DEVELOPMENT OF STRATEGIES FOR HIGHER VOCATIONAL TEACHERS' ROLES BASED ON ARTIFICIAL INTELLIGENCE IN NORTHERN GUANGDONG

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A thesis paper submitted in partial fulfillment of the requirements for the Degree of Doctor of Philosophy Program in Educational Management for Sustainable Development

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Thesis Title Strategies for Sustainable Development of The Artificial Intelligence Role of Higher Vocational Teachers in Guangdong

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ABSTRACT

The purpose of this study is to 1) study the current status of role cognition of teachers in higher vocational colleges in northern Guangdong under artificial intelligence, 2) study strategies to ensure the sustainability of the roles of teachers in higher vocational colleges in northern Guangdong under artificial intelligence, and 3) evaluate the adaptability and feasibility of the strategies for the roles of higher vocational teachers in northern Guangdong under artificial intelligence. The sample group of this study includes 338 full-time teachers from 5 higher vocational colleges in northern Guangdong, Guangdong, and was selected by systematic simple random sampling. The interview group includes 10 experts from 5 higher vocational colleges in northern Guangdong. The experts who evaluate the adaptability and feasibility of the strategy are composed of 5 people with high professional titles from 5 higher vocational colleges in northern Guangdong, and was selected by systematic simple random sampling. The data collection methods include questionnaire surveys, structured interviews with 10 experts, and evaluations by 5 experts with high professional titles. The research tools include a questionnaire to collect quantitative data on the cognition of higher vocational teachers, structured interview to collect qualitative insights from

experts, and evaluation forms to evaluate the feasibility of the proposed strategies.

The results show that: 1) The current status and influencing factors of the sustainable development of the role of teachers in higher vocational colleges in northern Guangdong include five aspects: teachers' cognitive level of artificial intelligence, teachers' literacy level of artificial intelligence, teachers' cognitive level of teaching under artificial intelligence, teachers' cognitive level of self-development, and teachers' cognitive level of their roles. All five aspects need to be improved; 2) The strategies for the sustainable development of the role of teachers in higher vocational colleges in northern Guangdong under artificial intelligence include: (1) strategies to improve teachers' cognitive level of artificial intelligence, (2) strategies to improve teachers' intelligent literacy, (3) strategies to improve teachers' cognitive awareness of self-development, (4) strategies to increase resource support, and (5) strategies to improve teachers' role cognition, 3) the adaptability and feasibility evaluation results of each strategy are at a high level and the highest level respectively.

The study recommends that the Ministry of Education implement policies to support continuous professional development, higher vocational colleges incorporate these strategies into institutional policies to encourage interdisciplinary cooperation, society supports higher vocational education by providing opportunities for real-world learning, and teachers actively seek opportunities to improve their abilities through continuous learning and self-assessment.

Keywords: Artificial Intelligence, Teacher Roles, Sustainable Development, Strategies

ชื่อเรื่อง **การพัฒนากลยุทธ์สำหรับบทบาทของครูอาชีวศึกษาระดับสูง โดยใช้ปัญญา ประดิษฐ์ในมณฑลกวางตุ้งตอนเหนือ**
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บทคัดย่อ

จุดประสงค์ของการศึกษานี้คือ 1) เพื่อศึกษาสถานะปัจจุบันของความรู้ความเข้าใจบทบาทของครูในวิทยาลัยอาชีวศึกษาระดับอุดมศึกษาทางตอนเหนือของมณฑลกวางตุ้งภายใต้ปัญญาประดิษฐ์ 2) เพื่อศึกษากลยุทธ์เพื่อให้มั่นใจถึงความยั่งยืนของบทบาทของครูในวิทยาลัยอาชีวศึกษาระดับอุดมศึกษาทางตอนเหนือของมณฑลกวางตุ้งภายใต้ปัญญาประดิษฐ์ 3) เพื่อประเมิน ความเป็นไปได้และประสิทธิผลของกลยุทธ์การพัฒนาอย่างยั่งยืนของบทบาทของครูอาชีวศึกษา กลุ่มตัวอย่างของการศึกษานี้ประกอบด้วยครูประจำ 338 คนจากวิทยาลัยอาชีวศึกษา 5 แห่งในภาคเหนือ ของมณฑลกวางตุ้ง กวางตุ้ง และได้รับการคัดเลือกโดยการสุ่มตัวอย่างแบบง่ายอย่างเป็นระบบ กลุ่ม สัมภาษณ์ประกอบด้วยผู้เชี่ยวชาญ 10 คนจากวิทยาลัยอาชีวศึกษา 5 แห่งในภาคเหนือของมณฑลกวางตุ้ง ผู้เชี่ยวชาญที่ประเมินความสามารถในการปรับตัวและความเป็นไปได้ของกลยุทธ์ประกอบด้วย บุคคล 5 คนที่มีตำแหน่งทางวิชาชีพสูงจากวิทยาลัยอาชีวศึกษา 5 แห่งในภาคเหนือของมณฑลกวางตุ้ง โดยได้รับการคัดเลือกโดยการสุ่มตัวอย่างแบบง่ายอย่างเป็นระบบ วิธีการรวบรวมข้อมูล ได้แก่ การสำรวจแบบสอบถาม การสัมภาษณ์แบบมีโครงสร้างกับผู้เชี่ยวชาญ 10 คน และการ ประเมินโดยผู้เชี่ยวชาญ 5 คนที่มีตำแหน่งทางวิชาชีพสูง เครื่องมือวิจัย ได้แก่ แบบสอบถามเพื่อรวบรวม ข้อมูลเชิงปริมาณเกี่ยวกับการรับรู้ของครูอาชีวศึกษาระดับสูง การสัมภาษณ์แบบมีโครงสร้างเพื่อรวบรวม ข้อมูลเชิงคุณภาพจากผู้เชี่ยวชาญ และแบบประเมินเพื่อประเมินความเป็นไปได้ของกลยุทธ์ที่เสนอ

ผลการวิจัยพบว่า: 1) สถานะปัจจุบันและปัจจัยที่มีอิทธิพลต่อการพัฒนาอย่างยั่งยืนของบทบาทของครูในวิทยาลัยอาชีวศึกษาระดับสูงในมณฑลกวางตุ้งตอนเหนือ ประกอบด้วย 5 ด้าน ได้แก่ ระดับการรับรู้ปัญญาประดิษฐ์ของครู ระดับการรู้หนังสือของครูด้านปัญญาประดิษฐ์ ระดับการรับรู้การสอนของครูภายใต้ปัญญาประดิษฐ์ ระดับการรับรู้การพัฒนาตนเองของครู และระดับการรับรู้บทบาท

ของ ตนเองของครู ทั้ง 5 ด้านนี้ต้องได้รับการปรับปรุง 2) กลยุทธ์เพื่อการพัฒนาอย่างยั่งยืนของบทบาทของครู ในวิทยาลัยอาชีวศึกษาตอนปลายในภาคเหนือของมณฑลกวางตุ้งภายใต้ปัญญาประดิษฐ์ ได้แก่ 1) กลยุทธ์ในการพัฒนาระดับความรู้ความเข้าใจของครูในด้านปัญญาประดิษฐ์ 2) กลยุทธ์ในการพัฒนาทักษะการอ่านเขียนเชิงอัจฉริยะของครู 3) กลยุทธ์ในการพัฒนาความตระหนักรู้ด้านความรู้ความเข้าใจของครูในการพัฒนาตนเอง 4) กลยุทธ์ในการเพิ่มการสนับสนุนทรัพยากร และ 5) กลยุทธ์ในการปรับปรุง การรับรู้บทบาทของครู ผลการประเมินความสามารถในการปรับตัวและความเป็นไปได้ของแต่ละกลยุทธ์ อยู่ในระดับสูงและระดับสูงสุดตามลำดับ

การศึกษานี้แนะนำให้กระทรวงศึกษาธิการดำเนินนโยบายเพื่อสนับสนุนการพัฒนาวิชาชีพอย่างต่อเนื่อง วิทยาลัยอาชีวศึกษาควรนำกลยุทธ์เหล่านี้ไปใช้ในนโยบายของสถาบันเพื่อส่งเสริมความร่วมมือแบบสหวิทยาการ สังคมสนับสนุนการศึกษาอาชีวศึกษาตอนปลายโดยให้โอกาสในการเรียนรู้ในโลกแห่งความเป็นจริง และครูแสวงหาโอกาสในการพัฒนาความสามารถของตนเองอย่างแข็งขันผ่านการ เรียนรู้และการประเมินตนเองอย่างต่อเนื่อง

คำสำคัญ: ปัญญาประดิษฐ์ บทบาทของครู การพัฒนาอย่างยั่งยืน กลยุทธ์

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Luo Yuying

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Rationale

Needs of social development

State Council (2017) issued the"New eneration Artificial Intelligence Development Plan," which listed artificial intelligence as a "major strategic opportunity". It clarified the development goals, key tasks, and safeguard measures for my country's new generation of artificial intelligence by 2030, emphasizing the need to "build my country's first-mover advantage in the development of artificial intelligence will accelerate the construction of an innovative country and a world science and technology power."

Ministry of Industry and Information Technology (2017) released the "Three-Year Action Plan to Promote the Development of the New Generation of Artificial Intelligence Industry (2018-2020)", which clarified the development of the industry in the next three years with the deep integration of information technology and manufacturing technology as the main line development priorities and goals. Policies on artificial intelligence have continued to be introduced intensively. Introducing these policies has brought huge dividends and created once-in-a-lifetime development opportunities, including Guangdong, Tianjin, Liaoning, Heilongjiang, Fujian, Sichuan, Anhui, etc (State Council, 2018). Provinces have successively released their artificial intelligence plans. "Artificial Intelligence +" industrial applications have become an excellent engine for a new round of rapid economic growth, and the development of artificial intelligence is the general trend. In the future, all walks of life will be upgraded and transformed because of it, and more new industries and new businesses will be born. Artificial intelligence has been increasingly used in education, medical care, elderly care, environmental protection, urban operation, justice, etc., and will gradually penetrate all aspects of production and life.

There is a need for the development of higher vocational education.

National Ministry of Education (2018) issued the "Artificial Intelligence Innovation Action Plan for Colleges and Universities," which clearly stated: "Based on intelligent technology, innovate the education talent training model, reform teaching methods, improve educational governance capabilities, and build intelligent, networked, personalized and lifelong education system."

Beijing Normal University (2018) published the blue book "Artificial Intelligence + Education," which looked forward to future artificial intelligence background education's five major development trends. (1) Future education should pay attention to the institutional system and thinking system of human- computer integration: we must be good at using the thinking method of human- computer integration so that education can not only achieve large-scale coverage but also achieve personalized development that matches personal abilities; (2) Future education should focus on core competency-oriented talent cultivation: Future education should be committed to cultivating innovative talents for the era of artificial intelligence, guiding learners to develop key abilities and core competencies in study and work, and cultivating creativity rather than just memorizing knowledge., to better adapt to the development of the future era; (3) Future education should pay attention to the soul and happiness of students: Future education should be a more humanistic education, laying the foundation for students' lifelong happiness and growth. With the liberation of intellectual labor, teachers have more time and energy to care about students' minds, spirits, and happiness, interact with students on an equal footing, and implement more humanistic teaching to make students more creative; (4) Future education should pay attention to personalization, Diversified and adaptive learning: With the support of artificial intelligence technology, establishing an education system that promotes personality development for large-scale learner groups is the basic trend of future education development. One of the values that future education should pursue is to enable every child to obtain educational services suitable for him based on his original skills; (5) Future education should focus on efficient teaching of human-machine

collaboration: the application of artificial intelligence in education and Research should draw on and absorb the latest research results in the field of learning science, and build a more accurate learning model to achieve more humane functions based on a more scientific and comprehensive understanding of the learning process with the help of artificial intelligence technology.

UNESCO (2019) published a research report entitled "Artificial Intelligence in Education: Challenges and Opportunities for Sustainable Development," which proposed the vision, goals, approaches, challenges, etc., for developing artificial intelligence education. Ministry of Education (2021) released the registration and approval results for undergraduate majors in general colleges and universities in 2020. Artificial intelligence, intelligent manufacturing engineering, data science and big data technology, big data management and application, and robotics engineering have become new hot topics. Ranked among the top five in quantity. In artificial intelligence alone, 130 universities have been added, including Tsinghua University, Beijing Language and Culture University, and North China Electric Power University. With the rapid development of artificial intelligence technology, the demand for talent continues to increase, and a new path has been opened up for talent training in colleges and universities in my country.

The need for sustainable development of teachers' Roles The development of artificial intelligence technology has led the education field into the "artificial intelligence era." The total knowledge we receive has exploded, and the knowledge generation mechanism has changed tremendously. Big data, information sharing, etc., have become the most prominent in the current era. Characteristics. Moreover, the continuous development of information technology has changed traditional teaching methods and challenged the traditional role of teachers. The authority of teachers as "teachers of knowledge" or "solvers of problems" is gradually being weakened. Modern education relies on big data computing. Emerging technologies such as machine learning can help teachers solve many work problems, such as teaching knowledge content, correcting homework, etc. This has caused the functional value of many traditional teacher roles to disappear gradually. Therefore,

teachers must reflect on their roles as an indispensable and essential subject in educational activities (Luo, 2020). But at the same time, we also need to re-examine our new role positioning because even in the era of artificial intelligence, we cannot forget the core of education and teaching, insist on educating people first, and cannot let machines or technology dominate or even replace the educational environment. Therefore, It is essential to think about the role of teachers in this context. (Xu, 2020) A survey of higher vocational colleges in Guangdong found that with the sudden rise of artificial intelligence, various artificial intelligence education products such as online classes, professional question banks, problem-solving guidance, and even emotional escorts have been put into practice, and teachers serve as knowledge imparters. His authority status declined rapidly.

In today's increasingly globalized world, we must rethink teachers' work, mission, and professional connotations to adapt to new needs and challenges. With the arrival of a new wave of technological revolution and industrial transformation, our country s education system must proactively meet the challenges of this strategic technology, seize this precious development opportunity, and accelerate the application and application of artificial intelligence in education, scientific research, etc. Teachers are the vanguard of educational development. Suppose they do not change their concepts, improve their literacy, and actively promote the formation of their abilities. In that case, it will be challenging to transform traditional education into innovative education. Therefore, the construction of teachers should be regarded as the top priority in promoting education reform in the era of artificial intelligence.

The State Council (2018) issued the "Opinions on Comprehensively Deepening the Reform of Teacher Team Construction in the New Era," which directly stated that "teachers proactively adapt to new technological changes such as informatization and artificial intelligence, and actively and effectively carry out education and teaching."

The Ministry of Education (2018) issued the "Education Informatization 2.0 Action Plan", which clearly stated that "it is necessary to carry out teacher team building actions with the theme of artificial intelligence + teachers to promote the updating of teachers' concepts, the reshaping of roles, and the improvement of literacy. Improvement and improvement of capabilities.

The Ministry of Education and the Ministry of Finance (2021) issued the "Notice on Implementing the National Training Plan for Primary and Secondary School Kindergarten Teachers (2021-2025)", proposing to "promote the integration of artificial intelligence and teacher training, and explore 'intelligence + teacher training,' Form a mechanism for artificial intelligence to' support teachers lifelong learning and sustainable development.

Strengthening the integration of teaching staff with new technologies such as artificial intelligence, promoting teachers to proactively adapt to the development of new technologies such as informatization and artificial intelligence, clarifying their roles, and finding their positions are necessary to realize efficient education and teaching work proactively. The road.

In summary, this study is based on the above three reasons: the need for national strategic development, the need to develop higher vocational education, and the need for sustainable development of teachers' roles. As the advantages of intelligent technology become more prominent in the teaching process of higher vocational education, the role of traditional teachers continues to weaken and will suffer a disruptive crisis. This phenomenon has caused people to think about the following questions: Will artificial intelligence replace teachers? What types of teachers will be replaced? What kind of teachers are needed in the smart era? How do we realize the expected role of teachers in the intelligent era? Wait. Because of this, this article will refer to relevant domestic and foreign literature, choose Guangdong higher vocational colleges as the research object, and choose "Research on the Sustainable Development of the Role of Guangdong Higher Vocational Teachers in the Intelligent Era" as the title, trying to respond to the above issues, To enrich the theoretical research on teacher role positioning under the background

of artificial intelligence, further clarify the "new role" of higher vocational teachers under the background of artificial intelligence, and propose a feasible path for the construction of teacher role in the intelligent era by reshaping the teacher role positioning strategy, to promote the integration of artificial intelligence and artificial intelligence. Integration of teacher professional construction.

Research Questions

1. What is the current status of role cognition of teachers in higher vocational colleges in northern Guangdong under artificial intelligence?

2. What are strategies to ensure the sustainability of the roles of teachers in higher vocational colleges in northern Guangdong under artificial intelligence?

3. What levels are the adaptrability and feasibility of the strategies for higher vocational college teachers?

Objectives

1. To study the current status of role cognition of teachers in higher vocational colleges in northern Guangdong under artificial intelligence

2. To study strategies to ensure the sustainability of the roles of teachers in higher vocational colleges in northern Guangdong under artificial intelligence.

3. To evaluate the adaptability and feasibility of the strategies for the roles of higher vocational teachers in northern Guangdong under artificial intelligence.

Scope of the Research

The Population and Sample Group Population

According to the Krejcie and Morgan sampling table, the sample of this study is 338 full-time teachers from five higher vocational colleges in northern Guangdong Province. These five higher vocational colleges are Heyuan Polytechnic, Meizhou Polytechnic, Qingyuan Polytechnic, Guangdong Songshan Polytechnic, and Luoding Polytechnic.

Purposive sampling selected 10 interview subjects from 5 higher vocational colleges.

1. The interviewees of this study were 10 full-time teachers selected from 5 higher vocational colleges in northern Guangdong. The qualifications of the interviewees are as follows: 1) Have more than 5 years of teaching experience in higher vocational colleges; 2) Have the title of lecturer or above.

2. Invite experts to evaluate the improved sustainable development strategy for the role of teachers in higher vocational colleges in Guangdong under artificial intelligence. The five evaluation experts are senior experts in artificial intelligence work or experts in teaching artificial intelligence subjects.

The qualifications of the interviewees are as follows: 1) have been working in the field of artificial intelligence or teaching subjects for more than 10 years; 2) have senior (senior engineer, professor) professional title; 3) Have a master's degree or above.

The Variable

Independent variables:

1) Teachers cognition of AI

2) Teachers' literacy in AI

3) Teachers' level of teaching cognition

4) Teachers' self-development awareness

5) Level of self-cognition of the role of higher vocational teachers

Dependent variable:

The quality of strategies is to improve the sound absorption and absorption of sustainable development strategies for the role of higher vocational teachers.

Time

The research period is from February to August 2024 and is divided into the following stages:

1) From March to April 2024, collect receipts through questionnaires and conduct data analysis and literature research. Combined with the literature review,

we understand the factors influencing the role crisis and the role positioning of higher vocational teachers under artificial intelligence.

2) From May to June 2024, study and formulate a sustainable development strategy for the role of higher vocational teachers under artificial intelligence and invite evaluation experts to verify the practicality and feasibility of the approach.

3) From July to August 2024, summarize the research results, complete the paper, and publish the paper.

Advantages

1) Students in group discussions, interactions, and teaching classes supported by an artificial intelligence background can independently construct knowledge and practice essential skills such as language expression, collaboration, analysis, and inquiry. Students will have a stronger sense of participation and accomplishment. And a sense of learning. Have fun in the learning process, have a deeper understanding of the theory, and internalize your knowledge system.

2) For teachers, solve crises such as ambiguous teacher roles. By clarifying the positioning of teachers' roles in the context of artificial intelligence, it points out the development direction for higher vocational teachers to better realize the role of teachers and provide a reference for their career planning; it also helps teachers conduct self-examination and reflection. The positioning of teachers' roles in the context of artificial intelligence is a general summary. Higher vocational teachers can check and fill vacancies according to their specific situations, promote the transformation of teachers' roles as soon as possible, and promote the effective implementation of national policies. This study proposes a transformation path based on the problems found in the current situation survey to provide some reference for teachers in my country to adapt to the changes brought about by the artificial intelligence era and to change their roles.

3) For schools, it can expand the ideas of classroom teaching reform and innovation in higher vocational colleges and promote the development of classroom teaching in higher vocational education. The transformation of teachers' roles in the

context of artificial intelligence has injected new vitality into current college teaching. It clarifies the series of changes brought about by the integration of artificial intelligence and teacher professional construction, deepens the specific connotation of new requirements for higher vocational teachers in the context of artificial intelligence, enriches theoretical research on teacher role positioning in the context of artificial intelligence, and clarifies the Positioning of teachers' roles and providing feasible guidance for the sustainable development of teachers' roles in higher vocational colleges.

Definition of Terms

Artificial Intelligence

Artificial Intelligence, in essence, is to study and create intelligent machines or systems that can simulate the ability of human brain activities to recognize and transform the world, thereby extending human intelligence.

Science. Artificial intelligence can be understood as a technology that uses science and technology, especially modern computer science, to simulate human intelligent thinking and behavior. Artificial intelligence is not human intelligence, but it can imitate human thinking and may even surpass humans in some respects. In this article, artificial intelligence generally refers to the effect of realizing human brain thinking through computers. It is developed by research and development. It is constructed with theories, methods, technologies, and application systems for simulating, extending, and expanding human intelligence. Its construction integrates computer science, mathematics, physiology, philosophy, and others.

Teacher AI literacy

The intelligent literacy of teachers is the artificial literacy of teachers. Teachers aim to promote the development of students by encouraging the deep integration of innovative technology and teaching and using various teaching resources. It is a comprehensive ability composed of several elements of information-based teaching ability. It mainly includes emotional literacy, research literacy, innovation literacy, aesthetic literacy, lifelong learning literacy, and so on.

Teacher's Role

Teacher's Role refers to society s expectations and requirements for teachers functions and status. It stipulates the psychological and behavioral ways that teachers should behave in educational situations. Their roles mainly include disseminators and creators of knowledge, facilitators of learning, designers of teaching, spokespersons for parents, symbols of social norms, and interpersonal relationships. Coordinator etc. From another perspective, it can also be understood as the position of teachers in social relations. Due to the social division of labor, they have the identity of imparting scientific and cultural knowledge to the younger generation and cultivating ideological sentiments and behavioral habits. The role of teachers in this article refers to the role that teachers play in education rather than in other fields or situations.

Awareness of artificial intelligence

It refers to the degree of understanding and acceptance of artificial intelligence by higher vocational teachers, including the popularity, frequency of use, and proficiency of artificial skills and technologies in teaching. Different schools have different funding, indicators, number and level of projects, and different levels of intelligence. Teachers subjective understanding of this teaching model, their willingness to participate, and their proficiency in using artificial intelligence methods will all directly affect the difficulty of transitioning to a new role, which is an essential factor in the transition of teachers' roles.

Intelligent literacy of teachers

The intelligent literacy of teachers is the artificial literacy of teachers. Teachers aim to promote the development of students by encouraging the deep integration of innovative technology and teaching and using various teaching resources. It is a comprehensive ability composed of several elements of information-based teaching ability. It mainly includes emotional literacy, research literacy, innovation literacy, aesthetic literacy, lifelong learning literacy,

and so on.

Perception of teaching

It refers to the cognition of higher vocational teachers on teaching content, teaching methods, teaching environment, etc., in the context of artificial intelligence. In the era of artificial intelligence, due to the rapid updating of knowledge and the diversification of learners learning environments, the learning environment is no longer limited to schools. How we choose the knowledge we need, the knowledge that is useful to us, and finally, transforming the knowledge into our wisdom will significantly impact the role of teachers in education and teaching. Teachers must constantly adjust their teaching content and methods according to the times and changes in knowledge and continuously update the knowledge and teaching methods students need from the complex information. Different targeted strategies should be adopted according to various student needs. Sexual teaching methods.

Self-development awareness

It refers to teachers pursuit of their own professional development goals, which is the source of motivation to promote their role transformation. In the era of artificial intelligence, higher vocational teachers face the risk of deskilling and role substitution. How do we become teachers who will not be "eliminated" by artificial intelligence? The era of intelligence has put forward higher requirements for teachers' professional development. Whether teachers have superb teaching skills is an essential factor in whether teachers can adapt to the role of teachers in the new era. If higher vocational teachers are habitually content with the status quo and do not think about making progress, they will be eliminated under the impact of artificial intelligence. Teachers should clarify their role positioning and self-development cognition, further enhance teacher ability improvement strategies such as digital competency, and continuously improve themselves. Only with professional qualities can we adapt to the professional survival style, the emerging diversified higher vocational education situations, and the personalized higher vocational education faced by higher vocational students.

Self-role awareness

Teacher self-role cognition refers to the role type and self-positioning teachers play under artificial intelligence. Teachers' roles mainly include disseminators and creators of knowledge, facilitators of learning, designers of teaching, spokespersons for parents, symbols of social norms, and coordinators of interpersonal relationships. In the era of artificial intelligence, the teacher's responsibility is not to teach knowledge but to help students grow, help students develop abilities, keep pace with the times, and realize the value of life. The most significant changes in the role of teachers in the era of artificial intelligence are analysts of student growth data, builders and developers of courseware, guides of deep learning, researchers of education and teaching, and implementers of intelligent education.

Sustainable development

It means development that meets the needs of the present without compromising the ability of future generations to meet their own needs. Its original meaning was the requirements for the environment. By 1988, UNESCO integrated "environmental education and development education" into "education for sustainable development." Since then, this concept has been widely applied to education. The construction of sustainable development of higher vocational teachers should be based on the continuous improvement of teachers' knowledge and skills and the advancement of the times so that they can continuously adapt to the development of society.

Strategy

Strategy, policy, refers to strategy, strategy refers to strategy, initially relates to the strategies and tactics of large-scale military operations, and later generally refers to the methods and means used to achieve a particular purpose. It has overall, fundamental, and long-term characteristics, and its essential elements include the main body of development strategy, strategic environment, strategic objects, strategic ideas, strategic goals, strategic priorities, strategic deployment, strategic steps, strategic measures, and guarantees. The education development

strategy is always based on social needs and guides development. It ensures and regulates the healthy and sustainable development of education, social development, and other external conditions according to the actual needs of society, and it coordinates the internal development of the education system itself. Develop and organically combine the independent elements within education systematically, holistically, and structurally to ensure sustainable development.

Research Framework

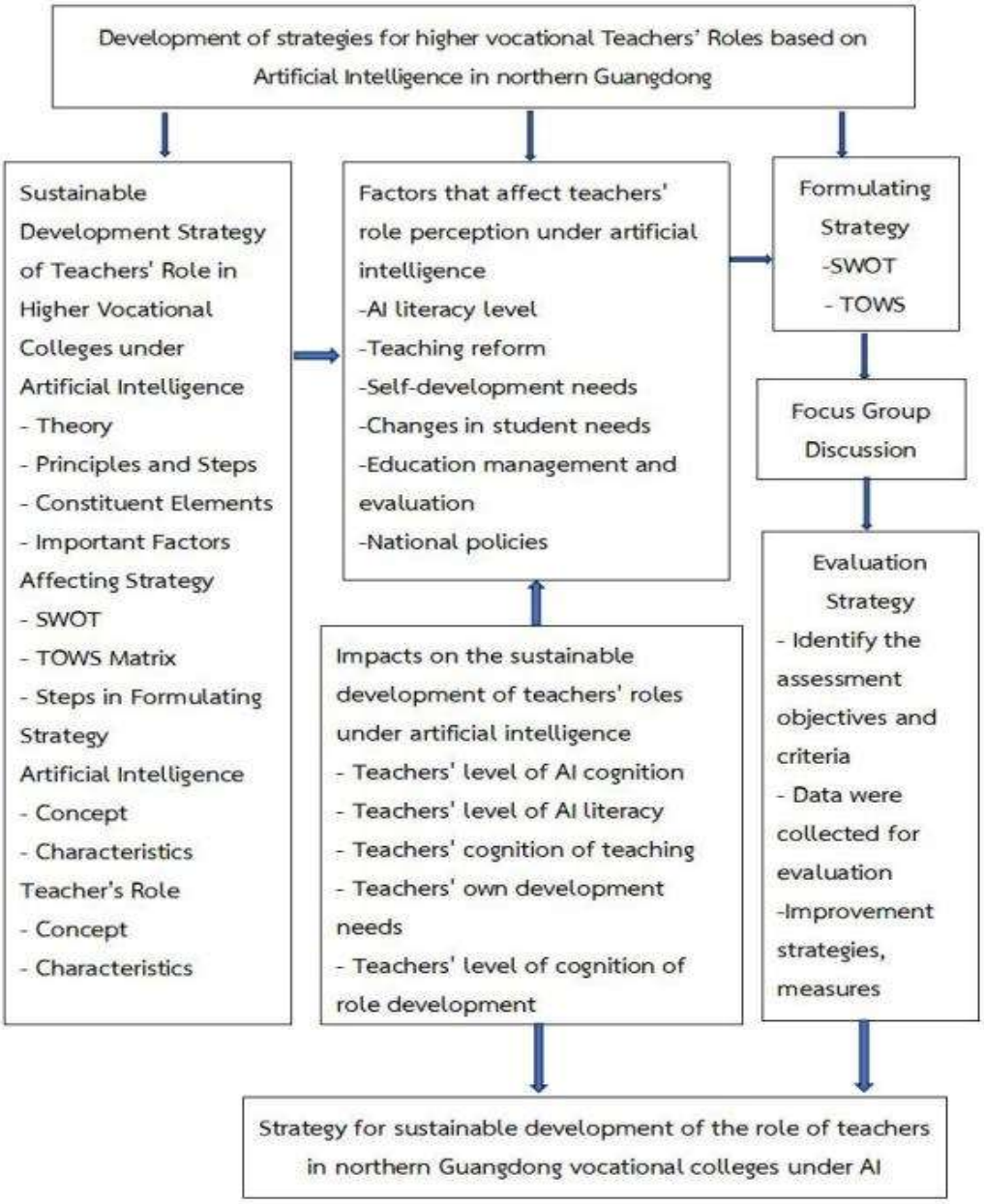


Figure 1.1 Research Framework

Chapter 2

Literature Review

This study refers to the theories and research results of relevant domestic and foreign scholars on artificial intelligence and the role positioning of higher vocational teachers, as well as the theories and results of the guidelines for the sustainable development of the role of higher vocational teachers. A detailed review then took place. On this basis, the researcher analyzed the literature and related research results from the following aspects:

1. Artificial intelligence
2. Teacher's Roles
3. Sustainable development
4. Strategy
5. Related Research

The details are as follows.

