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Research on the Reform of Ideological and Political Education in Information Technology Courses Based on the Cultivation of Scientific Thinking Ability

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Abstract: In response to the evolving demands of publishing and media talents in the era of intelligent media, current information technology (IT) courses face challenges in effectively cultivating digital skills. This study analyzes the connotation of scientific thinking ability, establishes their mapping relationship with IT education and curriculum ideological-political education. Propose to use the cultivation of scientific thinking ability as a bridge to promote the connection between IT courses and Curriculum Ideological and Political Education(CIPE). Based on the components of scientific thinking abilities, a three-Layer progressive scientific thinking ability cultivation framework is designed to restructure IT courses content, and corresponding teaching implementation strategies and teaching evaluation methods were proposed.

1. Introduction

With the rapid development of digital technology, innovative spirit and ability are the key to the development of countries, societies and individuals. For talents in publishing and media, the important foundation of digital innovation ability is scientific thinking ability. Information Technology (IT) courses are important carriers for cultivating scientific thinking. The existing courses have problems such as numerous knowledge modules but weak systematicness, and large disciplinary span but low integration. How to guide students to conduct reasoning from skill learning is a key issue that needs to be addressed to promote the support of IT for the publishing and media major.

Course-based ideological and political education enhances students' understanding of professional knowledge through ideological and political education, which is an inevitable choice for achieving " all-round education in the whole process with all-staff " [1]. However, most studies on ideological and political education in IT courses [2-4] focus on "craftsmanship spirit", "patriotism", "team spirit", "green environmental protection", etc. These elements are highly generalized and cannot fully demonstrate the differentiated value of ideological and political education in IT courses. This paper takes the cultivation of scientific thinking ability as the support

point of integrating ideological and political education into IT courses, combines the job requirements of the publishing and media industry, explores the integration path of scientific thinking and ideological and political education, and provides a reference for the reform of IT courses.

2. The Demand for Talents Cultivation and the Current Situation of IT Courses

2.1. Changes in job-related capabilities

At present, driven by the digital transformation, technological innovation and industry segmentation, the demand for positions in the publishing and media industry is gradually shifting towards a more comprehensive type. The main manifestations are:

- Enhancement of digital skills;
- Expansion of new media dissemination;
- Integration of content and technology;
- Strengthening of digital property rights and copyright management.

The changes in job-related capabilities demands in the publishing and media industry have raised new requirements for talents cultivation. Not only do students need to possess solid professional skills, but also they should have a sharp sense of information, proficient data analysis abilities, and the ability to carry out digital innovation by using common digital technology means. Moreover, as the significance of social responsibility and cultural orientation becomes increasingly prominent in the media field, strengthening education on information social responsibility has also become an important direction for cultivating talents that meet the demands of the industry development. Therefore, having core competencies in IT[5] is an important support for the new demands of publishing and media positions.

2.2. The existing problems of the IT courses

In light of the changing demands for abilities in publishing and media-related positions, the existing IT courses, as a general-purpose and skill-oriented public basic courses, have their own limitations.

According to the requirements of "Information Technology Curriculum Standards for Higher Vocational Education (2021 Edition)" [6], the IT courses covers 6 basic modules and 12 optional expansion modules based on professional needs. The knowledge modules are diverse, but the logical interrelationships among the modules are relatively weak, and there is a lack of connection between them.

IT courses teaching is mainly oriented towards the cultivation of "operational skills" and "skilled workers", while it neglects the cultivation of thinking abilities. For example, in the multimedia production module of the course, too much emphasis is placed on the presentation of visual effects, while insufficient attention is paid to the teaching of underlying logic and technical principles.

The teaching objectives of curriculum ideological and political education lack an effective mechanism for deep integration with IT. As a result, even if students have strong technical capabilities, they still have weak understanding of industry ethics issues such as digital copyright protection and information security.

Therefore, the current IT courses are unable to meet the demand of the publishing and media industry for high-quality IT talents. It is urgent to integrate the cultivation of scientific thinking ability into the teaching as the core of course ideological and political education, and to incorporate the cultivation of critical thinking, logical reasoning analysis and innovation ability into the teaching process, so as to enhance students' comprehensive digital literacy and skills.

3. Scientific Thinking Abilities

3.1. Connotation of Scientific Thinking

The term Scientific Thinking is widely used in fields such as philosophy, psychology, and science education. Its refers to the ability of people to apply scientific thought methods and logic in analysing, reasoning, summarizing and judging when they are recognizing and solving problems.

