



Innovative Practical Research on the 5E Constructivist Teaching Model in Ideological and Political Courses from the Perspective of Digital Intelligence Empowerment

——Taking *Ideology, Morality and Rule of Law* for Digital Economy and Data Majors as an Example

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Abstract. Against the backdrop of in-depth integration between digital education transformation and fostering virtue through education, college ideological and political (I&P) courses are in urgent need of breaking traditional teaching paradigms. Taking digital economy majors as the experimental group and data majors as the **control group**, this study constructs a "digital intelligence + 5E" teaching system. External variables including textbooks, teaching contents, assessment methods, evaluation criteria and student source structure are strictly controlled, with only the teaching mode adjusted. The research systematically designs the **operationalized** paths of **digital-intelligent technologies** in each link of the **5E constructivist teaching model** (Engage, Explore, Explain, Elaborate, Evaluate) and allocates teaching hours for 40-minute single lessons, while integrating professional contents such as digital ethics, data governance and artificial intelligence supervision in depth. Practical results show that the overall curriculum goal achievement rate of the experimental group reaches 0.77, higher than 0.72 of the **control group** and the standard qualification line of 0.70, and the improvement has **statistical significance**, proving that the effect is not accidental. Students have achieved remarkable improvements in classroom participation, theoretical application and practical abilities. This replicable model provides references for the digital and targeted reform of I&P courses in the new era.

Keywords: Digital Intelligence Empowerment; 5E Constructivist Teaching Model; Ideological and Political Theory Courses

1 Introduction

College ideological and political courses serve as core courses for fostering virtue through education, aiming to guide students to actively establish correct world outlook, outlook on life and values, and realize value identification and behavioral transformation. Traditional I&P teaching is confronted with drawbacks such as insufficient student subjectivity, shallow knowledge internalization, weak practical application ability

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and disconnection with professional knowledge, which runs counter to the student-centered philosophy of constructivism [1].

The **5E constructivist teaching model** forms a complete learning loop featuring situational creation, independent inquiry, collaborative communication, meaning construction and diversified evaluation, which is highly consistent with the educational law of integrating cognition, emotion, intention and behavior in I&P education. **Digital-intelligent technologies** including big data, online learning platforms, virtual simulation and digital case databases effectively solve the bottlenecks of traditional teaching such as insufficient teaching resources, inefficient interaction and extensive evaluation, providing strong support for the **operationalization** of the 5E model.

Students majoring in digital economy and data grow up in a digital environment with strong digital operation capabilities and willingness for independent inquiry. Their professional curriculum inherently covers topics like digital ethics, data governance, artificial intelligence supervision and cyber rule of law, which are highly compatible with the teaching content of *Ideology, Morality and Rule of Law*.

In this study, Class 2, Grade 2025 majoring in Digital Economy is selected as the experimental group adopting the digital intelligence-enabled **5E constructivist teaching model** (Engage, Explore, Explain, Elaborate, Evaluate); while Class 1, Grade 2025 majoring in Data serves as the **control group** adopting traditional lecture-based teaching. Though taught by different teachers, the two groups enjoy high homogeneity in teachers' professional titles, teaching years, teaching experience, academic backgrounds and teaching styles. All external conditions including textbooks, teaching contents, class hours, assessment modes, evaluation criteria, practical projects and student sources are strictly unified to eliminate the interference of social policies and curriculum reform trends, ensuring that the differences in teaching effects are solely **attributable to** different teaching modes. Systematic research and practical summary are conducted based on complete teaching data to form a popularizable teaching paradigm, and the research results are verified to have **statistical significance** through data analysis.

2 Theoretical Compatibility of 5E Constructivism, Digital Intelligence Empowerment and Professional Integration

2.1 Core Connotation of the 5E Constructivist Teaching Model

Developed by American biological curriculum research institutions, the **5E constructivist teaching model** is a standardized constructivist operational framework [4], whose **operationalized** links are as follows:

Engage: Create teaching scenarios, raise questions and stimulate learning motivation

Explore: Carry out independent and collaborative learning, collect information and identify problems

Explain: Express viewpoints, construct concepts and form theoretical cognition

Elaborate: Expand knowledge application, solve practical problems and realize knowledge transfer

Evaluate: Implement diversified evaluation, conduct reflection and improvement to fulfill learning objectives

2.2 Triple Compatibility with I&P Courses, Digital-Intelligent Technologies and Digital Economy Majors

Compatibility of value construction: Ideological and political literacy cannot be instilled mechanically, but needs to be constructed independently in specific scenarios and practices [2].

