



Artificial Intelligence Literacy Education for Vocational Colleges: A Blended Teaching Case Study

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Abstract. With the rapid development of generative Artificial Intelligence (AI), vocational college students will face significant challenges upon graduation, and collaborating with AI is becoming a crucial professional skill. This study provides a cross-cutting and hierarchical definition of AI literacy tailored for vocational colleges. Furthermore, using an AI class as an example, the study formulates teaching goals and designs corresponding course content. The case also demonstrates the effective use of blended teaching methods to gradually guide students in mastering the thinking habits and communication methods essential for working with AI.

Keywords: Vocational education; Artificial Intelligence literacy; Generative Artificial Intelligence; Blended teaching.

1 Introduction

In November 2022, OpenAI launched the groundbreaking ChatGPTv3.5, thrusting generative Artificial Intelligence (AI) and Large Language Models (LLMs) into the public's view. By 2023, generative AI tools achieved unprecedented development, sparking a technological wave. Various intelligent tools emerged on the market, revolutionizing the fields of writing, music, video, and even programming. According to research by Tyna Eloundou et al, approximately 80% of the U.S. workforce could have at least 10% of their work tasks affected by the introduction of LLMs [1].

By the end of 2022, reports indicated that the number of students in vocational colleges in China exceeded 16 million. It is necessary and urgent for vocational college management to study how to equip these graduates with the ability to collaborate with generative AI. This includes setting training objectives, designing courses, training teachers, adopting effective teaching methods, and enabling students from both computer and non-computer majors to acquire corresponding skills. This article will explore the aforementioned research content through theoretical analysis and a blended teaching case study.

2 Definition of AI literacy

According to literature research, various perspectives exist for defining AI literacy, such as pedagogy, cognition, and operation.

From a pedagogical perspective, Martin Kandlhofer et al likened AI literacy to classic literacy (reading/writing), providing a definition and outlining its stages of development. They emphasized that AI literacy enables individuals to comprehend the techniques and concepts behind AI products and services, moving beyond mere proficiency in using specific technologies or applications [2].

From a cognitive perspective, Davy Tsz Kit Ng et al mapped AI literacy in Bloom’s Taxonomy, categorizing it into knowledge, understanding, use, application, evaluation, and creation of AI [3].

From an operational standpoint, Long and Magerko presented a widely cited framework defining AI literacy as a set of competencies that empower individuals to critically evaluate AI technologies, communicate and collaborate effectively with AI, and use AI as a tool in various settings, such as online, at home, and in the workplace [4].

As students in vocational colleges in China, transitioning from ordinary high school to the workplace over a three-year study period, they are expected to master required professional skills and norms. Therefore, AI literacy education in vocational colleges should be practical, enabling students to collaboratively solve real-world problems using AI tools.

A cross-cutting and hierarchical framework of AI literacy, encompassing both AI and problem-solving perspectives, is depicted in Figure 1. On one hand, students should establish a cognitive system for AI technology and tools; on the other hand, they should be capable of defining and representing problems, evaluating AI-generated results, and modifying and optimizing outcomes based on common sense, industry regulations, customer requirements, and legal constraints.

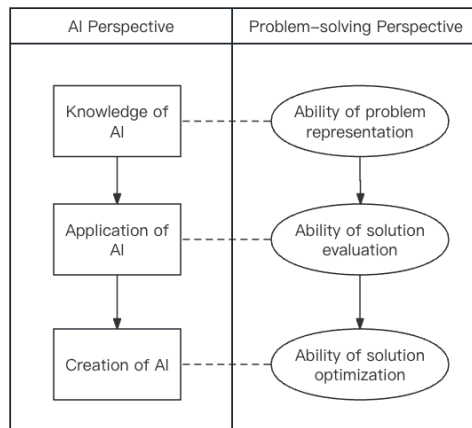


Fig. 1. AI literacy framework

3 Practice of teaching

In this section, a teaching case will be presented to demonstrate the design of the AI course, teaching methods, and students' performance. The class focuses on teaching a group of students with a little computer background how to collaborate with AI in writing.