Artificial Intelligence

Artificial intelligence, translated in English as "Artificial Intelligence," is called AI. The term artificial intelligence was coined by John Mc Cathy in 1955 and is defined as a computer capable of performing various human cognitive tasks, including communication, reasoning, learning, or problem-solving. It can be understood separately. "Artificial" means artificial and artificial; "intelligence" is the comprehensive expression of wisdom and ability. Artificial intelligence is an emerging technological science that aims to simulate, extend, and expand human intelligence. As a branch of computer science, it is committed to understanding the nature of intelligence and creating an intelligent machine that behaves similarly to human intelligence. It mainly develops robots, language recognition, image recognition, natural language processing expert systems and other fields. Artificial intelligence simulates human consciousness, thinking and other information processes.

Artificial intelligence is not human intelligence, but it can imitate human thinking and may even surpass humans in some aspects.

In the theory of individual multiple intelligences, Gardner (2017:20) proposed that intelligence is an operational ability, that is, the ability to solve intelligence test questions based on the traditional psychometric perspective. On the other hand, intelligence can also be a computational ability derived from human biological and psychological instincts to process specific information, solve problems, and create products.

Scholars such as Zhang (2017) regard artificial intelligence as a branch of computer science that researches, designs and applies intelligent machines to simulate and realize some intelligent abilities of the human brain and develop corresponding theories and technologies.

Toby et al. (2020) further explain that artificial intelligence is a general term used to describe various technologies and algorithms, such as machine learning, Natural language processing, data mining and neuroscience. Later, with the development of society and the advancement of science and technology, artificial intelligence gradually evolved into an interdisciplinary comprehensive science involving computer science, psychology, philosophy, neurophysiology, and other disciplines.

The academic community has proposed various conceptual definitions of artificial intelligence. Its essence is to study and create intelligent machines or systems that can simulate the ability of human brain activities to recognize and transform the world, thereby extending human intelligence. Science. Artificial intelligence can be understood as a technology that uses science and technology, especially modern computer science, to simulate human intelligent thinking and behavior. Artificial intelligence is not human intelligence, but it can imitate human thinking and may even surpass humans in some aspects. In this article, artificial intelligence generally refers to the effect of realizing human brain thinking through computers. It is developed by research and development. It is constructed with theories, methods, technologies, and application systems for simulating, extending,

and expanding human intelligence. Its construction integrates computer science, mathematics, physiology, philosophy, and others.

Development of artificial intelligence

According to the stage results of artificial intelligence, artificial intelligence is divided into three development stages. The first stage is from the 1950s to the 1960s. Scientists established artificial intelligence programs and began to simulate human thinking using computer programs; the second stage is the 20th century. From the mid-1970s to the late 1980s, scientists' research on artificial intelligence shifted from ability-based strategies to obtain intelligence to knowledge-based method research; the third stage was after entering the 1990s, with the development of technologies such as big data and deep learning. With the blessing of concepts, artificial intelligence research has become more in-depth, and people have greater expectations for artificial intelligence (Li et al., 2020). Artificial intelligence has experienced three waves and two troughs since its emergence. We have entered artificial intelligence's third explosive development stage (Zhang et al., 2020).

The future development of artificial intelligence is more focused on imagining the emergence and growth of artificial consciousness. For example, Igor Aleksander (2005) believes that it is only a matter of time before computers produce artificial consciousness. There are key issues to be grasped in developing artificial consciousness. The main body is a key issue to be overcome in the future. Domestic studies believe that new artificial intelligence in the future will have the ability to surpass human intelligence and can help humans liberate physical strength to liberate brain power. However, its development only extends human organs and will not threaten everyday life. Under the conditions of the continuous development and application of information technologies such as artificial intelligence, big data, and the Internet of Things, creating an organic integration of the three spaces of physics, information, and human society and promoting the intelligent form of the three-dimensional integration of "human-machine-thing" will become One of the key issues to be considered in the future (Huang, 2018; Li and Xiong, 2018; Haitao et al., 2020).

Artificial intelligence is one of the key topics of current research. It is relatively rich in the number and content of literature and relatively diverse in research directions and levels. It also has the characteristics of comprehensiveness and diversification. Many scholars have not yet reached a unified conclusion on the definition, characteristics, development stages, impact, and future development of artificial intelligence. However, it is precisely because of this phenomenon of "a hundred flowers blooming" that it has further promoted the growth and development of artificial intelligence-related research.

It can be seen that artificial intelligence has become the development direction of today's technology field and has independent learning and adaptability, efficient data processing capabilities, decision-making capabilities and independent planning capabilities, multi-field application capabilities, human-computer interaction and natural language processing capabilities, automation, and intelligent features as well as confidentiality and security features.

Characteristics of artificial intelligence

The mature development of artificial intelligence technology has led humanity into the era of intelligence. In the era of intelligence, the rapid growth of information technology has profoundly affected the elements of people's lives and brought all kinds of changes. Artificial intelligence technology has promoted the development of various fields of society toward intelligence (State Council, 2019), and artificial intelligence has the following characteristics.

Man-machine collaboration

As the name suggests, man-machine collaboration means that humans and machines (technology) cooperate to complete tasks together and highlight their respective "wisdom." In the era of intelligence, more and more physical robots are being used in shopping malls to meet the diversified needs of customers. In education, there are also cases of robots entering the classroom. Although these robots currently perform simple tasks, as technology advances, robots can perform more complex and precise tasks. The cooperation relationship between humans and robots will be closer and closer, and man-machine collaboration is an essential

trend in the future development of human life. Humans must live and work alongside robots in education or other fields. For the training of students in higher vocational colleges, cultivating students' growth mode from the perspective of customized production can better meet the demand for talents in the era of artificial intelligence. With the arrival of mass personalized customization, the production mode has shifted from standardization to individuation, and cultivating personalized talents is becoming increasingly important (Lou, 2021). The most significant impact of artificial intelligence technology on the teaching of higher vocational education also lies in the innovation of teaching methods and teaching means, especially the intelligent teaching system composed of artificial intelligence technology, Internet, network platform resources, mobile phone apps and other elements, which can further expand the teaching content of various courses (Ye, 2022).

Deep learning

Artificial intelligence can be self-learning and deep learning. Intelligent machines can obtain learning rules from large amounts of data through "big

data + cloud computing " and use deep learning to simulate the neural network of human brain behavior to identify and predict when facing new problems or new objects (Yu,2021). Artificial intelligence can learn and adapt independently, and the system can conduct independent analysis according to the increasing data. Then, it can independently learn and adjust its algorithm model to have a stronger ability to adapt. The wide application of machine learning technology is essential for artificial intelligence systems to learn and master new knowledge (Li,2021).

Liu et al. (2020) state that deep learning is a representation learning method developed based on artificial neural networks and a machine learning algorithm. As information technology tends to be intelligent, the intelligence of technology approaches or even surpasses the intelligence of human beings and challenges human intelligence. Faced with this challenge, educators in the innovative age have responded, and education should take the lead in making changes. Teaching no longer emphasizes superficial understanding and application of knowledge but

emphasizes deeper analysis and perception of knowledge and cultivates students' creative and innovative abilities.

Everything is interconnected and integrated across borders.

Cross-border integration is a prominent characteristic of the intelligence era, encompassing the integration and advancement between diverse fields and levels. The emergence of intelligent technology has gradually permeated various domains, fostering the amalgamation of innovative technology with different sectors and fortifying interconnections among these fields. Zhou (2019) discovered that in 1999, the Massachusetts Institute of Technology proposed a network radio frequency identification system (RFID), which employed information sensing devices like radio frequency identification to establish intelligent identification and management connecting objects to objects and individuals through the Internet. Zhou (2018) also highlighted that within the artificial intelligence era, internet technology applications, along with the expansion of the Internet of Things, will redefine, identify, and evaluate virtual and real elements worldwide while bringing about transformative changes in existing social structures and operational principles. Taking education as an example of applying artificial intelligence technology, intelligent tools facilitate teaching by transcending traditional technological limitations, thereby promoting effective information-based instruction. In summary, cross-border integration dismantles barriers between distinct disciplines while reinforcing their interlinkages. Profound fusion between artificial intelligence and educational development reshapes higher vocational education management patterns and necessitates innovative teaching approaches within higher vocational colleges; educators must adapt their roles accordingly by aligning instructional content with practical measurements to achieve innovation.

Large and complex data, mighty computing power

Artificial intelligence has powerful computational and reasoning capabilities. Both the rational school (which regards both the human brain and computer as information processors) and the perceptual school (which simulates brain nerves to obtain artificial intelligence) affirm the way of thinking that artificial intelligence

focuses on calculation and reasoning in solving abstract problems (Wan, 2016). Artificial intelligence also has human-computer interaction and natural language processing capabilities. It can better communicate and interact with humans through human-computer interaction methods, such as speech recognition, audio recognition, visual interaction, etc. Artificial intelligence systems also have natural language processing capabilities, which can complete natural language analysis and semantic understanding according to human natural language input. (Ma, 2022). Artificial intelligence has superior decision-making and execution ability. Artificial intelligence can imitate human intelligence and help people solve various problems or directly execute related tasks under its absolute working speed, accuracy, and endurance, which reflects the operational advantages of artificial intelligence in decision execution (Zhong, 2016; Yu, 2021).

Table 2.1 Features of the Intelligent Age

Trait Author	**Lou (2021-**	**Liu et al (2020-**	**Zhou (2019-**	**Zhou (2018-**	**Ni (2023-**	**Wan (2016-**	**Wan (2021-**	**Zhang et al (2020-**	**Li (2021-**	**Ma (2020-**	**Total**
man-machine coordination	√	√	√	√	√	√	√	√	√	√	10
in-depth learning	√	√	√			√	√	√	√	√	8
Cross-border integration	√		√	√	√		√	√	√		7
Strong computing power	√		√	√	√	√	√			√	7

According to Table 2.1, the researchers analyzed and synthesized relevant studies of the intelligent age, including Ye (2014) and Huang (2018); Hai et al. (2020) used these criteria to consider the corresponding characteristics. At the same time, features with 3 or more frequencies are selected. Four characteristics can be synthesized: 1) man-machine collaboration, 2) Deep learning, 3) Cross-border integration, and 4) Strong computing power.

Artificial intelligence literacy

"Intelligent literacy" is a new concept derived from the era of "artificial intelligence," different scholars have different understandings of intelligent literacy.

Focusing on the unique requirements of thinking and skills for individual development in the intelligent era, foreign scholars have put forward the connotation of intelligent literacy from different perspectives. Martin (2016) focuses on explaining AI Literacy from the standpoint of artificial intelligence knowledge. He believes that with the continuous development and improvement of intelligent technology, artificial intelligence products will play an increasingly important role in daily life, so the knowledge of computer science principles will be the basis for people to engage in science and engineering technology careers. Therefore, literacy in artificial intelligence and computer science will become equally important. In this regard, he starts with individual students' reading and writing abilities. He makes an analogy between individual intelligence literacy and traditional literacy: It advocates that individual intelligence literacy should pay attention to the deep meaning and technology represented by artificial intelligence products and services, and its purpose is to make students familiar with the basic concepts of artificial intelligence and find the connection between the application of intelligence to these concepts, rather than simply reading and understanding.

Aida (2018) argues that mere knowledge of artificial intelligence is insufficient for individuals; they must also acquire the ability to collaborate with artificial intelligence. Focusing on the future development trend of the labor force, particularly technical talents, it proposes that workers in an intelligent society must possess "artificial intelligence literacy" or AI Literacy. This form of intelligent literacy

encompasses computer literacy, precisely data processing skills, artificial intelligence recognition, and logical thinking abilities. These competencies are essential to meet career development demands in the forthcoming intelligence era. By acquiring intelligent literacy, workers can enhance their labor skill level and work efficiency to a significant extent while bolstering their core competitiveness.

From the perspective of artificial intelligence skills, Angela Lyons et al. (2019) underscored the significance of relevant competencies encompassing computational thinking and programming proficiency. They assert that education systems worldwide face unprecedented challenges due to technology-driven transformations. Only through digital skills can individuals effectively navigate and adapt to a rapidly evolving world propelled by technological advancements, enabling them to meet these novel challenges. Digital skills comprise a range of abilities imperative for all 21st-century citizens, including critical and innovative thinking, problem-solving, communication, and collaboration.

The intelligent age pays attention to cultivating innovative technical talents and puts forward new requirements for the core quality of development individuals should have. From the unique connotation of literacy, Chinese scholars have elaborated on the connotation of intelligent literacy.

Xu et al. (2020) believe that intelligent literacy is artificial intelligence literacy, which embodies an individual's ability to adapt to work, study and life in the context of the smart era. In other words, individuals must first use artificial intelligence based on mastering artificial intelligence knowledge in line with cognitive ethics and finally meet the needs of their growth and social development.

Similarly, from the perspective of the connotation of intelligent literacy, Peng (2021) believes that intelligent literacy is short for artificial intelligence literacy and the embodiment of the core literacy of talents in the smart era. To meet the needs of the development of an intelligent society, human beings should have the quality of understanding, using, creating, and managing artificial intelligence, which covers the essential quality of knowledge, ability, affection, and other aspects.

From the perspective of the components of intelligent literacy, Zhao (2018) believes that intelligent literacy is composed of scientific literacy. Among them, scientific literacy is based on individual scientific spirit and practical innovation, while intelligent literacy is based on a branch of "scientific literacy." Focus on cultivating students' appreciation, understanding, and application of artificial intelligence.

Zhou (2019) explains that "intelligence" is not equivalent to human intelligence but a technology that helps individuals develop. So, from this perspective, intelligent literacy is the ability of individuals to solve practical problems through the use of "intelligence" technology, and the ultimate purpose is to help individuals adapt to the needs of the development of the era of artificial intelligence. Wang (2018) further believes that this ability should be a key ability that individuals must possess in the era of artificial intelligence. Based on the definition of "core literacy," Wang Ming proposed that intelligent literacy is the character and ability that individuals must possess in the era of artificial intelligence. Also, from the perspective of "core literacy," Xu (2019) added that intelligent literacy is the ability of individuals to adapt to the development of the intelligent era and the lifelong development of individuals, and only with this ability can they face various challenges in the intelligent era, and emphasized the importance of possessing intelligent literacy from the perspective of teachers. Zheng et al. (2021) believe that intelligent literacy is the combination of human intelligence and artificial intelligence in the context of human-machine collaboration, emphasizing the ability of individuals to recognize artificial intelligence and cope with human-machine collaboration challenges.

According to CAI (2022), the intelligent literacy of teachers refers to the quality requirements that individuals must possess based on the era background of "artificial intelligence" and the comprehensive quality requirements that individuals need to adapt to work, study, and life in the era of artificial intelligence. It can be manifested as an individual exploration of artificial intelligence, understanding of artificial intelligence, application of artificial intelligence and appreciation of artificial

intelligence. Based on this, this study believes that intelligent literacy is the comprehensive quality of individuals to mobilize their knowledge, feelings, and intentions to adapt to the development, analysis and solution of practical problems in the era of artificial intelligence under the intelligent situation. Starting from the connotation framework of literacy, this study divides intelligence literacy into four dimensions, namely, "intelligent consciousness," "intelligent knowledge," "intelligent ability," and "intelligent sentiment and ethics."

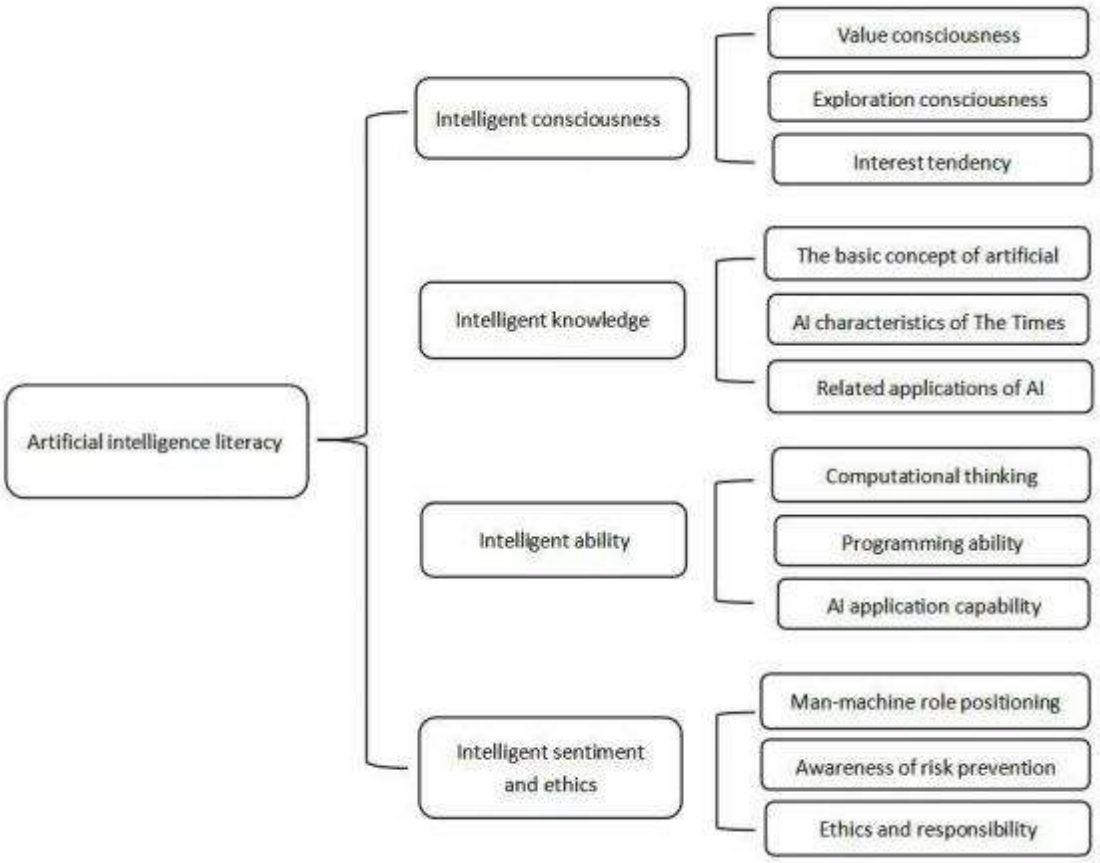


Figure 2.1 The connotation of intelligent literacy

(Source: According to CAI, 258)

In summary, from the perspective of the connotation development of intelligent literacy, it can be divided into two types: one is to highlight the individual's mastery of a particular thinking skill; The second emphasizes the requirement of individual survival and development ability in the background of

significant changes of The Times. Through comparison and analysis, the author classifies the differences between domestic and foreign scholars in their knowledge and understanding of intelligent literacy: foreign scholars focus on explaining the connotation of intelligent literacy from the perspective of the importance of computational thinking and programming thinking and pay attention to the cultivation of thinking and skills. However, Chinese scholars emphasize that intelligent literacy is the embodiment of the key ability of individuals to cope with the challenges of the intelligent age and emphasize the acquisition of the ability of individuals to adapt to the survival and development of the intelligent society. Specifically, it includes four aspects: intelligent consciousness, intelligent knowledge, intelligent ability, intelligent sentiment, and ethics.

Teacher's Roles

Definition of teacher role

The academic community has not formed a unified concept of the word "role," so it is challenging to create a unified idea of the "teacher's role." Among them, there are three representative views:

1) The first is a definition biased towards the pedagogical meaning: Grambs (1992) divides the role of teachers into two types: learning instructors and cultural communicators. He believes teachers' roles can be placed in the above categories. The first is about the actual role of teachers in classroom teaching, and the second is about the expectations for teachers' roles contained in social structure and cultural inheritance. Yuan (2001) mentioned that teachers play six roles: 1) Preacher - conveying traditional social morals and values; 2) Teacher - teaching knowledge and answering doubts of students; 3) Demonstrator-Model for students to learn; 4) Managers - manage educational and teaching activities; 5) Parents and friends - parents in the eyes of junior students, friends in the eyes of senior students; 6) Researchers - to continue to learn, reflect, explore, Innovation. These six teacher roles position teachers from moral and humanistic education perspectives, curriculum structure, student experience, learning methods, student development,

teachers themselves, curriculum development, and interpersonal relationships, showing readers a comprehensive teacher role positioning. To adapt to the requirements of comprehensive quality education in the new era (Wu, 2005).

In the context of pedagogy, teachers inherit the excellent culture of humanity and promote the comprehensive and healthy development of the body and mind of the educated. Teachers are those who teach and educate people.

The second is a definition that is biased toward psychological meaning: Gu (1997) explained the role of teachers in the "Education Dictionary" as "the expected behavior of teachers related to their social status and identity, which includes the actual role of teachers and the role of teachers. “Two Aspects of Expected Roles" also discusses teachers' roles in terms of professional consciousness, professional ability, and psychological quality. Firstly, teachers should love the cause of education and be willing to contribute to it, love children, and constantly improve their professional ability. Secondly, teachers should be good at imparting knowledge and developing students' intellectual potential. Finally, teachers should have noble educational ideas and set an example for others. Gong (2011) combed through the literature on the role of teachers abroad and concluded that the role of teachers refers to teachers, a unique social group, who adapt to their environment based on the objective expectations of society and their subjective abilities. The specific behavior displayed includes the school's aim requirements for teachers' behavioral norms and the personal subjective color caused by differences in teachers' personality structures and psychological states.

The third type is a definition biased towards the sociological meaning of education: Johnson (1992) summarized teachers as organizers, managers, consultants, communicators, professional roles, innovators, ethicists, political roles, and legal roles and discussed their different functions. Kristen et al. (2002), In the 9 Roles of Teacher Profession, teachers are regarded as classroom environment builders, classroom teaching managers, teaching process designers, educational outcome evaluators, literacy culture advocates, student learning instructors, relationship coordinators, external communication practitioner, and lifelong learning progressor).

Table 2.2 Connotation of Teacher Role

NO.	Researcher	Content
1	Yuan (2001)	A preacher; Enlighten and dispel doubts; Demonstrator; Managers; Parents and friends; researcher
2	Wang et al.(2001)	"Parent's agent" and "friend who knows himself"; Those who preach, teach and decipher; Managers; Mental adjusters; researcher
3	Grambs (1992)	Learning instructor; Cultural communicator
4	John (1992)	Organizers; Managers; A consultant; Communicator role; Professional roles; Innovative role; Ethical role; Political roles; Legal role
5	Kristen (2002)	Teacher environment builder; Classroom teaching manager; Teaching process designer; Evaluators of educational outcomes; Literacy advocates; Student learning instructor; Evaluators of educational outcomes; External communication practitioners; Lifelong learning progressives

In summary, scholars' research on teachers' roles mainly focuses on several aspects, such as teachers' rights and obligations, social development expectations for teachers' roles, teachers' role behaviors in specific situations, and teachers' perceptions of teachers' roles. The teacher role discussed in this article refers to the role played by teachers in education rather than in other fields or situations. There are differences in the roles that teachers play in the field of education in different eras; that is, the study of teachers' roles must be placed in the specific social

environment and situations in which teachers live. The role of teachers that this article wants to explore refers to the role of teachers in the context of the intelligent era, where the educational ecological environment has undergone fundamental changes. Teachers adapt to the requirements of artificial intelligence based on their understanding of the identity of teachers, based on the objective expectations of society and their subjective efforts-the sum of specific behavioral norms and models formed by the changed educational and ecological environment.

The basic theory of teacher role

In the earliest period of oral communication, teachers were the transmitters of labor production experience and the inheritors of tribal culture.

As the inheritor of tribal culture, "teacher" means that "teacher" shoulders the mission and responsibility of inheriting, disseminating, and teaching tribal culture. In the era of clan-based and tribal survival, respected and experienced elders (including parents) play the role of "teachers," responsible for teaching the younger generation of the tribe the rules of life, taboos, and tribal laws. Customs and other related responsibilities (Wu, 1987). pointed out, “In primitive societies, the patriarch became the person who trained the younger generation

in the conduct of formal life-behaving appropriately. “These specific” “rites of passage” are all served by experienced elders. For example, in the “coming of age ceremony” ceremony for boys in South America, the mentor is usually the father of the oldest child in the group participating in the “coming of age ceremony,” and in the “coming of age ceremony” ceremony for African girls, their mentors are served by older women of the tribe (Meng, 1993; Teng, 2008). Sun (2019) mentioned that in the context of backward productivity and lack of fixed educational places and professionals, the "leaders," "old men," and "elders" in the tribe usually play a specific role as teachers and daily life experience was passed on to the younger generation through words and deeds and word of mouth, and then passed on from the younger generation to the next generation. The role of "teacher" at that time was mainly the transmitter of life experience. "Teachers" will teach the next generation that they are prohibited from hunting and eating animals and plants

that are closely related to the survival of the group, that they are not permitted from contacting anything related to the elders, and that they are prohibited from speaking loudly or making sounds, singing, and doing anything during a specified special period (Zhang, 2008). As school education is separated from productive labor, the personnel who play the role of teachers are gradually becoming fixed and professionalized. The teaching content and teaching methods in the school field are constantly updated, which promotes the role of teachers, from the transmitters of life experience to the midwives of knowledge change. (Li, 2008; Xu and Zhang, 2016).

Teachers' roles changed from scientific knowledge disseminators to knowledge authorities in the written communication period. With the continuous progress of science, the cultural achievements of humanity in the evolution of civilization continue to accumulate. In such a fixed and rigid teaching model, teachers simply "copy and paste" historical cultural knowledge and "copy and paste" it to students. "Trafficking" repeatedly means disseminating scientific and artistic expertise (Wu, 2009; Chen, 2011). Students of different ages are assigned to fixed classes. Teachers have unified and fixed teaching content divided into small, roughly balanced parts. Teaching follows the prescribed teaching plan, syllabus, and textbooks (Peng, 2010). Socrates pointed out, "The teacher's task is not to impart established knowledge, but to eliminate all errors and vague understandings through conversation and discussion, awaken students' consciousness, and thereby discover the truth."

Regarding student learning, students passively acquire knowledge from teachers and dare not face teachers to question knowledge. Teachers only measure whether students' mastery of knowledge is up to standard by test scores; in terms of the teacher-student relationship, It is manifested in the unequal status between teachers and students. Teachers are superior "gods" and control students' learning of knowledge. Students can only look up and wait for teachers to instill knowledge. Teachers continue to play the role of autocrats in teaching

management. In this role, students do not have any voice or autonomy and are constantly subject to any management by teachers (Jing, 2011).

In the information age, the role of teachers has changed from curriculum teaching executors to diversified roles. The leading roles played by teachers during this period include curriculum innovators, leaders in equality, practitioners of lifelong learning, and guides of learning methods. The new generation of artificial intelligence technology empowers the field of education. Teachers play the role of teaching developers, and teachers also play the role of engineers in the classroom. When teaching activities are implemented, machines cannot fully control the classroom, and teachers must be responsible for classroom design. To achieve the best teaching effect, teachers should make full use of artificial intelligence technology and combine their advantages to carry out effective teaching design (Sun, 2004); teachers should liberate students from a large amount of knowledge content, and teachers should care about students' acquisition of the process of knowledge and the methods for students to master knowledge. Teachers must be learning facilitators and cultivate students' correct learning attitudes, strategies, and flexible knowledge transfer abilities (Shi, 1998; Yi, 1999). Artificial Intelligence Technology It can also assist teachers in creating a "zone of proximal development" so that teachers' teaching is more suitable for students' development levels. Teachers act as classroom designers, using artificial intelligence technology to improve and enhance the quality of classroom teaching and promote their understanding and acceptance of knowledge (Li, 2007).