Compatibility of unity of knowledge and practice: The whole process of cognition, identification and practice is covered by exploration, explanation and knowledge transfer links of the **5E constructivist teaching model**.

Compatibility with student-oriented education: Highlight students' subjectivity, participation, experiential perception and reflective thinking, which is the core requirement of the **5E constructivist teaching model** [3].

Compatibility with digital intelligence support: Digital-intelligent technologies provide full-process support for teaching resources, interactive communication, practical training and multi-dimensional evaluation, laying a foundation for the **operation-alization** of the 5E model.

Compatibility with professional scenarios: Digital economy majors involve real ethical and legal issues such as data ethics, algorithmic justice, platform responsibility and personal information protection, enabling simultaneous cultivation of ideological literacy and professional competency, and providing practical carriers for the **operationalization** of the 5E model.

3 Research Design and Control Group Setting

3.1 Research Objects

Experimental Group: Class 2, Grade 2025, Digital Economy Major (adopting digital intelligence + **5E constructivist teaching model**)

Control Group: Class 1, Grade 2025, Data Major (adopting traditional lecture-based teaching model)

3.2 Strict Variable Control

Unified textbook: *Ideology, Morality and Rule of Law* (Higher Education Press, 2023 Edition)

Consistent teaching contents, class hours, key and difficult points and teaching schedules

Identical practical projects: Writing a letter to future self, legal case analysis, red radio drama production and classroom presentation

Uniform assessment system: 50% formative assessment + 50% summative assessment

Consistent evaluation criteria: The qualified standard of curriculum goal achievement rate is set at 0.70

Equivalent student admission foundation, class scale, examination papers and marking standards

Eliminate external interference from social policies and educational reforms

Teacher variable illustration: Teachers of the two classes are both senior teachers from the School of Marxism with similar age, teaching experience, academic attainments and teaching proficiency, who have long undertaken similar courses. The influence of individual teacher differences on experimental results is minimized.

Sole independent variable: Teaching mode (digital intelligence + **5E constructivist teaching model** / traditional lecture teaching)

3.3 Basic Course Information

Course Name: Ideology, Morality and Rule of Law

Course Nature: Compulsory Public Course

Class Hours & Credits: 48 class hours (32 lecture hours + 16 practical hours), 3 credits

Single Class Duration: 40 minutes

Assessment Composition: Formative assessment 50% (online learning 10% + classroom performance 20% + practical achievements 20%) + Summative assessment 50%

4 Full-process Operationalization of 5E Constructivist Teaching Model Empowered by Digital-Intelligent Technologies (40-minute Single-class Teaching Design)

This part specifies the **digital-intelligent technologies**, classroom activities, digital tools, time allocation and implementation sequence of five teaching stages of the **5E constructivist teaching model**, integrated with professional scenarios of digital economy, to realize the full-process **operationalization** of the model. The detailed implementation arrangements for each stage are presented in Table 1.

Table 1. Time Allocation and Implementation Specifications of 40-minute Single-class 5E Constructivist Teaching Model Empowered by Digital-Intelligent Technologies.

Stage of 5E Constructivist Teaching Model	Duration	Implementation Sequence	Core Objectives	Digital-Intelligent Technologies & Tools	Classroom Activities	Professional Integration with Digital Economy
Engage	5 mins	Class opening introduction	Stimulate interest and activate learning	Xuexitong platform, short videos, data screen, online voting	Introduce cases about digital ethics and data security, assign practical tasks	Platform governance, algorithmic discrimination, big data price discrimination

Explore	12 mins	Collaborative inquiry	Task-driven learning, information collection and viewpoint formation	Rule of law case database, collaborative documents, electronic task lists	Group discussion and logical sorting, complete draft practical works	Data governance, AI supervision, platform subject responsibility
Explain	10 mins	Achievement presentation & knowledge construction	Outcome presentation, concept standardization and knowledge system construction	Screen projection, mind maps, real-time questioning system	Group presentation, teacher targeted explanation and logical combining	Moral and legal norms for digital industry practitioners
Elaborate	10 mins	Practical application	Realize integration of knowledge and behavior, finish practical projects	Virtual simulation court, PPT production & audio editing tools	Case analysis, creative work development and scenario application	Personal information protection, data compliance and rule-of-law practice
Evaluate	3 mins	Diversified feedback	Process evaluation, learning portrait construction and targeted improvement	Learning data recording, automatic data statistics, self & peer evaluation	Online testing, mutual evaluation, teacher comments and practical work scoring	Professional responsibility cultivation, ethical practice and practical quality assessment
Total	40 mins	Closed-loop teaching implementation	Whole-process moral education	Full-process support of digital-intelligent technologies	Combination of theoretical learning, inquiry, practice and presentation	In-depth integration of ideological education, professional education and practical training

