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Current Implementation Status and Corresponding Countermeasures of Interdisciplinary Subject Research in Geography at the Senior High School Level

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Abstract: With the continuous evolution of social civilization and the rapid development of science and technology, the knowledge reserve of a single discipline has been unable to meet the society's demand for compound and innovative talents. The cultivation of interdisciplinary talents has become an urgent task in the field of education. As a comprehensive practice that integrates the knowledge of different disciplines, interdisciplinary thematic research can cultivate talents with innovative thinking and practical ability in the new era. The core purpose of this study is to deeply explore the implementation status of interdisciplinary thematic research in high school Geography, in order to find out the problems and deficiencies, and put forward practical countermeasures and suggestions for these problems. Through the sorting of existing literature, combined with field observation and interviews, this paper reveals the challenges faced by the implementation of interdisciplinary thematic research in high school Geography at present, and provides suggestions for improvement.

Keywords: senior high school, Geography, interdisciplinary, research practice

Introduction

With the deepening of educational reform, interdisciplinary subject research has become a new educational model. This model emphasizes the cross-integration between disciplines, aiming at cultivating students' comprehensive quality and innovative ability. Geography as a comprehensive and practical subject, its interdisciplinary subject research is of great significance.

As a key means to cultivate students' core accomplishment and improve the quality of education, interdisciplinary subject research is increasingly valued by the educational circle. *The Compulsory Education Curriculum Plan (2022 edition)* clearly puts forward the requirements of "focusing on core literacy" and "coordinating the design of comprehensive courses and interdisciplinary theme learning", highlighting the core position of interdisciplinary theme learning[1]. According to the *Geography Curriculum Standards for Compulsory Education (2022 edition)*, the hours of interdisciplinary subject learning in Geography courses should account for at least 10% of the total hours of the course[2]. High school Geography curriculum, with its unique comprehensiveness, is closely connected with other natural disciplines and humanities disciplines, giving it a unique advantage in interdisciplinary subject research[3]. Especially in field research trips, the integration and application of interdisciplinary knowledge centered on Geography is particularly important.

1. Questionnaire design and survey objects

The questionnaire consists of five parts: the basic information of the teachers participating in the survey, the action cognition, the action basis, the action confusion and the practice expectation.

The survey subjects were mainly Geography teachers in first-tier high schools in Zhejiang Province. A total of 600 valid questionnaires were issued and successfully recovered, covering cities all over Zhejiang Province. From the gender distribution, female teachers accounted for 66.98%, male teachers accounted for 33.02%; In terms of teaching grades, the proportion of teachers in Senior One and senior two is relatively high, which are 39.66% and 34.67% respectively. In terms of teaching experience, teachers with 15-20 years of teaching experience accounted for the largest proportion (23.78%), and teachers with more than 20 years of teaching experience accounted for 26.19%; In terms of educational composition, the proportion of teachers with bachelor's degree is the largest (60.66%), while the proportion of teachers with master's degree is relatively high (17.83%). To sum up, the survey subjects have rich teaching experience, which can better reflect the general situation of Geography teachers in Zhejiang Province.

2. The implementation of interdisciplinary subject research in high school Geography

Through literature review and field observation, this paper finds that there are the following problems in the implementation of interdisciplinary Geography research in senior high schools:

2.1The degree of interdisciplinary integration is not enough

In practical teaching, the degree of cross integration between Geography and other disciplines is low, which leads to the limitation of the depth and breadth of research. This lack of integration not only limits the depth and breadth of research activities, but also affects students' ability to fully and deeply understand and apply geographical knowledge. Due to the interdisciplinary nature of Geography itself, involving many fields such as natural science and social science, the cross-integration between Geography and other disciplines is of great importance. However, the current teaching system and teaching practice often lack enough attention to this cross-integration and effective implementation. This may be due to the limitation of teachers' own disciplinary background, or it may be due to the deficiency of teaching resources and teaching methods. In order to improve the research effect, we need to further strengthen the cross-integration of Geography and other disciplines, expand students' knowledge vision and cultivate their comprehensive quality and innovation ability by enriching teaching content and methods.

2.2The research content lacks practice

Many research projects are too theoretical and lack practical operation and practice, which makes it difficult for students to truly understand geographical knowledge. The lack of practical research content is a significant problem in the current Geography research projects. Many research projects focus too much on the transfer of theoretical knowledge and neglect the importance of practical operation and field experience. This tendency to theorize makes it difficult for students to truly understand and apply geographical knowledge in the learning process. Geography is a highly practical subject, and its research activities should be closely combined with field investigation, observation and experiment. By engaging students in hands-on operations, observing geographical phenomena, and collecting and analyzing data, they are able to gain a deeper understanding of geographical knowledge and develop the ability to solve practical problems. Therefore, in order to improve the effect of Geography research, we need to increase the practical links, so that students can have more opportunities to participate in geographical practice activities, so as to improve their practical ability and comprehensive application of geographical knowledge.

2.3Teachers lack interdisciplinary literacy

Some teachers lack interdisciplinary knowledge and teaching experience, and it is difficult to effectively implement interdisciplinary subject research[4]. Interdisciplinary subject research requires teachers to have interdisciplinary knowledge and teaching experience, but in actual teaching, some teachers' interdisciplinary accomplishment is insufficient. This

deficiency may stem from the limitations of teachers' disciplinary backgrounds, or it may be due to their lack of training and experience in interdisciplinary teaching. Since the professional quality of teachers is directly related to the quality and effect of research courses, this deficiency may lead to the difficulty in the effective implementation of interdisciplinary research. In order to enhance teachers' interdisciplinary literacy, we need to strengthen teachers' interdisciplinary training, provide more learning and development opportunities, and help them master interdisciplinary knowledge and teaching methods. At the same time, schools and education departments should also establish corresponding incentive mechanisms to encourage teachers to actively explore interdisciplinary teaching and improve teaching effects, so as to better implement interdisciplinary research.