3.1 Teaching goals

Consistent with the structure of AI literacy, the teaching objectives of this lesson are also composed of two aspects. From the perspective of AI cognition, there are three tiers of goals:

- G-1. Knowledge
 - G-1-1. Students should be aware of scenarios where AI tools can be applied in writing, such as summarization, outlining, translation, grammar check, and drafting business documents.
 - G-1-2. Students should understand the performance criteria of AI in writing, encompassing professionalism, literality, creativity, and logicity.
 - G-1-3. Students should know the basic principles of text generation by AI (not necessarily the algorithms and programming) so that they can better understand the underlying causes of errors and illusions.
 - G-1-4. Consequently, students should build deep knowledge of ethical bias, copyright issues, and violations of the law.
- G-2. Application
 - G-2-1. Students should master how to apply AI tools to write, understanding the prompts and knowing what information to input in different situations.
 - G-2-2. Students should acquire the ability to self-study online because generative AI evolves rapidly. The AI tools the teacher introduces in class may become outdated in a few weeks.
- G-3. Creation
 - (Optional) Students should know about training a LLM, fine-tuning for a specific field, and building a web application. Although some cloud platforms provide components that users can deploy with one click, they still require computer knowledge. With the development of generative AI, it is believed that there will be natural-language-based development tools in the near future. At this moment, for students with non-computer backgrounds, this level of goal is an optional item, and teachers can choose to demonstrate it and show students how it works.

From the perspective of problem-solving, students should be trained in the following aspects:

- G-4. Problem representation
 - G-4-1. Students should possess the ability to recognize and understand situations, requiring observation competence and professional knowledge.
 - G-4-2. Students should have language expression skills to describe problems accurately, concisely, and specifically. For instance, if one wants AI to write an emotionally charged story, they should use vocabulary to clearly convey their intentions.
- G-5. Solution evaluation
 - G-5-1. Students should cultivate a habit of evaluating AI-generated text responsibly rather than delivering assessments without consideration.
 - G-5-2. Students should be familiar with general evaluation criteria, including language quality (spelling and grammar), accuracy of word usage, logic of language, authenticity and rationality of content, and the presence of biased or illegal content.
 - G-5-3. Students should understand evaluation criteria for specific scenarios, such as conformity to professional common sense, meeting requirements, and appropriateness of style.
- G-6. Solution optimization
 - Students should firmly understand that people play a leading role, and AI is only a tool. In other words, individuals are responsible for the authenticity, fairness, legality, and compliance of the results. When AI output falls short of expectations, students should take the initiative to modify and improve it, aiming for high-quality delivery. The purpose of using AI is to enhance human work efficiency and output results, not to replace human thinking. This is the last, but not the least, goal of AI teaching.

3.2 Characteristic of students

The class in the research represents a typical vocational college setting in China with the following characteristics:

- There are 26 students attending this lecture, comprising 21 (81%) boys and 5 (19%) girls. The majority of them hail from small cities or rural areas in Sichuan, a south-west province of China.
- These students are beginning their second year in the Internet of Things (IoT) program, with very limited programming experience.
- Since high school, they have encountered challenges in traditional classroom learning, displaying lower levels of self-discipline and weaker self-learning abilities.
- As millennials, they are well-acquainted with cellphones and the Internet. Most of them prefer mobile games, regularly use online social tools, and have some experience with office software.
- Based on a pre-class survey, only 4 (less than 20%) students have heard about ChatGPT frequently, while 13 (50%) students said they had never heard about it or

were uncertain, as shown in Figure 2. For Chinese LLM tools such as Baidu's Wenxinyiyuan, Tsinghua's ChatGLM, and iFlytek's Xinghuo, 16 students, accounting for over 60%, have never heard of them.

