

# Research on Project-Based Teaching and Political Education in Big Data Technology

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**Abstract:** *The research for this paper takes the big data technology major as its carrier, follows the transformation approach of value guidance and task-driven, and integrates value shaping, knowledge imparting, and ability cultivation into a unified design. It adopts an action-oriented teaching method, with the completion of preset tasks as the main thread, emphasizing on guiding students' abilities to independently analyze, plan, implement, and evaluate. It truly reflects the action field and action orientation from content to method, enhancing students' autonomous learning capabilities. By excavating the ideological and political education points within professional knowledge points, sorting out the ideological and political education lines, and integrating them into an ideological and political education plane, the major systematically addresses the issues of the dispersion and rigidity of ideological and political points in specialized courses, as well as the difficulty in organically integrating ideological and political education with professional studies.*

**Keywords:** *Big Data Technology Major, Course Ideological and Political Education, Project-based Teaching, Teaching Team, Maritime Characteristics*

## 1. Introduction

Higher vocational education possesses distinct characteristics, including its direct alignment with industrial demands, a broad coverage of engineering and practical majors, and a strong emphasis on practicality. Its objective is to cultivate talents equipped with craftsmanship, operational skills, and practical knowledge [1-2]. The focus of ideological and political education in courses is to leverage the educational function of specialized courses. Ideological and political education in courses at institutions of higher learning is an educational philosophy grounded in the basic positions, viewpoints, and methods of Marxism, using courses as the carrier to subtly embed value guidance into knowledge imparting and ability cultivation, aiming to achieve the fundamental task of moral education and cultivating people [3]. Professional course teachers are the implementing entities of ideological and political education in courses at China's institutions of higher learning and a new force in fulfilling the fundamental task of moral education and cultivating people. In the process of moral education and cultivating people, having lofty moral cultivation is a prerequisite for professional course teachers to carry out their work of moral education and cultivating people, and guiding students to develop an ideological and moral level that meets the requirements of social development is the goal of moral education and cultivating people [4].

Leveraging the high-level professional group of Big Data Technology and Application in Jiangsu Province, the major has actively implemented the "three educational reforms" (reform of teachers, reform of textbooks, reform of teaching methods), carried out project-based and ideological and political-oriented teaching reforms for core specialized courses, and constructed an action-oriented, project-based, and task-driven ideological and political education system in courses.

## 2. Overall Design for the Integration of Project-based Teaching and Course Ideological and Political Education

To embody industry characteristics and fulfill the task of moral education and cultivating people, the big data technology major has selected project-based teaching cases that integrate value guidance with industry characteristics. As shown in Figure 1, project-based teaching uses the AIS Big Data Analysis System for Ships as the carrier, and incorporates the technologies applied in the project throughout the entire big data technology major through technology decomposition and iteration.

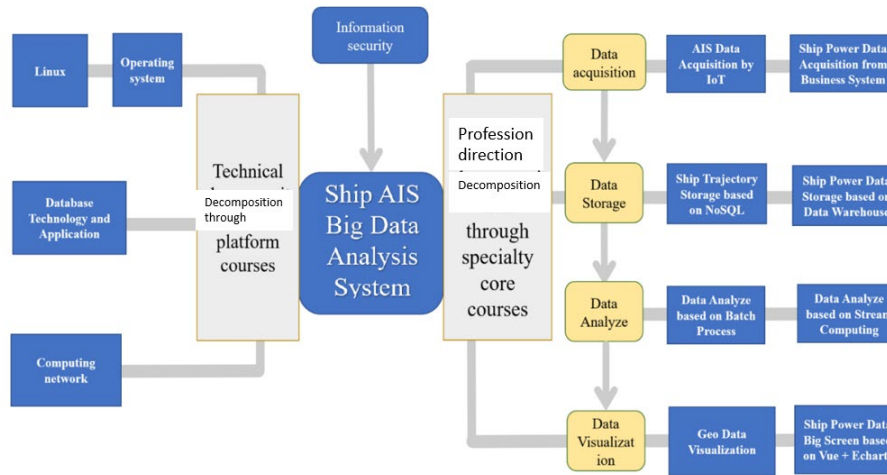


Figure 1: The curriculum system of project-based teaching

The major revolves around the fundamental task of moral education and cultivating individuals, aligns with the development of the big data industry, and serves the demands of smart shipping. With the goal of cultivating composite technical and skilled talents with distinct shipping characteristics, it emphasizes the integration of the spirit of navigation, the strategy of building a strong marine country, and big data professional technology in course teaching. It incorporates ideological and political elements such as the spirit of navigation, a strong marine country, digital ethics, and engineering thinking into the process of talent cultivation through points, lines, and areas. In the construction of ideological and political education in courses, it considers the talent training program from a holistic perspective, reasonably divide the ideological and political tasks between courses, and ensure that there is a consistent thread of ideological and political content, no repetition of ideological and political cases, and a focus on the continuation of ideological and political education. A notable characteristic of the curriculum design for big data professional courses is their strong correlation. Many course contents require the support of precursor courses and lay the foundation for subsequent courses. To ensure the correlation and continuity between core professional courses, the ideological and political design for the big data technology major is presented in Table 1.

