ISSN 2522-6398 Vol. 8, Issue 1: 7-12, DOI: 10.25236/FER.2025.080102

Exploring Strategies for Cultivating Information Awareness in Primary School Based on AIGC Technology

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Abstract: *Artificial Intelligence Generated Content (AIGC) technology, as an extension of human cognitive intelligence, offers new paths for the cultivation of core competencies. In the context of primary school information technology courses, how to use AIGC technology to cultivate students' information awareness has become an important topic. This paper analyzes the connotation and dimensions of information awareness through a literature review, explains the concept of AIGC and its educational potential, and uses CiteSpace to visually analyze and discuss the current research on information awareness. Based on this, specific strategies for cultivating information awareness in primary school information technology education empowered by AIGC are proposed, focusing on six dimensions such as information needs and information acquisition. This study seeks to provide new theoretical insights and practical guidance for fostering information awareness in primary schools and offer insights for the further application of AIGC technology in education.*

Keywords: *AIGC Technology, Information Awareness, Core Competencies*

1. Introduction

With the publication of the "Compulsory Education Information Technology Curriculum Standards (2022 Edition)," the role of information technology courses in cultivating core competencies has become increasingly prominent [1]. However, current primary school information technology courses often focus too much on technical operations and lack a systematic cultivation of students' information awareness [2]. Simultaneously, the rapid advancement of artificial intelligence-generated content (AIGC) technology has brought new opportunities to the education sector. In 2022, OpenAI released ChatGPT, sparking widespread discussions on the role of AI in education, with excellent generative AI models such as "Wenxin Yiyin" and "Zhipu Qingyan" emerging in China [3]. As a cutting-edge achievement in the field of artificial intelligence, AIGC can generate high-quality text, images, and multimodal content, and also enable personalized educational resource allocation and efficient teaching assistance.

AIGC, which includes GPT and large-scale language models (LLMs), is a broader concept that not only has the capability for multi-turn natural language interaction but also surpasses traditional one-way knowledge delivery by using question-answer dialogue formats. This bi-directional communication mode aligns with the Socratic method of teaching and Confucius' conversational style in the "Analects," reflecting attributes that align more closely with contemporary educational philosophies. Currently, integrating AIGC and other cutting-edge technologies into educational practices, in combination with modern educational theories, to promote high-quality transformations in teaching modes, has become a core issue in the field of educational research. Against this backdrop, exploring strategies for cultivating information awareness empowered by AIGC is significant not only for the reform of information technology courses but also for providing new perspectives and paths to enhance students' information literacy.

2. Literature Review

2.1. Information Awareness

Information awareness originated from "intelligence awareness." After the term "intelligence" was

ISSN 2522-6398 Vol. 8, Issue 1: 7-12, DOI: 10.25236/FER.2025.080102

changed to "information" in 1992, its connotation gradually evolved and integrated into the framework of information literacy. Lim discussed its application in the workplace from the perspective of information literacy and lifelong learning, expanding the practical significance of information awareness [4]. As research deepened, the Ministry of Education issued new standards in 2022 for compulsory education, clearly incorporating information awareness as an important part of the core competencies framework and further clarifying its connotation [5]. Additionally, Professor Xiong Zhang noted at the New Curriculum Standards Interpretation Conference that "information literacy" and "core competencies" are conceptually aligned from the current "core competencies" term in the information technology subject, as "information literacy" has gradually evolved into "core competencies," with both terms having the same meaning and only differing in developmental stages [6]. Therefore, this paper does not distinguish between "information literacy" and "core competencies."

The new standards specify that information awareness is the ability of individuals to identify, evaluate, and make judgments about information. The criteria for judgment include whether students possess a certain level of information perception, familiarity with information and its expression and transmission, a willingness to seek different digital resource platforms to solve problems, the ability to use information communication tools to express information sincerely and friendly, and the awareness of mastering core technologies to independently solve problems [1]. Based on literature research and the explanation of the standards, information awareness is divided into six dimensions: information needs, information acquisition, information evaluation, information management, information application, and information sharing [7]. Each dimension and its meaning are shown in Table 1.

Table 1: Dimensions and connotations of information awareness.

Dimension	Meaning
Information needs	Ability to identify personal information needs and recognize the importance of information in solving problems or completing tasks.
Information acquisition	Ability to effectively acquire information from various sources (e.g., internet, literature, field research) and assess the credibility of sources.
Information evaluation	Ability to critically analyze and evaluate the truthfulness, relevance, and effectiveness of obtained information.
Information management	Ability to organize, classify, and store information efficiently using digital tools or other methods for easy retrieval and application.
Information application	Ability to apply information to solve real-world problems or complete tasks, creating value through innovation or achieving specific goals.
Information sharing	Awareness of the importance of information exchange and collaboration, and ability to share information with others while respecting intellectual property and ethical guidelines.