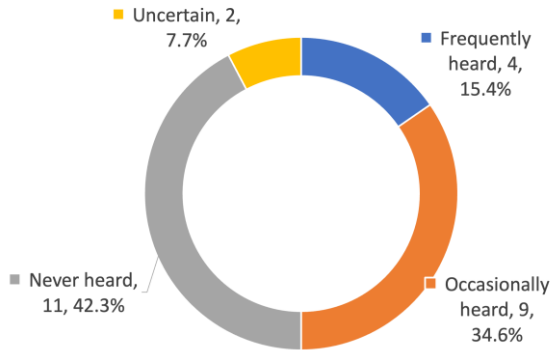


Fig. 2. The frequency of students' hearing about ChatGPT

3.3 Design of course

For this course, it is both natural and necessary to implement a blended teaching approach, combining online and offline methods. On one hand, the course requires students to use AI tools repeatedly to complete tasks. On the other hand, face-to-face teaching, coupled with active question-and-answer interaction, enhances the participation of vocational college students and proves more effective than pure online education.

Moreover, the blended teaching approach is rooted in constructivism, metacognitive strategies, and connectivism [5]. Constructivism emphasizes the need for student-centered teaching. In the context of this course, AI tools serve as assistants, with students taking on the role of decision-makers. This setup helps students establish a sense of responsibility, enabling them to construct knowledge and awareness of how to assign tasks to AI, evaluate AI's work, and ultimately take responsibility for the results.

Simultaneously, a writing task is divided into three-round iterations, guiding students to review each round and achieve metacognitive monitoring. The teacher gradually explains the reasons, and students practice, forming coherent knowledge blocks. Table 1 describes the ten sessions of this lesson, including corresponding teaching goals, activities for teachers and students.

Table 1. Teaching goals and sessions design

Ses- sion	Goals	Teacher’s activity	Students’ activity
1	G-1-1	Play a short video that mentions multiple scenarios for applying AI writing, and then conduct a quiz to assess participants' recall of these scenarios	Complete the quiz and form a preliminary impression of the application scenarios of AI writing
2	G-1-2	Build a skill competition scenario for three AI tools, evaluating their literary, professional, creative, and logical performance through four questions	Act as judges, conduct the test, and select the winner and aware of shortage of AI
3	G-1-3	Compare the best and worst performance of AI tools, explaining the factors determining AI performance and the key principles of AI writing	Listen and understand
4	G-1-4	Play a short video about AI crimes and demonstrate AI’s potential illusions	Listen and understand
5	G-2-1 G-2-2 G-1-4	Set up a job interview scenario, asking students to prepare a 1-minute self-introduction using any AI tool before explaining the prompt	Iteration-I: spontaneously ask AI to generate text
6		Explain why students receive fabricated content and introduce general prompt skills	Iteration-II: Retry the job using a correct prompt
7	G-4-1 G-4-2	Select some students’ input to comment on and ask about a better prompt for a self-introduction in a job interview	Rethink or ask AI for help
8	G-5-1 G-5-2 G-5-3	Select a few students’ output to read and ask others for comments, leading to a more essential question about the criteria of writing	Rethink or ask AI for help
9	G-6	Ask students to revise the AI output themselves and provide reasons	Iteration-III: Finish a satisfactory writing
10	All above	Assignment: submit a persuasive copy to sell your old phone online	Complete the assignment based on skills learned

3.4 Students’ performance in the classroom

Vocational school students have exhibited low levels of participation in the classroom, including infrequent initiation of questions, a reduced response rate to teachers’ queries, and susceptibility to distraction. To address this, the course emphasizes a significant proportion of hands-on practice sessions and encourages frequent interactions through questions and answers between teachers and students.

Through observation, it was noted that in teacher-led segments, such as sessions 3 and 4, only 15 (57.7%) students were actively listening. However, during hands-on practice segments, like sessions 5 and 6, engagement increased, with 21 (80.8%) students participating. The gamification in the first session proved effective, as 25 (96.2%)

students responded, even finding amusement in the initially perceived dull AI tools. The proportion of engaged students in each session is depicted in Figure 3.