Table 2.3 Development and change of teacher's role characteristics in different periods

Transfer mode characteristic characteristics are	Broadcasting agent mass	Propagate real-time state	Interaction feature	Audience size	Dominant force	Teacher role
Oral communication mode in the period of oral communication	Spoken language, simple symbols	synchronism	Point-like face-to-face interaction between teachers and students	lesser	The communicator controls the content, direction, speed and scale of the audience	The bearer of labor and production experience and the inheritor of tribal culture
The mode of text communication in the period of text communication	Handwritten writing word	asynchronism	One-to-one or one-to-less many dots or lines between teachers and students		The communicator controls the content, direction, speed and scale of the audience	Course teaching implementor
The digital mode of network communication in the network age	Digital material	Almost the same pacing	One-to-many or many- to-many network interaction between teachers and students	Very large	The audience controls the direction and speed of the disseminator's communication content	Diverse roles (curriculum innovator, practitioner of lifelong learning, instructor of learning methods, etc.)

Based on the above analysis, teachers' roles have different definitions in different periods. Teacher's Role refers to society s expectations and requirements for teachers functions and status. It stipulates the psychological and behavioral ways that teachers should behave in educational situations. Their roles mainly include disseminators and creators of knowledge, facilitators of learning, designers of teaching, spokespersons for parents, symbols of social norms, and interpersonal relationships. Coordinator etc. From another perspective, it can also be understood as the position of teachers in social relations. Due to the social division of labor, they have the identity of imparting scientific and cultural knowledge to the younger generation and cultivating ideological sentiments and behavioral habits. The role of teachers in this article refers to the role that teachers play in education rather than in other fields or situations.

Definition of the role of higher vocational teachers

"Teachers in higher vocational colleges" refers to professionals who have received professional education and training, possess good professional ethics, master systematic professional knowledge and professional skills, and perform the responsibilities of higher vocational education and teaching in higher vocational colleges, referred to as "teachers in higher vocational colleges." Higher vocational teachers."

According to the Vocational Education Law of the People's Republic of China (Revised Draft) (2021), vocational schools are divided into secondary and higher vocational school education. Among them, higher vocational school education is implemented by vocational colleges and ordinary colleges and universities at the junior college and undergraduate education levels. In this study, the research on higher vocational education is mainly at the junior college level, and higher vocational teachers also specifically refer to those who specialize in teaching professional courses in higher vocational colleges.

Foreign higher vocational education systems cover junior colleges and undergraduates. My country's higher vocational colleges are mainly at the junior college level. The course content is primarily about learning technology and is highly

practical. Higher vocational teachers are the abbreviation of teachers in higher vocational colleges. They are the main teaching body in higher vocational colleges and refer to teachers' role in higher vocational education rather than in other fields or occasions (Xu, 2021:7). In the intelligent era in which the educational, ecological environment has undergone fundamental changes, teachers must base themselves on their understanding of their identity as teachers, the objective expectations of society and their subjective efforts to adapt to the specific educational, ecological environment changed by artificial intelligence. The sum of behavioral norms and models Higher vocational colleges are not only an essential type of higher education in our country but also an important part of vocational education (Wang, 2021).

Unlike ordinary and secondary vocational education, higher vocational education has two unique attributes: "advanced" and "vocational." Specifically reflected in the difference in technology and talent training goals, higher vocational education technology is more applicable, innovative, and complex and mainly cultivates high-quality technical and skilled talents with relatively rich theoretical knowledge. In contrast, the technology of secondary vocational education is relatively simple and less complicated to operate, and the students' theoretical preparation requirements are relatively low. "Professional" indicates that higher vocational education's academic and theoretical aspects are relatively weak. Compared with undergraduate colleges and universities, more emphasis is placed on higher vocational education's technical and practical functions, which mainly cultivate people with specific theoretical knowledge and strong practical abilities. Technical application talents. Therefore, higher vocational teachers themselves have cross-border attributes. They need to develop talents, serve society like ordinary college teachers, and give full play to vocational education teachers' practical and social characteristics (Zhao, 2020; Tang, 2021; Gao, 2016).

Therefore, higher vocational teachers refer to professionals who have received professional education and training, have good professional ethics, have mastered systematic professional knowledge and professional skills, and have performed higher vocational education and teaching responsibilities in higher

vocational colleges. They are "higher vocational colleges," The abbreviation of "school teacher." It includes teachers in vocational and technical colleges, junior colleges, and vocational universities. It does not include other administrative and management teachers in higher vocational colleges. These teachers can be students who have graduated directly from colleges and universities. They are technical experts, technical experts, and other skilled talents introduced from industry enterprises, or they can also be professional teachers introduced from different types of schools. The role of higher vocational teachers discussed in this article refers to the role played by teachers in higher vocational education rather than in other fields or occasions. In the context of the intelligent era in which the educational, ecological environment has undergone fundamental changes, teachers must base themselves on their understanding of their identity as teachers, the objective expectations of society and their subjective efforts to adapt to the specific educational, ecological environment changed by artificial intelligence the sum of behavioral norms and patterns.

Research on the impact of artificial intelligence on the role development of higher vocational teachers

In higher vocational education professional teaching, teachers can use artificial intelligence technology to provide situational awareness, two-way interaction, virtual and objective combination, and other functions to provide one-to-many personalized teaching services and operation drill platforms with the support of intelligent teaching systems. At the same time, it gives students diversified teaching methods and means while improving classroom teaching effects (Tahara and Tao, 2023). Artificial intelligence empowers higher vocational teachers to “teach” more accurately and “learn” more leanly. Artificial intelligence provides a practical platform for higher vocational teachers to explore more personalized and high-quality practical teaching models, helping higher vocational teachers solve problems such as "cannot get in, cannot see, cannot move, and difficult to reproduce" in higher vocational practical teaching (Zhong et al., 2022). For teachers, the critical role of artificial intelligence technology is to free teachers' brain power

and allow teachers to make more complex decisions. In the future, there will be two teachers in teaching: one is a fundamental human teacher, and the other is a virtual or robot teacher. A virtual teacher is a kind of "teaching assistant" that can help teachers do some repetitive tasks, such as grading homework, etc., so that teachers can spend more time on teaching design. Artificial intelligence can complete complex and precise calculations that higher vocational teachers cannot complete, but it cannot effectively represent the practical knowledge of “knowing how to do it ” (Liu, 2020; Cheng, 2020).

Although artificial intelligence can replace people to do many things, artificial intelligence only has an "intelligence quotient" but no "emotional intelligence." Although classroom teaching is preset, it is more important to emphasize its generative nature. This link is in people's emotional communication. Formed from the collision of ideas. Moreover, humans have values that artificial intelligence does not have, and human teachers can truly educate people (Duan, 2017). Artificial intelligence is not the factor that determines whether teachers will be replaced. The factors that determine it are the nature of education, the needs of students, and the truth of education. Education is an activity that always occurs in human society. No matter what carrier the theory is presented in, human beings always need to receive education. Where there is education, there will naturally be students; where there are students, there will naturally be teachers (Li, 2017). There are apparent differences between artificial intelligence and human teachers regarding the source, transmission, and feedback of knowledge. In addition, artificial intelligence still has unsolved problems in emotional communication and ethical norms. Therefore, artificial intelligence is only for teachers. Auxiliary tools, the two can depend on each other (Wang and Li, 2018).

Therefore, in the era of artificial intelligence, even though it is inevitable that artificial intelligence will not replace human teachers, it is undeniable that with the advent of artificial intelligence, significant changes are taking place in the education field. Teachers must face the consequences of this. Opportunities and

challenges: take the initiative to seek the transformation and development of your role. Otherwise, you will face an existential crisis.

Research on the role dilemma of higher vocational teachers under artificial intelligence

Artificial intelligence technology is a "double-edged sword." While it dramatically liberates teachers' bodies and working time, it also causes teachers to be trapped in a jungle of role crises. In the intelligent era, the role of teachers is facing marginalization, instrumentalization and ambiguous cultural turmoil.

Marginalization of teacher role

Under artificial intelligence, the role of teachers as knowledge disseminators has become marginalized in the smart era. As knowledge disseminators, teachers are outmatched by machines in many aspects ("machine" mainly refers to smartphones, tutoring machines, tablets, and wearable devices). Equipment and educational robots, etc). What kind of teacher-student relationship is constructed in the era of artificial intelligence will also be a key factor in promoting the transformation of teachers' roles (Jin and Ro, 2019). Given the advantages of "machines" such as superhuman speed of knowledge dissemination per unit time, superhuman total amount of knowledge dissemination, and low cost of knowledge dissemination, more and more schools are trying to "transfer" the task of teachers to impart knowledge to artificial intelligence teachers (AI teacher), these have also accelerated the marginalization of teachers as knowledge imparters to a large extent (Xun, 2019). The intervention of artificial intelligence will gradually transform the original direct teaching dialogue relationship between "teachers-students" into the indirect, interactive relationship of "teachers-intelligent tools-students." In the traditional sense, the dominant position of teachers has been overtaken, and teachers are facing the crisis of losing their role in the teacher-student relationship. Information transmission between teachers and students has changed from one-way transmission from teachers to students to two-way interaction and is even a ubiquitous trend. It shocks teachers from the psychological perspective of the teacher-student relationship. The emergence of related learning intelligent machines and educational

APP software has also accelerated the marginalization of teachers as knowledge solvers (Zhang and Zhao, 2021; Jiang, 2022).

Teachers ’ knowledge authority is dispelled

With the sudden rise of artificial intelligence, various artificial intelligence educational products such as online classes, professional question banks, problem-solving tutoring, and even emotional escorts have been put into practice, and the authoritative status of teachers as knowledge imparters has rapidly declined (Xu, 2020). Another manifestation of the marginalization of teachers as knowledge imparters is that students are increasingly willing to believe in the knowledge presented by "machines" rather than the knowledge taught by teachers in class (Liu, 2020). The massive nature of big data has expanded the accessible scope of knowledge. Teachers are far behind in knowledge storage for energy, time, professionalism, and vision. Secondly, the digitalization trend of all kinds of knowledge has intensified, breaking through time, region, economy, and culture. Open and shared without restrictions, various online courses have opened up multiple channels for knowledge acquisition, and resources worldwide can be accessed anytime and anywhere on the "net." This easy acquisition of knowledge challenges the knowledge authority of teachers (Liu, 2020).

The rapid nature makes the update and iteration of knowledge extremely fast, and the knowledge possessed by teachers appears to be relatively backward and outdated, making it difficult to meet students' requirements for knowledge novelty and cultural cutting-edginess. In the era of artificial intelligence, the role of teachers as a "monopoly" of knowledge is unsustainable. It is no longer the only way for students to obtain knowledge, not meaningfully. The "aphasia" crisis is inevitable to a certain extent (Zou, 2021). With its ultra-large data, complex programs, self-generation, human-computer dialogue and even emotional temperature, artificial intelligence has replaced our immersion in all known educational stories such as school learning, class teaching, books first, etc., and acquiring and mastering knowledge., students no longer rely entirely on teachers, and teachers’ absolute right to speak in knowledge is broken (Xu, 2022).

Artificial intelligence has played an essential role in disseminating knowledge. They have independently completed knowledge dissemination tasks, such as explaining concepts and cases to students. From this point of view, intelligent teaching media has weakened teachers' control and voice over the classroom, pushing teachers in physical classrooms from the central position of knowledge transfer to the marginal position of "spectators" (Tang, 2021).

It can be seen that the advent of the artificial intelligence era has made "comprehensive surveillance of all people" an actual living situation. No one's behavior can escape the all-round, full-process and full-time tracking, recording and monitoring of AI's eyes, and teachers cannot withdraw from it. Leave. At this time, if a teacher's behavior in front of students is very different from his behavior in private life, he adheres to double standards regarding moral requirements. He has a moral schizophrenia of "not believing what he says and not doing what he says," and he will be "sullied" once exposed by online media. "Nonified" and "demonized," or captured and known by students through big data, artificial intelligence and other technologies, their prestige and moral image in students' minds will collapse, and the educational effect will be significantly reduced.

The blurring of the role of teacher professionals

Since entering the intelligent era, a significant feeling among teachers (especially those in developed cities) is that they feel “more and more like general ‘waiters’ serving schools and parents.” To a certain extent, this reflects that teachers, as education professionals, are in a state where their professionalism is gradually blurred, and their professional authority is ignored by others (Shang, 2019). Not only can students quickly obtain the experienced knowledge of teachers through the mobile Internet, intelligent computers, smartphones or tablets, but also with the advent of innovative technologies such as the Internet of Things, sensors, educational robots, big data, 3D printers, VR technology, and AR technology, and smart campuses With the establishment and put into use, artificial intelligence teachers (AI teachers) can not only replace human teachers to impart knowledge to students, answer students' confusions, and correct students' homework. Still,

they can also automatically evaluate, diagnose, and provide feedback on students' learning situations and develop personalized learning for students' plans. The professionalism of teachers as education professionals appears to be surpassed or obscured by “others ” in the intelligent era (Yu, 2018).

Teachers are less sensitive to intelligent technology than computers, finance, medicine, commerce, transportation, and other industrial workers. The professionalism shown by teachers is inferior, insignificant, and lagging. Teachers cannot quickly realize intelligent technology. Integrating technology, education, and teaching cannot immediately make parents feel student changes. As a result, parents have increasingly interfered with teachers’ teaching sovereignty, and teachers have become increasingly unpopular with parents (Zhang, 2019). Educational public accounts established on social media platforms such as WeChat, Weibo, and Facebook, as well as online education platforms such as Micro Classes and MOOCs, have also sprung up, seriously threatening teachers ’ right to speak in educational activities and making them The road to disseminating knowledge suffers from a dilemma similar to “on the information highway, most roads avoid journalists” (Wang, 2015). Today is a new era in which standardization is gone, and individualization is prominent. Suppose education still relies on average standards to judge personal value and ignores or even ignores the influence of other factors that deviate from the normal distribution. In that case, it will be difficult to stimulate students' creativity. Force. The emergence of artificial intelligence has had a significant impact on the traditional model of teachers teaching based on experience and has also posed a severe challenge to the role of teachers as experience accumulators (Song, 2018).

It can be seen that artificial intelligence technology is a "double-edged sword." While it dramatically liberates teachers' bodies and working time, it also causes teachers to be trapped in a jungle of role crises. When humanity enters the era of "strong artificial intelligence" and "super artificial intelligence," when the professional ethics, professional knowledge and professional abilities that support teachers' professional authority are no longer unique and exclusive to human

teachers, teachers will serve as educators. The role of professionals will inevitably become blurred and void.

Research on factors influencing the role change of higher vocational teachers under artificial intelligence

Teachers' understanding and acceptance of artificial intelligence, their awareness of teaching content and teaching methods, their development needs and role positioning are all significant factors leading to teacher role changes.

Awareness of artificial intelligence

The understanding and acceptance of AI among vocational teachers, including the extent to which AI technology is integrated into teaching, its frequency of use, and the proficiency with which it is applied, are crucial factors in transforming teachers' roles. Li (2020) points out that the AI literacy levels among vocational teachers vary significantly. Some teachers have a limited understanding of AI technology, which hinders its effective integration into teaching practices. This situation impedes the comprehensive application of AI in education and restricts innovation and development in vocational education. Zhang (2019) further emphasizes improving AI literacy among vocational teachers. She argues that with the widespread application of AI technology in education, vocational teachers need not only to master basic AI knowledge but also to apply these technologies to enhance teaching effectiveness flexibly. Therefore, improving teachers' AI literacy is necessary to cope with technological change and a key to driving educational reform and enhancing teaching quality. Xu (2021) notes that the necessity of improving vocational teachers' AI literacy is evident in two main aspects. First, AI technology is rapidly changing the educational landscape, and teachers must have the corresponding knowledge and skills to function effectively in the new academic environment. Second, the AI literacy of teachers directly affects students' learning experiences and the development of their professional abilities.

Higher vocational teachers understanding and acceptance of artificial intelligence, including the popularity, frequency and proficiency of artificial skills and technology in the teaching process, are essential in transforming teachers

roles. The degree of understanding of artificial intelligence by higher vocational teachers is a crucial factor in changing teachers' roles. Due to the funding, indicators, number and level of projects in each school, the level of intelligence is different, and the differences between departments are apparent. Each major in the School of Artificial Intelligence often has more intelligent equipment, but they are more used in classroom teaching demonstrations. Or establish laboratories with various research institutes and Internet companies, shelving artificial intelligence on the shelf, and cannot be close to students' daily lives. Teachers and students majoring in humanities and social sciences lack an understanding of artificial intelligence, and intelligent teaching equipment has been unable to play a role. It plays a tremendous auxiliary role and is only used to avoid single repetitive tasks such as check-in. Therefore, combining humanities and social science majors with artificial intelligence is quite tricky, and planning needs to be made in the future the direction of reform in higher education (Huang, 2020). At the same time, because many teachers have "misunderstandings" about artificial intelligence, they voluntarily give up their positions, accelerating the dissolution of the subjectivity of higher vocational teachers. In addition, some higher vocational teachers, out of their admiration for intelligent technology, happily regard the "expert system" of artificial intelligence as a powerful assistant to liberate themselves and actively give up their leading teaching status to artificial intelligence teachers. In the long run, higher vocational classrooms will become the home venue for artificial intelligence teachers to answer questions, and higher vocational teachers will become "transparent people" in higher vocational education (Liu and Liu, 2020).

It can be seen that school funding, indicators, differences in the number and level of projects, different levels of intelligence, teachers subjective understanding of this teaching model and willingness to participate, and proficiency in the use of artificial intelligence methods will all These are essential factors in the transformation of teachers' roles, which directly affect the ease of transition to new roles.

Teacher AI literacy

In the context of the rapid development of artificial intelligence (AI) technology, the AI literacy of vocational teachers has become critical. According to Li (2020), although vocational teachers' interest in AI gradually increases, their overall literacy level remains bare. Many teachers are still not sufficiently familiar with AI's fundamental knowledge and applications, making it challenging to effectively utilize these technologies in their teaching. This situation indicates that teachers' AI literacy needs further enhancement to meet the evolving educational demands. Zhang (2019) highlights the significant impact of improving AI literacy among vocational teachers on the quality of education. She argues that with the widespread application of AI technology in education, teachers must possess the necessary technical literacy to fully leverage AI's advantages in teaching, thereby enhancing teaching effectiveness and students' learning experiences. Xu (2021) further emphasizes enhancing vocational teachers' AI literacy. He points out that the application of AI technology changes teaching models and imposes new demands on teachers' professional

abilities. Only with high levels of AI literacy can teachers effectively fulfill their roles in the latest educational environment and provide more targeted academic support to students. Ding (2014) analyzes the motivation mechanisms for improving teacher literacy from the perspective of professional development. He argues that a teacher's professional development is closely related to their adaptability in the workplace. With the widespread application of AI technology, enhancing teachers' AI literacy is a response to technological advancements and an intrinsic motivation for teachers' professional growth. Only by continuously improving their literacy can teachers maintain competitiveness in their careers and effectively address the challenges posed by technological changes.

As for the research on teachers' intelligent literacy, most scholars agree that it comprises several specific sub-abilities, aiming to optimize teaching and learning activities with the help of innovative technology according to new educational concepts and promote the deep integration of intelligent technology and teaching.

After sorting out various ability elements, it is found that it is mainly reflected in the teaching design of Intelligent China's teaching preparation before classes, the development of teaching resources, the implementation and evaluation of the teaching process, teaching reflection, and the promotion of students' information learning.

Table 2.4 Structure of teachers' intelligent literacy

Researcher	Specific Content
Siriwatchana et al., (2018)	To develop an information specialist's digital literacy, s/he has to practice three skills: information management skills, digital tools usage, the creation of new content, and the consolidation of information. The three skills are based on developing cognitive skills, which must be integrated into every step of the developmental process. Instructors must adopt optimal techniques, teaching methods and evaluations that encourage students to develop their thinking process, question, debate, and create projects using proper digital tools. In addition, instructors may enable students to become aware of the critical role of an information specialist as a digital content creator in the present moment, and they could alert them to the fact that they can take on more moral responsibility as information intermediaries.
Hu (2019)	Intelligent teaching ability of university teachers: " Foundation of intelligent teaching ability, general intelligent teaching ability, and intelligent teaching ability of subjects.

Table 2.4 (Continued)

Researcher	Specific Content
Li (2019)	General intelligent teaching ability includes intelligent design, operation, and monitoring ability. Teachers' information-based teaching ability includes information-based teaching consciousness, information-based teaching design ability, information-based teaching implementation ability, and information-based teaching evaluation ability.
Zhang (2019)	The ability of informatized teaching of regular university students includes three dimensions: the technical accomplishment of informatized teaching, the development ability of informatized major and the development ability of informatized students. Under the background of "Internet +," young teachers' informatization teaching ability: essential intelligence ability,
Cheng (2019)	teaching design ability, resource management and processing ability, knowledge management ability, self-reflection and perception of practical teaching ability.
Ren (2019)	Basic technology literacy, technology-supported learning and technology-supported teaching.
Tang (2019)	Attitude and awareness, knowledge and skills, application and innovation. Information-based teaching knowledge, information-based
Luo (2021)	teaching skills, information-based teaching ability, information-based teaching concepts. Subject teaching method knowledge, information-based teaching design ability, information-based teaching

Table 2.4 (Continued)

Researcher	Specific Content
Zhang (2021)	implementation ability, information-based teaching management ability, information-based teaching evaluation ability, and information-based teaching reflection ability.

To sum up, the intelligent literacy of teachers is the artificial literacy of teachers. Teachers aim to promote the development of students and realize their development by facilitating the deep integration of smart technology and teaching and using various teaching resources. It is a comprehensive ability composed of several elements of information-based teaching ability. It mainly includes emotional literacy, research literacy, innovation literacy, aesthetic literacy, lifelong learning literacy and so on.

Perception of teaching

Under an artificial intelligence background, higher vocational teachers' understanding of teaching content, teaching methods, teaching environment, etc., also significantly affects the transformation of teachers' roles. It has become an established trend that intelligent technology will impact and coerce the reform of higher vocational education. Intelligent technology shines with its dazzling "AI + higher vocational education" show, leading higher vocational teachers to join the ranks of thinking and applying innovative technology unconsciously. Under the urging and placement of intelligent technology, higher vocational teachers are faced with Greater occupational pressure and survival crisis (Wang and Xu, 2018). Innovative technology has more serious damage to value rationality than traditional technology.

Improving the AI teaching awareness of vocational teachers is crucial for enhancing teaching quality and addressing future educational challenges. Zhang (2019) argues that the rapid development of AI technology requires teachers to

possess specialized knowledge and master and apply new technologies to improve teaching practices. Wang (2019) further points out that the enhancement of teachers' teaching awareness is not only related to individual career development but also to the progress and innovation of the entire education system. Liu Jie (2020) emphasizes that teachers' teaching awareness determines their ability to effectively respond to the evolving educational demands and changes in students' learning methods in the era of AI. To adapt to this trend, teachers must continually improve their understanding and application of AI technology, which is necessary for educational transformation and an inevitable requirement for teachers' personal and professional development.

(Wannapiroon. Nilsook P et al., 2021) Research showed them that online instruction was easy, convenient, possible to learn and not difficult to use. Further, the instructors also perceived that online instruction was useful to both themselves and their learners, especially during the period of the COVID- 19 pandemic, which calls for social distancing. As a result, these vocational instructors adjusted their attitude toward online instruction for the better. This adjusted attitude directly affected changes in these instructors ' behavior from face-to-face classes to online classes and, finally, their acceptance of online instruction for learners in the New Normal period further.

In the era of artificial intelligence, due to the rapid updating of knowledge and the diversification of learners learning environments, the learning environment is no longer limited to schools. How to choose the knowledge we need, the knowledge that is useful to us, and finally, transforming the knowledge into our wisdom will significantly impact the role of teachers in education and teaching. Teachers must constantly adjust their teaching content and methods according to the times and changes in knowledge and continuously update the knowledge and teaching methods students need from the complex information. Different targeted strategies should be adopted for other student needs, such as sexual teaching methods.

Self-development awareness

Higher vocational teachers' pursuit and understanding of their development are the driving force behind their role transformation. In the era of artificial intelligence, higher vocational teachers face the risk of deskilling and role substitution. If higher vocational teachers are habitually content with the status quo and do not think about making progress, they will be eliminated by the impact of artificial intelligence. Only by constantly improving their professional qualities can they adapt to the professional living style, the emerging diversified higher vocational education situation faced by higher vocational students, and personalized higher vocational education (Tang and Shi, 2020). As artificial intelligence enters the field of higher vocational education, higher vocational teachers are confused, anxious and hesitant about their positioning, and their main initiative in professional development is seriously weakened. Second, the strong momentum of the development of intelligent technology has promoted artificial intelligence teachers from "behind the scenes" to "in front of the stage" and even become "agents" for higher vocational teaching and classroom reform (Lu and Xu, 2021).

Zhang (2023) points out that the current self-development awareness of vocational teachers is generally at a moderately low level. Although many teachers recognize the importance of self-development, they still lack a clear understanding and practical strategies for enhancing their abilities by integrating AI technology. This situation indicates that vocational teachers must further strengthen their awareness of self-development in AI to adapt to the changing educational environment and diver Implementer of smart education se student needs. Li (2021) emphasizes that with the profound impact of AI technology on teaching models and the academic ecosystem, improving vocational teachers' self-development awareness has become essential. Li Yang believes teachers must have a proactive learning attitude and self-improvement awareness to maintain competitiveness in the AI-driven educational transformation. Especially in the context of rapidly evolving AI technology, teachers need to continuously learn and adapt to new technologies to ensure their teaching methods and content keep pace with the times. Liu (2022) further points out that

enhancing vocational teachers' self-development awareness in the context of AI is necessary for personal career development and an urgent requirement for educational reform. He argues that teachers' self-development ability directly impacts the quality of student training and the overall level of education. Only when teachers possess a high level of self-development awareness and actively work to improve their competencies can they effectively drive teaching innovation and enhance educational quality in the AI era.

Self-role awareness

In the context of artificial intelligence's rapid development, vocational teachers' self-role awareness has become a key indicator of their ability to adapt to new technologies and educational changes. However, vocational teachers' current self-role awareness remains relatively low, closely related to their AI literacy, policy support lag, and educational environment limitations. According to Wang (2019), with the profound impact of AI technology on education, the role of vocational teachers is shifting from traditional knowledge transmitters to technology guides and education innovators. However, due to insufficient AI literacy among many teachers, they often struggle to accurately identify their new roles, leading to low levels of self-role awareness. This situation limits teachers' capacity for innovation in teaching and affects students' learning outcomes. Zhang (2019) points out that national and social policies significantly influence teachers' self-role awareness. However, due to the policy lag and insufficient guidance on teachers' new roles in the AI era, many teachers lack clear direction in their self-role awareness. This lack of policy support further exacerbates teachers' confusion about their roles, impacting their confidence and enthusiasm for teaching.

Additionally, Liu (2020) emphasizes that schools' educational environment and cultural atmosphere significantly impact teachers' self-role awareness. Many vocational colleges still maintain traditional educational models and lack adequate support and training for teachers' new roles. This makes teachers feel confused and uncertain when adapting to educational changes by AI technology, affecting their self-role awareness.

It can be seen that the superiority of artificial intelligence in data analysis, resource integration and logical operations empowers higher vocational teacher education and teaching innovation. While bringing development opportunities to higher vocational education, it also poses new challenges to the role development of higher vocational teachers. Higher vocational teachers' cognition and acceptance of artificial intelligence, teaching content and methods, self-role cognition, and teachers' cognition of their development are all significant factors that affect the transformation of teachers' roles.

Research on role positioning types of higher vocational teachers under artificial intelligence

The transfer of knowledge, the cultivation of students' higher-order thinking abilities, and the shaping of students' moral character are inherent requirements rooted in the extraordinary profession of teachers and are three fundamental issues in establishing the role of teachers. When predicting the specific types of teachers' roles in the intelligent era, we must also reflect on the inherent nature of teachers' professional characteristics. At the same time, we must also fully consider the profound impact of the development characteristics of the times on teachers' roles.

Student growth data analyst

From the perspective of higher vocational teachers, the role of teachers has requirements such as integrating multiple educational resources, planning student development, and improving personal quality. Under artificial intelligence, the work of higher vocational teachers can no longer be limited to imparting their knowledge and experience to students. Instead, they should have specific "data literacy," collect relevant data about students' interests, problems, and other related data, and use big data applications to conduct research. Calculate and analyze to obtain students' learning needs, then screen and recommend personalized and more appropriate learning resources to help students grow best (Fan, 2018; Shu,2006). Artificial intelligence technology can transform knowledge concepts or principles into acceptable psychological forms that align with students'

physical and mental development rules and can be understood and perceived by students. Teachers use artificial intelligence to transform knowledge into a dynamic situation similar to knowledge production and reasoning, mobilize students' multi-dimensional senses and interaction, and participate in an educational form of understanding knowledge and meaning (Chen, 2021).

