

Research on the Strategy of Interdisciplinary Integration and Comprehensive Ability Cultivation in Education and Teaching

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Abstract: The interdisciplinary integration of education and teaching can consolidate the students' basic quality, help students associate with their own subject knowledge in life, and improve students' systematic degree of knowledge mastery. Based on this article from the perspective of comprehensive ability training analysis of interdisciplinary integration in education and teaching related issues, through effective teaching design, improve students' perception of interdisciplinary ability, and carry out specific teaching activities, in order to enrich the actual content of classroom teaching.

Keywords: Education and teaching; Interdisciplinary integration; Comprehensive ability

Introduction:

Interdisciplinary integration ability refers to the ability of students to organically integrate knowledge, concepts, skills and methods from different subject areas and be able to apply them to solve complex problems or complete interdisciplinary projects. This ability is an important way to train students to use knowledge of different disciplines comprehensively, and it is also an important means to train students' innovative thinking and solve practical problems. Interdisciplinary integration ability itself is an important part of the cultivation of comprehensive quality. In the current education and teaching environment, through effective interdisciplinary integration, students can truly cultivate their ability to find problems, propose problems and solve problems, so as to further consolidate students' disciplinary foundation and cultivate students' comprehensive literacy.

1. Curriculum design of interdisciplinary ability cultivation

The cultivation of interdisciplinary integration ability needs to start from the aspects of curriculum design, teaching methods, interdisciplinary inquiry and connecting with practical problems, and through diversified teaching strategies and activities, cultivate students' ability to integrate and apply knowledge and skills of different disciplines, so that they can better cope with complex problems in real life.

The cultivation of interdisciplinary integration ability needs to start from curriculum design. Design courses that can cover multi-disciplinary content, so that students can integrate knowledge and skills from different disciplines into each other through inquiry, practice and problem solving, and be able to apply them to practical situations. The development of interdisciplinary integration requires a diverse pedagogical approach. For example, project-based learning can help students understand and solve problems from an integrated perspective while involving multi-disciplinary knowledge; Cooperative learning can facilitate students to work together in teams, communicate, and integrate their respective expertise. Encouraging students to conduct interdisciplinary inquiry is an important means to cultivate the ability of interdisciplinary integration. By carrying out interdisciplinary activities such as scientific experiments, social investigations, and literature research, students are able to cross disciplinary boundaries, deeply understand and master knowledge in related fields, and integrate the contents of different disciplines to form a comprehensive understanding. The cultivation of interdisciplinary integration ability requires the application of knowledge to practical problems. Through the introduction of real problems, cases and situations, students can combine the knowledge of different disciplines for analysis, synthesis and solution, and cultivate students' ability to use interdisciplinary integration to solve practical problems.

2. Specific strategies for cultivating interdisciplinary competence

2.1 Design strategies for interdisciplinary teaching themes

Teachers can design interdisciplinary teaching themes that organically combine knowledge points, skills and concepts from multiple disciplines. For example, when exploring the topic of environmental protection, multiple subjects such as science, sociology and politics can be introduced to allow students to have cross-associations and thinking in their learning. Teachers can organize students to participate in interdisciplinary cooperation projects, and divide tasks and cooperate through group cooperation. Each team member can be responsible for the research and exploration of different disciplines, and finally integrate the knowledge of various disciplines to form a comprehensive project result. Schools can set up interdisciplinary courses to integrate the content of multiple disciplines for teaching. For example, interdisciplinary courses such as “Science and Society” and “Art and mathematics” can be set up to allow students to learn and apply knowledge from different disciplines. Teachers can guide students to cultivate interdisciplinary thinking and encourage students to think from the perspectives of different disciplines to broaden the breadth of their thinking. For example, students can be guided to use systems thinking, problem solving thinking and other interdisciplinary ways of thinking to learn and think. Through the implementation of the above strategies, students can get more comprehensive knowledge, cultivate the integration of interdisciplinary abilities, improve the ability to solve complex problems, and better adapt to the needs of the future society.

2.2 Design of interdisciplinary practical activities

The design of integrated practical activities is a process aimed at improving students’ interdisciplinary learning and thinking ability. A variety of practical teaching activities can help improve students’ thinking level in all aspects: (1) Interdisciplinary research project: select a topic and ask students to explore the topic from the perspective of different disciplines. For example, the topic could be environmental protection, and students could study it from the perspectives of science, social science and the arts. Students need to collaborate and integrate knowledge and methods from different fields to form an integrated research report or presentation. (2) Problem solving activities: Provide a comprehensive problem and encourage students to apply knowledge and skills from different disciplines to solve it. For example, to discuss how to solve the problem of urban traffic congestion, students can analyze from the perspectives of urban planning, traffic engineering and psychology, and come up with innovative solutions. (3) Role play and simulation: Create a situation that requires students to take on different roles and apply interdisciplinary knowledge and skills to solve the problem. For example, a Model United Nations conference, where students can take on the role of representatives of different countries to discuss global problems and develop solutions. (4) Art Project: Students are encouraged to integrate art with other disciplines to create an interdisciplinary art project. For example, students can express historical events or scientific concepts through forms such as dance, music, and visual art. (5) Community service projects: Organize students to carry out community service activities that require them to integrate knowledge and skills from multiple disciplines to improve community issues. For example, students may choose water resource management as a topic to improve water quality and use efficiency in local communities through research, education and action. Through these concrete hands-on activities, students will be able to experience the process of interdisciplinary learning and understand the interconnectedness between different disciplines. They will develop the ability to integrate various kinds of knowledge and skills, and improve their ability to solve problems and think creatively. At the same time, they will also develop more comprehensive observational and analytical skills to better understand complex world problems.