2.2. AIGC (Artificial Intelligence Generated Content)

Table 2: AIGC technical support and educational applications.

Technology name	Core features	Application Area and Representative Cases
Pre-trained Models (GPT)	Generates fluent and coherent text using large-scale corpus; supports tasks like Q&A, summarization, and programming assistance.	OpenAI's ChatGPT for knowledge retrieval, content generation, and programming education. "Wenxin Yiyin" by Baidu for smart Q&A and course knowledge base construction in K-12 education.
Generative Adversarial Networks (GAN)	Generates realistic content like images and videos through a generator and discriminator.	Used in virtual reality (VR) for educational content creation, such as virtual labs and interactive teaching materials.
Diffusion models	Generates high-quality content by simulating a reverse process from noise to target distribution.	Used in creative education for art style transfer and high-definition image content generation. SenseTime's educational video generation tool is a representative case.
Multimodal generation technology	Combines text, image, audio, and other data to generate cross-modal content for diverse tasks.	Tsinghua University's Wenxin large model for intelligent matching and integration of educational resources. Alibaba's "M6 model" combines audio, video, and text for personalized learning materials.

AIGC is an innovative paradigm for generating high-quality content based on AI technology. It utilizes deep learning models to analyze massive amounts of data and generates content in various forms such as text, images, audio, and video based on input instructions. This technology not only reduces content creation costs but also drives transformations in fields such as education, creativity, and business.

ISSN 2522-6398 Vol. 8, Issue 1: 7-12, DOI: 10.25236/FER.2025.080102

AIGC is considered a new stage following user-generated content (UGC) and machine-generated content (MGC) [8].

In the field of education, the rise of AIGC is of significant importance for cultivating information literacy. By automatically generating learning resources, personalized education plans, and multimedia content, AIGC not only meets the demands for personalized and efficient education but also helps students master information awareness in an AI-assisted environment, adapting them to the learning methods of the intelligent era [9]. The following Table 2 are the main technical support of AIGC and its related application in education.

3. Current Status and Challenges in Cultivating Information Awareness in Primary Schools

The trend of research on information awareness in CNKI is shown in the following Figure 1:

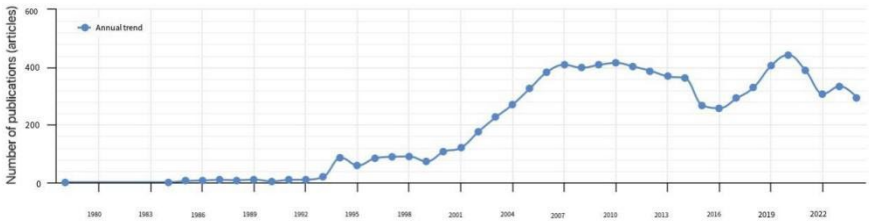

Figure 1: Trend of published articles on information awareness.

As shown in the table, before 2016, the number of research articles steadily increased. By 2017, with the new revision of the national high school information technology curriculum standards, which incorporated information awareness into the core competencies of the subject, the number of research articles related to information awareness gradually reached its peak. After the publication of the new curriculum standards in 2022, there has been even more research on information awareness.

To explore this further, an advanced search using the keywords "information awareness" and "education" resulted in 429 valid articles. A visual analysis of the literature from the past three years using CiteSpace generated Figure 2. This figure reveals that the research focus is concentrated on "information literacy," which is closely related to "information awareness," emphasizing the importance of information awareness as one of the four core competencies. Additionally, marginal clusters such as "vocational colleges," "enhancement strategies," and "informationization" reflect the practical applications and specific directions of research in this field, particularly in the context of vocational education and educational informationization. The analysis shows a network density of 0.0203, indicating that the relationships between research topics are somewhat dispersed. However, the Modularity Q value of 0.5357 and the Weighted Mean Silhouette value of 0.9084 indicate high internal consistency within clusters, with a significant degree of modularity and clear division of research topics.