Lioyd (2005) selected graduates who had entered teaching internships as survey subjects to study how these interns played the role of middle school mathematics teachers in the classroom. Through face-to-face interviews and observations, it was found that these survey subjects believed that middle school mathematics teachers should focus on guiding students to understand fundamental theorems and concepts and encourage students to have the courage to try to integrate information and solve problems in various ways. Therefore, under the new education model, higher vocational teachers must change their role as teachers and grow from traditional repetitive workers such as imparters and teachers to intelligent teachers. At the same time, they must further deepen the role of teachers as researchers., Give full play to the role of teachers in innovative teaching. On the other hand, it focuses on rethinking the nature of higher vocational education in the context of the artificial intelligence era and adhering to the role of teachers (Lin, 2020).

Guide to the value of faith

Shirley and Williams (2005) believe that in the teaching process, teachers must play the roles of caregiver, encourager, giver, problem solver and challenger. In the era of artificial intelligence, higher vocational teachers' role is diversified and professional. The knowledge-oriented role characteristics are gradually being eliminated, progressively developing into leaders of student learning, evaluators of student learning, and creators of learning situations. Communicators of student growth, learning resource developers and professional development self-managers. Teachers do not appear to be knowledge authorities but establish new relationships with students, pay more attention to interaction with students and the construction of knowledge, and become assistants in the students' learning process (Wen, 2016; Xun, 2019).

Chen (2020) and others positioned the role of teachers by analyzing the changes in teaching models, teacher-student interaction forms, and teacher behaviors caused by artificial intelligence. Based on the changes proposed by artificial intelligence to the teaching environment, essential teaching elements, and teaching organization models, learning communities, including innovative teaching, deep learning, and innovation and entrepreneurship, are constructed, respectively. Song (2018) pointed out that there may be a large amount of unreal irrelevant data or "alienated data" in the massive data, which hinders the generation of correct predictions and judgments, thus obscuring the application value of big data. Teachers can use artificial intelligence to generate and monitor students' learning status in real-time to ensure the authenticity of data, the processing of evaluation results, and the number of evaluation materials so that the data can present a visual analysis effect and genuinely reflect the students' performance. Actual status to achieve accurate interpretation and personalized analysis of students. In the reform of higher vocational education, teachers must grasp the true meaning of education, "educate people," be good guides and demonstrators, practice their functions as personalized educators, and constantly innovate to become true pioneers of educational theory (Lu, 2020)

In the process of education and teaching activities in the era of artificial intelligence, teachers must actively transform into "passengers" for students' growth and development, provide timely guidance when students are confused, cultivate students' essential moral qualities, ethical concepts and social responsibility awareness, and pay attention to Students' psychological and emotional conditions are constantly provided with care, companionship and recognition**,** and students are guided to continuously pursue truth, goodness and beauty in their life value orientation.

Implementers of smart education

(Wannapiroon, Nilsook, Kaewrattanapat, et al., 2021) Their research shows that the characteristics of augmented reality as a technology that helps teachers explain abstract topics more effectively, namely augmented reality improves

learning efficiency and allows students to understand abstract content with less learning time. Augmented reality technology and Imagineering processes are flexible in teaching and learning. They can adapt to arious teaching methods and environments, using augmented reality technology as a learning source database for learning in SMART classrooms, and as a teaching media for student-created works to review knowledge.

From the perspective of technological phenomenology, teachers are guides of people and technology, interlocutors of spiritual communication, awakeners of advanced intelligence, and explorers of the essence of education. Higher vocational teachers should embed artificial intelligence concepts and technologies into their teaching concepts and methods, innovatively apply technology for teaching, tap the potential of educational technology, and integrate traditional education and artificial intelligence technology well, like a "conductor." Similarly, we will collaborate with artificial intelligence to carry out education and teaching work and use artificial intelligence technology to make new explorations in educational forms and content. (Wei, 2020; Lu, 2020).

Actual online and offline integrated teaching needs to incorporate artificial intelligence, multimedia resources, timely data analysis and diagnosis and other elements that reflect the unique advantages of informatization. With its powerful advantages, artificial intelligence breaks through the limitations of time and space, realizes the integration and interconnection of online and offline teaching, and expands the breadth and form of teaching activities. Teachers need to skillfully use different teaching strategies to give full play to the "multiplier effect" of online and offline teaching and achieve deep integration of artificial intelligence and education and teaching. To use artificial intelligence to connect online and offline teaching scenarios, we must consider what media and technology can maximize its role and effectiveness. Regarding communication forms, teachers can use diverse artificial intelligence media to push knowledge and enrich its depth and breadth. In terms of students' interactive experience, it is necessary to stimulate students' "sense of participation" and "sense of acquisition" in knowledge construction,

enhance their understanding of educational content, and create opportunities for students ' immersive experience and in-depth learning, to achieve the goal of "teacher-artificial intelligence" -Information transmission-students' connectivity and inclusion. (Lan, 2021 and Wang, 2021).

Practitioner of lifelong learning

Michael Horn and Heather Steck (2018) mentioned that there will not be a single individual teacher who can complete various teaching tasks in future education. Still, multiple professional teachers with particular characteristics will form an educational community, complete teaching tasks from an all-round perspective, including curriculum construction and instructional design experts, class education managers, experimental operation instructors, and professional evaluators of academic performance. Yu (2018) also pointed out that artificial intelligence teachers will play 12 roles in the future: automatic question setting and marking, learning disability diagnosis and timely feedback, problem-solving ability assessment, comprehensive psychological quality assessment and improvement, institutional health testing, comprehensive quality assessment and Formative reports, personalized teaching, intelligent tutors, student growth and development guidance, precise teaching and research, customized learning content generation, and educational decision-making simulation calculations are designed to reduce teachers' workload and pressure.

By analyzing the traditional representation of teachers' roles, some scholars believe that the role of teachers in the era of artificial intelligence should shift from "preaching" to "exploring," from "teaching" to "establishing careers," and from "solving doubts" to "seeking doubts." To demonstrate the value of the teaching profession (Zhou and Xie, 2021). In integrating people and technology, continuous innovation will intensify the transformation of teachers' roles. Teachers must change their previous "all-knowing and all-powerful" roles and differentiate their roles. That is to say, teachers can change their roles according to their abilities. As well as the needs of students, they seek to gain professional growth and identity in a specific professional field and transform into "experts" (Zhang and Shang, 2019). Facing the

era of artificial intelligence, higher vocational teachers need to be rooted in teaching practice, be "researchers" or "explorers," and find and analyze various educational phenomena in their work. Teachers must always remain sensitive to educational phenomena, grasp the development and changes of the times, learn scientific educational theories and research methods, face up to and actively use artificial intelligence technology, promote the combination of personal practice and academic theory, and promote individuals to become true experts. Educator (Wang, 2020).

It can be seen that in the era of artificial intelligence, what role should higher vocational teachers play? We should pay attention to the transformation of teachers' roles. We should further deepen the researcher role of higher vocational teachers, give full play to the role of teachers in innovative teaching, and focus on artificial intelligence. In the context of the intelligent era, we need to rethink the nature of education and stick to the role of teachers.

Sustainable Development

Sustainable development concept

The "sustainable development" concept comes from the "Our Common Future" report published in 1987. Its meaning refers to development that can meet the needs of our present generation without endangering the ability of future generations to meet their own needs. American scientist Rachel

Carson (1962) first proposed that humans and nature live in harmony and share the earth in her popular science book "Silent Spring." Its original meaning was the requirements for the environment. By 1988, UNESCO integrated "environmental education and development education" into "education for sustainable development." Since then, this concept has been widely applied to education.

The World Commission on Environment and Development (1987.) submitted the report "Our Common Future" to the United Nations, in which it proposed a sustainable development model and defined "sustainable development" as

"meeting contemporary needs without endangering the development of the ability of future generations to meet their needs."

In 2014, UNESCO launched the "Global Action Plan for Education for Sustainable Development (2015-2019)", hoping that education for sustainable development can play its due role through this plan. The following year, the United Nations adopted the 2030 Agenda for Sustainable Development and put forward targeted vocational education requirements. Therefore, through the interpretation of the concept of sustainable development, under the background of artificial intelligence, the construction of sustainable development of higher vocational teachers should be based on the continuous improvement of teachers' knowledge and skills and the advancement with the times so that they can continuously adapt to the development of society.

It can be seen that sustainable development requires development that can meet the needs of our present generation without endangering the ability of future generations to meet their own needs. The construction of sustainable development of higher vocational teachers should be based on the continuous improvement of teachers' knowledge and skills and the advancement of the times so that they can continuously adapt to the development of society.

Principles of sustainable development of the role of higher vocational teachers

Scientific principles. The role development of higher vocational teachers adheres to the concept of sustainable development. Members of the Tianjin Heping District research group (2007) believe that the sustainable development of teachers' roles means that teachers, guided by the scientific outlook on development, consciously and proactively improve their political understanding, emotional awareness, and aesthetics in response to the lifelong development of their education, teaching, and profession. Interests, knowledge and skills, behavioral attitudes and values and other aspects gain the power of research, lifelong learning, and continuous and harmonious development. Promoting the sustainable development of the role of higher vocational teachers is a process of teacher

self-growth and improvement. It is necessary to analyze the needs of teachers at different levels and provide relevant satisfaction so that teachers can continue to maintain the motivation for development (Xie, 2019).

The principle of suitability. The famous educator Confucius proposed the educational principle of teaching students following their aptitude during the Spring and Autumn Periods and the Warring States Period. Teaching students to follow their aptitude fully reflects the need to pay attention to the differences of students. Because students live in different environments, their life experiences are also other (Liu, 2019). Under artificial intelligence, teachers should promptly change their roles according to the times' characteristics. The selection of teaching content, teaching mode, course content, etc., should be

based on local students' life background and current level. Appropriate course resources should be selected for teaching on time. Transform the role of the times to better adapt to the needs of the times (Zhao, 1993; Li, 2020).

The principle of continuity. In the era of artificial intelligence, the role of teachers must adapt to the needs of the development of the times. It must not only meet the needs of professional value but also consider the persistence of their professional development value from the perspective of teachers' development. The role of teachers is to develop the principle of sustainability, that is, to adapt to the needs of sustainable development of education and society; teachers ensure that their main qualities are comprehensive,

harmonious, free, and lasting development capabilities are not damaged. The core is to create long-lasting quality and continuous development (Qin and Zhang, 2002). The sustainable development of teachers' roles refaspects, which are not only qualified for their current teaching tasks but also conducive to their future teaching tasks. The development of teachers cannot be "fishing in the swamp" but must be prepared for future development. Lifelong development creates conditions and opportunities to make development more sustainable (Wang, 2005, Wang, 2008).

Artificial intelligence, to ensure the sustainable development of the role of higher vocational teachers, should accompany social development, changes in the times, essential education reform, and knowledge updating. Under the guidance of correct role cognition, role emotions and role behaviors, higher vocational teachers should establish The awareness of sustainable development not only promotes the development of one's potential in the process of teaching and educating people but also can be continued in college students, promotes the development of students' potential, and realizes the collaborative evolution and development between people.

The necessity of sustainable development of the role of higher vocational teachers under artificial intelligence

Requirements of the development of the times. The General Office of the Ministry of Education (2022) mentioned competence in future education and teaching. Teachers must keep up with the times, adapt to new technological changes such as artificial intelligence and informatization, and improve their literacy and abilities. Entering the new era, building a high-quality, professional, innovative teaching team and creating millions of backbones, outstanding and educator-type teachers are the goals that our country has proposed for the construction of the teaching team from a strategic and overall perspective. General Secretary Xi Jinping attaches great importance to the construction of the teaching team, emphasizing: “Building a modern and powerful socialist country poses new challenges to the construction of the teaching team, and also puts forward new and higher requirements for the whole party and the whole society to respect teachers and value education” (Gu, 2019). The sustainable development theory believes that the times are constantly moving forward, and the transformation of teachers' roles is closely related to the development of the times. As we enter a new era, if higher vocational teachers still use "yesterday's" methods to train today's students, this is equivalent to depriving these students of their future (Huang and Kang, 2022).

Requirements for educational development: When teachers' educational concepts are updated, their role positioning is also reshaped. They are no longer "preachers, imparters, and solvers of doubts" in the traditional sense but "explorers and guides" for students learning. Those who "establish a career and pursue doubts" guide students to establish a correct worldview, outlook on life, and values, teach students to be responsible caring, develop in an all-round way, and learn to learn, and further improve the quality of basic education (Sun, 2022). We increasingly realize that education has rules to follow, and suitable education is the best. Targeted educational measures should be adopted based on the characteristics of each student: flexible use of teaching management methods such as personalized guidance and interest groups to focus on cultivating students with unique expertise in the face of students who struggle to learn, be good at discovering their strengths, let each student fully demonstrate their strengths and enjoy the opportunity to excel in life (Deng, 2007).

Needs for teachers' development: Entering a new stage, the development of the party and the country has put forward higher requirements for education and the construction of the teaching team, and teachers' ability and quality in teaching and educating people need to be further improved. Standing at a new historical starting point and facing innovation and changes in education, higher vocational teachers who adapt to the background of the times must focus on the new needs for talent training in the new era and take the initiative. This will further promote the transformation of teachers' roles and prepare them to cope with the new situation. Preparation for challenges (Liu, 2022). The changing role of higher vocational teachers helps them to continuously deepen their work understanding and establish a correct outlook on education, talents, students and quality; in the process of deepening educational reform, they should conduct in-depth research on courses and teaching materials, improve teaching methods, and improve teaching quality., improve the ability to teach and educate people, dance with the new era and become the core force in constructing high-quality basic education teachers (Gu, 2022).

It can be seen that higher vocational teachers should change their roles in time under different historical conditions. This is not only an inherent embroidery of the development of the times and educational development but also a requirement of social progress and national development. The sustainable development of teachers' roles will help improve the quality of education and build a team of high-quality vocational teachers.

Research on sustainable development strategies for the role of higher vocational teachers in the era of artificial intelligence.

Strengthen the construction of artificial intelligence

The future is an era of "human-machine co-teaching." It is far from enough to only focus on teachers' personal growth to seek teachers' professional development. It is necessary to start from the three levels of the country, society and teachers, and always put moral education into practice. In the first place, we should strengthen top-level design. In addition, we should improve the teacher training system, organize teacher training, and change teaching and evaluation methods according to the requirements of the new era.

On the social side, the state needs to increase investment in basic education, effectively improve teachers' remuneration, and solve teachers' worries. And improve relevant laws and regulations to protect teachers' legitimate rights and interests and increase attention to teachers' psychological pressure. (Song and Xu, 2018; Dong, 2010).

Strengthen the use of "Internet + education" to promote the construction of an "intelligent" teaching environment. Based on multi-party research, the education authorities and local governments have raised platform construction funds to comprehensively promote the construction of information technology infrastructure such as high-speed mobile networks, smart classrooms, and the Internet of Things; the school has adopted "Internet + Education" school-based training and information-based teaching Competitions, expert lectures, etc., continue to enrich the "Internet + Education" online learning resources (Sun and Jiang, 2022). Schools should strengthen teachers' role education to understand and perform their roles

and tasks correctly. Secondly, the school coordinates teachers' role relationships, implements role care, enhances the school's management mechanism, and gives teachers a warm harbor. Schools should provide methodological and technical support to improve teachers' teaching reflection ability. Regular collective teaching and research activities can be carried out to encourage teachers to fully communicate intelligent teaching experiences and existing problems, guide teachers to learn from each other and improve teachers' overall understanding of artificial intelligence teaching content and teaching techniques, thus promoting the role of teachers change. (Xian, 2022; Liu, 2023). At the same time, teachers should have a lifelong learning philosophy, improve their teaching knowledge system and skills, and teach students the latest theoretical and technical knowledge. On the other hand, the popularity of the Internet has provided a new way to improve teachers professional standards. Vocational colleges should also strengthen teacher training and education, build a rational and experienced teaching team, and enhance the quality of teaching (Bi, 2020).

Improve teachers' professional qualities and abilities

In the intelligent era, higher vocational teachers should base themselves on morality, establish their studies on morality, cultivate moral and technical skills, and pursue excellence in higher and vocational education. Higher vocational teachers should improve their educational and teaching capabilities and promote the deep integration of intelligent technology and higher vocational education and teaching (Yan and Liu, 2022). Teachers in higher vocational education should consciously learn the specific application methods of artificial intelligence technology, formulate artificial intelligence application plans based on professional characteristics, course objectives, etc., and further promote the deep integration of artificial intelligence and experienced teaching in higher vocational education; dig deeper into the theory of artificial intelligence and professional disciplines and the convergence between knowledge and skills, integrate relevant professional knowledge and skills throughout the entire process of talent training, and build a professional curriculum system based on the application of artificial intelligence technology (Zhang, 2023).

The creative realm of higher vocational teachers lies in combining morality and skills to benefit society. In the era of intelligence, higher vocational teachers should base their lives and studies on morality and cultivate the sentiments of higher vocational education with morality and skills and the pursuit of excellence. At the same time, higher vocational teachers should improve their educational and teaching capabilities and promote the in-depth integration of intelligent technology and higher vocational education and teaching (Li, 2022). Teachers in higher vocational colleges should strengthen their awareness of "learning" and use various intelligent learning tools to carry out demand-driven personalized learning and autonomous knowledge construction, moving towards individual adaptive in-depth learning. At the same time, we must cultivate an open mind and continuously learn and improve

"human intelligence that AI is incompetent, but humans are good at." Teachers in higher vocational schools should learn to create and decode artificial intelligence while endowing artificial intelligence with educational qualities and constantly developing educational intelligence that goes hand in hand with life (Liu, 2023). To realize the sustainable development of the role of teachers, higher vocational teachers must base themselves on the times, keep up with academic frontiers, master advanced educational and teaching concepts, and constantly update concepts and practices in self-education and teaching activities to adapt to the development needs of the new situation. When teachers adjust on time in response to changes in the environment, their teacher roles also quietly change (Liu, 2022).

Learn artificial intelligence technologies and methods

Zhang (2021) constructed a professional development model for higher vocational teachers in the context of the artificial intelligence era and proposed professional development strategy suggestions for higher vocational teachers, including updating concepts, continuous learning, intelligent collaboration, building platforms, etc., to provide professional development for higher vocational teachers. Provide driving force. Yu (2014) believes that it is mainly at the personal level. Teachers must always be aware of the importance of advancing, actively changing

personal and educational concepts, adhering to lifelong learning, improving personal and professional skills, and integrating new ideas and requirements into education. Develop diversified teaching methods in teaching activities and further upgrade classroom "dialogue." We should avoid mechanically instilling knowledge points taught by teachers or artificial intelligence systems into students during the learning process. Instead, we should guide students to explore new knowledge and skills under the interactive learning function of the artificial intelligence teaching system so that students can complete the exploration independently. Verification, improvement, induction, and summary, etc. Thereby effectively improving students' knowledge integration ability and practical skills in the whole process of self-discovery (Wang and He, 2022). Hu (2019) proposed that, from the era of artificial intelligence, the corresponding path to realize the teacher's role is proposed. It is believed that teachers should strengthen their educational beliefs and practice lifelong learning, improve their role awareness, pay attention to developing students' creativity, give full play to their role and pay attention to the emotional exchange between teachers and students.

In the AI-smart education environment, higher vocational education requires teachers in all majors to master and apply artificial intelligence, and it is imperative to cultivate teachers' intelligent pheromones. Teachers should promptly change their education concepts, strengthen skills learning, and improve competent education literacy to cope with the opportunities and challenges of the AI era (Xu, 2020). When higher vocational teachers face a teacher role crisis in the era of artificial intelligence, they must not only actively change their thinking, but more importantly, they must continuously improve their scientific research capabilities and communication skills, understand the advantages and disadvantages of artificial intelligence, and complement its advantages (Wang and Zhu, 2019). Teachers in higher vocational colleges can introduce intelligent video analysis systems into offline course teaching, upgrade classrooms, and use image recognition technology to regularly collect information such as students' head-up rate and class absence rate. To summarize the classroom teaching situation, compare the teaching situation

in the whole school, and provide a basis for course quality evaluation. Big data analysis, intelligent prediction and algorithm analysis technology can also be introduced into student performance assessment to help teachers formulate performance prediction tables and scientifically allocate teaching hours and online resources based on this (Zhang, 2020). In the face of various demands and new challenges raised by intelligent education, teachers must actively accept artificial intelligence and actively learn and utilize relevant knowledge and technology to realize the ideal pursuit of "soul engineers." The fundamental meaning of letting technology exist is to serve people. Therefore, the education process should highlight the subjectivity of teachers as "people" and help higher vocational teachers' roles change from "knowledge" to "wisdom" (Liu, 2020; Cai, 2020).

In the face of the new requirements and challenges posed to the role of teachers in the era of artificial intelligence, scholars believe that the role of teachers should be reshaped from the aspects of the country, society, schools, and individual teachers. The explanation and interpretation of education and the relationship between man and machine are comprehensive and profound. However, the role of teachers in the intelligent era is ideal. We should also consider the impact of intelligent media on teachers perceptions, values, outlook on life, etc., especially at the personal level of teachers, and we should give full play to the human advantages of higher vocational teachers, attach importance to the emotional dialogue between teachers and students, actively learn relevant knowledge and technology, change thinking, continuously improve scientific research capabilities and communication skills, and become a warm vocational educator.

Strategy

Strategy definition

Strategy, tactic, refers to strategy, strategy to strategy. It originally refers to the strategies and tactics of large-scale military operations and later generally relates to the methods and means used to achieve a particular purpose. Education development strategy is a brand-new research field that emerged after the 1980s.

It is an essential, global, and long-term decision-making strategy. It is the overall goal of a country or region to achieve social development in a specific historical period (Li, 2012). From the perspective of strategic goals, education development strategy refers to formulating strategic development countermeasures from an overall and long-term perspective based on the objective laws of education and the needs and possibilities of economic, scientific, technological and social development, starting from predicting the development of various factors Starting from trends, development levels and development conditions (Liu, 1986). From the perspective of strategy implementation, education development strategy refers to the main goals that the country wants to achieve at a particular stage of educational development, as well as the plans and arrangements to achieve these goals (Zeng, 1990). Education development strategy refers to the planning and decision-making made by a country or region in a particular historical period to achieve the overall goal of social development. It is a fundamental and long-term issue, including education development planning, strategy formulation, and implementation. The education development strategy is always based on social needs and guides development. It ensures and regulates the healthy and sustainable development of education, social development, and other external conditions according to the actual needs of society, and it coordinates the internal development of the education system itself. Development and organically combine the independent elements within education systematically, holistically and structurally to ensure sustainable development (Chen, 2020; Jiang, 2021).

Wenzhu (1991:430-431) mentioned that educational development strategy refers to research and planning that guides long-term, overall and significant issues in the educational development process. Specific contents include: 1. Study the relationship between education and social and economic development and explore how education can meet social, political, economic, cultural and scientific needs. 2. Study the development trends of education in the future period and find out their common characteristics and laws. 3. Study the development goals of future education and formulate basic policies, guiding ideology and specific measures for

educational development to achieve these goals. 4. Study the existing problems in implementing the education development strategy and modify and improve the strategy on this basis. Education development strategy is the planning and decision-making of the overall, fundamental and long-term issues of education development (Hao Keming and Tan Songhua, 2001). An education development strategy is a strategy for a country or region to solve complex educational development problems by focusing on the future and the overall situation. It can plan the implementation objectives and specific action elements of the strategy. Generally speaking, strategic planning for educational development can clarify the reasons for actions and the specific implementation of actions (Gao, 2009; Lin, 2011).

The development trategy is based on analyzing the external environment and internal conditions to form and maintain competitive advantages and seek long-term survival and development. It has the correct guiding ideology for the main development goals of the school the ways, methods and implementation steps to achieve these goals. A systematic master plan. A higher education development strategy is a management approach that formulates the school's future development strategy based on the university's external and internal environment challenges and the opportunities it provides. It puts it into practice to guide the school's continued development in an uncertain environment. Education development strategy is a major macro-level overall plan for education development made by high-level national decision-makers ased on the needs of coordinated economic and social development and a comprehensive judgment of education's internal and external environment in a certain period. Compared with similar concepts such as education policy and education reform, education development strategy is a relatively superior concept (Lou, 2006; Chen, 2020; Jiang, 2021).

In short, the overall, fundamental, and long-term nature of the development strategy has always been the unchanging characteristic of the development strategy. Formulating any development strategy is a comprehensive, fundamental and long-term strategy to achieve organizational development goals within a specific period. Its essential elements include the main body of development strategy, strategic

environment, strategic objects, strategic ideas, objectives, priorities, deployment, steps, measures, and guarantees.

The Importance of Development Strategy

Daniel Julie and Herbert Sherman (2006) believe that development strategies can promote the better-coordinated development of universities and the environment. It can improve the effectiveness of learning, continuously create new knowledge dissemination and education methods, ensure that the university has a long-term sustainable goal, actively promote school integration through development strategies, improve the living standards of students, faculty and even administrators, and Quality of life for the entire university community.

Yuan (2010:13) mentioned that formulating education development strategies is of great significance in improving the quality of higher education talent training, adjusting and optimizing the higher education training structure, accelerating the cultivation of high-level applied professionals, and meeting the diverse needs of society.

Bai (2012:28) mentioned that an education development strategy helps a country and region allocate resources more rationally, maximize wisdom and strength in education operations, respond more effectively to competition in comprehensive national strength, and promote educational stability. Health and sustainable development.

Li (2012:15) mentioned that the higher education guidelines are of greater significance to the modernization of China's higher education, improving the development of a strategic blueprint for higher education modernization and the development mechanism.

Chen (2020:8) mentioned that the education development strategy starts from the needs of social and economic development and the construction of high-level universities, re-examining and positioning the talent training goals of higher education, promoting better development of higher education, and further optimizing higher education competition. It is significant to realize higher education's

coordinated and sustainable development in terms of quality, structure, scale and efficiency.

Jiang (2021, p.16) mentioned that the guiding principles of higher education help determine the strategic goals, strategic countermeasures and strategic position of higher education modernization and clarify the action roadmap and guidelines for higher education modernization.

Methods and steps for formulating strategies

Ma (2015) mentioned seven steps to develop effective strategies. 1) Define goals. The first thing you need to do is define any strategy's default goals. This helps the strategy team stay focused throughout the development process. Once you've defined your goal, you must concentrate all your strategies around that goal. 2) Conduct a SWOT analysis. Weaknesses: S (strengths) is a strength, W (weaknesses), O (opportunities) is an opportunity, and T (threats) is a threat. SWOT analysis can help an organization understand the internal and external environment. The analysis includes analyzing the relationship with market trends, competitors, industry design, and strategy- supported internal elements. SWOT analysis can help the strategy development team better understand the changes in the environment to which the strategy is adapted when formulating the plan. 3) Identify your target audience. You need to be clear about the target audience for your strategy and think about how to deliver it to them appropriately. In strategy formulation, a suitable and effective communication mechanism should be established. 4) Develop plans and action plans. Develop detailed and actionable plans. The development team can develop this step with the strategy support team to ensure that all scenarios are feasible and meet the expected results. 5) Identify resources. Understand all the resources required for the strategy, including time, money, people, etc. Understanding these resources can help organizations develop actionable action plans and translate them into operational guidelines. 6) Establish a phased schedule. Based on the strategy's time, resources, and budget, establish a detailed phased schedule to follow up on the specific implementation of the strategy. This requires a tracking table to track the progress of the policy. 7) Evaluate your strategy regularly.

Regular strategy evaluation is key to determining whether adjustments should be made. The strategy team should monitor the dynamics of performance metrics, market developments, and competitors to make decisions to adjust and revise the strategy.

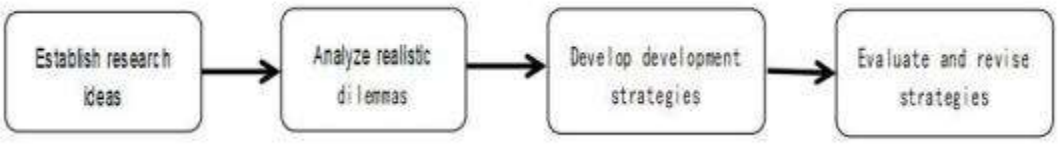
Zhang (2018) pointed out that strategic management, as an essential management link in the development of modern enterprises, refers to the process by which enterprises combine internal and external environments to construct complete long-term development goals and implement and control strategies. It is carried out in four aspects, namely: (1) internal and external strategic environment analysis, (2) formulation of overall strategic goals and ideas, (3) preparation of strategic measure planning, and (4) evaluation of strategic implementation.

