



Exploration of Interdisciplinary Theme Based Teaching of Information Technology Curriculum in Junior High School

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Abstract. Information technology curriculum is highly comprehensive. Interdisciplinary theme based teaching breaks down the boundaries between traditional disciplines, integrates knowledge and methods from different disciplines, and conducts teaching activities around a central theme. It has the advantages of enhancing students' comprehensive abilities, improving classroom teaching methods, and improving single evaluation methods. It can effectively cultivate students' core competencies and promote their all-round development. To effectively implement interdisciplinary theme based teaching, teachers should care about the development of students' comprehensive abilities, scientifically design and implement interdisciplinary integration teaching, cultivate students' interdisciplinary literacy, enhance teachers' interdisciplinary teaching ability, and carry out interdisciplinary theme based teaching according to the teaching theme based on curriculum standards, establish teaching goals around core literacy, set core tasks and problem chains, and conduct multiple evaluations.

Keywords: Information Technology Curriculum, Interdisciplinary, Theme Based Teaching, Core Competencies.

1 Introduction

The "Compulsory Education Curriculum Plan (2022 Edition)" proposes to focus on cultivating students' ability to comprehensively apply knowledge to solve problems in real situations, actively carry out comprehensive teaching activities, and strengthen the collaborative education function of the curriculum [1]. The "Compulsory Education Information Technology Curriculum Standards (2022 Edition)" proposes that information technology courses have comprehensive and practical characteristics, aiming to cultivate students' scientific spirit and technological ethics, strengthen the interconnection between disciplines, drive the comprehensive implementation of the curriculum, strengthen practical requirements, and promote the improvement of stu-

dents' digital literacy and skills [2]. However, traditional information technology courses often focus too much on theoretical knowledge and skill training, neglecting the cultivation of students' interdisciplinary application abilities. Interdisciplinary theme based teaching is a teaching method that centers around students, with a particular subject course content as the backbone, and revolves around a certain theme. Middle school students have strong curiosity and active thinking. Teachers can use this teaching method to guide students to discover, analyze, and solve problems through exploration, cooperation, practice, and other means, thereby achieving the internalization and application of knowledge, and also helping to cultivate students' comprehensive and innovative abilities. Therefore, it is of great significance to carry out interdisciplinary theme based teaching in junior high school information technology courses.

2 The Values

2.1 Enhance Students' Comprehensive Abilities and Develop Core Competencies

Interdisciplinary theme based teaching enables students to comprehensively apply knowledge from multiple disciplines to view problems from different perspectives during problem solving, thereby cultivating students' innovative abilities and higher-order thinking skills such as critical thinking, logical thinking, and reflective thinking. We not only focus on students' knowledge accumulation, but also on their overall development in terms of abilities, emotions, attitudes, and other aspects. The learning tasks of interdisciplinary theme based teaching in information technology courses are usually not simple, but complex, authentic, and difficult. It is difficult for students to complete them alone, which requires students to work together in teams to complete them. In this process, students' ability to collaborate and communicate can be cultivated, making interdisciplinary learning transcend the scope of knowledge learning.

2.2 Improve Classroom Teaching Methods and Stimulate Learning Interest

Interdisciplinary theme based teaching breaks through the limitations of traditional single-discipline teaching and improves classroom teaching methods. Firstly, it emphasizes diversity and flexibility in teaching methods. It is not limited to traditional lecture-based teaching but adopts various teaching methods such as case analysis, role-playing, group discussions, practical operations, etc., based on the needs of the theme and the characteristics of students. Secondly, interdisciplinary theme based teaching emphasizes students' subjectivity and autonomy. In this teaching mode, students actively participate in the learning process. They need to explore and discover knowledge independently, solve problems, and complete learning tasks in cooperation with classmates.

2.3 Improve the Single Evaluation Method and Promote Comprehensive Development

Through interdisciplinary theme based teaching, combined with students' participation, teamwork, practical operation, project completion quality, and other dimensions, evaluation is conducted. This diversified evaluation system can more comprehensively reflect students' learning outcomes and abilities. Through diversified evaluation methods, students can understand their performance in knowledge mastery, skill application, emotional attitudes, values, and other aspects, and thus make targeted self-improvement and improvement. At the same time, diversified evaluation methods can reduce the subjectivity and bias caused by a single evaluation method, and improve the accuracy and fairness of evaluation through the use of multiple evaluators, evaluation methods, and tools.

3 Implementation Strategies

3.1 Implement Interdisciplinary Integrated Teaching based on Disciplinary Characteristics

China's education aims to cultivate well-rounded individuals. Under the traditional teaching model, there is often a lack of connection and interaction between various disciplines. However, interdisciplinary teaching emphasizes the intersection and integration of disciplines, combining knowledge and skills from different disciplines to form a comprehensive teaching method. Discipline teaching is the foundation and prerequisite for interdisciplinary teaching. When conducting interdisciplinary theme based teaching, teachers first need to deeply understand the characteristics of the discipline, understand the connections and differences between the discipline and other disciplines, and on this basis, find knowledge points and teaching resources related to other disciplines, choose themes that are close to students' lives, consciously connect students' lives and learning, design teaching programs with interdisciplinary characteristics, and achieve collaborative education between information technology disciplines and other disciplines.