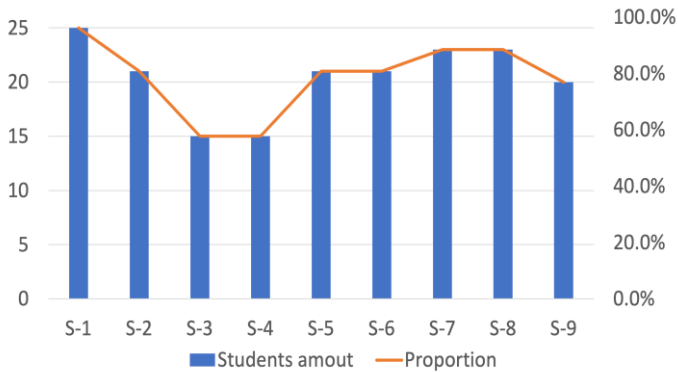


Fig. 3. Proportion of students engaged in each session

3.5 Students' performance in the assignment

Traditionally, vocational college students exhibit low activity in submitting assignments, with limited quality as they allocate minimal time to post-class studies. However, in this case, the assignment takes the form of a skill transfer exercise, focusing on a topic relevant to students' daily lives—writing a copy to sell an old cellphone online. Submission is through the online learning tool Chaoxing APP, with feedback provided on the platform. The assignment is evaluated based on five dimensions, graded from A to E, as shown in the Table 2.

Table 2. Evaluation dimension for assignment

Dimensions	Description
Attractiveness	Attract readers with impressive titles and a personalized style
Targetability	Offer selling points to your target customers to leave a lasting impression
Clarity	Be concise and logical, enabling readers to quickly find key information and comprehend it
Credibility	Describe the features and advantages of the cellphone, supported by necessary data or evidence
Attractiveness	Attract readers with impressive titles and a personalized style

Finally, 25 (96.2%) students completed the assignment, and 6 (23.1%) of them produced excellent copies with attractive content, a humorous tone, considerable detail, or impactful titles. The distribution of students' assignment scores is illustrated in Figure 4.

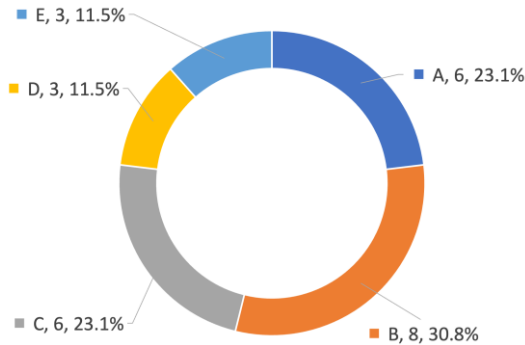


Fig. 4. The distribution of students' assignment scores

4 Conclusions

This study analyzes the structure of AI literacy that vocational college students should possess, with its core focus on using AI tools to address real-world problems. AI literacy is hierarchical, ranging from awareness and application to creation, and from describing problems and evaluating results to optimizing solutions. In this process, students need to develop a sense of responsibility and not entirely rely on AI tools.

Furthermore, this study utilizes the AI-assisted writing class to demonstrate how to refine teaching objectives, design scenarios and content, guide students in understanding the reasons for AI-generated errors, and deepen their comprehension of the working relationship between humans and AI. The performance of students in both classroom activities and assignments underscores the effectiveness of a blended teaching approach based on constructivism and metacognitive strategies in fostering active engagement among vocational college students. These teaching experiences can be flexibly applied to other AI courses.

ChatGPT has been in existence for a year, yet surprisingly, half of the vocational college students have not heard of it. Most students are also not aware of how generative AI could impact future careers. From this perspective, it is urgent to initiate AI literacy education in vocational colleges. This necessitates concerted efforts from teachers across various disciplines.

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