Zhou (2019) mentioned that the determination of teaching goals is related to the lifelong development of students, so when formulating strategies for teaching goals, it is carried out through the following four steps: (1) specifying teaching goals and requirements, (2) analysis, and research teaching materials, (3) consider the actual situation of students, (4) choose appropriate teaching methods.

Zeng (2023) mentioned that college English teaching is not a simple indoctrination teaching but should be teaching that pays attention to students' individual needs. Only specific teaching plans, implementation steps, methods and methods can be formulated according to different learning stages and tasks. Continuous summarization improves teaching strategies, thereby establishing students' awareness of using learning strategies and providing a valuable reference for cultivating students' independent learning abilities.

Zhang and Yu (1996) point out that teaching strategies point to clear teaching goals and objectives. Among them, teaching objectives are the key to restricting the formulation of teaching strategies. The starting state of the learner determines the starting point of teaching and is the basis for formulating teaching strategies. Teachers are the main body in teaching activities, and their characteristics are necessary subjective conditions that restrict the formulation or selection of effective teaching strategies.

To sum up, I think there are four steps in formulating guidelines. The first step is to clarify the goals; the second step is to analyze the dilemmas faced by the role of higher vocational teachers under artificial intelligence; the third step is to formulate clear guidelines; and the fourth step is to evaluate and revise the strategies.



Figures 2.2 Strategies development steps

Related Research

Research on new opportunities faced by higher vocational teachers under artificial intelligence

The intelligent era is a new era of continuous innovation supported by modern high-precision science and technology. It is characterized by independent intelligence, cross-border integration, and human-computer collaboration. It contains opportunities for action for the professional development of higher vocational teachers.

First, in the intelligent era of open crowd intelligence, co-creation and sharing, information and knowledge circulate in a crisscrossing "information highway." Big data-driven knowledge learning technology empowers higher vocational teachers to use advanced methods to capture the essence of human knowledge and wisdom in the "flowing world," helping higher vocational teachers stay connected with the latest knowledge points. Second, in the face of massive amounts of knowledge and information, the professional characteristics of higher vocational teachers are not to shelve knowledge. Higher vocational teachers use intelligent information analysis and data mining tools to improve their professional knowledge management capabilities and become experts in knowledge deconstruction and construction. Third, the

limited use of artificial intelligence provides an “opportunity” for creating and developing practical knowledge for higher vocational teachers. Artificial intelligence can complete complex and precise calculations that higher vocational teachers cannot complete, but it cannot effectively represent the practical knowledge of “knowing how to do it ” (Liu, 2020).

Artificial intelligence improves teaching efficiency. Due to its ability to quickly calculate and store memory, teachers will be limited by personal energy and physical strength. Artificial intelligence can work tirelessly and hard for a long time while maintaining high efficiency, while teachers will be tired from heavy and repetitive labor. It is challenging to maintain high efficiency for a long time (Hu, 2019). Artificial intelligence facilitates personalized learning. Education is a movement from thought to behavioral activities, and artificial intelligence allows invisible education and conceivable and ineffable feelings to be visually presented from behavioral habits. Learners can personalize themselves in such an intelligent environment by choosing to learn (Ning and Lai, 2019).

Research on why the role development of higher vocational teachers is hindered under artificial intelligence.

The continuous development of artificial intelligence technology has brought education into the "smart education" stage, providing a new driving force for educational reform. However, teachers cannot immediately accept and internalize new educational theories. The new requirements for teachers’ roles in the era of artificial intelligence will inevitably conflict with teachers’ original teacher role concepts, causing teachers to doubt their teacher role positioning.

Deviation. Therefore, higher vocational teachers still play more of the role of traditional teachers in actual teaching work. Thus, there is a particular imbalance in the cognition and behavior of higher vocational teachers. The main reasons are as follows:

Higher vocational teachers have biases and lack initiative in understanding artificial intelligence and its role as teachers. Whether higher vocational teachers can complete the transformation of teachers' roles in the context of artificial

intelligence and actively and effectively perform the responsibilities of various roles in actual education and teaching practice has much to do with the teacher's subjective cognition and ability. Peng (2022) surveyed the research has learned that some higher vocational teachers have insufficient experience in existing artificial intelligence applications, which has led to biases in their understanding of artificial intelligence, thinking that it is dispensable in their teaching work or even brings trouble to their work, thus affecting higher vocational teachers' cognition and emotional tendencies towards the role of teachers in the context of artificial intelligence. Some teachers do not have a strong awareness of actively learning the theories and technologies related to artificial intelligence. Pressure from various aspects has also affected, to a certain extent, teachers' lack of time to actively practice new concepts and new responsibilities and complete the transformation of teachers' roles. Higher vocational teachers lack a comprehensive and in-depth understanding of the application of artificial intelligence technology in the teaching process, and the original traditional teacher role concept is relatively strong, especially for teachers with more extended teaching experience. As their teaching experience increases, they will be more likely to develop a sense of job burnout, their career expectations and sense of social community will decrease accordingly, and they will feel pressured by developmental tasks and develop fearful or rebellious thoughts (Li and Gu, 2021).

It can be seen that under the new teacher role and function requirements, some teachers will feel that this adds many difficulties and tasks to their teaching work, resulting in rejection thoughts and teachers' insufficient emotional investment in the role of teachers in the context of artificial intelligence, which affects Teachers in higher vocational colleges transform their roles in the context of artificial intelligence.

Limitations of the traditional class teaching system. With the acceleration of the pace of the intelligent era and the prevalence of online education, revolutionary changes have taken place in the form of educational organizations. However, the "barriers" that the traditional class teaching system has on teachers' thoughts and

behaviors have not been completely eradicated. Among them, the conventional class teaching system uses class as the unit of personnel, class as the unit of teaching activities, and time as the unit of implementation of teaching activities in offline education. It can still be found everywhere. Institutional resistance was caused by the conflict between the "three centers" of the traditional class teaching system and the "decentralization" of the intelligent era. Unlike the "class" system pointed to by flipped classrooms, MOOCs, and micro-classes that are popular in the smart era, the students, teachers, teaching space, and teaching time in the "class" in the traditional class teaching system are entirely fixed.

In summary, the institutional resistance caused by the conventional class teaching system to the future role construction of teachers in the intelligent era is mainly reflected in the contradiction between "centralization" and "decentralization," closedness and openness. The conflict between the closed nature of the traditional class teaching system and the transparency of education in the intelligent era caused resistance. Entering the era of intelligence, the material and spiritual foundations for closed education have been disintegrated by the intelligent teaching media that are “always present, everywhere, and omnipotent.” In the educational scene of the intelligent era, academic time and space transcend the closed confinement of previous educational scenes and present apparent open features. Whether it is the existence of physical education spaces such as smart classrooms, innovative laboratories, innovative libraries, and smart campuses, or online learning spaces based on the mobile Internet (such as MOOCs, micro-classes, flipped classrooms, etc.) and online and offline They all show great openness (Luo and Obstacles of the teacher qualification certificate system. The teaching qualification certificate is for teachers, and the legal professional qualification certificate is for lawyers. It is the admission card for citizens to enter the teaching profession. The teacher qualification certificate system is a mandatory requirement set by the state on the conditions or identities people engaged in the teaching profession, profession, or educational and teaching activities should possess. Anyone must obtain the teacher qualification certificate system (Lortie) before

engaging in the teaching profession. (D.C, 2003). From the perspective of educational development in the intelligent era, we will find that in this round of education reform driven by artificial intelligence, there is insufficient connection between the teacher qualification certificate system and teacher professional education, and the teacher qualification certificate system is challenging to adapt to the impact of the intelligent era on teacher professional development. Requirements and other issues. On the one hand, the theoretical basis for the teacher qualification certificate examination has not changed. It is still the "old three" education, psychology, subject textbooks, and teaching methods. The country still uses a set of "examination standards" from long ago to select teachers. Future teachers do not consider the developmental characteristics of teachers, nor do they take into account the requirements of the development of the intelligent era; that is, they cannot better integrate the requirements of teachers' professional knowledge, teachers' professional abilities, and teachers' professional ethics required in the intelligent era. Therefore, in this situation, the demand contradiction that it is difficult to match the teachers "supplied" by the teacher qualification certificate system with the teachers "demanded" by the development of education in the smart era has become inevitable (Xun 2018; Wang and Tang, 2004).

It can be seen that due to the deviation in the perception of teachers' roles, the traditional class teaching system, etc., and the over-refinement of teacher qualification categories and the incompatibility among subject teachers, they are inconsistent with the "cross-border integration" required by the intelligent era.", openness to crowd intelligence" and other characteristics are contrary to each other, which to a large extent will limit the construction tension of the future role of teachers in the intelligent era. Faced with the new role and responsibility requirements and challenges that artificial intelligence education poses to teachers, teachers need to strengthen their initiative and enthusiasm for personal learning, promptly update their individual education and teacher role concepts, and continuously exercise and enhance their abilities in practice, to minimize own resistance in the process of role change.

Chapter 3
Research Methodology

In order to develop sustainable development strategies for the roles of teachers in higher vocational colleges in northern Guangdong under artificial intelligence, this paper adopts multiple research methods from the following aspects: 1) The current status of role cognition of teachers in higher vocational colleges in northern Guangdong under artificial intelligence. 2) Research on sustainable development strategies for the roles of teachers in higher vocational colleges in northern Guangdong under artificial intelligence. 3) Evaluate the feasibility of sustainable development strategies for the roles of teachers in higher vocational colleges in northern Guangdong under artificial intelligence. The research steps are as follows:

1. The Population / Sample Group
2. Research Instruments
3. Data Collection
4. Data Analysis

Step 1: Investigate the current status of role cognition of teachers in higher vocational colleges in northern Guangdong under artificial intelligence.

Step 2: Conduct expert interviews to explore the formulation of sustainable development strategies for the roles of teachers in higher vocational colleges in northern Guangdong under artificial intelligence.

Step 3: Evaluate the feasibility of sustainable development strategies for the roles of teachers in higher vocational colleges in northern Guangdong under artificial intelligence.

The research structure diagram is shown in Figure 3.1:

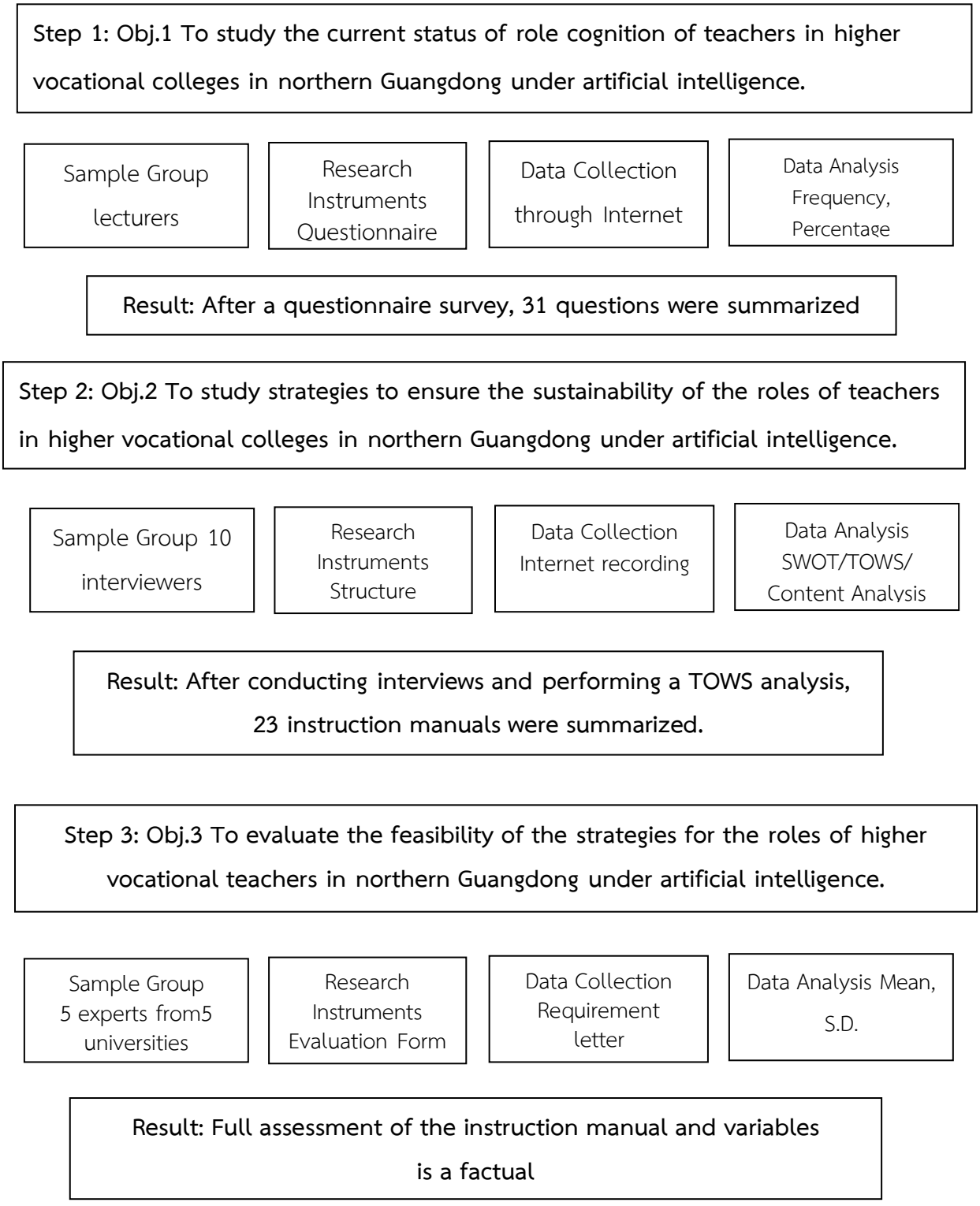


Figure 3.1 Summary of research methods and steps

The Population / Sample Group

The Population

This study selected 2689 full-time teachers from 5 higher vocational colleges in the northern city of Guangdong Province (Guangdong North region) as the research objects. Due to the rapid economic development in Guangdong, while the economic and social development and infrastructure construction in northern Guangdong are still relatively backward, the economic development level of the five cities in the north of Guangdong is close, and the development of the five higher vocational colleges is relatively consistent. Therefore, this study chooses northern Guangdong as the research area. The five higher vocational colleges in the north of Guangdong are Heyuan Vocational and Technical College, Meizhou Vocational and Technical College, Qingyuan Vocational and Technical College, Songshan Vocational and Technical College and Luoding Vocational and Technical College.

The Sample Group

Sampling table based on Krejci and Morgan.

The first stage is the questionnaire survey stage. The sample group of this study is 338 teachers from 5 higher vocational colleges in northern

Guangdong. The stratified sampling method was adopted to conduct a survey of higher vocational teachers in the north of Guangdong.

The interviewees were 10 full-time teachers selected from 5 higher vocational colleges in northern Guangdong. The qualifications of the interviewees are as follows: 1) More than 5 years of teaching experience in higher vocational colleges; 2) Lecturer or above.

Table 3.1 Sample Group Table

NO.	Higher Vocational College in Northern Guangdong	Population	Questionnaire survey Sample group	Interview Sample group
1	GuangDong Songshan Polytechnic	924	116	2
2	Heyuan Polytechnic	680	86	2
3	Qingyuan Polytechnic	480	60	2
4	Luoding Polytechnic	405	51	2
5	Meizhou Polytechnic	200	25	2
	Total	**2689**	**338**	**10**

Evaluation Team

The evaluation of sustainable development strategies for the role of teachers in higher vocational colleges in northern Guangdong under artificial intelligence is composed of 5 experts from higher vocational colleges in northern Guangdong. The qualifications of these experts are consistent with the research objectives and questions, including the following criteria: 1) at least 10 years of teaching experience; 2) have extensive digital learning experience or digital industry background; 3) have an academic title of associate professor or above. As shown in Table 3.2

Table 3.2 Lists of higher vocational colleges and evaluation size

NO.	Higher vocational colleges in northern Guangdong	Interviewers
1	GuangDong Songshan Polytechnic	1
2	Heyuan Polytechnic	1
3	GuangDong Songshan Polytechnic	1
4	Heyuan Polytechnic	1
5	Meizhou Polytechnic	1
	Total	**5**

Research Instruments

Questionnaire

The tool used to collect research objective 1 data to study the role of teachers in higher vocational colleges in China under the background of artificial intelligence is a questionnaire survey.

The questionnaire consists of three parts. The first part is the introduction of the questionnaire, which introduces the purpose, contents, and methods of the survey to obtain support for the survey objectives and ensure the reliability of the survey information. The second part is the basic information on demographic variables, including gender, age, teaching age, highest education, teaching subject, etc. (6 questions total). The third part is the main content of the questionnaire, mainly to understand the cognition and acceptance of artificial intelligence among college teachers in northern Guangdong province. Five measurement questions are set for the role of higher vocational teachers, and the designed questionnaire includes the following five aspects: (1) the cognition of higher vocational teachers on artificial intelligence (4 questions in total); (3) The cognition of vocational teachers on teaching level (teaching content, methods and environment) under artificial intelligence (6 questions); (4) The self-role understanding of higher vocational teachers under artificial intelligence (4 questions); (5) Higher vocational teachers' cognition on the influence of artificial intelligence on teacher role development

under artificial intelligence (4 questions); (6) Strategies for the sustainable development of higher vocational teachers' role under artificial intelligence (1 question, 3 questions in total). 30 and 31 are open questions, hoping to make up for the shortcomings of closed questionnaires and provide references for this study. The questionnaire consisted of 31 questions.

Data interpretation criteria based on the five-point Likert scale are as follows: 1= strongly disagree, 2= strongly agree, 3= agree, 4= somewhat agree, and 5= strongly agree.

Construct questionnaire process

The questionnaire construction process is as follows:

Step1: review and analyze the literature, concepts and theories related to the role of higher vocational teachers under artificial intelligence.

Step2: According to the current situation, construct a questionnaire on the role of vocational teachers under artificial intelligence.

Step3: The test questionnaire's objective consistency index (1OC) was composed of 5 experts, and the objective consistency index (1OC) was collected. The range of objective consistency index (1oC) was 0.50-1.00.

Step4: Modify the questionnaire according to expert advice.

The fifth step is to send questionnaires to 30 teachers in higher vocational colleges in northern Guangdong for pre-investigation. Test the reliability coefficient of the questionnaire. Conbach's Alpha was used to test the reliability of the questionnaire, and the coefficient should be between 0.41-1.

Step 6:338 teachers from 5 higher vocational colleges in northern Guangdong were surveyed by questionnaire.

Structured interview

This tool is used to collect data for Objective 2. A total of 10 vocational teachers are expected to be interviewed for informal one-on-one interviews (phone or face-to-face). The results of the interviews are processed and used as a basis for developing strategies.

1. Formulate an interview outline based on the role cognition of higher vocational roles in AI background.

2. The respondents are full-time teachers with master's degrees or above in five higher vocational colleges in northern Guangdong and have worked in higher vocational colleges for more than five years. Structured interviews are conducted on them;

3. Qualified interview candidates will be screened and invited by the researchers.

4. Conduct an interview. The researchers invited 10 people to be interviewed and gave them an outline for the interview.

5. Interview data analysis. After the interview, organize the interview content.

Data Collection

The researcher collects data based on the type of research instrument and procedures. Details are as follows:

Questionnaire

1. Questionnaire design: The researcher designs the questionnaire based on the first research purpose, accepts the supervisor's guidance, and submits it to the Graduate School for review and confirmation.

2. Questionnaire distribution: The researcher will distribute the questionnaire at 5 higher vocational colleges from March 5 to March 16, 2024.

3. Questionnaire follow-up: Follow up the sample size of the questionnaire, stop the questionnaire when the sample size is met, and enter the next step of questionnaire data analysis.

4. Questionnaire data sorting: sort out the collected questionnaires, check the completeness of the questionnaires, and use SPSS to analyze the complete and valid questionnaire data.

Interview

1. Summarize the analysis results of the "Role cognition of vocational teachers under artificial intelligence" and formulate an interview outline.

2. The respondents selected 5 vocational colleges for structured interviews, and they were full-time teachers or AI experts in 5 vocational colleges. Associate professor or above with more than 10 years of work in vocational colleges.

3. Interview candidates who meet the requirements will be screened and invited by the researcher.

4. Conduct interviews. The researcher invited 10 people to be interviewed and gave them an interview outline.

5. Interview data analysis. After the interview, organize the interview content.

Data Analysis

Step 1: Analyze the frequency and percentage of respondents' personal information and classify it by gender, age, teaching discipline, educational background, etc.

Step 2: The mean and standard deviation methods were used to analyze the status quo of vocational teachers' role cognition and its influencing factors.

Step 3: Conduct a structured interview content analysis on strategies to promote the sustainable development of the role of higher vocational teachers in the context of artificial intelligence.

Questionnaire follow-up: follow up on the sample size of the questionnaire, stop the questionnaire when the sample size is satisfied, and proceed to the next step of questionnaire data analysis.

Step 4: Mean and standard deviation analysis were used to evaluate adaptability and the adaptability and feasibility of strategies to promote the sustainable development of vocational teachers' roles in the context of artificial intelligence.

The second stage is to formulate management strategies to promote the sustainable development of the role of higher vocational teachers in the context of artificial intelligence.

Target Group

A focus group of 10 experts. I will invite ten experts to participate in a focus group discussion. Experts from the school require (1) more than 15 years of work experience and (2) a senior title or senior leadership ability.

Research instrument

Content composition form

1. Summarize the analysis results of the questionnaire and interview, and develop an outline of the question for the discussion in the focus group.

2. Send the discussion questions of the focus group to the thesis supervisor and discuss the questions according to the supervisor's suggestions Review and revise.

Data collection

Researchers collect data based on the type of research tool and procedure. The details are as follows:

1. Membership requirements for focus groups. They are experts in higher vocational colleges in northern Guangdong or senior workers in artificial intelligence. Requirements: (1) more than 15 years of working experience; (2)

Have a senior title or senior leadership position.

2. Researchers will screen and invite qualified personnel.

3. Conduct online focus groups and post-publication discussion Outlines.

Data Analysis

Content analysis

1. Analyze the results of focus group discussions.

2. Discuss the content of the focus group, combine SWOT and PEST analysis, and formulate the draft strategy for promoting the sustainable development of higher vocational teachers' role in artificial intelligence.

The third stage is to evaluate the strategy of promoting the sustainable development of the role of higher vocational teachers in the context of artificial intelligence.

Target group

Assessment Expert 5. Five teachers with senior professional titles or senior experts in the field of artificial intelligence were invited to evaluate the feasibility of strategies to promote the sustainable development of the role of higher vocational teachers in the context of artificial intelligence. Requirements:

(1) more than 15 years of work experience, (2) senior title or senior leadership ability.

Research instrument Evaluation form

Based on the results of the questionnaire survey and interview form, combined with the results of focus discussion content analysis, this paper puts forward the sustainable development strategy of higher vocational teachers' role under the background of artificial intelligence.

Design evaluation forms for strategy implementation and invite evaluation experts to evaluate the adaptability and feasibility of the strategies.

4.51-5.00 Highest level

3.51-4.49 High level

2.51-3.49 Medium level

1.51-2.49 Low levels

1.00-1.49 Minimum level.

Data collection

The assessment is emailed to the experts for evaluation and collected in parallel within the stipulated time.

Chapter 4

Results of Analysis

The purpose of the study on sustainable development strategies of higher vocational teachers' roles in northern Guangdong under artificial intelligence is to study the role cognition of higher vocational teachers under the background of artificial intelligence, formulate sustainable development strategies for the roles of higher vocational teachers under the background of artificial intelligence, and evaluate the adaptability and feasibility of the strategy. The researchers conducted questionnaire surveys and structured interviews with the sample group of this study and sent evaluation forms to experts. The data analysis results are presented as follows:

1. Symbols and abbreviations
2. Presentation of data analysis
3. Results of Data Analysis

The specific areas are as follows.

Symbol and Abbreviations

n refers to a sample.

$\bar{X}$ refers to the average value.

S.D. refers to standard deviation.

Presentation of Data Analysis

The presentation of data analysis of this study is as follows:

Part 1: Quantitative Analysis The results of the analysis of the personal information of the respondents are classified by gender, age, teaching experience, teaching subject, teaching grade, academic qualifications, etc., and expressed in the form of numbers and percentages.

Part 2: The results of the questionnaire analysis on the role cogniation of teachers in higher vocational colleges in northern Guangdong under artificial intelligence, presenting the data in the form of mean and standard deviation. Data analysis of the role cognition and influencing factors of higher vocational college teachers under the background of artificial intelligence;

Part 3: The results of the content analysis of the interview on the sustainable development strategy of the role of higher vocational college teachers in northern Guangdong under artificial intelligence, presenting the data in the form of frequency.

Part 4: Results of the adaptability and feasibility evaluation and analysis of the sustainable development strategy of the role of higher vocational teachers in northern Guangdong under artificial intelligence. The data are presented in the form of mean and standard deviation.

Results of Data Analysis

The researcher analyzed the data in 4 sections as follows:

Section 1: The results of the analysis of the personal information of the respondents are classified by gender, age, teaching experience, teaching subject, teaching grade, academic qualifications, etc., and expressed in the form of numbers and percentages.

Table 4.1 Personal Information of Respondents

(n=338)

Personal information		Number of people	Percentage(%)
Gender	Male	160	47.33%
	Female	178	52.67%
	Total	**338**	**100%**
Age	30 years old and below	92	27.22%
	31~40 years old	90	26.63%
	41~50 years old	87	25.74%
	51 years old and above	69	20.41%
	Total	**338**	**100%**
Teaching year	0~10 years	180	53.25%
	11~20 years	116	34.32%
	More than 20 years	42	12.43%
	Total	**338**	**100%**
Teaching grade	First Grade	124	36.69%
	Second Grade	112	33.14%
	Third Grade	102	30.18%
	Total	**338**	**100%**
Teaching subject	science	170	50.30%
	liberal arts	168	49.70%
	Total	**338**	**100%**
Educational background	Bachelor degree	98	28.99%
	Master's degree	180	53.25%
	Doctoral Degree	60	17.76%
	Total	**338**	**100%**

Table 4.1 shows that this study involved 338 effective participants, including 160 male teachers, accounting for 47.33%, and 178 female teachers, accounting for 52.67%. There were 92 teachers aged 30 or below, accounting for 27.22%; 90

teachers aged 31-40, accounting for 26.63%; 87 teachers aged 41-50, accounting for 25.74%; and 69 teachers aged 51-60, accounting for 20.41%. There were 180 teachers with 0-10 years of teaching experience, accounting for 53.25%, 116 teachers with 11-20 years of teaching experience, accounting for 34.32%, and 42 teachers with more than 20 years of teaching experience, accounting for 12.43%. Among them were 124 first-year teachers, accounting for 36.69%, and 112 second-year teachers, accounting for 33.14%. And 102 third-year teachers, accounting for 30.18%. There are 170 science teachers, accounting for 50.30%, and 168 liberal arts teachers, accounting for 49.70%. There are 98 people with bachelor's degrees, accounting for 28.99%, 180 people with master's degrees, accounting for 53.25%, and 60 people with doctoral degrees, accounting for 17.76%. It can be seen that the overall distribution of the population in this questionnaire survey is relatively even.

Part 2: The analysis result of the questionnaire on the current situation of higher vocational teachers in northern Guangdong under artificial intelligence, and gives the analysis results in the form of mean, standard deviation, etc.

This section aims to explore the current status of role cognition of teachers in higher vocational colleges in northern Guangdong under artificial intelligence. To achieve this goal, the researchers designed a questionnaire. Through exploratory factor analysis and testing the reliability and validity of the questionnaire, it was found that the questionnaire designed by the researchers for this study meets the requirements of measurement science. Based on the results of the questionnaire survey, this study analyzed the current status of role cognition of teachers in higher vocational colleges in northern Guangdong from five aspects: teachers' cognition of artificial intelligence, teachers' artificial intelligence literacy and ability level, teachers' cognition of teaching, teachers' cognition of self-development, and teachers' cognition of their roles. Through the investigation, the researchers have a deeper understanding of the problems faced by the role development of teachers in higher vocational colleges in northern Guangdong under artificial intelligence and provide necessary data support for further formulating sustainable

development strategies for the role of teachers in higher vocational colleges in the north of Guangdong under artificial intelligence.