Table 1: The ideological and political elements of core courses

Courses	Contents	Ideological and Political Elements
Big Data Processing	Overview of Development, Concepts, and Key Technologies	Accumulation, Quantitative to Qualitative Change, the Spirit of the Foolish Old Man Who Moved Mountains, Perseverance, Patriotism
Big Data Platform Deployment and Operation	Hadoop, Zookeeper, Kafka, HBase, Hive, etc.	Craftsmanship, Self-Reliance, Hard Work, Collaboration, Courage to Climb, Self-Confidence and Self-Improvement, National Spirit
Big Data Analysis and Development	MapReduce, Scala, Spark, RDD, SparkSQL	Craftsmanship, Phenomenon and Essence, Justice, Rule of Law Spirit
Big Data Storage and Mining	NoSQL, data statistics, machine learning, SkLearn, Spark MLlib	Integrity, Friendliness, Freedom, Equality Spirit, Collectivism
Big Data Visualization	Spring Boot, MyBatis, Vue, Echarts, Mapbox	Teamwork, Harmony, Innovation, Professional Dedication

### 3. Teaching Practice

Taking the course of Big Data Platform Deployment and Operation as an example, this course selects the platform operation module of the AIS Ship Big Data Analysis System, which is the main project that runs through the core of the major, as the teaching case. The project interface is shown in Figure 2.

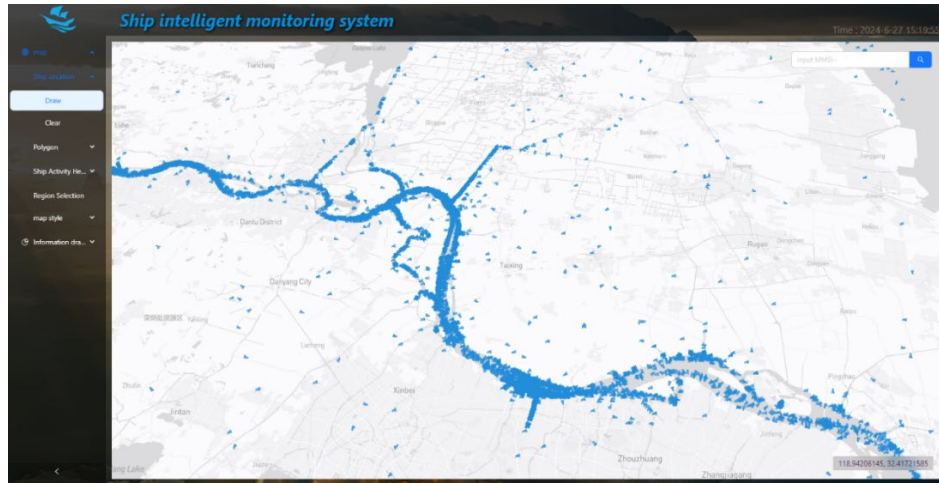


Figure 2: The main project

As shown in Figure 3, this project is divided into 8 projects, each corresponding to different knowledge points, with gradually increasing difficulty, forming a complete platform module of the AIS Ship Big Data Analysis System through progressive layers.