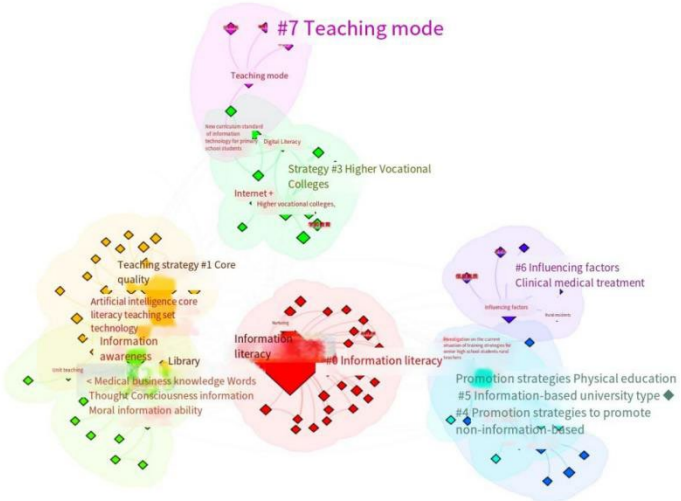

Figure 2: Co-occurrence of keywords in information awareness education.

ISSN 2522-6398 Vol. 8, Issue 1: 7-12, DOI: 10.25236/FER.2025.080102

Overall, the research status in this field shows the following three main characteristics: first, the significant role of policy guidance, with course objectives gradually becoming clearer, providing institutional support for the cultivation of information awareness; second, the continuous rise in research interest, with an increasing focus on information awareness in academia [10]; and finally, the gradual integration of modern technology into teaching practices, providing technological support for the innovation of educational models. However, the cultivation of information awareness in primary schools still faces many challenges: on one hand, the teaching model remains relatively traditional, overly emphasizing skill operations and neglecting the comprehensive development of students' information competencies [11]; on the other hand, course resources lack innovation and fail to effectively stimulate student initiative. Additionally, insufficient teacher training in technology application limits the effective use of modern information technology in the classroom [12]. These issues indicate that the cultivation of information awareness in primary schools urgently requires a new path empowered by technology.

4. Designing AIGC Empowered Pathways for Cultivating Information Awareness in Primary Schools

4.1. Characteristics and Educational Advantages of AIGC

AIGC utilizes AI technology to learn knowledge from massive data and automatically generate content. This new production model is characterized by interactivity, dynamism, creativity, and cross-modal fusion, as illustrated in Figure 3. These features are exemplified by tools like ChatGPT and Wenxin Yiyin, which engage in human-machine interactions through dialogue and have user-friendly interfaces [13]. Tools like ChatGPT and Wenxin Yiyin achieve human-machine interaction through dialogue, with well-developed interfaces and user-friendly designs. These tools dynamically adjust responses in fields like intelligent customer service and knowledge Q&A to meet user needs [14]. AIGC also provides real-time feedback based on user input, with dynamic algorithms optimizing the results. Unlike traditional search engines, AIGC generates original content by recombining knowledge through AI models, showcasing creativity, such as in the fusion of calligraphy and painting [15]. Additionally, AIGC supports cross-modal fusion, integrating verbal (text), vocal (audio), and visual (image) modalities, enabling efficient interaction between them and enhancing the diversity and applicability of generated content.

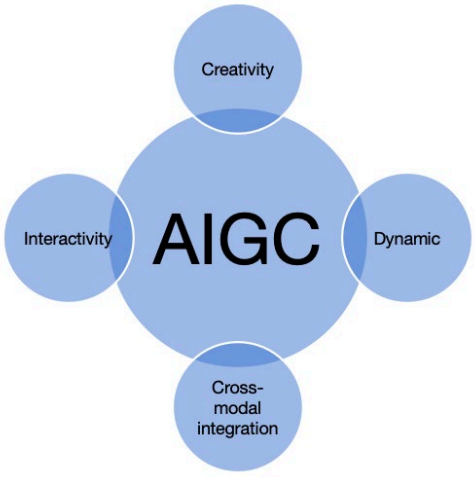

Figure 3: AIGC characteristics diagram.

In the field of education, AIGC greatly enhances the potential for improving teaching quality by supplementing teacher resources, enabling personalized teaching, and reducing teacher workload. Firstly, as a powerful tool, AIGC improves the efficiency of information discovery, screening, and integration, providing both teachers and students with new ways to efficiently access a wealth of knowledge. AIGC, based on large language models, can quickly generate answers and text content, making it suitable for brainstorming, problem-solving, and other scenarios. This helps expand knowledge, inspire ideas, and is highly practical in refining research questions and modifying texts. These features provide an efficient and convenient method for information literacy education. Secondly, AIGC makes highly personalized information literacy education possible. Teachers can use AIGC to design more personalized teaching content, answer individual student questions, making teaching more precise and efficient while enriching the teaching process. This also significantly alleviates the teacher's workload, allowing them to focus

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more on complex intellectual tasks. AIGC can also promote the self-development of teachers, continuously enriching and perfecting their knowledge systems. Students can improve their learning interest and develop an active spirit of inquiry through personalized interactions with AIGC.