Table 4.2 Analysis of the current situation of role cognition of teachers in highervocational colleges in northern Guangdong under artificial intelligence

(n = 338)

Factors of role development of teachers in higher vocational colleges in northern Guangdong under AI	$\bar{X}$	**S.D.**	**Level**	**Rank**
Awareness of artificial intelligence	3.11	0.91	high	2
AI literacy	3.46	0.66	high	1
Teaching content and methods	3.04	0.89	high	4
Self-role awareness	3.01	0.88	high	5
Self-development awareness	3.08	0.87	high	3
Total	**3.14**	**0.842**	**high**	

According to Table 4.2, the interviewed higher vocational teachers' overall cognition of the teacher's role in the context of artificial intelligence is at a medium level ($\bar{X}$=3.14). From the average values of the five dimensions, the interviewed teachers are at a medium level in all dimensions. The following is the ranking of each level, from high to low: the first is the cognition of the

level of artificial intelligence literacy ($\bar{X}$=3.46), the second is the cognition of artificial intelligence ($\bar{X}$=3.11), the third is the self-development awareness ($\bar{X}$=3.08), the fourth is the cognition of teaching content and teaching methods in the context of artificial intelligence ($\bar{X}$=3.04), and the fifth is the cognition of self-role awareness ($\bar{X}$=3.01). In the questionnaire survey, the standard deviation is an essential statistical indicator to measure the degree of data dispersion. The larger the standard deviation, the more dispersed the data distribution; the smaller the standard deviation, the more concentrated the data distribution. In the questionnaire survey, standard deviation is an essential statistical indicator to

measure the degree of data dispersion. The larger the standard deviation, the more dispersed the data distribution, the smaller the standard deviation, the more concentrated the data distribution. Table 4.2 shows that the standard deviations of each dimension of teacher role cognition are between 0.6 and 1, indicating that the questionnaire design is reasonable. The survey results are credible and compelling. Among the factors affecting teacher role positioning, the more significant the gap between teachers' expectations and current conditions, the higher their enthusiasm for improving the sustainable development strategy of teachers' roles.

Table 4.3 Analysis of the cognition of higher vocational teachers on artificial intelligence

(n=338)

Teachers understanding of AI	$\overline{X}$	S.D.	Level	Rank
1. Basic concepts and principles of AI	3.15	0.87	high	2
2. Application of AI in education	3.20	0.90	high	1
3. significantas a significant impact on teachers' education and teaching	3.06	0.98	high	3
4. Big data analysis should be used to obtain accurate teaching content	3.04	0.89	high	4
Total	**3.11**	**0.91**	**high**	

As seen from Table 4.3, higher vocational teachers' current level of understanding and acceptance of AI is at a medium level ($\overline{X}$=3.11). From the survey results, from high to low, question 1, "under the standing of the basic concepts and principles of AI," scored medium ($\overline{X}$=3.15), question 2, "application cases of AI in the field of education" scored high ($\overline{X}$=3.20), and question 3 "AI has a great impact on teachers' education and teaching" scored medium ($\overline{X}$=3.06). Question 4, "big data analysis should be used to obtain accurate teaching content," scored the lowest ($\overline{X}$=3.04), which shows that higher vocational teachers' level of understanding and acceptance of AI is at a medium level.

Table 4.4 Mean and standard deviation of teachers AI literacy status

(n = 338)

AI Literacy	$\bar{X}$	S.D.	Level	Rank
1. Be proficient in using at least one AI tool or platform to assist teaching.	4.14	0.64	high	1
2. Frequently organize students to use smart devices in education and teaching.	3.29	0.81	moderate	4
3. One s own AI literacy can meet current teaching needs.	2.88	0.73	moderate	6
4. Possess data analysis capabilities	2.65	0.57	low	7
5. Possess programming skills	2.43	0.92	low	8
6. Possess innovative ability	3.24	0.53	moderate	5
7. Possess interdisciplinary integration capabilities	3.43	0.69	moderate	3
8. Possess lifelong learning ability	3.81	0.60	high	2
Total	**3.23**	**0.68**	**moderate**	

According to Table 4.4, the current status of teachers' AI literacy is medium ($\bar{X}$=4.14). The survey results are ranked from high to low as follows: Question 1 "Proficient in using at least one AI tool or platform to assist teaching" ($\bar{X}$=4.14), Question 8 "Possessing lifelong learning ability" ($\bar{X}$=3.81), Question 7 "Possessing interdisciplinary integration ability" ($\bar{X}$=3.43), Question 2 "Often organizing students to use smart devices in education and teaching" scored medium, Question 6 "Possessing innovation ability" Question 3 "One's AI literacy can meet current teaching needs" ($\bar{X}$=2.88), Question 4 "Possessing data analysis ability" ($\bar{X}$=2.65), Question 5 "Possessing programming skills" ($\bar{X}$=2.43). In the AI literacy level of teachers, the higher the teacher's recognition value, the higher the level of artificial literacy in this aspect. Conversely, the lower the score, the greater the space for improvement.

Table 4.5 Mean and standard deviation of teachers current understanding of teaching

(n=338)

Teachers' understanding of teaching	$\bar{X}$	S.D.	Level	Rank
1. AI can enrich teaching content and form.	3.04	0.86	high	3
2. Develop new teaching methods using AI technology.	3.01	0.91	high	5
3. AI can improve teaching effectiveness and students' learning experience.	3.11	0.87	high	1
4. AI can provide more personalized learning support for students	3.03	0.89	high	4
5. AI helps create a more interactive and engaging teaching environment	3.06	0.92	high	2
6. AI technology can promote interaction and communication between teachers and students	3.00	0.91	high	6
Total	**3.04**	**0.89**	**high**	

According to Table 4.5, teachers' overall understanding of teaching is at a medium level. From the research results, question 3, "Artificial intelligence can improve teaching effectiveness and students' learning experience," has the highest recognition rate ($\bar{X}$=3.11), followed by question 5, "Artificial intelligence helps create a more interactive and interesting teaching environment" ($\bar{X}$=3.06), and the lowest score is question 6 "Artificial intelligence technology can promote interaction and communication between teachers and students" ($\bar{X}$=2.99).

Table 4.6 Mean and standard deviation of teachers cognition of self- development (n=338)

Teachers expect more applications of artificial intelligence	$\bar{X}$	S.D.	Level	Rank
1. Smart Tutor	3.22	0.85	high	2
2. Big Data Mining	2.98	0.9	moderate	5
3. Intelligent Assessment	3.06	0.86	high	4
4. Smart Education	3.39	0.89	high	1
5. It is believed that artificial intelligence can change the teaching mode and role positioning of higher vocational teachers	3.18	0.80	high	3
6. Believe that artificial intelligence will promote the professional development of teachers	2.68	0.78	high	6
Total	**3.08**	**0.87**	**high**	

According to Table 4.6, in the era of artificial intelligence, teachers' cognition of self-development is at a medium level ($\bar{X}$=3.04). From the survey results, from high to low, they are: Question 4 expects artificial intelligence to have more applications in "intelligent education" is the highest ($\bar{X}$=3.19), Question 2 expects artificial intelligence to have more applications in "big data mining" is at a medium level ($\bar{X}$=2.98), Question 5 "believes that artificial intelligence can change the teaching mode and role positioning of higher vocational teachers" ($\bar{X}$=3.18), Question 3 expects artificial intelligence to have more applications in "intelligent assessment" is at a medium level ($\bar{X}$=3.06), Question 1 expects artificial intelligence to have more applications in "intelligent tutors" has a low score ($\bar{X}$=2.96), and Question 6 "believes that artificial intelligence will promote the professional development of teachers" has the lowest score ($\bar{X}$=2.68).

Table 4.7 Mean and standard deviation of teachers' self-role awareness

(n=338)

The role of teachers in the era of artificial intelligence	$\bar{X}$	S.D.	Level	Rank
1. Education and teaching researcher	3.02	0.83	high	4
2. Student Growth Data Analyst	3.04	0.89	high	3
3. Student learning career planner	2.96	0.9	moderate	5
4. Mental and emotional caregiver	3.61	0.91	high	1
5 . A guide to values and beliefs	3.52	0.93	high	2
Total	**3.01**	**0.88**	**high**	

According to Table 4.7, in the era of artificial intelligence, teachers' self-role cognition is generally at a medium level ($\bar{X}$=3.01). From the survey results, from high to low: Question 4 believes that teachers in the era of artificial intelligence should be "psychological and emotional caregivers" with a high score ($\bar{X}$=3.61), followed by Question 5, "guides of values and beliefs" with a medium score ($\bar{X}$=3.52), and Question 3 "students' learning career planner" scored the lowest ($\bar{X}$=2.96).

Table 4.8 Main factors affecting teachers' use of artificial intelligence technology

(n=338)

Options	n	Percentage (%)	Rank
1. Lack of necessary AI equipment and environment support	255	75.44	1
2.Real-time maintenance of technical duration, rhythm and sequence of application and non-technical application	207	61.24	2
3. Insufficient attention to teaching management and lack of corresponding intelligent teaching atmosphere	198	58.58	3

Table 4.8 (Continued)

(n=338)

Options	n	Percentage (%)	Rank
4. Lack of necessary AI knowledge theory and operational skills	189	55.92	4
5. Traditional teaching methods and concepts are deeply rooted	172	50.89	5
6. Lack of emergency response measures for AI operation in teaching	131	38.76	6
Please fill in the valid number of people for this question	**338**		

According to Table 4.8, 75.44% of teachers believe that the lack of necessary AI equipment and environmental support is the most critical factor; 61.24% of teachers believe that the application of technology duration, rhythm and sequence and real-time maintenance of non-technical applications as the second key factor; 58.58% of teachers said that insufficient attention to teaching management and lack of a corresponding intelligent teaching atmosphere is the third key factor; 55.92% of teachers believe that the lack of necessary AI knowledge theory and operational skills is the fourth main factor; 50.89% of teachers believe that the deep-rooted traditional teaching methods and concepts in the country are the fifth important factor; 38.76% of teachers believe that the lack of emergency response measures for AI operations in teaching is the sixth main factor.

Table 4.9 Main factors affecting teachers' AI literacy

(n=338)

Options	n	Percentage (%)	Rank
1. Education and the scientific and technological environment of universities	225	75.74	1
2. The degree of perfection of the training system for college teachers	233	68.92	3
3. Related resource support	243	71.89	2
4. Incentive Mechanism	256	66.56	4
5. Policy support	216	63.91	5
6. Teacher's reasons	153	45.26	6
7. Support from social organizations	146	43.20	7
8. Technical support from society and enterprises	101	29.88	8
Please fill in the valid number of people for this question	**338**		

According to Table 4.9, 75.74% of teachers believe that education and the scientific and technological environment of universities are the most important factors; 71.89% of teachers believe that relevant resource support can promote the development of teachers' artificial intelligence literacy (such as teaching resources, educational technology literacy improvement courses, educational technology platforms, etc.) is the second key factor; 68.92% of teachers said that the degree of perfection of the training system for university teachers is the third key factor; 66.56% of teachers believe that the incentive mechanism for university teachers to use artificial intelligence teaching technology is the fourth main factor; 63.91% of teachers believe that the country's policy strength for the promotion of artificial intelligence technology in universities is the fifth important factor; 45.26% of teachers believe that personal reasons of teachers are the sixth main factor; 43.20% of teachers believe that organizational support from teachers, education,

technology, and professional development; 29.88% of teachers believe that technical support from society and enterprises is also a significant factor.

Table 4.10 Main affecting recognition of Higher Vocational teachers

(n=338)

Options	n	Percentage (%)	Rank
1. Teachers ’ AI literacy level	255	75. 44	1
2. Teachers' level self-rule cognition	237	70.11	2
3. Changes in teaching content and course design	234	69.23	3
4. Changing student needs	228	67.46	4
5. Teachers ’ own development needs	187	55.32	5
6. Innovation in Educational Management and Assessment	162	47.93	6
7. National and social policy environment	155	45.86	7
8. Other factors	78	23.08	8
Please fill in the valid number of people for this question	**338**		

According to Table 4.10, 75.44% of teachers believe that the level of teachers' artificial intelligence literacy is the critical factor; 70.11% of teachers believe that teachers' awareness of the roles is the second key factor; 69.23% of teachers say that changes in teaching content and curriculum design are the third key factor; 67.46% of teachers believe that changes in students' needs are the fourth main factor; 55.32% of teachers believe that teachers' own development needs are the fifth important factor; 47.93% of teachers believe that innovation in education management and evaluation is the sixth main factor; 45.86% of teachers believe that the national political and social policy environment is the seventh main factor; and 23.08% of teachers believe that other factors are also a major influencing factor.

Part 3: Content analysis of interviews on strategies to promote sustainable development of higher vocational teachers roles.

This section aims to develop strategies for the sustainable development of the role of teachers in higher vocational colleges in northern Guangdong under artificial intelligence. To this end, this study uses the interview method to deeply explore the current situation and influencing factors of the role cognition of teachers in higher vocational colleges in northern Guangdong under artificial intelligence and attempts to develop development strategies. A total of 10 teachers and artificial intelligence experts from higher vocational colleges north of Guangdong participated in this survey interview. Through the interview, we have an in-depth understanding of the problems and influencing factors of the role cognition of teachers in higher vocational colleges in northern Guangdong under artificial intelligence, which provides essential data for formulating sustainable development strategies for the role of higher vocational teachers.

In this study, the researchers used an interview outline explicitly designed to present the information the interviewees provided through structured interviews. The interviewees are the sample group of this study, see Table 4.11. The results of the interview content analysis on the sustainable development strategy of the role of teachers in higher vocational colleges in northern Guangdong under artificial intelligence, and the data are expressed in frequency.

Table 4.11 Analysis of basic information of respondents

Personal information		n	Percentage(%)
Gender	male	6	60.00
	Female	4	40.00
	Total	**10**	**100.00**
Work experience in University (years)	≤15	3	30.00
	16-19	3	30.00
	≥20	4	40.00
	Total	**10**	**100.00**
Educational background	Master's degree	7	70.00
	Doctor's degree	3	30.00
	Total	**10**	**100.00**
Position	AI Experts	3	30.00
	Teacher	7	70.00
	Total	**10**	**100.00**

Table 4.11 shows that this study involves 10 respondents, including 6 males, accounting for 60%, and four females, accounting for 40%. The number of years of university work is less than or equal to 15 years, accounting for 30%, 16-19 years, accounting for 30%, and greater than or equal to 20 years, accounting for 40%. Education, 7 masters, accounting for 70%, 3 doctors, accounting for 30%. Position: 3 AI experts, accounting for 30.0%, and 7 teachers, accounting for 70.0%. The overall distribution of the population in this questionnaire survey is relatively uniform.

The researchers conducted 10 online face-to-face interviews, each conducted one-on-one and lasted about 30 minutes. The researchers recorded the content of the interviews. The interview records of the 10 respondents are shown in Appendix C.

According to the collation and statistics of the interview data, the influencing factors and frequency statistics of the sustainable development of the role of higher

vocational teachers in northern Guangdong under artificial intelligence are shown in Table 4.12.

Table 4.12 Interview Content Analysis

No	Influencing factors	Interviewee 1	Interviewee 2	Interviewee 3	Interviewee 4	Interviewee 5	Interviewee 6	Interviewee 7	Interviewee 8	Interviewee 9	Interviewee 10	Frequency
1	Insufficient understanding and awareness of AI	√	√		√	√	√	√	√		√	8
2	Lack of technical support and training	√	√			√		√		√		5
3	Weak technical operation ability		√		√	√	√		√	√	√	7
4	Insufficient adoption of AI technology	√		√	√			√	√			5
5	The pressure of technological change	√	√				√	√	√			5
6	Misunderstandings about AI technology						√		√		√	3
7	Unfamiliar with the application scenarios of artificial intelligence technology			√	√	√				√		4
8	Skills Missing	√		√				√			√	4
9	Ignoring the importance of AI	√		√				√				3
10	Insufficient continuous learning				√	√			√		√	4
11	Insufficient teaching resources	√					√		√			3

Table 4.12 (Continued)

No	Influencing factors	Interviewee 1	Interviewee 2	Interviewee 3	Interviewee 4	Interviewee 5	Interviewee 6	Interviewee 7	Interviewee 8	Interviewee 9	Interviewee 10	Frequency
12	The teaching platform is not intelligent enough	√		√				√				3
13	Teaching philosophy lags behind	√	√		√					√	√	5
14	Insufficient student-centered teaching philosophy					√	√		√			3
15	Insufficient innovation in teaching methods			√				√		√	√	4
16	Insufficient teaching feedback and reflection		√	√		√	√			√		5
17	Insufficient policy and regulatory support	√	√		√		√		√	√	√	7
18	Teaching concepts lag and lack innovation	√		√	√			√	√		√	6
19	Insufficient interdisciplinary integration		√	√			√		√	√		5
20	Lack of practical experience		√		√					√	√	4
21	Lack of awareness of continuous learning and professional evelopment	√		√		√	√	√	√			6
22	Ethical and privacy concerns		√							√	√	3
23	Lack of incentives	√		√						√		3
24	The evaluation system does not match the teaching objectives		√		√	√					√	4

Table 4.12 (Continued)

No	Influencing factors	Interviewee 1	Interviewee 2	Interviewee 3	Interviewee 4	Interviewee 5	Interviewee 6	Interviewee 7	Interviewee 8	Interviewee 9	Interviewee 10	Frequency
24	The evaluation system does not match the teaching objectives		√		√	√					√	4
25	Insufficient innovative thinking and cross-border cooperation capabilities							√		√	√	3
26	Insufficient data analysis capabilities	√	√		√							3
27	Lack of recognition and reward mechanism					√			√			2
28	Information blockage				√					√		2
29	Worried about unemployment		√	√								2
	Total	**14**	**13**	**12**	**12**	**10**	**9**	**12**	**11**	**13**	**11**	

According to Table 4.12, from the results of word frequency statistics, among the 28 words, the five most frequent factors affecting the development of the role of higher vocational teachers under artificial intelligence are understanding and cognition of artificial intelligence (8 times), artificial intelligence technology operation ability (7 times), policy and regulatory support (7 times), social recognition and expectations (6 times), and awareness of continuous learning and professional development (6 times).

According to the collation and statistics of the interview data, the improvement strategies and frequency statistics of the sustainable development of

the role of higher vocational teachers in northern Guangdong under artificial intelligence are shown in Table 4.13.

Table 4.13 Strategies and frequency statistics of improvement strategies

No	Strategy	Interviewee 1	Interviewee 2	Interviewee 3	Interviewee 4	Interviewee 5	Interviewee 6	Interviewee 7	Interviewee 8	Interviewee 9	Interviewee 10	Frequency
1	Organize AI technology training and seminars	√		√				√	√		√	5
2	Strengthen the cultivation and learning of intellectual literacy	√	√		√	√		√	√	√	√	8
3	Carry out practical technical training			√	√			√		√	√	5
4	Widely publicize the applications and advantages of AI technology	√			√	√						4
5	Establish support mechanisms to cope with technological change	√		√		√				√		4
6	Clarify misunderstandings about AI technology through special lectures, case studies, etc.		√				√		√			3
7	Organize a visit				√		√			√	√	3
8	Strengthened publicity		√				√		√			3
9	Establish the concept of lifelong learning				√			√		√	√	4
10	Increase investment in teaching resources	√		√		√	√					4

Table 4.13 (Continued)

No	Strategy	Interviewee 1	Interviewee 2	Interviewee 3	Interviewee 4	Interviewee 5	Interviewee 6	Interviewee 7	Interviewee 8	Interviewee 9	Interviewee 10	Frequency
11	Promote the intelligent upgrade of teaching platforms	√	√		√			√		√		5
12	Update teaching concepts	√		√		√	√			√		5
13	Strengthen the promotion and training of student-centered teaching concepts	√	√		√		√		√	√		6
14	Encourage teachers to innovate teaching methods			√		√	√		√			4
15	Establish a sound teaching feedback mechanism		√		√			√		√	√	5
16	Actively seek support from the government and society	√	√	√					√	√	√	6
17	Regularly carry out teaching concept updates and innovation training	√	√			√			√			4
18	Strengthen interdisciplinary cooperation and exchanges	√	√	√			√	√		√		7
19	Strengthening school-enterprise cooperation	√				√			√	√	√	5
20	Establish incentives for professional development	√	√			√		√	√			6
21	Strengthen ethics and privacy education		√							√	√	3
	Total	**13**	**11**	**8**	**9**	**9**	**8**	**8**	**10**	**13**	**9**	

According to the word frequency statistics in Table 4.13, the interviewees put forward some constructive suggestions. Among the 21 strategies to promote the sustainable development of the role of higher vocational teachers, the five most frequent strategies are to strengthen the cultivation and learning of intelligent literacy (8 times), strengthen the publicity and training of student-centered teaching concepts (7 times), enhance interdisciplinary cooperation and exchanges (7 times), actively seek support from the government and society (6 times), and establish an incentive mechanism for continuous learning and professional development (6 times). In general, according to the questionnaire analysis in the second part and the interviews in the third part, it can be found that the sustainable development of the role of higher vocational teachers under artificial intelligence requires the optimization of teachers' cognitive level of artificial intelligence, teachers' literacy level of artificial intelligence, teachers' cognition of teaching, teachers' self-development cognition, and teachers' self-role cognition.

Under artificial intelligence, promoting the sustainable development of the role of higher vocational teachers depends not only on the teachers' efforts but also on the support of external environments such as society, schools, technology, and the teaching environment. Therefore, this study combines the results of questionnaire surveys, interview surveys, and SWOT-PEST analysis methods to formulate a scientific and reasonable promotion strategy draft. SWOT is an analysis method that analyzes the internal environment of an organization and summarizes its strengths and weaknesses; at the same time, it analyzes the organization's external environment, identifies opportunities and threats, and uses this as the basis for formulating strategies. When analyzing the external environment, I combined PEST.

Table 4.14 SWOT Analysis Interview Content

S1. National reforms have driven the transformation of teachers' roles and teaching innovation (S1). S2. Increased funding and demand for skilled personnel promote teacher development (S2). S3. AI integration: AI technology has enhanced teaching tools, methods, and personalized learning opportunities (S3).	W1. Policy imbalances limit teacher training and development, especially in less developed regions (W1). W2. Economic disparities lead to unequal access to professional development and AI technologies across regions (W2). W3. Low recognition and insufficient support for vocational education undermine teachers' confidence and growth (W3).
S	W
O	T
O1.Policies and funding promote AI integration, training, and school-enterprise cooperation (O1). O2. Rising demand for AI skills promotes teacher skill improvement and career development (O2). O3. The marketization and demand for vocational education promote teacher development (O3O	T1. Uncertainty and poor implementation limit AI education and teacher support (T1). T2. Fluctuations and cutbacks reduce training and job opportunities (T2). T3.AI raises privacy and security concerns and requires teacher expertise. (T3).

According to the above SWOT analysis results, TOWS strategic analysis is conducted to formulate corresponding strategies: Advantage Opportunities (SO), Weak Opportunities (WO), Advantage Threats (ST), and Weak Threats (WT). TOWS analysis is an extended version of SWOT analysis used to make strategy formulation more specific and action-oriented. TOWS analysis helps organizations or individuals formulate more targeted strategies by combining internal strengths and weaknesses with external opportunities and threats. As shown in Table 4.15.

Table 4.15 TOWS Strategy Matrix

Internal / **External**	Strengths (S) S1. National reforms have driven the transformation of teachers' roles and teaching innovation (S1). S2. Increased funding and demand for skilled personnel promote teacher development (S2). S3. AI integration: AI technology has enhanced teaching tools, methods, and personalized learning opportunities (S3).	Weaknesses (W) W1. Policy imbalances limit teacher training and development, especially in less developed regions (W1). W2. Economic disparities lead to unequal access to professional development and AI technologies across regions (W2). W3. Low recognition and insufficient support for vocational education undermine'teachers confidence and growth (W3).
Opportunities (O) O1.Policies and funding promote AI integration, training, and school-enterprise cooperation . O2.Rising demand for AI skills promotes teacher skill improvement and career development .	SO (Leverage Strengths to Seize Opportunities) Strategies: 1. Enhance AI Awareness Programs.Utilize national reforms (S1) and AI tools (S3) to deliver targeted training sessions that increase teachers' AI understanding (O1). 2. Strengthen AI Literacy.Leverage funding (S2) to integrate AI skill development modules into teacher education programs (O2).	WO (Overcome Weaknesses to Seize Opportunities) Strategies: 1. Mitigate Regional Disparities.Target underserved regions with subsidized AI literacy programs to address imbalances (W1, O1). 2. Promote Equal Access to AI Resources.Develop economic support structures ensuring widespread access to AI training tools (W2, O2).

Table 4.15 (Continued)

Internal / **External**	Strengths (S) S1. National reforms have driven the transformation of teachers' roles and teaching innovation (S1). S2. Increased funding and demand for skilled personnel promote teacher development (S2). S3. AI integration: AI technology has enhanced teaching tools, methods, and personalized learning opportunities (S3).	Weaknesses (W) W1. Policy imbalances limit teacher training and development, especially in less developed regions (W1). W2. Economic disparities lead to unequal access to professional development and AI technologies across regions (W2). W3. Low recognition and insufficient support for vocational education undermine'teachers confidence and growth (W3).
O3.The marketization and demand for vocational education promote teacher development.	3. Innovate Teaching Cognition Promote AI-enabled personalized learning (S3) and align teaching innovations with vocational education demands (O3). 4.Boost Self-development Initiatives.Drive professional growth by linking role transformations (S1) with opportunities for career advancement (O2). 5.Advance Role Awareness Use market-driven vocational trends (O3) to redefine teacher roles under AI influence (S1).	3. Improve Teaching Confidence.Launch campaigns emphasizing the value of vocational education to enhance teacher confidence (W3, O3). 4. Expand Self-development Support.Establish mentorship networks to aid teachers in self-driven professional development (W3, O2). 5.Foster Role Identity.Train teachers on AI's impact on vocational roles, promoting adaptation to evolving demands (W1, O3).

Table 4.15 (Continued)

Internal / External	Strengths (S)	Weaknesses (W)
	S1. National reforms have driven the transformation of teachers' roles and teaching innovation (S1). S2. Increased funding and demand for skilled personnel promote teacher development (S2). S3. AI integration: AI technology has enhanced teaching tools, methods, and personalized learning opportunities (S3).	W1. Policy imbalances limit teacher training and development, especially in less developed regions (W1). W2. Economic disparities lead to unequal access to professional development and AI technologies across regions (W2). W3. Low recognition and insufficient support for vocational education undermine'teachers confidence and growth (W3).
T1. Uncertainty and poor implementation limit AI education and teacher support . T2. Fluctuations and cutbacks reduce training and job opportunities . T3.AI raises privacy and	ST(Leverage Strengths to Seize Opportunities) Strategies: 1.Address AI Implementation Challenges.Use reforms (S1) to improve AI education frame works, reducing uncertainty (T1). 2.Stabilize AI Training Opportunities.Ensure consistent funding (S2) through public-private partnerships, addressing economic fluctuations (T2 3.Enhance Data Privacy Competence.Train teachers using AI-enhanced tools (S3) to	WT (Overcome Weaknesses to Seize Opportunities) Strategies: 1.Increase AI Literacy Resilience.Address policy gaps (W1) by implementing continuous AI literacy programs despite external uncertainties (T1). 2.Build Funding Resilience.Design adaptive economic models ensuring resource availability for training amid financial fluctuations (W2, T2). 3.Enhance Confidence in AI Roles.Conduct' workshops to boost vocational teachers

Table 4.15 (Continued)

Internal / External	Strengths (S)	Weaknesses (W)
	S1. National reforms have driven the transformation of teachers' roles and teaching innovation (S1). S2. Increased funding and demand for skilled personnel promote teacher development (S2). S3. AI integration: AI technology has enhanced teaching tools, methods, and personalized learning opportunities (S3).	W1. Policy imbalances limit teacher training and development, especially in less developed regions (W1). W2. Economic disparities lead to unequal access to professional development and AI technologies across regions (W2). W3. Low recognition and insufficient support for vocational education undermine'teachers confidence and growth (W3).
security concerns and requires teacher expertise.	manage privacy and security risks effectively (T3). 4.Advance Adaptive Teaching Models.Equip teachers with AI tools to maintain teaching quality during external disruptions (S1, T2). 5.Promote Sustainable Role Adaptation.Develop support systems leveraging AI innovations to prepare teachers for new vocational demands (S3, T3).	confidence in navigating AI transitions (W3, T1). 4.Integrate Privacy Awareness into Training.Incorporate robust data security modules into teacher training programs to address privacy challenges (W3, T3). 5.Develop Inclusive Role Awareness Programs.Promote understanding of evolving roles in vocational education, focusing on underserved regions (W1, T2).

Based on the questionnaire survey and interviews, combined with the above-mentioned SWOT and TOW methods for analysis, and proposed a draft strategy to promote the sustainable development of the role of higher vocational teachers under artificial intelligence. These draft strategies are based on the results of the questionnaire survey, and the items with the lowest average score for each variable are determined. The interview results and relevant literature also support these suggestions. The draft strategy includes 5 aspects, comprising 20 main strategies and 28 measures. As shown in Table 4.16.