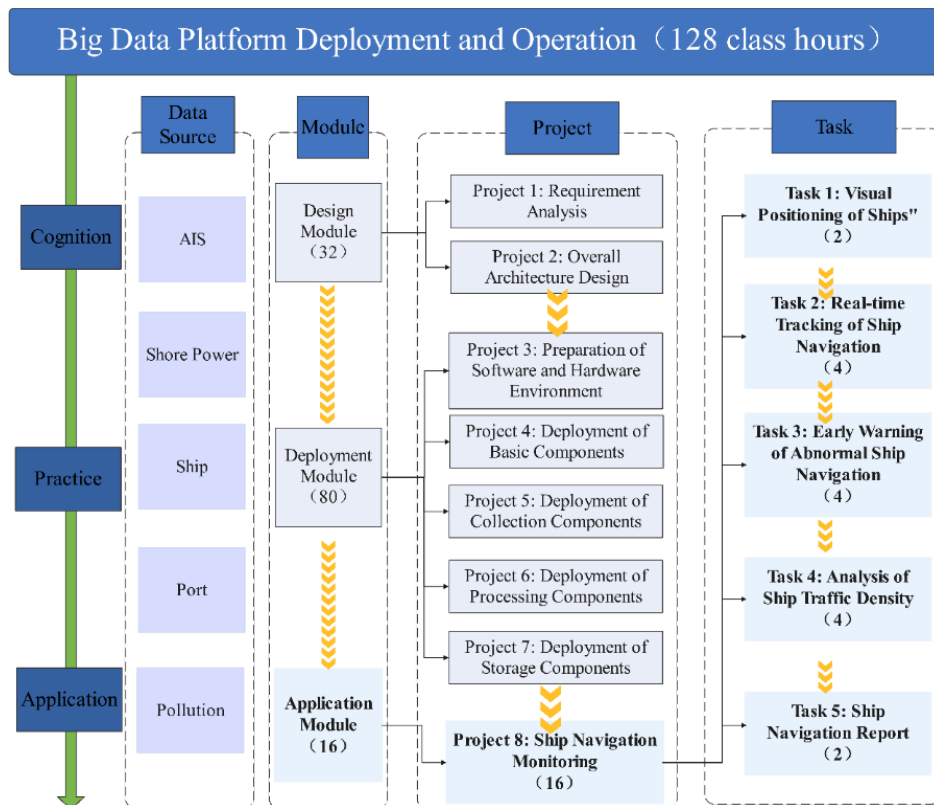


Figure 3: Project-based teaching design of big data platform deployment and operation

**3.1. Follow the Point-Line-Plane Approach to Implement Ideological and Political Education in Courses, Supporting the Goal of Cultivating Talented Individuals with Morality**

Each task in the project corresponds to several "points" of ideological and political education in courses, which are embedded in skill points and internalized in practical combat. The main "line" is to cultivate big data skilled craftsmen with social responsibility, national sentiment, and engineering thinking, organically incorporating ideological and political elements such as socialist core values and the spirit of the 20th National Congress. This systematically outlines the "plane" of ideological and political content supply. Combining the characteristics of the school, elements such as the spirit of navigation and the strategy of strengthening the country through marine development are integrated into

the course content. This guides students to accurately grasp the characteristics of shipping demands during social practice, innovate and design using a multidisciplinary knowledge system, and cultivate skilled big data craftsmen in shipping who are both talented and virtuous and urgently needed by the country.

### ***3.2. Project-Oriented and Task-Driven Approach to Explore Ideological and Political Elements in Courses***

The Big Data Platform Deployment and Operation course selects the AIS ship big data analysis system reconstructed based on real projects as the teaching project throughout. According to the characteristics of big data technology and industry features, the course relies on real smart shipping projects to build a big data equipment center room that stores massive shipping big data. During the course, simulated real-world scenarios are set up, with multiple job roles and rotations, allowing students to participate in the project across the entire process. This enhances students' self-learning ability, communication and coordination skills, cultivates their professional spirit of teamwork and dedication to work, and guides them to establish correct professional and value outlooks.

### ***3.3. Utilize Diversified Teaching Methods to Fully Carry Out Ideological and Political Education Step by Step***

To meet the needs of online and offline blended teaching, the teaching process is divided into four steps: demand analysis, scheme design, project implementation, and platform optimization. Taking project 7 as an example, this unit requires selecting appropriate big data platform components for design and development to complete the real-time display and tracking of ship trajectories, including ship position location and ship trajectory tracking.

### ***3.4. Enhance the Ideological and Political Qualities of the Teaching Team Based on Research***

Cultivating talented individuals with morality is the fundamental task of education. Enhancing the ideological and political qualities of the teaching team helps teachers subtly transmit socialist core values to students during the educational process, assisting them in establishing correct world views, outlooks on life, and values. Teachers declare and conduct research projects on ideological and political education for theoretical and practical research, and apply research results to actual teaching, which can enhance teachers' ideological and political qualities and promote continuous innovation and development of ideological and political education. The big data technology teaching team has completed multiple research projects on ideological and political education in courses, relying on research to enhance the team's ideological and political qualities and teaching abilities.

## **4. Conclusion**

The big data technology major adopts a three-dimensional design model of "point-line-plane" for ideological and political education in courses, achieving systematic design and three-dimensional penetration of ideological and political education in courses. This paper delves into the ideological and political elements contained in the course teaching modules and the educational functions they carry, forming a three-dimensional design model of "excavating ideological and political points, sorting out ideological and political lines, and integrating ideological and political planes" for ideological and political education in courses. It systematically addresses the issues of "dispersion" and "rigidity" in the ideological and political points of professional courses, as well as the difficulty in organically integrating ideological and political elements with professional content.

The major reforms its teaching philosophy and innovates its teaching methods with students as the center, achieving the unity of professional instruction and value guidance. The core courses of the major are developed and implemented using an action-oriented teaching approach, introducing ideological and political elements into multiple teaching segments of each teaching task. This fully stimulates students' autonomy and creativity, cultivates their ability to independently formulate work plans and complete work tasks, and achieves the "three-in-one" teaching objectives of course knowledge transmission, ability cultivation, and value shaping, highlighting the fundamental task of cultivating talented individuals with morality.

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