The methodology of Marxist philosophy points out that scientific thinking, also known as scientific logic, is a theoretical system that represents the way and means of forming and applying scientific cognitive activities, and processing and handling the materials of sensory cognition[7]. In psychological research, the concept of scientific thinking can be traced back to the studies on "higher-order thinking" conducted by psychologists in the early 20th century. The cognitive development theory proposed by Jean Piaget and the theory of "reflective thinking" by John Dewey both provided theoretical foundations for the cultivation of scientific thinking ability [8]. In the field of scientific education research, scientific thinking is often associated with the development of students' core competencies [9]. The United Nations Educational, Scientific and Cultural Organization (UNESCO) advocates developing students' scientific thinking abilities through scientific education. In the Education 2030 Action Framework, UNESCO urges countries to re-examine and formulate new visions for scientific education, emphasizing concepts such as "interdisciplinary teaching", "systematic thinking", and "lifelong learning" to cope with the rapidly changing world. Moreover, the Student Artificial Intelligence Competence Framework released by UNESCO also highlights the importance of cultivating students' critical thinking and creative thinking.

In conclusion, scientific thinking is the cross-disciplinary outcome of multiple disciplines, an important component of digital literacy and high-order thinking ability, and a way of thinking and practical process based on scientific methodology and logical reasoning. In the construction and teaching reform of IT courses, scientific thinking ability is an important manifestation of the "digital literacy and skills" training goal, and is of great significance for IT courses to serve the cultivation of talents in various professional directions in the context of digitalization.

3.2. Components of Scientific Thinking Ability

Scientific thinking is mainly characterized by its logicality, criticality and creativity. In combination with the cultivation of abilities, logicality is manifested as sensitivity and insight towards the objective world, as well as the ability to analyze and reason about information; criticality is demonstrated through reflection, questioning and critical thinking on problems; creativity emphasizes imaginative thinking that breaks through conventions and innovative thinking ability, as well as the interdisciplinary thinking ability to explore solutions through various approaches. Moreover, attention to the ethical significance of behavior is also an important manifestation of scientific thinking. Therefore, the components of scientific thinking ability can be summarized as follows: sensitivity and insight, analytical and reasoning abilities, critical thinking, creative thinking, interdisciplinary thinking, and ethical awareness, etc.

3.2.1. Scientific thinking ability and Core Competencies in IT

According to the four core disciplinary competencies proposed in the "Information Technology Curriculum Standards for Higher Vocational Education (2021 Edition)", namely Information Awareness, Computational Tthinking, Digital Innovation and Development, and Information Social Responsibility, it is not difficult to find that scientific thinking ability is highly compatible with the

core competencies of IT and there exists a mapping relationship, as shown in Table 1.

Table 1 Construction of Mapping Relationship between Scientific Thinking Ability and Core Competencies in IT courses

Core Competencies in IT	Scientific Thinking Ability	Description of Mapping Relationship
Information Awareness	Sensitivity and Insight	Discover, extract, evaluate and utilize information. Through acute observation of phenomena or data, identify problems and form understanding.
Computational Thinking	Analytical and Reasoning Abilities	Logical reasoning and analytical abilities in scientific thinking constitute an important foundation for computational thinking. By applying algorithmic and logical methods, one can conduct systematic analysis and solve problems.
Digital Innovation and Development	Creative Thinking Interdisciplinary Thinking	Utilizing digital technology to solve complex problems, reflecting on existing theories and technologies, seeking improvement space, integrating with other fields, and promoting technological and social progress.
Information Social Responsibility	Ethical Awareness	Focus on the impact of technological application on the environment, society and the future of mankind, and promote the fairness and sustainable development of technology.

3.2.2. Scientific thinking ability in Curriculum Ideological and Political Education

The cultivation of scientific thinking ability is closely related to curriculum ideological and political education. In terms of ideological guidance, scientific thinking ability focuses on cultivating students' critical thinking and creative thinking, etc., which is in line with the dialectical materialism theoretical system of Marxist philosophy and can play a role in guiding values. In terms of integration with practice, the cultivation of scientific thinking ability requires combining with specific course practical activities, including data collection, experimental design and implementation, etc., which is in line with the concepts of curriculum ideological and political education emphasizing the role of practice and cultivating virtue through skills. In addition, the creative thinking ability in scientific thinking ability is consistent with the goals of curriculum ideological and political education emphasizing the spirit and consciousness of innovation.

4. Teaching Design and Implementation

4.1. Framework for Cultivating Scientific Thinking Abilities

A progressive framework for cultivating scientific thinking ability has been constructed from three aspects: foundation, application and integration, as shown in Figure 1. In this framework, teaching objectives of IT courses are also designed from the perspective of the publishing and media major.