Table 4.16 Draft Strategy Checklist

No.	Aspects of Strategies	Number of strategies	Numbers of Measures
	Strategies for Awareness of Artificial		
1	Intelligence	4	6
2	Strategies for Teacher AI Literacy	4	5
3	Strategies for teaching content and methods	4	5
4	Strategies for Self-development Awareness	4	6
5	Strategies for Self-role Awareness	4	6
	Total **5**	**20**	**28**

Table 4.17 Draft strategy for sustainable development of the role of teachers in higher vocational colleges in northern Guangdong under artificial intelligence

Strategies	How to
Strategies for Awareness of Artificial Intelligence	
1. Strengthen policy support	1) Promote the government and education departments to formulate policies and financial investments to support AI education and ensure teachers have sufficient factors for AI- related teaching and research.
	2) Hold policy briefings and seminars to interpret education policies and help teachers understand the strategic positioning and development prospects of AI in education
2. Strengthen publicity efforts	3) Use mass media and social platforms to widely publicize the importance of AI in education and increase society s attention and support for teachers AI awareness.
3. Organize professional training	4) Invite experts, scholars, or business representatives in artificial intelligence to hold special lectures, seminars and workshops for teachers to deeply analyze the basic principles, development trends and application cases of artificial intelligence in education.
4. Strengthen ethics and privacy protection education	5) Provide data privacy protection tools and technical support to help teachers effectively protect student privacy in
	6) Establish risk warning and emergency response mechanisms in the application of AI technology; organize emergency drills regularly to improve teachers ability to deal with ethical and privacy risks.

Table 4.17 (Continued)

Strategies	How to
Strategies for Improving Teachers' AI Literacy	
1. Increase investment instruction funds	1) Increase funding for AI teaching research and application, supporting teachers, purchasing equipment and software, etc.
2. Strengthening training on intelligence literacy	2) Strengthen teacher training, provide systematic artificial intelligence courses and learning resources, help teachers learn artificial intelligence technology in depth, and understand this principle and operating mechanisms to organize teachers to participate in AI laboratory practice activities to improve practical operation skills.
3. Promoting collaboration between schools and society	3) Cooperate with social organizations, educational institutions, and enterprises to hold AI education forums and lectures, establish AI education research and development platforms, and help teachers acquire the latest AI application knowledge and master the practical application skills of AI technology.
4. Promoting interdisciplinary integration	4) Establish an interdisciplinary teaching and research platform or team to encourage teachers from different disciplinary backgrounds to explore the application of AI in teaching jointly.
	5) Establish an interdisciplinary AI teaching case library to help them flexibly use AI application examples from different disciplines in teaching.
Strategies to Improve Teachers' Teaching Awareness	
1. Optimizing teaching resources to promote	1) Use intelligent technology to assist teaching, such as AR and VR technology, to create an immersive

Table 4.17 (Continued)

Strategies	How to
educational equity	learning environment, allowing students to interact and explore in virtual scenes, using intelligent assessment tools to analyze learning situations, and intelligent recommendation systems to provide students with personalized learning resources.
2. Optimizing teaching resources to promote educational equity	2) Build a shared AI teaching resource platform to promote resource sharing among schools and improve the utilization rate of teaching resources.
	3) Focus on the balanced distribution of educational resources, increase investment in educational technology, actively use intelligent technology, provide students with more diversified and personalized learning resources, and narrow the digital divide.
3. Establish learning communities and share resources	4) Establish a teacher learning community or communication platform to encourage teachers to share teaching experiences, technical resources, and research results and improve teaching cognition through collective learning and communication.
4. Improve the teaching evaluation mechanism	5) Develop an AI-based student learning feedback and multi- dimensional learning effect evaluation system to collect student learning data in real-time, provide teachers with detailed student learning reports and precise teaching improvement suggestions, and further adjust and optimize teaching strategies.
Strategies for Self-development Awareness	
1. Increased awareness of	1) By participating in seminars, reading professional

Table 4.17 (Continued)

Strategies	How to
technological change	literature, etc., teachers can understand the development trends and potential impacts of artificial intelligence in education and realize the importance of self-improvement.
	2) Share cases of successful application of artificial intelligence technology to improve teaching effectiveness, stimulate teachers' interest and motivation, and realize that technology can become a powerful tool for teaching innovation.
2. Improving teachers career development planning	3) Provide career development planning guidance services to help teachers set personalized career development goals and paths.
	4) Implement policy-supported professional development training programs covering all career stages and ensure that teachers receive appropriate training support at different stages of development.
4. Promoting teachers' professional growth and lifelong learning	6) Establish a mechanism for continuous learning, such as regular training, seminars, workshops, etc., to help teachers develop personalized lifelong learning plans, combine personal career development goals and interests, and clarify learning content and paths.
Strategies for Self-role	
1 . Help teachers change and adapt to their roles	1) Formulate special policies to support the transformation of teachers roles and help them adapt to the role change from knowledge transmitters to learning instructors and resource coordinators.
	2) Conduct training on teacher role transformation to

Table 4.17 (Continued)

Strategies	How to
	enhance teacher awareness and adaptability; encourage teachers to participate in educational innovation projects and explore new teaching roles and models.
2. Establish a life- oriented role consciousness	3)Transform the traditional teacher-centered teaching concept, focus on students' dominant position and personalized needs, and use artificial intelligence technology to provide students with a more accurate and customized experience.
	4) Strengthen the emotional connection and humanistic care between teachers and students, stimulate students' emotions and values, strengthen communication and cooperation between teachers and students, and build a good teacher-student relationship.
3. Improve teachers' professionalism and abilities	5)Utilize online learning platforms, educational apps and other online resources to independently learn courses and resources related to artificial intelligence technology to improve your local level; use AI technology to analyze teachers' teaching effectiveness, provide professional development suggestions, and make targeted improvements.
4. Improve teachers' self-efficacy	6)Establish a systematic professional mission education system to help teachers deeply understand their professional mission and social value in the AI era; enhance teachers' sense of self-efficacy through training and practice to be more confident when taking on multiple roles.

The focus group discussion of the draft sustainable development strategy for the role of teachers in higher vocational colleges in northern Guangdong under artificial intelligence was analyzed using content analysis. In this step, we invited 10 experts to participate in a focus group discussion. As shown in Table 4.17, in terms of gender, there are 6 male teachers, accounting for 60%, and 4 female teachers, accounting for 40%. Regarding positions, there are 7 full-time teachers in higher vocational colleges in northern Guangdong, accounting for 70%; there are 3 artificial intelligence experts, accounting for 30%.

Table 4.18 Status information statistics of experts

Personal information		n	Percentage(%)
Gender	Male	6	60.00
	Female	4	40.00
	Total	**10**	**100.00**
work experience in university (years)	⩽15	3	30.00
	16-19	3	30.00
	⩾20	4	40.00
	Total	**10**	**100.00**
Educational background	Master’s Degree	7	70.00
	Doctor's Degree	3	30.00
	Total	**10**	**100.00**
Position	Teacher	7	70.00
	Ai Experts	3	30.00
	Total	**10**	**100.00**

Based on the collection and statistics of the focus group discussion content, the frequency data of experts' opinions on the feasibility and applicability of the proposed draft strategy and the new strategy are shown in Table 4.19:

Table 4.19 Discussion results and frequency statistics of focus group discussions

Discussion Topic	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10	Frequency	Percentage 100%
Are the strategies mentioned in the draft necessary?												
Improve teachers' awareness of artificial intelligence	√	√	√	√	√	√	√	√	√	√	10	100.00
Improve teachers' artificial intelligence literacy	√	√	√	√	√	√	√	√	√	√	10	100.00
Improve teachers' teaching cognition	√	√	√	√	√	√	√	√	√	√	10	100.00
Improve teachers' self-development cognition	√	√	√	√	√	√	√	√	√	√	10	100.00
Improve teachers' self-role awareness	√	√	√	√	√	√	√	√	√	√	10	100.00
How can the sustainable development strategy of higher vocational teachers' roles be more sustainable under artificial intelligence?												
1. Strategies to improve teachers' understanding of artificial intelligence												
1.1 Strengthen policy support	√					√			√	√		40
1.2 Strengthen publicity efforts		√		√	√							30
1.3 Organize professional training								√	√	√		30
1.4 Strengthen ethics and privacy protection education					√	√	√					30
1.5 Strengthen career stability and reduce the impact of regional differences	√	√	√									30

Table 4.19 (Continued)

Discussion Topic	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10	Frequency	Percentage 100%
2. Improve teachers' AI literacy												
2.1 Increase investment in construction funds				√	√	√						30
2.2 Strengthening training on intelligence literacy	√							√	√	√		40
2.3 Promote collaboration between schools and society							√	√	√			30
2.4 Promote interdisciplinary integration			√	√	√							30
2.5 Regional support plan to improve AI literacy of teachers in backward areas					√	√	√					30
3. Improve teachers' teaching awareness												
3.1 Promoting teaching innovation of human-computer collaboration	√	√	√	√								40
3.2 Optimizing teaching resources to promote educational equity	√								√	√		30
3.3 Establish a learning community and share resources					√	√	√					30
3.4 Improve the teaching evaluation mechanism	√	√	√									30

Table 4.19 (Continued)

Discussion Topic	Expert 1	Expert 2	Expert 3	Expert 4	Expert 5	Expert 6	Expert 7	Expert 8	Expert 9	Expert 10	Frequency	Percentage 100%
4. Improve teachers' self-development awareness												
4.1 Enhanced awareness of technological change	√				√		√					30
4.2 Improving teachers' career development planning			√	√	√					√		40
4.3 Enhance scientific research and innovation capabilities								√	√	√		30
4.4 Promoting teachers' professional growth and lifelong learning	√		√			√						30
5. Improve teachers' role recognition level under artificial intelligence												
5.1 Help teachers change and adapt their roles							√	√	√			30
5.2 Establish a life-oriented role consciousness	√		√		√							30
5.3 Improve teachers' professionalism and abilities		√					√			√		30
5.5 Improving teachers' sense of self-efficacy	√			√	√							30
5.6 Develop a personalized role recognition improvement plan							√	√	√			30
Total	**10**	**5**	**7**	**6**	**10**	**6**	**6**	**6**	**9**	**7**		

According to Table 4.18, from the word frequency statistics, regarding the discussion topic of "Are the strategies mentioned in the draft for commentsnecessary?", 10 experts answered that it is necessary, and the frequency statistics percentage exceeds 100.00%. In the focus group discussion regarding the discussion topic of "How to make the sustainable development strategy of the role of higher vocational teachers under artificial intelligence more sustainable?", experts proposed three supplementary strategy suggestions from three different perspectives: improving teachers' artificial intelligence cognition level, improving teachers' artificial intelligence literacy, and improving teachers' role cognition level: 1.5 Strengthen career stability and reduce the impact of regional differences, 2.5 Regional support plan to improve the AI literacy of teachers in backward areas, and 5.6 Develop a personalized role cognition improvement plan. Combining the SWOT strategic analysis with the results of the focus group discussion, the draft strategy was adjusted and improved to obtain the final strategy, as shown in Table 4.19:

Table 4.20 Strategy List

No.	Aspects of Strategies	Number of strategies	Numbers of Measures
Strategies for Awareness of Artificial			
1	Intelligence	5	7
2	Strategies for Teacher AI Literacy	5	6
3	Strategies for teaching content and methods	4	5
4	Strategies for Self-development Awareness	4	6
5	Strategies for Self-role Awareness	5	7
Total	**5**	**23**	**31**

Table 4.21 Sustainable development strategy of teachers' roles in higher vocational colleges in northern Guangdong under artificial intelligence

Strategies	How to
Strategies for Awareness of Artificial Intelligence	
1. Strengthen policy support	1) Promote the government and education departments to formulate policies and financial investments to support AI education and ensure teachers have sufficient resources and conditions for AI-related teaching and research. 2) Hold policy briefings and seminars to interpret education policies and help teachers understand the strategic positioning and development prospects of AI in education
2. Strengthen publicity efforts	3) Use mass media and social platforms to widely publicize the importance of AI in education and increase society s attention and support for teachers AI awareness.
3. Organize professional training	4) Invite experts, scholars, or business representatives in artificial intelligence to hold special lectures, seminars and workshops for teachers to deeply analyze the basic principles, development trends and application cases of artificial intelligence in education.
4. Strengthen ethics and privacy protection education	5) Provide data privacy protection tools and technical support to help teachers effectively protect student privacy in teaching. 6) Establish risk warning and emergency response mechanisms in the application of AI techno'logy; organize emergency drills regularly to improve teachers ability to deal with ethical and privacy risks.

Table 4.21 (Continued)

Strategies	How to
5. Strengthening career stability and reducing the impact of regional differences	7) Through policy support and special funding, we help teachers in economically underdeveloped areas improve their AI cognition and reduce job insecurity caused by unbalanced technological development.
Strategies for Improving Teachers' AI Literacy	
1. Increase investment in construction funds	1) Increase funding for AI teaching research and application and support teachers in training, purchasing equipment, and software, etc
2, Strengthening training on intelligence literacy	2) Strengthen teacher training and provide systematic artificial intelligence courses and learning resources, help teachers learn artificial intelligence technology in-depth and understand the principles and operating mechanisms behind it; organize teachers to participate in AI laboratory practice activities to improve practical operation skills.
3. Promoting collaboration between schools and society	3) Cooperate with social organizations, educational institutions and enterprises to hold AI education forums and lectures, establish AI education research and development platforms, and help teachers acquire the latest AI application knowledge and master the practical application skills of AI technology.
4. Promoting interdisciplinary integration	4) Establish an interdisciplinary teaching and research platform or team to encourage teachers from different disciplinary backgrounds to explore the application of AI in teaching jointly. 5) Establish an interdisciplinary AI teaching case library to help them flexibly use AI application examples from different disciplines in teaching.

Table 4.21 (Continued)

Strategies	How to
5. Regional support program to improve AI literacy of teachers in underserved areas	6) Through regional special support programs, help teachers in poor areas improve their AI literacy. These programs can include exceptional funding support, policy preferences, and priority training opportunities to ensure these teachers have access to the same training resources and support as those in developed regions.
Strategies to Improve Teachers' Teaching Awareness	
1.Promoting teaching innovation of human-Computer collaboration	1) Use intelligent technology to assist teaching, such as AR and VR technology, to create an immersive learning environment, allowing students to interact and explore in virtual scenes, using intelligent assessment tools to analyze learning situations, and intelligent recommendation systems to provide students with personalized learning resources.
2.Optimizing teaching resources to promote educational equity	2) Build a shared AI teaching resource platform to promote resource sharing among schools and improve the utilization rate of teaching resources. 3) Focus on the balanced distribution of educational resources, increase investment in educational technology, actively use intelligent technology, provide students with more diversified and personalized learning resources, and narrow the digital divide.
3. Establish learning communities and share resources	4) Establish a teacher learning community or communication platform to encourage teachers to share teaching experiences, technical resources, and research results and improve teaching cognition through collective learning and communication.

Table 4.21 (Continued)

Strategies	How to
4. Improve the teaching evaluation mechanism	5) Develop an AI-based student learning feedback and multi- dimensional learning effect evaluation system to collect student learning data in real-time, provide teachers with detailed student learning reports and precise teaching improvement suggestions, and further adjust and optimize teaching strategies.
Strategies for Self-development Awareness	
1. Increased awareness of technological change	1) By participating in seminars, reading professional literature, etc., teachers can understand the development trends and potential impacts of artificial intelligence in education and realize the importance of self-improvement. 2) Share cases of successful application of artificial intelligence technology to improve teaching effectiveness, stimulate teachers' interest and motivation, and realize that technology can become a powerful tool for teaching innovation.
2. Improving teachers career development planning	3) Provide career development planning guidance services to help teachers set personalized career development goals and paths. 4) Implement policy-supported professional development training programs covering all careers and ensure that teachers receive appropriate training support at different stages of development.
3. Enhance scientific research and innovation capabilities	5) Regularly organize training on AI technology and its application in scientific research to help teachers master cutting-edge technologies such as data analysis and machine learning and provide new tools and methods for scientific research.

Table 4.21 (Continued)

Strategies	How to
4. Promoting teachers' professional growth and lifelong learning	6) Establish a mechanism for continuous learning, such as regular training, seminars, workshops, etc., to help teachers develop personalized lifelong learning plans, combine personal career development goals and interests, and clarify learning content and paths.
Self-role recognition strategy	
1 . Help teachers change and adapt to their roles	1) Formulate special policies to support the transformation of teachers' roles, such as providing flexible work arrangements and transformation training funds, to help teachers adapt to the role change from knowledge transmitters to learning instructors and resource coordinators. 2) Conduct training on teacher role transformation to enhance teacher awareness and adaptability; encourage teachers to participate in educational innovation projects and explore new teaching roles and models.
2. Establishing a student-centered role consciousness	3) Transform the traditional teacher-centered teaching concept, focus on students' dominant position and personalized needs, and use artificial intelligence technology to provide students with a more accurate and customized learning experience. 4) Strengthen the emotional connection and humanistic care between teachers and students, focus on cultivating students' emotions and values, strengthen communication and cooperation between teachers and students, and build a good teacher-student relationship.

Table 4.21 (Continued)

Strategies	How to
3. Improve teachers' professionalism and abilities	5) Utilize online learning platforms, educational apps and other online resources to independently learn courses and resources related to artificial intelligence technology to improve your technical level; use AI technology to analyze teachers' teaching effectiveness, provide professional development suggestions, and make targeted improvements.
4. Improve teachers' self-efficacy	6) Establish a systematic professional mission education system to help teachers deeply understand their professional mission and social value in the AI era; enhance teachers' sense of self- efficacy through training and practice, making them more confident when taking on multiple roles.
5. Develop a personalized role recognition enhancement plan	7) For teachers who feel that their roles are unclear in the application of AI technology, we develop personalized role recognition improvement plans. Through mentoring, individual guidance and specialized training, we help teachers understand and clearly identify their professional roles.

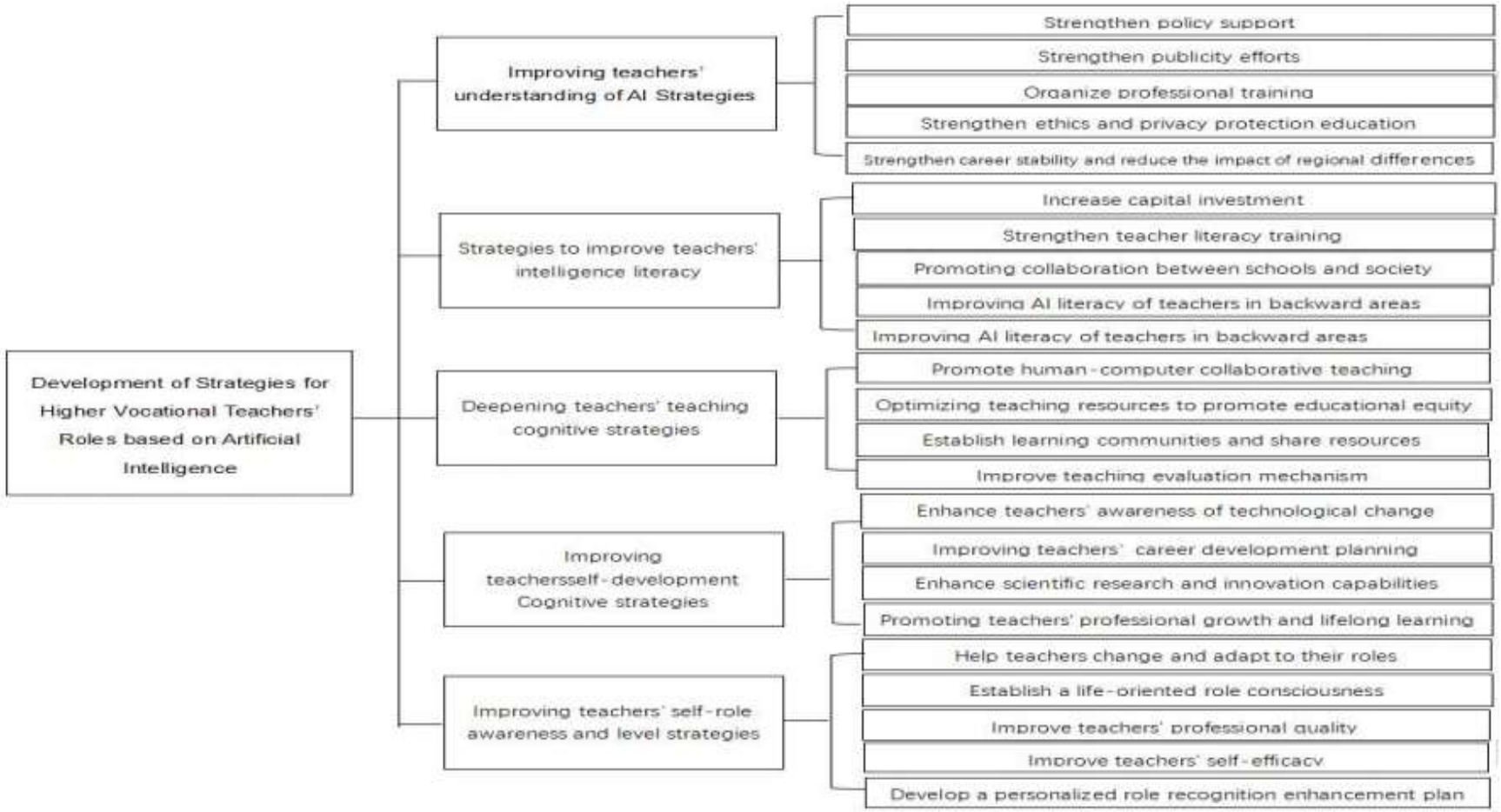


Figure 4.1 Sustainable development strategy of higher vocational teachers' roles under artificial intelligence

Section 4: Results of Feasibility evaluation sustainable development strategy of higher vocational teachers' roles under artificial intelligence.

This section aims to evaluate the feasibility of sustainable development strategies for the roles of higher vocational teachers under artificial intelligence. To this end, we invited 5 experts from 5 higher vocational colleges in northern Guangdong to evaluate the feasibility of sustainable development strategies for the roles of higher vocational teachers under artificial intelligence. The calculation results are shown in the following table:

Table 4.22 Basic Information Analysis of Strategic Evaluation Experts

Personal Information		n	percent
Gender	Male	3	60.0%
	Female	2	40.0%
	Total	**5**	**100%**
Work Experience In University (Years)	⩽15	1	20.0%
	16-19	1	20.0%
	⩾20	3	60.0%
	Total	**5**	**100%**
Educational Background	Master’s Degree	3	60.0%
	Doctor's Degree	2	40.0%
	Total	**5**	**100%**
Position	AI Experts	2	40.0%
	Teacher	3	60.0%
	Total	**5**	**100%**

Table 4.23 Mean and standard deviation of expert evaluation on sustainable development strategies of higher vocational teachers under artificial intelligence

Assessment checklist	Adaptability			Feasibility		
	$\bar{X}$	S.D.	Level	$\bar{X}$	S.D.	Level
1. Strategies to improve teachers' understanding of artificial intelligence	4.53	0.42	highest	4.83	0.41	highest
1.1 Strengthen policy support	4.40	0.55	high	4.85	0.35	highest
1.2 Strengthen publicity efforts	4.75	0.40	highest	4.88	0.45	highest
1.3 Organize professional training	4.35	0.20	high	4.84	0.45	highest
1.4 Strengthen ethics and privacy protection education	4.65	0.55	highest	4.75	0.40	highest
1.5 Strengthening career stability and reducing the impact of regional differences	4.53	0.40	highest	4.83	0.38	highest
2. Improving teachers' intelligence, literacy and ability strategies	4.70	0.28	highest	4.85	0.22	highest
2.1 Increase investment in construction funds	4.75	0.00	highest	5.00	0.00	highest
2.2 Strengthening intelligence literacy training	4.80	0.45	highest	5.00	0.45	highest
2.3 Promoting collaboration between schools and society	4.60	0.25	highest	4.60	0.00	highest
2.4 Promoting interdisciplinary integration	4.65	0.45	highest	4.80	0.45	highest

Table 4.23 (Continued)

Assessment checklist	Adaptability			Feasibility		
	$\bar{X}$	S.D.	Level	$\bar{X}$	S.D.	Level
2.5 Regional support program to improve AI literacy of teachers in underserved areas	4.71	0.27	highest	4.84	0.23	highest
3. Deepening teachers' teaching cognitive strategies	4.65	0.37	highest	4.48	0.26	high
3.1 Promoting teaching innovation of human-computer collaboration	4.55	0.20	highest	4.60	0.20	highest
3.2 Optimizing teaching resources to promote educational equity	4.80	0.45	highest	4.20	0.40	high
3.3 Establish learning communities and share resources	4.65	0.40	high	4.45	0.00	high
3.4 Improve teaching evaluation mechanism	4.60	0.45	highest	4.70	0.45	highest
4. Improving teachers' self-development Cognitive strategies	4.40	0.30	high	4.60	0.25	highest
4.1 Enhance teachers' awareness of technological change	4.65	0.20	highest	4.60	0.00	highest
4.2 Improve teachers' career development planning	4.10	0.30	high	4.75	0.45	highest
4.3 Enhance scientific research and innovation capabilities	4.25	0.25	high	4.45	0.10	High

Table 4.23 (Continued)

Assessment checklist	Adaptability			Feasibility		
	$\overline{X}$	S.D.	Level	$\overline{X}$	S.D.	Level
4.4 Promoting teachers' professional growth and lifelong learning	4.60	0.45	highest	4.60	0.45	highest
5. Improve teachers' self-awareness of their roles	4.80	0.31	highest	4.92	0.18	highest
5.1 Help teachers change and adapt to their roles	4.80	0.30	highest	5.00	0.00	highest
5.2 Establish a life-oriented role consciousness	4.75	0.40	highest	4.90	0.40	highest
5.3 Improve teachers' professionalism and abilities	4.85	0.20	highest	5.00	0.00	highest
5.4 Improve teachers' self-efficacy	4.80	0.35	highest	4.80	0.35	highest
5.5 Develop a personalized role recognition enhancement plan	4.81	0.30	highest	4.91	0.19	highest
Total	**4.61**	**0.34**	**highest**	**4.73**	**0.22**	**highest**

According to Table 4.23, the data show that the experts' overall evaluation of the adaptability and feasibility of the strategy is very high, with the general assessment of feasibility being the highest ($\overline{X}$=4.73). The overall review of adaptability is also high ($\overline{X}$=4.61), indicating that the strategy has high adaptability and feasibility. In the feasibility evaluation of the five sub-dimension strategies, the strategy of improving teachers' self-role cognition level is at the highest level, followed by the strategy of enhancing teachers' intelligent literacy ability, the strategy of improving teachers' artificial intelligence cognition level, the strategy

of deepening teachers' teaching cognition is at a high level and the level of enhancing teachers' self-development awareness. The order of the five sub-adaptability evaluations from high to low is the strategy of enhancing teachers' self-role cognition level, the strategy of enhancing teachers' intelligent literacy ability, the strategy of enhancing teachers' self- development cognition, the strategy of enhancing teachers' artificial intelligence cognition level, and the strategy of enhancing teachers' artificial intelligence cognition level.

Chapter 5
Discussion Conclusion and Recommendations

The aims of the sustainable development strategy of High Vocational school teachers in the AI era in the northern part of Guangdong include three research objectives: 1) to understand the current status of High Vocational school teachers' role cognition in the AI era. 2) to explore the strategies for the sustainable development of High Vocational school teachers' roles in the AI era. 3) to examine the feasibility of sustainable development strategies for High Vocational school teachers to achieve universal recognition. The factors affecting the sustainable development of High Vocational school teachers' roles include five aspects: 1) teachers' AI cognitive level, 2) teachers' intelligence literacy ability, 3) teachers' self- development cognition, 4) teachers' self-development cognition, and 5) teachers' self-recognition.

To achieve these research objectives, this study employed the method of online questionnaire distribution and determined the sample size concerning Cressey and Morgan. Questionnaires were disseminated to 5 higher vocational teachers in northern uangdong Province, and 338 valid questionnaires were gathered. Simultaneously, structured interviews were carried out with ten teacher experts. This study's statistical methods for data analysis include frequency, percentage, mean, and standard deviation. The conclusions, discussions, and recommendations in this research area are as follows:

Conclusion

Through the study of sustainable development strategies for High Vocational school teachers in the northern part of Guangdong under artificial intelligence, the conclusions are summarized in three parts, as follows:

Part 1: Part One: Current status of teachers' role cognition in higher vocational colleges in northern Guangdong under artificial intelligence.

Based on the first research objective, the current status of role cognition among High Vocational school teachers under AI mainly includes five variables: 1) teachers' awareness of artificial intelligence; 2) teachers' understanding of artificial intelligence; 3) teachers' self-development cognition; 4) teachers' self- development cognition (Note: This seems to be repeated and should probably be a different point); 5) teachers' self-role awareness. Statistical analysis of the questionnaire data revealed that the average values for High Vocational school teachers' role cognition across four aspects are moderate. Considering this result, the aspects are ranked from highest to lowest as follows: the highest level is the awareness of AI literacy, followed by the understanding of artificial intelligence, third is self-development awareness, fourth is the cognition of teaching content and methods in the context of AI, and the lowest level is self-role awareness.

