

A Study on the Instructional Design of Interdisciplinary Thematic Learning in Middle School Physical Education Based on the CASES-T Model

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Abstract: With the deepening of educational reform, interdisciplinary thematic learning, as an emerging educational model, has become a focus of attention in the field of educational research. Based on the STEM (science, technology, engineering, and mathematics) education concept and CASES-T (Content, Activity, Situation, Evaluation, Strategy-Target) model, this study provides a theoretical basis for the teaching design and implementation of interdisciplinary thematic learning in middle school physical education. Through the analysis of specific interdisciplinary thematic learning cases, it aims to provide theoretical support and practical guidance for the reform of middle school physical education through the CASES-T model-based interdisciplinary thematic teaching design research in middle school physical education, in order to enhance students' learning effects, cultivate core literacy in physical education, and promote students' all-round development.

Keywords: New curriculum standards; Middle school physical education; Interdisciplinary thematic learning; Instructional design

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1. Theoretical foundations

1.1. STEM education philosophy

The STEM education philosophy refers to the integration of Science, Technology, Engineering, and Mathematics into a holistic approach to education. It emphasizes interdisciplinary integration, collaboration, contextualization, and experience, and provides students with a generalized and systematic educational experience that helps to improve their overall quality and competitiveness^[1].

1.2. CASES-T model

CASES-T is a combination of the first letters of six English words, CASES stands for the system as a whole,

including Content, Activity, Situation, Evaluation, and Strategy, and T (Target) is the goal to be achieved by the system ^[2]. In actual classroom teaching, drawing on the CASES-T model, we need to pay attention to the organic integration of the content, activities, contexts, assessment, and strategies in order to achieve the teaching goals.

2. Instructional design and implementation of interdisciplinary thematic learning based on the CASES-T model

In order to confirm that the CASES-T model of instructional design is practicable and able to guide instructional design, the design of an interdisciplinary thematic learning instructional design example was developed based on this model.

2.1. Instructional case design

2.1.1. Instructional design ideas

Based on the instructional design ideas proposed by the STEM education concept and the CASES-T model, this study aims to design an interdisciplinary thematic teaching example that integrates physical education and patriotism education.

The teaching objectives are to cultivate students' core physical education qualities and pass on the spirit of patriotism, aiming to promote students' mastery of motor skills, cultivate healthy behaviors, shape physical education virtues, and strengthen students' patriotism spirit. The specific design is as follows:

- (1) Studying: A pair of students engage in the passing of small sandbags, with each student learning and practicing this activity independently ^[3]. Subsequently, each group focuses on practicing middle and long-distance running at various stages. The video clip of "The Life Boat" is played for students to experience the fearlessness displayed during flood rescues and the indomitable spirit. Through observing the flood-fighting tactics and witnessing the fighters transporting sandbags back and forth to impede floodwaters, students can understand the training involved in middle and long-distance running ^[4].
- (2) Training: Students practice running with weighted small sandbags in small groups within the specified time, completing both carrying and stacking and practicing distance running. When watching the video, students take note of the moments that resonate with them emotionally.
- (3) Racing: During the simulation of fire support for flood rescue, the four groups in the class engage in the competition. The group that uses the least amount of time to complete the armed assault and flood interception will be the winner (all members of the group are required to partake in the armed assault to execute the content of the battlefield flood control) Additionally, the following scenario is contemplated: If Character A had their home at risk of destruction by the flood, would they still be daunted by the exertion involved in middle and long-distance running?
- (4) Evaluation: Student performance is evaluated on the following three dimensions: the ability to listen to teachers' instruction and advice; the ability to actively consult relevant information and practice diligently; the ability to unite and cooperate, demonstrate courage, and actively participate in training and competitions.

2.1.2. Design concept

Patriotism is the core spirit of the Chinese nation. Integrating the spirit of patriotism into the physical education classroom and training students' athletic skills while stimulating their patriotic feelings can realize

the organic integration of physical education and moral education. Promoting a high-quality classroom with multidisciplinary integration has become the development direction of the future physical education class. This study takes the middle-distance running in Level 4 of the physical education and health curriculum and the anti-flood content in the Chinese curriculum as the entry points to design related activities^[5]. Through leading-in social hot spots, the study incorporates the spirit of patriotism in the middle-distance running program. Setting students in the role of “fighting against floods and protecting their homes” enables them to develop the qualities of bravery and tenacity, overcoming difficulties, working in solidarity, and striving to be the first in the exercise. Students are guided to demonstrate their courageous and unrelenting spirit in the face of challenges, deepen their patriotism, and meet their future development needs.

2.1.3. Teaching plan design

(1) Teaching objectives

The first teaching objective involves knowledge and skills. Through the study of this class, students gain familiarity with and have preliminary mastery of the fundamental techniques of middle-distance running. They learn about the initiation of middle-distance running, the principles of accelerating running, and the essentials of running and sprinting, as well as provide a simple demonstration of these concepts. The second teaching objective involves process and method. Through the study of this class, students can develop their athletic ability as well as the quality of speed and endurance. The third teaching objective involves emotional attitudes and values. It aims to cultivate students’ patriotism, courageous and tenacious, and good quality teamwork.

(2) Pre-course preparation

The site and equipment for this curriculum include a 400-meter runway playground and a stopwatch. The student tasks include reflecting on the memory of the soldiers who sacrificed themselves in the fight against the flood, previewing the techniques of middle-distance running, watching related videos and news reports to understand the patriotic spirit of the People’s Liberation Army, and learning to sing the military song “Bloodstained Elegance.” The teacher’s task includes preparing related equipment, videos, and wall charts.