3. Conducting interdisciplinary experimental teaching activities

Through specific experimental activities, students should develop the integration of interdisciplinary abilities, including critical thinking, problem solving, creativity and interpersonal cooperation.

Preview stage: Introduce experimental topics, stimulate students’ interest and curiosity, and briefly introduce experimental background knowledge. Groups allow students to discuss and ask some questions or doubts, encouraging them to think across disciplines and integrate knowledge.

Experiment design stage: Students design an experiment scheme according to the experiment topic, using multidisciplinary knowledge and methods. Students need to consider the purpose, steps, materials and data collection of the experiment, and make detailed records.

Experimental operation stage: Students carry out experimental operation according to the designed experimental scheme, and gradually collect relevant data. Guide students to observe experimental phenomena, ask questions, and encourage them to try different solutions.

Data analysis stage: Students sort out experimental data, and apply the analysis methods of mathematics, statistics, science and

other disciplines to process the data. Students are encouraged to ask questions and use their interdisciplinary knowledge for in-depth analysis and interpretation.

Results presentation stage: Students write an experiment report based on the experimental results and analysis, showing the purpose, methods, results and conclusions of the experiment. Students can use charts, pictures and other multimedia forms to display the results, showing the results of interdisciplinary integration.

Cooperative evaluation stage: students compare and discuss experimental results and evaluate each other's experimental design and results. Teachers provide feedback and guidance, and students are encouraged to evaluate themselves and improve from the perspectives of others.

Through the above specific experimental activity design, students will cultivate the integration of interdisciplinary abilities through exploration and practice, using multidisciplinary knowledge and methods, so as to improve their interdisciplinary abilities such as critical thinking, problem solving, creativity and interpersonal cooperation.

4. Conclusion

The cultivation of students' comprehensive ability based on interdisciplinary thinking is helpful for students to further solve problems, so that the learned knowledge can be truly connected with the reality of life, so as to improve students' thinking level to find problems, further improve students' problem awareness, and complete the comprehensive goal of teaching activities. The cultivation of interdisciplinary ability is closely related to the development of students' comprehensive quality. The training of interdisciplinary ability aims to cultivate students' interdisciplinary thinking ability and the ability to solve problems by comprehensively applying the knowledge of various disciplines, so as to promote the development of students' innovative thinking, critical thinking and the ability to solve practical problems. The comprehensive quality of students refers to the comprehensive development of students in many aspects such as knowledge, ability, morality and emotion, including the mastery of subject knowledge, the cultivation of thinking ability and the cultivation of moral quality. The cultivation of interdisciplinary ability is of great significance to the development of students' comprehensive literacy. First of all, interdisciplinary competence training can help students establish knowledge connection and integration. Through interdisciplinary learning, students can go beyond the pure disciplinary boundaries and integrate the knowledge of different disciplines to understand and apply knowledge more comprehensively. Such ability training is conducive to students to form a systematic way of thinking and knowledge framework, and promote the improvement of their subject ability. Secondly, interdisciplinary competence training can also promote the development of students' innovative thinking and problem-solving ability. In interdisciplinary learning, students need to apply the knowledge and methods of different disciplines to solve complex problems from multiple dimensions. The cultivation of this kind of comprehensive thinking helps to stimulate students' innovative thinking and improve their problem-solving ability and innovation ability. In addition, interdisciplinary ability training can also promote the formation of students' comprehensive literacy. Comprehensive quality includes the mastery of subject knowledge, the cultivation of thinking ability, the cultivation of moral quality and so on. Through interdisciplinary learning, students can fully develop their various qualities, which not only makes them breakthrough in subject knowledge, but also cultivates their critical thinking, cooperation ability and innovative spirit. This kind of comprehensive literacy is of great significance to students' future development and lifelong learning.

In general, the cultivation of interdisciplinary ability is closely related to the development of students' comprehensive literacy. The cultivation of interdisciplinary ability can help students establish the connection and integration of knowledge, promote the development of innovative thinking and problem-solving ability, and also promote the formation of various comprehensive qualities of students. Therefore, schools and educational institutions should attach importance to the cultivation of interdisciplinary competence and provide more opportunities and platforms for the development of students' comprehensive literacy.

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