4.2. Information Awareness Cultivation Strategies Based on AIGC

Generative AI (AIGC) technology, acting as an intelligent learning companion or assistant in information technology classrooms, empowers students' information awareness in three main ways: enhancing information sensitivity through questioning, improving information value judgment through follow-up inquiries, and fostering information sharing through collaboration. AIGC supports the cultivation of information awareness across six dimensions: task scenarios and problem decomposition strategies address the dimension of information needs; search optimization and resource recommendations support information acquisition; comparative analysis and evaluation criteria assist in information evaluation; template generation and task design promote information application; and expression and presentation guidance, along with multimodal displays, enhance information communication (as illustrated in Table 3). Overall, AIGC further ensures real-time guidance for students through features such as real-time feedback, collaborative learning facilitation, progress tracking, and personalized recommendations. These features improve teamwork skills, foster information exchange and sharing, provide personalized learning pathways, and enhance learning efficiency.

Table 3: Strategies for cultivating information awareness based on AIGC.

Strategy	Examples of AIGC-supported teaching	Teaching objectives
Task scenario design	Generate real-world tasks related to learning content. For example: "Suppose you need to design a quiz for a class about online knowledge resources. What information do you need?"	nspire students to identify information needs and guide them to uncover knowledge gaps.
Question decomposition Guidance	Generate guiding questions for decomposing tasks, such as "What do you already know?" or "What do you need to do next?"	Help students clarify task objectives and enhance demand analysis.
Search optimization guidance	Provide students with keyword optimization suggestions or search term rewrites (e.g., change "Sun knowledge" to "A brief introduction to the Sun").	mprove students' efficient searching abilities.
Resource recommendation	Recommend suitable resources based on student needs (e.g., website links, suggested article titles, topic-specific recommendations).	Help students quickly connect to and find relevant information.
Comparative analysis support	Analyze and compare two pieces of content (e.g., two articles) by criteria such as authenticity, authority, or relevance, to facilitate structured evaluations.	Cultivate students' critical thinking, strengthen their ability to distinguish reliable information.
Evaluation criteria assistance	Generate evaluation guidelines for students (e.g., "Judge whether the information is true based on its sources, content logic, and data support").	Provide students with clear evaluation reference frameworks.
Template generation	Generate templates for information organization and application (e.g., report frameworks, mind maps, storyboards, timelines).	Help students learn to transform information into usable knowledge results.
Task design	Design practice-oriented tasks (e.g., "Use the information you searched to create a weather forecast report").	Enhance students' information application skills, making learning more meaningful.
Classification and organization guidance	Provide suggestions for categorizing and organizing information input by students (e.g., "Your resources can be categorized by time, themes, or sources").	Help students master the skills of information organization and structuring.
Personal database creation	Guide students to establish their own information management systems, such as electronic folders containing tags and keywords.	Develop students' long-term abilities in managing and utilizing information.
Presentation and expression guidance	Generate content presentation suggestions suitable for students' levels (e.g., "Use three pictures and a 50-word description for your topic").	Help students transform information into understandable and presentable formats.
Multimodal presentation support	Assist in generating multimodal presentation elements (e.g., charts, infographics, short videos, animations).	Enhance students' interest and diversity in information communication.

ISSN 2522-6398 Vol. 8, Issue 1: 7-12, DOI: 10.25236/FER.2025.080102

5. Conclusions

Life Cycle, Human-Machine Co-Growth. The rapid development of AIGC technology has injected new vitality into primary school information education and provided strong support for information awareness training and personalized teaching. Through effective questioning and questioning, students can have a deeper understanding of information and cultivate their ability of independent judgment. At the same time, AIGC provides an efficient collaboration platform to promote information exchange and teamwork among students, and comprehensively improve information literacy. However, in the process of application, it is still necessary to pay attention to the balance between educational equity and individuation, to ensure that different students can benefit from technology empowerment. In addition, AIGC has promoted the transformation of the role of teachers from knowledge imparts to learning instructors and technology integrators, placing higher requirements on the professional competence of teachers. At present, problems such as the threshold for the use of technology, safety, teaching effectiveness evaluation and insufficient teacher training limit its wide application in education. In the future, AIGC will show great potential in promoting the deep integration of intelligent and personalized education models, providing more possibilities for the high-quality development of information education in primary schools.

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