universities should strengthen relevant research.

4) Currently, there is no prominent figure in the field of research on ideological and political education in the "Advanced Mathematics" course in China. It is necessary for relevant experts and scholars to further strengthen research in both theory and practice, and guide more "Advanced Mathematics" course teachers to conduct related research and teaching practices.

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