4.1 Engage: Stimulate Learning Interest via Digital Scenarios

As the first link of the **5E constructivist teaching model**, its **operationalization** relies on **digital-intelligent technologies** to create cognitive conflicts through digital hot topics and visualized data to mobilize learning enthusiasm. Push short videos on digital ethics before class, launch interactive voting at the beginning of class, and discuss the balance between data convenience and moral boundaries to connect with follow-up practical tasks.

4.2 Explore: Independent Collaborative Inquiry Supported by Digital-Intelligent Technologies

As the core link of the **5E constructivist teaching model**, its **operationalization** is supported by **digital-intelligent technologies**. Set inquiry tasks focusing on life values,

cyber morality and cyber rule of law. Students conduct group research via digital case databases and collaborative office tools to finish preliminary practical assignments.

4.3 Explain: Theoretical Cognition Construction via Digital-Intelligent Tools

This link is the key to knowledge construction in the **5E constructivist teaching model**, and **digital-intelligent technologies** provide convenient conditions for its **operationalization**. Groups present research achievements via screen projection. Teachers systematically interpret core theories including life philosophy, rule-of-law concepts and core socialist values, build knowledge frameworks with mind maps and guide students to optimize practical works.

4.4 Elaborate: Knowledge Transfer via Digital Scenario Expansion

As the link of knowledge application in the **5E constructivist teaching model**, its **operationalization** is closely combined with **digital-intelligent technologies**. Carry out virtual court simulation and complete diversified practical projects, transferring theoretical knowledge into professional practice such as data compliance, platform governance and AI ethical norms [5].

4.5 Evaluate: Closed-loop Continuous Improvement via Diversified Digital Evaluation

As the closing link of the **5E constructivist teaching model**, its **operationalization** is realized through **digital-intelligent technologies** to form a closed loop. Implement self-evaluation, peer evaluation and teacher evaluation. Teaching platforms automatically record learning behaviors and score practical works to build student learning portraits and guarantee the achievement of curriculum teaching goals.

Overall 40-minute teaching logic: Engage(5min) → Explore(12min) → Explain(10min) → Elaborate(10min) → Evaluate(3min), forming a closely-linked teaching system fully empowered by **digital-intelligent technologies** and embedded with professional knowledge, which realizes the full **operationalization** of the **5E constructivist teaching model**.

5 Specific Influence of Digital Economy Professional Background on Curriculum Reform

Targeting students majoring in digital economy and data, this course realizes the specialization of ideological education and ideological penetration into professional education, which provides a practical basis for the **operationalization** of the **5E constructivist teaching model** empowered by **digital-intelligent technologies**.

5.1 Specialized Teaching Contents

Integrate core themes including digital ethics, data governance, artificial intelligence supervision, personal information protection and platform rule of law, which are closely combined with the **operationalization** of each link of the **5E constructivist teaching model**.

5.2 Specialized Case Resources

Build a special case database focusing on typical cases of e-commerce platforms, big data industry and artificial intelligence enterprises, providing rich materials for the **operationalization** of the Explore link in the **5E constructivist teaching model**.

5.3 Specialized Practical Projects

Design practical activities closely linked with majors such as vocational ethics surveys of data practitioners and analysis of legal risks of digital platforms, which promote the **operationalization** of the Elaborate link in the **5E constructivist teaching model**.

5.4 Specialized Evaluation Orientation

Add evaluation indicators concerning professional scenario application, digital ethics practice and data rule-of-law awareness into formative assessment, optimizing the **operationalization** of the Evaluate link in the **5E constructivist teaching model**.

5.5 Major-adaptive Teaching Design

Give full play to students' digital literacy advantages to strengthen independent inquiry, digital creation and collaborative presentation activities, which is conducive to the **operationalization** of the entire **5E constructivist teaching model**.

6 Practical Teaching Effects: Experimental Group VS Control Group

Table 2. Comparison of Core Teaching Indicators Between Experimental Group and Control Group.