3.2 Care for Students' Growth and Cultivate Their Interdisciplinary Literacy

Concerns for students' growth constitute one of the vital goals of education. Today's education has shifted its focus from imparting knowledge to nurturing students' competencies. The cultivation of interdisciplinary competencies is crucial for students' development. Interdisciplinary theme based teaching involves not just the integration of knowledge but also the fusion of competencies. Interdisciplinary competencies refer to those that transcend individual disciplines and possess a universal nature, developed through students' resolution of complex real-life problems, enabling them to better adapt to the evolving societal landscape in the future [3]. In teaching, educators should anchor their efforts in the field of information technology, utilizing authentic life sce-

narios to guide students in utilizing digital tools to solve problems, thereby fostering and developing core discipline competencies. It is imperative to monitor students' growth processes, understand their interests, needs, and characteristics. By encouraging students to engage in self-directed inquiry and collaborative learning, educators can spark their interest in learning and initiative. Additionally, teachers must pay attention to students' feedback on their learning, promptly adjusting teaching strategies and methods to better meet their learning needs.

3.3 Assist Teachers in Their Development and Enhance Their Interdisciplinary Teaching Abilities

With the deepening of educational reform, interdisciplinary teaching has emerged as a trend. Teachers need to possess the ability to conduct interdisciplinary teaching, adopt an interdisciplinary mindset, break through disciplinary boundaries, emphasize the intersection and integration of knowledge both within and across disciplines, and strengthen the coherence among various knowledge areas [4]. Teachers' interdisciplinary teaching abilities encompass interdisciplinary instructional design, implementation, and assessment capabilities. In practical teaching, enhancing teachers' teaching abilities can be achieved by establishing interdisciplinary communities. "An interdisciplinary community comprises multiple teachers with complementary disciplinary backgrounds. Based on the need to address common issues in practice, it is a school organizational community established through resource cooperation, characterized by shared beliefs, openness, diversity, and integration" [5]. Emphasize collaboration and communication with teachers from other disciplines, continuously update one's knowledge system, develop a cross-disciplinary perspective and way of thinking, and continuously promote the progress and development of education.

4 Teaching Design Ideas and Processes

4.1 Select Teaching Themes based on Curriculum Standards

The theme serves as the core of thematic teaching, guiding the organization, instruction, and assessment of the entire course unit. When selecting a theme, attention should be paid to the following principles: First, the theme should center around core competencies. The core competencies to be cultivated in information technology courses primarily include information awareness, computational thinking, digital learning and innovation, and information social responsibility. Core competencies are the key abilities and indispensable characters that students need to develop during the learning process, which are of great significance for both students' personal development and societal needs. Second, the theme selected should possess interdisciplinary characteristics. Interdisciplinary teaching integrates knowledge and skills from different fields, promotes curriculum integration, better cultivates talents who meet societal needs, broadens students' knowledge horizons, and forms a more complete and comprehensive knowledge system. Third, the theme should be close to students' lives. In the digital age, information technology has penetrated all aspects of our lives. When se-

lecting a theme, it should be close to students' life experiences and based on learners' current learning and life experiences [6], creating authentic situations or real-world problems. Authentic problem situations can lead students to conduct sustained and in-depth inquiries and apply what they have learned to solve real-world problems, eliminating the "inertia" of knowledge [7]. This article will analyze the theme of "Campus Historical Time Machine," and through the integration of knowledge from multiple disciplines, design a presentation on the historical development of one's own school, aiming to enhance students' understanding of their alma mater and stimulate their sense of pride and belonging.

4.2 Establish Teaching Objectives Around Core Competencies

The teaching goal of interdisciplinary theme based teaching not only leads the smooth development of teaching activities, but also provides a basis for the final evaluation of teaching activities. It is the starting point and end point of a lesson. Determining teaching objectives should be viewed from two dimensions. On the one hand, it should be viewed longitudinally, based on the knowledge students have already acquired in their past studies and lives, as well as the content they will learn in the future. On the other hand, we should look horizontally and integrate the curriculum standards of multiple disciplines, selecting several common curriculum standards in each subject area to determine the interdisciplinary content. Taking the theme of "Campus History Time Machine" as an example, it can cover the curriculum content of five subjects in junior high school: information technology, geography, Chinese, history, and art. The interdisciplinary knowledge content included is shown in Table 1, and the designed teaching objectives are shown in Table 2.