(3) Lesson plan design

The specific design is divided into the following parts. Preparation activities consist of a 3-minute lead-in, followed by a 5-minute segment that includes fostering a sense of the military spirit of “not afraid of suffering, not afraid of tired.” This is followed by free exercise. The next part is the essential part, which includes activities such as “I am a Little Doctor” (6 minutes), “Armed Cross-Country Running for the First Time” (8 minutes) that includes creating a scenario simulating armed cross-country running for military personnel with reduced difficulty, “Rushing to Help Friends, Blocking the Flood” (10 minutes) that includes setting the scene of a natural disaster with sudden flooding, and “Sing the Military Song in Unison to Remember the Heroes” (5 minutes). The ending part (3 minutes) involves the teacher playing smooth music and leading the students in stretching and relaxing to relieve their fatigue. In the post-lesson summary, this interdisciplinary theme learning achieves a nuanced integration of the spirit of patriotism and middle school middle-distance running teaching. Through activities such as becoming a small doctor, experiencing cross-country running, galloping with teammates, rescuing the wounded, and participating in a chorus of the military song, the lesson subtly influences students’ behavior and values. This approach enables the practical implementation of moral education, reaching the hearts of the students.

2.2. Teaching case implementation

2.2.1. Objects of implementation

This interdisciplinary thematic learning was implemented for 40 students in a class of 8th grade at No.10 Middle School in Kunming, China.

2.2.2. Implementation process

In the process of teaching physical education at the Baita Campus of No.10 Middle School in Kunming, a class of 40 students in the 8th grade was selected for teaching.

2.2.3. Preparation component

Firstly, teachers played the video of the flood relief in the classroom, leading students to experience the situation and stimulate their patriotic feelings. By playing the video clip of the soldier's weighted cross-country, students were asked what they had realized. The students responded that they recognized the spirit of "not afraid of hard work and not afraid of tiredness." Next, teachers divided the students into four groups. Each group had 10 students as the combat class.

2.2.4. Basic components of the concrete framework

(1) Activity 1: I am a Little Doctor

Students were divided in groups of two. After two students had practiced three times, the teacher recorded the students' time taken for hemostasis and bandaging exercises, and the student who took a shorter time to complete the exercise well will be designated as the hygienist for each combat class.

(2) Activity 2: Armed Cross-Country Running for the First Time

The teacher demonstrated and explained the technical points of each stage of middle and long-distance running, covering starting running, accelerating running, running during the course, and finishing the race. The students were prompted to pay attention to the coordination of the upper and lower limbs when practicing on the track.

(3) Activity 3: Rushing to Help Friends, Blocking the Flood

The teacher created a situation and assigned a task to students, where there is a conflict at the front line that needs to be supported quickly. The time taken for each group was recorded, the group that arrived at the destination in the shortest time and successfully rescued the wounded will be the winner.

(4) Activity 4: Sing the Military Song in Unison to Remember the Heroes

Through singing the military song "Bloodstained Elegance," the aim is to evoke a sense of the generals facing the enemy with courage and readiness to wield their swords, instilling an understanding of the heroic spirit that "on a narrow path, the brave one will win."

2.2.5. Ending section

In an environment where soft music was played, the teacher guided the students to perform stretching and relaxation exercises for all parts of the body to relieve their fatigue. Students shared their experiences and gains from the class. During the class commentary, the teacher emphasized the desire for students to bravely confront various difficulties and challenges in their daily studies and lives, urging them to embody the noble spirit of "advancing without fear of difficulties." The teacher encouraged them to foster unity among their classmates and extending support to one another. Moreover, the teacher guided students to establish ambitious ideals and contribute to the prosperity of the motherland.

2.3. Post-lesson summary

The core of physical education lies in “motor skills, health behavior, and sports morality,” and moral education runs through every sports activity ^[6]. Through a series of activities such as the hygienist competition, cross-country running experience, teammate assistance, casualty rescue, and singing the chorus of the military song, the subtle influence on students’ behavior and values facilitates the implementation of moral education and truly resonates with the hearts of students. In the teaching process, students not only mastered the knowledge and skills, but also experienced emotional cultivation, realizing the high efficiency of subject integration. Moral education focuses on “less teaching, more teaching by example,” sports activities in the context of “competition” provide the best platform for “teaching by example.” In a competitive and cooperative gaming scenarios, students can undergo intense emotional experiences. Therefore, teachers should effectively utilize the educational resources that arise from such competitions to guide students in developing correct values at the right time.

2.4. Teaching effectiveness and reflection

The general design ideas for constructing interdisciplinary thematic teaching in middle school physical education based on the CASES-T model are as follows. Firstly, interdisciplinary themes are established; secondly, teaching situations are created; thirdly, teaching objectives are set; fourthly, teaching contents are organized; fifthly, teaching activities are planned; and finally, teaching evaluation is designed. Practice shows that the design idea of sports interdisciplinary thematic teaching is highly operable, achieving the teaching objectives, exerting a positive effect on cultivating students’ core qualities, and realizing the integration of five sides of education. However, interdisciplinary thematic learning in physical education is still in the preliminary stage of exploration. The theoretical system is not yet mature and there is a lack of practical experience. The teaching paradigm of this study is still to be perfected and the selected theme focuses on sports and patriotic education, which has certain limitations in the research perspective. As sports have unique values in nurturing people, further comprehensive and in-depth research is needed on how to better integrate knowledge from other disciplines, with sports as the core. This exploration aims to enhance interdisciplinary thematic teaching, fully unlocking the educational potential inherent in sports. We expect more experts, scholars, and front-line teachers to focus on the interdisciplinary thematic teaching of middle school physical education in the future and put forward more targeted teaching strategies and suggestions.

Disclosure statement

The author declares no conflict of interest.

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