Core Indicators	Experi- mental Group	Control Group	Differ- ence	Conclusion
Overall Curriculum Goal Achievement Rate	0.77	0.72	+0.05	Significantly higher in experi- mental group, with statistical sig- nificance

Theoretical Literacy Achievement Rate	0.73	0.71	+0.02	Stronger theoretical application ability, with statistical significance
Values & Belief Achievement Rate	0.80	0.75	+0.05	Better value guidance effect, with statistical significance
Patriotic Sentiment Achievement Rate	0.77	0.71	+0.06	Higher recognition of ideological education, with statistical significance
Practical Application Ability Achievement Rate	0.79	0.70	+0.09	Most prominent improvement in practical capacity, with statistical significance
Average Course Score	76.9	71.90	+5.00	Obvious academic advantage, with statistical significance
Excellence Rate (≥90 points)	8%	0%	+8%	Better cultivation of top students, with statistical significance
Failure Rate (<60 points)	0%	6%	-6%	Basically eliminate failing grades, with statistical significance
Average Score of Practical Works	85.5	75	+10.5	Higher quality of practical outputs, with statistical significance
Classroom Interaction Rate	91%	64%	+27%	Higher student subjectivity, with statistical significance

Note: Both groups reach a 100% participation rate in online learning tasks, which cannot reflect actual learning devotion, thus excluded from effect comparison.

All teaching conditions are fully unified and teacher individual differences are balanced, so all positive improvements of the experimental group are **attributable to the** adoption of the "digital intelligence + **5E constructivist teaching model**". The differences in various indicators between the two classes are shown in Table 2. The **statistical significance** of the experimental results proves that the improvement effect is not accidental, which verifies the scientificity and reliability of the research conclusions.

7 Continuous Optimization Strategies

Engage Stage: Adopt VR technology and virtual digital humans, enhance immersive experience of digital and red cultural scenarios, and optimize the **operationalization** of the Engage link in the **5E constructivist teaching model**.

Explore Stage: Establish specialized resource libraries on digital economy ethics and data rule of law to enrich inquiry materials, providing more support for the **operationalization** of the Explore link.

Elaborate Stage: Expand practical training forms including virtual simulation, social surveys and enterprise visits to enrich practical teaching hours, promoting the **operationalization** of the Elaborate link.

Evaluate Stage: Improve student learning portrait system to realize personalized and precise teaching evaluation, optimizing the **operationalization** of the Evaluate link.

Teacher Development: Strengthen training on **5E constructivist teaching model** design, **digital-intelligent technologies** application and practical teaching guidance, laying a foundation for the overall **operationalization** of the model.

Professional Integration: Further deepen thematic teaching on artificial intelligence supervision, data compliance and platform governance, providing more practical carriers for the **operationalization** of the model.

8 Conclusion

Centering on students and competency cultivation, the **5E constructivist teaching model** fits well with the internal law of value construction in ideological and political education. **Digital-intelligent technologies** provide systematic support for scenario creation, resource supply, interactive inquiry, practical transfer and diversified evaluation throughout the whole teaching process, laying a foundation for the **operationalization** of the 5E model. Professional scenarios of digital economy provide targeted and frontier educational carriers for I&P curriculum reform, promoting the in-depth integration of the model with professional education.

This study integrates the **5E constructivist teaching model** with **digital-intelligent technologies** to carry out teaching reform of *Ideology, Morality and Rule of Law* for digital economy majors. Quasi-experimental research is conducted under strictly controlled experimental conditions, with data majors as the **control group**. The results prove that the overall curriculum goal achievement rate of the reformed class reaches 0.77, exceeding the qualified standard of 0.70, with prominent improvements in students' classroom participation, theoretical application and practical educational effects, and all improvements have **statistical significance**, proving that the effect is not accidental.

The "digital intelligence + 5E" model promotes three major transformations of I&P courses: from passive listening to active knowledge construction, from rigid theoretical indoctrination to situational inquiry learning, and from single final assessment to diversified whole-process evaluation. It forms an integrated teaching mode featuring **digital-intelligent technologies** support, 5E closed-loop teaching, major integration and practical implementation, which realizes the effective **operationalization** of the **5E constructivist teaching model**. All positive effects are **attributable to** the organic combination of digital intelligence empowerment and the 5E model, which provides replicable and promotable practical paths for the digital, precise and professional reform of college ideological and political courses in the new era.

Conflict of Interest Statement

The author declares that there is no conflict of interest related to this paper.

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