3. Cause analysis of interdisciplinary subject research in high school Geography

3.1 Geography teachers have insufficient interdisciplinary knowledge reserve

Geography contains both the rigor of the natural sciences and the humanity of the social sciences, which provides a natural bridge for interdisciplinary learning. However, different disciplines have their unique knowledge systems, thinking logic and core qualities, which makes the knowledge gap between Geography and other disciplines inevitable. Taking "atmosphere" teaching in high school Geography as an example, it not only requires knowledge of Geography, but also involves the content of physics, chemistry and other disciplines, and the deep integration of these contents requires advanced skills, such as quantitative analysis and model construction.

For most high school Geography teachers, these skills may be outside their area of expertise, and as a result, they may feel stretched when faced with interdisciplinary curriculum development. As they are not familiar with the knowledge of other disciplines, they may lack self-confidence and are prone to scientific errors in the course design and implementation, which will undoubtedly weaken their enthusiasm for developing interdisciplinary courses and lead to insufficient motivation for interdisciplinary course design.

3.2 Lack of perfect teaching and research system of interdisciplinary subject research

The interdisciplinary subject research of Geography in high school is still a new field, so it has not yet formed a complete system to support its implementation in middle school. First of all, the current theoretical foundation of interdisciplinary Geography research in high school is relatively weak, which leads to the lack of scientific and effective guidance in the course development and implementation, and it is easy to fall into misunderstandings. Secondly, relevant training and curriculum resources for middle school Geography teachers are scarce, and practical cases are also relatively few, which makes middle school teachers lack necessary knowledge and experience reserve, and it is difficult to effectively implement interdisciplinary subject research. Finally, the existing evaluation system lacks the evaluation mechanism for the interdisciplinary subject research of high school Geography, which not only affects its popularization and application, but also restricts its in-depth development in teaching practice. Therefore, in order to promote the effective implementation of interdisciplinary subject research in high school Geography, we need to strengthen theoretical research, improve training and curriculum resources, and establish a corresponding evaluation mechanism to stimulate teachers' enthusiasm and innovative spirit, and promote the extensive application of interdisciplinary subject research in high school Geography teaching.

4. Implementation countermeasures and suggestions for interdisciplinary Geography research in senior high school

4.1 Bridging the barriers between Geography and other disciplines

The interdisciplinary subject research of Geography should focus on the Geography knowledge of middle school, and integrate the knowledge related to Geography of other disciplines, with research trips as the main form. In the process of practice, first of all, it is necessary to clarify the difference and connection between Geography and other disciplines, and accurately identify the knowledge fields suitable for interdisciplinary subject research in high school Geography. Secondly,

in order to ensure the scientific and integrity of knowledge, the comprehensiveness of the curriculum should be improved through various means, such as collaborative teaching, inviting teachers of other disciplines to participate in the development and implementation of the curriculum, or consulting professional authoritative literature. Finally, in view of the correlation and integration between the core literacy of different disciplines, the multi-disciplinary core literacy should be organically integrated into the curriculum when formulating teaching objectives, so as to maximize the teaching effect of interdisciplinary subject research courses.[5]

4.2 Strengthening the organic connection of Geography research courses in junior and senior high schools

Geography courses in junior and senior high schools are closely linked and together constitute a complete education system. In the process of promoting interdisciplinary subject research, the two should achieve organic unity and close cooperation, give full play to their respective advantages, and ensure the continuity of the curriculum and the unity of educational objectives.[6] According to the requirements of the *Compulsory Education Geography Curriculum Standards (2022 edition)*, the junior high school Geography curriculum plays an important role in the study of interdisciplinary topics and has a special value and mission. Therefore, in the future, junior high school Geography curriculum will accelerate the pace of exploration of interdisciplinary Geography research to meet the requirements of curriculum standards.

For high school Geography curriculum, it needs to be further expanded and deepened on the basis of middle school Geography curriculum. By making use of the characteristics of more in-depth curriculum content and more perfect knowledge system of various disciplines in senior high school, Geography courses in senior high school can increase the depth of teaching, strengthen the connection with other disciplines, and promote students' deep learning. This can not only help students better understand geographical knowledge, but also improve their comprehensive quality and innovation ability, laying a solid foundation for their future study and life.

5. Conclusion

Currently, interdisciplinary subject research is still in its nascent stage of exploration. Through a questionnaire survey, we have conducted an in-depth analysis of the current situation and countermeasures of interdisciplinary research from the perspective of teachers. The findings indicate that there are numerous challenges in implementing interdisciplinary research in high school Geography teaching. For instance, integrating interdisciplinary courses proves to be arduous, as teachers lack the capacity for integration and innovation[7]. Moreover, students' ability to comprehensively integrate knowledge from different subjects remains inadequate, thereby impeding effective implementation of multidimensional evaluation. Furthermore, the primary role of interdisciplinary curriculum integration lacks clarity, hindering efficient execution of the integration process. Additionally, during research endeavors, there is a dearth of curriculum consciousness regarding interdisciplinary integration and a need for enhanced interdisciplinarity between subjects.

In response to these issues, we endeavor to propose targeted coping strategies while also encouraging further scholarly exploration and research on this topic in future.

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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