Table 1. Interdisciplinary knowledge related to "Campus Historical Time Machine"

Related disciplines	Interdisciplinary knowledge
Information Technology	Collection, processing and presentation of multimedia information, multimedia production tools such as PowerPoint
Geography	Geographical coordinates, interpretation of topographic maps, analysis of landform features, identification and use of maps, etc
Chinese	Reading comprehension, text editing and writing skills, cultural awareness and cross-cultural communication
History	Historical research methods, such as literature analysis, are used to obtain historical data
Art	Color matching, layout and typography, basic principles of photography and art

Table 2. Interdisciplinary Teaching Objectives of "Campus Historical Time Machine" Theme

Related disciplines	Knowledge and skills	Process and Method	Emotional Attitude and Values
Information Technology	Collection, processing, and editing of images, audio, and video	Shoot creative short videos and photos of the school through group collaboration.	Cultivate students' innovative thinking, explore the unique features of the school, and showcase and disseminate them through digital media.
Geography	Basic knowledge and usage of geographic information technology tools and maps	By conducting on-site inspections and using maps and other methods, obtain relevant information such as the geographical location of the school	Inspire students' interest and love for campus geography environment and Recognizing the important role of geographical environment.
Chinese	Using writing techniques from the Chinese language subject, write textual materials introducing the school	Collect and organize relevant information about the school, and complete the creation of the school introduction	Deepen the understanding of the school, enhance the love for the school, and generate a sense of pride and belonging
History	Master important events in the history of the school, including its founding background, development process, etc	Using historical research methods to collect, organize, and analyze historical materials of schools	Cultivate a sense of belonging and identity to the school, respect historical facts, form correct historical and value systems, and inherit campus culture.
Art	Be able to use color to express the atmosphere and characteristics of the school.	Through group cooperation, students can think about the characteristics and highlights of the school from different perspectives and levels.	Cultivate a spirit of respecting the value of art and pursuing excellence, and enhance artistic literacy and creative level.

4.3 Set Core Tasks and Build a Problem Chain

The core task is a key link. The core task of interdisciplinary theme based teaching should be coherent, meaningful, and included in the real problems to be solved. Because these core tasks are real, diverse, complex, and can reflect interdisciplinary skills and are included in real problems, it is necessary to further deconstruct these real problems to form a problem chain [8]. Starting from the core knowledge and ideas of

the main disciplines, using the problem chain to construct learning scaffolds [9], and gradually advancing the completion of the core tasks. For example, the question chain and core task design of the theme of "Campus History Time Machine" are shown in Table 3.

Table 3. Problem Chain and Core Tasks of the "Campus Historical Time Machine" Theme

Interdisciplinary themes	Problem Chain	Core tasks	Involving disciplines
Campus History Time Machine	Q1: What is the background of the school's establishment and how has the school's geographical location changed?	Explore school history through the Internet or the library	Information Technology, History, Geography
	Q2: What important development stages or turning points has the school gone through?		
	Q3: After obtaining information, how can we process this information to vividly showcase the history of the school?	Collect videos or photos of the school's development process, unleash creativity, integrate them, and design presentation layouts and animations	Information Technology, Art
	Q4: How to organize language to better describe the history of the school?	Write text and commentary	Information Technology, Chinese, Art

Based on the above core tasks, carry out teaching activities. Teaching activities are divided into two parts: the first part is group cooperative learning, which is divided into groups based on the principle of "heterogeneity within the group and homogeneity between groups", allowing students to help each other and complete a work together, promoting the development of students' cooperative communication skills and problem-solving abilities. Students need to work in groups, divide the work, collect, organize, and analyze relevant materials, and then use their imagination and creativity to creatively integrate and process the collected materials to better complete their works. The second part is the presentation and exchange activity. After students complete their works, they will present and exchange their works, allowing students to evaluate each other and promote better absorption of the strengths of other groups, thus promoting student development. Each group completes their work and then goes on stage to present and explain their group's work. Other groups evaluate and score the group.

4.4 Conduct Multiple Evaluations to Obtain Comprehensive Feedback

Evaluation is the final step of teaching activities and should be aligned with the objectives. In terms of evaluation methods, a combination of process evaluation, perfor-

mance evaluation, and other evaluation methods is used to emphasize the performance of students' learning process, reflect the changes in their core competencies during learning activities, and adhere to the principle of emphasizing both process and outcome. In the theme teaching of "Campus History Time Machine", "the production of various elements such as taking photos and videos of the campus" can be used as the content of process evaluation and performance evaluation. After the course ends, evaluation should also be conducted from the aspects of completion level, innovation level, and problem-solving situation. In terms of evaluation content, we should not only focus on students' cognitive development, but also pay attention to the development of students' emotional attitudes, values, and other aspects, and comprehensively evaluate the development of students' core competencies. Encourage multiple stakeholders such as teachers, parents, and students to participate in the evaluation process.

5 Conclusion

First of all, interdisciplinary education has become an important trend in the field of education. It has changed the original single teaching mode and can effectively improve students' comprehensive abilities.

Secondly, interdisciplinary theme based teaching can effectively improve classroom efficiency. It pays more attention to the comprehensive development of students and cultivates their innovative thinking and practical abilities than traditional classroom teaching.

Finally, interdisciplinary theme based teaching has improved teaching methods and evaluation methods. It emphasizes both process and outcome, and promotes the improvement of students' interdisciplinary application abilities through diversified teaching methods.

Fund Project

This article is part of the 2024 Chongqing Normal University Graduate Research Innovation Project "Exploration of Interdisciplinary Theme based Teaching of Information Technology Curriculum in Junior High Schools under the Background of Smart Education" (Project Number: YZH24017).

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