4.1.1. Foundation Layer

The foundation layer aims to cultivate students' awareness, sensitivity and insight into scientific methods, as well as their basic analytical abilities. The corresponding teaching contents designed for the IT courses are Information Processing Tools, Information Retrieval and Security, and

Programming Fundamentals. Through these teaching contents, students can be made aware of the crucial role of scientific methods in data analysis for publishing and market research; they can conduct effective information retrieval through various platforms, use scientific methods to judge the credibility of information, and cultivate sensitivity and insight towards digital information; on this basis, they can master common methods for data protection and privacy management, understand the basic concepts of information security, and possess basic abilities for information analysis and reasoning.

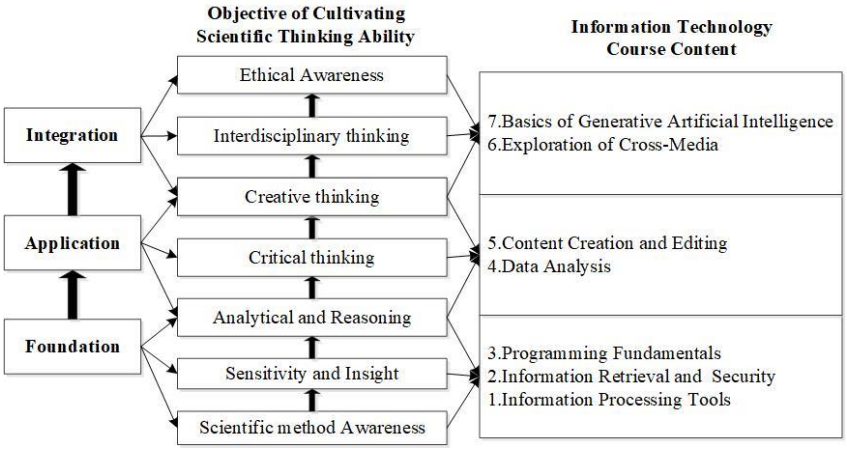

Figure 1: Three-Layer progressive scientific thinking ability cultivation framework

4.1.2. Application Layer

The application layer aims to cultivate students' analytical and reasoning, as well as their critical and creative thinking abilities. The corresponding design of the teaching content is Data Analysis and Content Creation and Editing. In combination with the industry background, tasks such as publishing data analysis and market assessment are completed to cultivate students' data analysis and evaluation abilities. Based on data analysis, students may question the decline in sales of a certain type of publication during a specific period. This examination and reflection on data is the starting point of critical thinking, which prompts students to deeply explore the essence of the problem and attempt to use more digital tools and technologies to verify hypotheses and solve problems. The deepening of critical thinking can also stimulate creative thinking, enabling students to explore more innovative solutions in the process of continuous reflection and optimization of analytical methods.

4.1.3. Integration Layer

The integration layer aims to cultivate students' creative, interdisciplinary and ethical thinking abilities. The corresponding teaching contents are Exploration of Cross-Media and Basics of Generative Artificial Intelligence. Firstly, by deepening creative thinking, students are encouraged to use cutting-edge and diversified IT means to innovate in aspects such as publishing content design, intelligent editing, and data-driven decision-making. Based on creative thinking, their comprehensive thinking and innovation abilities are enhanced, and interdisciplinary thinking is further cultivated. Ultimately, as scientific exploration progresses, students are prompted to develop ethical thinking, establish concepts of sustainable development and information social responsibility, and pay attention to moral norms, human well-being and green publishing in the process of technological innovation and content production, ensuring the organic integration of science and humanities.

4.2. Implementation

4.2.1. Teaching Strategies

Based on the three-level progressive training framework, teaching is carried out through task practice for different teaching units. The Foundation Layer takes "knowledge points" and "skill points" as teaching units. Combines instruction and practice with step-by-step guidance to build knowledge, skills, and scientific awareness. The Application layer focuses on “task” as teaching units, emphasizing problem-solving. Teaching steps include task introduction, guided operations, breakdown of steps, and feedback to develop students' analytical, critical, and innovative thinking. The integration layer focuses on “project” as teaching units, integrating cross-disciplinary knowledge. Methods like independent exploration, collaboration, and iterative optimization deepen students' understanding of real-world IT applications.

4.2.2. Teaching Evaluation

Apart from summative evaluation, capturing learning behavioral data for diagnosing learning outcomes can provide process evaluation and enable targeted adjustment of teaching strategies. Moreover, introducing ethical evaluation dimensions, such as analyzing the authenticity of digital hosts, the fairness of algorithms, and data privacy protection through cases, can guide students to reflect on the social responsibility of IT application and enhance their ethical awareness in scientific thinking.

5. Conclusions

This paper examines the digital skills required by publishing and media talents, assesses the current state of IT courses, and develops a framework for fostering scientific thinking abilities. It also explores the implementation paths of teaching. The cultivation of scientific thinking ability among publishing and media professionals is conducive to strengthening the leading role of socialist ideology, promoting the dissemination and popularization of correct values, and fostering social responsibility, critical thinking and innovative spirit.

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