The cognitive level of AI literacy is at a moderate level. Based on the results of this study, the levels from highest to lowest are as follows: The highest level is the application cases of AI in the field of education, followed by "understanding of the basic concepts and principles of AI," then "AI has a significant impact on teachers' education and teaching." The lowest level is "precision teaching content should be obtained through big data analysis." This status quo indicates that teachers understand AI's basic concepts and knowledge and can try to apply simple AI tools in teaching. However, they lack the necessary theoretical knowledge and operational skills of AI. Due to the lack of deep technical understanding and application, teachers still face significant challenges in fully leveraging AI's potential and conducting innovative educational practices.

Regarding teachers' AI literacy, the scores are at a moderate level. According to the survey results, the scores from high to low are as follows: "possessing lifelong learning abilities" scored the highest, followed by "cross-disciplinary integration abilities," and then "innovation abilities." In contrast, the abilities with lower scores were "data analysis abilities" and "programming abilities," which had the lowest scores. A lower score indicates that teachers have a lower recognition of their intelligence abilities in AI. We expect a larger gap between

the situation and the current state, indicating that teachers must enhance their abilities in this area. This the situation indicates that teachers have made some progress at the basic level of AI literacy. However, there is still a need for significant improvement in technological depth and interdisciplinary applications.

The current level of teachers' cognition about teaching is moderate. According to the research results, the highest-scoring statement is "Artificial intelligence can enhance teaching effectiveness and students' learning experience," indicating the highest level of acceptance. The next highest is "Artificial intelligence creates a more interactive and engaging teaching environment," and the lowest scoring statement is "AI technology promotes interaction and communication between teachers and students." This situation indicates that High Vocational school teachers in northern Guangdong are beginning to have initial contact with and understand the potential of AI. However, teachers' ability to use AI to improve teaching effectiveness remains relatively low due to a lack of in-depth understanding of AI teaching methods and experience integrating AI technology into teaching. As AI technology's impact on education deepens, teachers need to gradually transition from basic knowledge to in- depth comprehension and practical application to meet the challenges of future educational reforms.

Teachers' self-development awareness scores are at a moderate level. According to the survey results, the highest-ranking aspect is "More applications of artificial intelligence in education," followed by "Moderate level of application of artificial intelligence in big data mining," and the lowest-scoring aspect is "Belief that artificial intelligence will promote the professional development of teachers." This situation indicates that High Vocational school teachers in northern Guangdong generally recognize the importance of self-development and possess a certain level of reflection and improvement ability. However, there is still a significant gap in self- learning and enhancing professional competitiveness in AI. As the impact of AI technology on education gradually deepens, teachers need to pay more attention to self-learning and skill enhancement in the AI

environment, proactively improving their professional competitiveness through self-development to adapt to the changes and challenges in the field of education.

In the era of artificial intelligence, teachers' overall self-awareness of their roles are at a moderate level. According to the survey results, the highest-ranking belief is that in the era of artificial intelligence, teachers should be "guardians of students' psychological and emotional well-being," followed by the belief that teachers should be "guides of values and beliefs" in the era of artificial intelligence, and the lowest scoring belief is that teachers should be "planners of students' learning careers" in the era of artificial intelligence. This situation indicates that High Vocational school teachers in northern Guangdong are beginning to rethink and redefine their teaching roles in the AI environment. However, there is still a lack of readiness regarding how to adapt to future changes in professional roles, especially in the ability to effectively apply AI technology in actual teaching, indicating considerable room for improvement. Teachers need to enhance their deep understanding of the integration of vocational education and artificial intelligence to address better the challenges posed by the rapid development of AI technology in teaching practices.

Part 2: Strategies for Sustainable Development of High Vocational School Teachers' Roles in the Era of Artificial Intelligence.

Based on the second research objective, the researchers formulated strategies for the sustainable development of High Vocational school teachers' roles in the era of artificial intelligence from five aspects through statistical analysis of questionnaire survey data and interviews, totaling 23 measures. These measures include 5 strategies to enhance teachers' awareness of artificial intelligence, 5 to improve teachers' intelligence literacy, 4 to deepen teachers' teaching cognition, 4 to enhance teachers' self-development awareness, and 5 to improve teachers' role cognition. The specific content is as follows:

Enhancing teachers' awareness of artificial intelligence includes 4 strategies: 1) Strengthening policy support; 2) Increasing publicity efforts; 3) Organizing

professional training; 4) Enhancing education on ethics and privacy protection; 5) Strengthening occupational stability to reduce the impact of regional disparities.

Improving teachers' intelligence literacy level involves 5 strategies: 1) Increasing investment in infrastructure; 2) Intensifying training for intelligence literacy; 3) Promoting collaboration between schools and society; 4) Promoting interdisciplinary Integration; 5) Regional support programs to enhance the AI literacy of teachers in underdeveloped areas.

Deepening teachers' teaching cognition includes 4 strategies: 1) Promoting innovative teaching through human-computer collaboration; 2) Optimizing educational resources to promote educational equity; 3) Establishing learning communities and resource sharing; 4) Improving teaching evaluation mechanisms.

Enhancing teachers' self-development cognition includes 4 strategies: 1) Strengthening awareness of technological change; 2) Enhancing teachers' career development planning; 3) Enhancing research and innovation capabilities; 4) Promoting teachers' professional development and lifelong learning.

Improving teachers' role cognition involves 5 strategies: 1) Assisting teachers in role transformation and adaptation; 2) Establishing a student-centered role consciousness; 3) Enhancing teachers' professional literacy and skills; 4) Improving teachers' self-efficacy; 5) Developing personalized role cognition enhancement plans.

Part 3: Adaptability and Feasibility of Sustainable Development Strategies for the Role of Teachers in Higher Vocational Colleges in Northern Guangdong Province under the Influence of Artificial Intelligence.

According to the third research objective, the researchers invited 5 experts to assess the adaptability and feasibility of the strategies for optimizing the sustainable development of High Vocational school teachers' roles. The data analysis results show that the experts rated the strategies' feasibility and adaptability highly, with an average feasibility score of 4.73 and an average adaptability score of 4.61. This indicates that the sustainable development strategies for High Vocational school teachers' roles under artificial intelligence have high adaptability and feasibility. The analysis also suggests that the strategy possesses

significant practical applicability and theoretically promotes the development of High Vocational schoolteachers' roles.

Regarding strategies for enhancing teachers' awareness of artificial intelligence, both feasibility and adaptability are at the highest levels, with average scores of 4.75 and 4.53, respectively, indicating that these strategies have high adaptability and feasibility. Regarding strategies for improving teachers' intelligence literacy, both feasibility and adaptability are also at the highest levels, with average scores of 4.70 and 4.85, respectively, suggesting that these strategies demonstrate high adaptability and feasibility.

For strategies aimed at deepening teachers' teaching cognition, the adaptability of the approach is at the highest level, with an average score of 4.65, while feasibility is at a relatively high level, with an average score of 4.48. This demonstrates that these strategies have high adaptability and feasibility.

In the context of strategies for enhancing teachers' self-development cognition, feasibility is at the highest level, with an average score of 4.60, and adaptability is at a relatively high level, with an average score of 4.40, indicating that these strategies possess strong feasibility and adaptability.

Regarding strategies for enhancing teachers' self-role cognition, both feasibility and adaptability are at the highest level, with average scores of 4.80 and 4.92, respectively, indicating that the strategies for improving teachers' intelligent literacy capabilities possess high adaptability and feasibility.

Discussion

Research optimizing the sustainable development strategies of teachers' roles in higher vocational colleges in Northern Guangdong under artificial intelligence. The researcher summarizes the discussion into three parts, with specific contents as follows:

Part 1: The current status of role cognition of teachers in higher vocational colleges in Northern Guangdong under the influence of artificial intelligence.

Discuss the cognitive awareness of High Vocational school teachers towards artificial intelligence in Northern Guangdong under artificial intelligence. A survey on the current status of High Vocational school teachers' cognitive understanding of artificial intelligence in Northern Guangdong under the context of artificial intelligence found many issues. This includes teachers' understanding of the basic concepts and principles of artificial intelligence, the application of artificial intelligence in education, the perception of the significant impact of artificial intelligence on teacher education and teaching, and the utilization of big data analysis to obtain precise teaching content. By analyzing the average and standard deviation of these situations, it was found that they are at a moderate level. This is mainly related to factors such as teachers' insufficient understanding of the basic concepts and principles of artificial intelligence, limited application of artificial intelligence technology in teaching, and an insufficiently deep understanding of the impact of artificial intelligence on education and teaching. This is consistent with Li (2020) and Zhang (2019), who believe that teachers' literacy in artificial intelligence is crucial for the effective application of educational technology. High Vocational school teachers need to master the basic principles of artificial intelligence and be able to apply it effectively in teaching practices. In addition, teachers' understanding of the application effects of artificial intelligence technology in education needs to be strengthened, especially on how to use these technologies to enhance teaching effectiveness in actual teaching processes. Furthermore, Xu (2021) further pointed out that although artificial intelligence contributes to personalized and intelligent education, teachers' understanding and practical application skills have not caught up completely. Therefore, enhancing teachers' cognitive awareness of artificial intelligence requires strengthening training in artificial intelligence technology and continuous accumulation of experience in teaching practice.

Discuss the level of artificial intelligence literacy of High Vocational school teachers under the context of artificial intelligence in Northern Guangdong. The cognitive awareness of High Vocational school teachers' literacy level regarding AI

is moderate. This is mainly related to the following factors: the incomplete incentive mechanism for the use of artificial intelligence technology among university teachers, insufficient national promotion of artificial intelligence technology in education, the imperfect training system for university teachers, the need to enhance the educational and technological environment, and the insufficient proficiency of teachers in mastering artificial intelligence technology. In response, experts an Scholars such as Zhang (2019), Li (2020), and Xu (2021) pointed out that teachers' cognitive level of AI directly affects its effectiveness in teaching. Zhang (2019) believes that the incentive mechanism for applying artificial intelligence technology among High Vocational school teachers is not mature, which limits the teachers' enthusiasm for new technology. Li (2020) added that insufficient national promotion and the imperfect training system make it difficult for teachers to fully grasp and utilize AI technology. Xu (2021) further pointed out that the educational environment and the technological atmosphere play a crucial role in enhancing teachers' technological cognition. Still, the current climate has not effectively promoted teachers' in-depth understanding of AI technology. Therefore, to improve the cognitive level of High Vocational school teachers' knowledge of artificial intelligence, it is necessary to address various aspects such as perfecting the incentive mechanism, strengthening national promotion, optimizing the training system, and enhancing the educational and technological environment, among others. This is consistent with Ding Zhitong's (2014) view on the mechanism of teachers' transformational motivation. It states that it is necessary to comprehensively consider teachers' actual needs and environmental factors to effectively promote teachers' enthusiasm and capability improvement in applyingAI technology.

Discuss the teaching cognition of High Vocational school teachers under artificial intelligence in Northern Guangdong. Regarding teaching cognition, the level of High Vocational school teachers ’ understanding of artificial intelligence is moderate. The main reasons for this are closely related to the incentive mechanism for the application of artificial intelligence technology in teaching,

the level of national promotion of artificial intelligence education, the completeness of the training system for university teachers, the educational and university technological environment, and the proficiency of teachers in mastering artificial intelligence technology. This aligns with scholars such as Li (2020) and Zhang (2019), who point out that although artificial intelligence has great educational potential, teachers' understanding and mastery of these technologies still needs improvement. In addition, Xu (2021) believes that the country and universities should increase the promotion of artificial intelligence education technology and Improve the training system for teachers to motivate them to effectively use artificial intelligence technology in teaching. However, the current incentive mechanisms and training systems have not fully met the actual needs of teachers regarding artificial intelligence technology, leading to teachers' cognitive and application levels of artificial intelligence being moderate. Therefore, enhancing teachers' artificial intelligence literacy, improving relevant incentive mechanisms and training systems, and creating a favorable technological environment are crucial for raising the teaching cognition level of High Vocational school teachers in artificial intelligence.

Discuss self-development cognition of High Vocational school teachers in Northern Guangdong under artificial intelligence. Regarding self-development cognition, High Vocational school teachers in Northern Guangdong have a moderate level of self-development cognition in the context of artificial intelligence. The main reasons for this are closely related to their cognition of technological changes, the clarity of career development planning, and the improvement of research and innovation capabilities. This situation is consistent with the views of Zhang (2023) and Li (2021). Zhang Xiaomin believes that technological changes pose new challenges to teachers' career development, and the level of teachers' cognition of these changes directly affects the effectiveness of their career development planning. Li points out that many teachers lack systematic understanding and application capabilities when faced with emerging technologies such as artificial intelligence, limiting their potential for career

development and research innovation. Liu (2022) further adds that improving research and innovation capabilities is crucial for teachers to adapt to technological changes and achieve self-development. Teachers must continuously update their knowledge and skills to adapt to the new educational environment. Therefore, vocational colleges in Northern Guangdong should strengthen teachers' technical training and career planning guidance while providing more research support and innovation incentives to enhance teachers' self-development cognition in artificial intelligence.

Discussion on self-role development cognition of High Vocational school teachers in Northern Guangdong under artificial intelligence. In terms of Role cognition, the level of High Vocational school teachers' role cognition under an artificial intelligence background, is moderate. The main reasons include teachers' level of artificial intelligence literacy, the depth of teachers' self-role cognition, national policies and social environment, and changes in student needs. The views of Wang (2019) and Zhang (2019) are consistent. They believe that with the rapid development of artificial intelligence technology, the role of High Vocational school teachers is not only that of knowledge disseminators but also as technology guides and drivers of educational innovation. However, due to the uneven level of teachers' artificial intelligence literacy, many teachers have not fully recognized and accepted this new role positioning. This has led to a generally moderate level of role cognition among teachers in the era of artificial intelligence. National policies and the social policy environment significantly impact teachers' role cognition. However, due to the lag in policy and the lack of clear guidance for teachers' new roles in the era of artificial intelligence, many teachers feel confused about their role cognition and find it difficult to adapt to the changes brought about by new technologies. This imperfect policy environment further exacerbates the insufficient level of teachers' role cognition. In addition, Liu (2020) emphasizes that the rapid changes in student needs pose new challenges to teachers' role cognition. With increasing personalized and technology-driven student needs, teachers often lack sufficient support and

resources, making it difficult to keep pace with the times in role cognition. Therefore, under the background of artificial intelligence, the improvement of the level of role cognition of High Vocational school teachers relies not only on the enhancement of teachers' literacy but also on the improvement of national policies, the reform of school organizational structures, and effective support for teachers to adapt to changes in student needs.

Part 2: Sustainable Development Strategies for the Role of Teachers in Higher Vocational Colleges in Northern Guangdong under the Background of Artificial Intelligence

In terms of strategies to improve the cognitive level of higher vocational teachers toward artificial intelligence, the researchers have proposed four Measures: These strategies include strengthening policy support, intensifying publicity efforts, enhancing professional training, emphasizing ethics and privacy protection education, and reinforcing occupational stability to reduce the impact of regional disparities. These strategies align with Ofojebe and Ezugoh's (2010) and Cui and Shen's (2019) perspectives. Ofojebe and Ezugoh emphasize that clear policy support and systematic training are crucial for improving teachers' understanding and application of emerging technologies. Cui and Shen suggest increasing publicity efforts and conducting ethics education can enhance teachers' awareness and capacity to use artificial intelligence technology. This study found that these measures positively impact teachers' cognitive levels, but attention is still needed to address challenges in practical applications. Recommendations include establishing clear policy-support implementation guidelines, utilizing diverse communication channels for publicity efforts, integrating real-life cases and practical exercises in professional training, and offering specialized courses on ethics and privacy protection education to enhance teachers' ethical awareness and ensure proper handling of privacy issues. Lastly, reinforcing occupational stability to mitigate th impact of regional disparities (Jiang and Nielsen, 2019). Improving the occupational stability and satisfaction of High

Vocational school teachers is beneficial for them to actively face the challenges brought by artificial intelligence.

Strategies to Improve the Artificial Intelligence Literacy Level of High Vocational School Teachers in Northern Guangdong. Researchers have proposed five optimization strategies to improve teachers' technical literacy and application capabilities to enhance the artificial intelligence literacy of High Vocational school teachers in Northern Guangdong. Based on the perspectives of Wang (2017); Ofojebe and Ezugoh (2010); Shen and Wang (2016); Song and Feng (2018), Zhang (2018); Tian (2021), researchers suggest increasing investment in infrastructure development to improve the level of artificial intelligence infrastructure and technological equipment on campus. They also recommend strengthening training in artificial intelligence literacy and promoting collaborative partnerships between schools and society to enhance teachers' practical skills and career Development opportunities. These measures provide teachers with the necessary resources and support to improve their artificial intelligence literacy and technological application capabilities. Additionally, researchers propose measures to promote interdisciplinary integration based on the perspectives of Tian (2007), Liu and Guo (2021). These measures aim to enhance teachers' comprehensive understanding of artificial intelligence technology, promote knowledge exchange and collaboration between disciplines, and enhance overall teaching quality and innovation capabilities. Finally, the suggestion to encourage regional support programs and improve the AI literacy of teachers in underdeveloped areas aligns with the viewpoint of Cui (2018). It emphasizes the importance of policy support and resource allocation to help teachers in underdeveloped areas enhance their professional abilities in artificial intelligence, ultimately achieving educational equity.

Strategies to Improve High Vocational School Teachers' Cognitive Understanding of Teaching in the Context of Artificial Intelligence. Researchers have proposed four optimization strategies to optimize High Vocational school teachers' cognitive understanding of teaching under artificial intelligence. Based

on the perspectives of Chen and Liu (2016), Ji (2017), Zhang et al. (2018), Song and Feng (2018), and Cui and Shen (2019), researchers suggest promoting teaching innovation through human-machine collaboration, optimizing teaching resources to promote educational equity, establishing learning communities and resource sharing, and improving teaching assessment mechanisms. These measures aim to enhance teachers' cognitive understanding and practical capabilities in teaching within an artificial intelligence environment. Specifically, promoting teaching innovation through human-machine collaboration can help teachers fully utilize artificial intelligence technology in the classroom and traditional teaching methods to enhance teaching effectiveness. By optimizing teaching resources, fair distribution of educational resources can be achieved, ensuring that all students have relatively equal learning opportunities. Establishing learning communities and resource sharing can enhance collaboration and knowledge exchange among teachers, improving overall teaching quality and promoting the enhancement of teaching quality by sharing high-quality teaching resources. Additionally, improving the teaching the assessment mechanism is key to optimizing teachers' cognitive understanding of teaching. This includes establishing scientific and reasonable evaluation standards and methods to assess teachers' teaching effectiveness in the artificial intelligence environment, helping teachers adjust teaching strategies on time and improving teaching quality. These strategies align with current educational technology development trends and consider teachers' needs and challenges in the artificial intelligence environment.

Improving High Vocational School Teachers' Self-Development Cognitive Awareness in the Context of Artificial Intelligence. Researchers have proposed four strategies to enhance High Vocational school teachers' self-development and cognitive awareness in the context of artificial intelligence. Based on the perspectives of Li and Zhang (2018); Wang (2019); Zhao (2020); and Liu and Guo (2021), researchers suggest enhancing awareness of technological changes, improving teachers' career development planning, enhancing research and innovation capabilities, and promoting teachers' professional growth and lifelong learning. In

addition to these measures, researchers also point out that improving teachers' self-development cognitive awareness requires schools to provide more comprehensive support and resources. This is consistent with the views of Wang (2017) and Ofojebe and Ezugoh (2010), who believe enhancing teachers' self-development requires considering both individual capacity building and external support. Based on these analyses, schools should strengthen comprehensive support for teachers' self-development cognitive awareness to promote effective growth and development in the artificial intelligence environment.

Optimizing Strategies for Enhancing High Vocational School Teachers' Role Cognitive Awareness. Researchers have proposed five optimization measures to improve teachers' role cognitive awareness. Firstly, based on the studies conducted by Li (2019) and Zhang (2018), researchers suggest measures to help teachers transform and adapt their roles, particularly through training and support, enabling teachers to meet the requirements of new technologies. It is also emphasized to establish a student-centered role awareness, promoting teachers to transform from knowledge transmitters to learning facilitators and focusing on students' personalized development. Secondly, Liu (2020) and Zhao (2020) highlight the importance of enhancing teachers' professional competence and skills in adapting to the teaching environment in the era of artificial intelligence. Researchers recommend continuous career development plans, skills training, and professional learning communities to help teachers improve their professional abilities to cope with rapidly changing educational technologies. Additionally, researchers propose measures to enhance teachers' self-efficacy, encouraging their active participation in teaching innovation and academic research, thereby strengthening their confidence and self-identity in the context of artificial intelligence. These strategies improve teachers' professional competence and enhance their adaptability in the face of educational reforms, thus better supporting students' learning and development.

Lastly, measures to promote regional support programs and to improve AI literacy among teachers in underdeveloped areas align with the viewpoints of

Cui and Huang (2020). This approach emphasizes narrowing the gap in educational resources and improving the effectiveness of overall quality education through policy and financial support.

Part 3: Adaptability and Feasibility of Sustainable Development Strategies for Teachers' Roles in Higher Vocational Colleges in Northern Guangdong under the Influence of Artificial Intelligence.

Strategies for Improving High Vocational School Teachers' Cognitive Levels of Artificial Intelligence. Regarding strategies to enhance High Vocational school teachers' cognitive levels of artificial intelligence, adaptability and feasibility are at their highest. This is because, on the one hand, the rapid development of artificial intelligencetechnology poses higher requirements for vocational education, and teachers must have the corresponding cognitive levels to effectively guide students in addressing future career challenges. On the other hand, the current education system has not fully adapted to the widespread application of artificial intelligence technology, making it imperative for teachers to enhance their cognitive levels of artificial intelligence to ensure the modernization and advancement of educational content and methods. This is related to the viewpoints of Li (2020) and Zhang (2019), who emphasize that teachers must enhance their cognitive levels of artificial intelligence in the new technology environment to meet future teaching demands.

Strategies for improving artificial intelligence literacy among high vocational school teachers are at the highest level in terms of adaptability and feasibility. This is because, on the one hand, the extensive application of artificial intelligence technology is rapidly changing the skill requirements across various industries. Teachers not only need to understand the basic knowledge of artificial intelligence but also must have the ability to apply and practice these technologies to cultivate students' vocational skills better. On the other hand, many current vocational education courses have not fully integrated content related to artificial intelligence. Therefore, enhancing teachers' artificial intelligence literacy can help fill this gap, drive curriculum reform, and improve teaching quality. This is

related to the viewpoints of Wang (2021) and Chen (2019), who emphasize that teachers need to not only master the theoretical knowledge of artificial intelligence but also possess practical operational capabilities to adapt to the changing educational and vocational environments in the future.

Strategies for optimizing the cognitive teaching level of high vocational school teachers are at the highest level in terms of adaptability and feasibility. This is because artificial intelligence technology is rapidly integrating into vocational education, and teachers need to have a higher level of teaching cognitive abilities to address new teaching environments and educational requirements effectively. By optimizing teachers' cognitive teaching levels, it is possible to ensure that they have a better understanding and application of artificial intelligence technology during the teaching process, thereby enhancing teaching quality and student learning outcomes. This is related to the viewpoints of Liu (2020) and Zhang (2021), who points out that in the era of artificial intelligence, teachers' teacher's cognitive teaching levels must be synchronized with the development of new technologies to ensure teaching methods' innovation and the achievement of educational objectives.

Strategies for improving the self-development cognition of vocational college teachers are at the highest or relatively high level in terms of adaptability and feasibility. This is because of the rapid development of artificial intelligence technology Poses new requirements for teachers' self-development, as they must continuously enhance their self-awareness to adapt to the changing and challenging future educational environment. By strengthening teachers' self-development cognition, it is possible to effectively promote their active learning of new technologies and enhance their professional competence and teaching abilities. This aligns with the views of Li (2020) and Wang (2021) argue that in the era of artificial intelligence, teachers' self- development cognition must be synchronized with technological progress to ensure that they maintain competitiveness in educational reform.

Regarding strategies to enhance the cognitive level of vocational college teachers' role awareness, adaptability, and feasibility are at the highest or relatively high level. This is because artificial intelligence is profoundly changing various aspects of education, and the role of vocational college teachers is also evolving accordingly. Teachers are not only the disseminators of knowledge but also the guides of learning and supporters of innovation with the assistance of artificial intelligence. Improving teachers' awareness of this role can ensure they better adapt to this change and play a positive role in teaching and student guidance. This aligns with the views of Liu (2020) and Zhao (2021), who point out that in the era of artificial intelligence, teachers must reshape their role awareness to better respond to new technologies' educational changes and challenges.

Recommendations

In terms of vocational college teachers' awareness of artificial intelligence, survey results show that the lowest score is in the statement, "Should utilize big data analysis to obtain precise teaching content". This indicates that although vocational college teachers have some understanding of artificial intelligence technology, there are still deficiencies in their specific cognitive and application of how to utilize big data analysis to optimize teaching content. Therefore, the researchers propose the following suggestions to vocational college administrators: 1) Strengthen training in big data analysis technology: Schools should regularly organize professional training for big data analysis to help teachers master the basic skills and application techniques of data analysis, and enhance their ability in precise teaching content. 2) Provide data analysis support and resources: Schools should provide relevant big data analysis tools and technical support for teachers, including using data analysis software, data collection methods, and result interpretation to enhance teachers' practical abilities. 3) Promote data-driven teaching practices: Encourage teachers to apply big data analysis technology in teaching design by setting up practical projects and case studies to promote teachers'

exploration of data-driven teaching methods and their application in actual teaching. 4) Establish incentive mechanisms: Design incentive measures to encourage teachers to actively use big data analysis technology in teaching, such as setting up rewards or providing research funding, to stimulate teachers' interest and enthusiasm in utilizing data to optimize teaching content. These measures aim to enhance vocational college teachers' cognitive understanding of using big data analysis to obtain precise teaching content and promote the practical application of artificial intelligence technology in teaching.

Regarding vocational college teachers' awareness of their AI literacy, survey results indicate that the lowest score comes from the statement, "My AI literacy is adequate to meet current teaching needs." This suggests that while vocational college teachers have a basic understanding of AI technology, they have deficiencies in self- assessing whether their AI literacy meets current teaching demands. Therefore, the researchers propose the following suggestions: 1)Clarify the requirements for AI literacy: Schools should define the AI literacy requirements that vocational college teachers need to possess in their teaching. Based on the school's teaching objectives and actual needs, detailed AI literacy standards should be established, helping teachers recognize and gradually achieve these requirements through the curriculum and teaching practices. 2) Enhance teachers' AI literacy: Schools should establish an AI literacy improvement support center that offers professional training, special lectures, online learning resources, and personalized guidance to enhance teachers' knowledge and skills in AI, ensuring they meet current teaching needs. 3) Conduct regular self- assessments and feedback: Encourage teachers to regularly perform self-assessments to gauge whether their AI knowledge and skills meet teaching demands. Schools can implement feedback mechanisms to provide suggestions for improvement and support teachers in continuously enhancing their AI literacy. 4) Introduce AI application cases: Incorporate practical AI application cases into teaching to help teachers understand and master the specific applications of AI technology in education. Through case analysis and hands-on training, teachers can strengthen

their confidence and practical application skills regarding AI technology in teaching. These measures aim to enhance vocational college teachers' awareness of their AI literacy, ensuring they can meet current teaching demands and effectively apply AI technology.

Regarding teachers' cognitive recognition of teaching, the survey results indicate that the lowest score is in the statement, "Artificial intelligence technology can promote teacher-student interaction and communication." This suggests that vocational college teachers lack understanding of how artificial intelligence technology can enhance teacher-student interaction and communication, indicating a need for further improvement in specific cognitive aspects of applying artificial intelligence technology to enhance teacher-student interaction. Therefore, the researchers propose the following suggestions: 1) Enhance training on the application of artificial intelligence technology in teaching: Schools should organize professional training specifically focused on how artificial intelligence technology can promote teacher- student interaction and communication in teaching, helping teachers understand and master how to use these technologies to improve communication between teachers and students. 2) Popularize practical application cases of artificial intelligence technology: Provide practical examples of applications to demonstrate how technology can facilitate teacher-student interaction, such as intelligent teaching assistants, online discussion platforms, virtual classrooms, etc., assisting teachers in applying theory to practice. 3) Encourage teachers to try innovative teaching methods: Encourage teachers to actively explore and apply artificial intelligence technology in teaching to enhance interaction and communication between teachers and students. Establishing innovative teaching awards or support programs can stimulate teachers' interest in exploration. 4) Provide technical support and resources: Schools should provide necessary technical support and resources, such as usage instructions for AI tools, technical support teams, online learning platforms, etc., to ensure that teachers can effectively utilize artificial Intelligence technology to enhance teacher-student interaction. These measures aim to improve vocational college teachers'

cognitive recognition of how artificial intelligence technology can promote teacher-student interaction and communication, thereby advancing the practical application of AI technology in teaching.

Regarding teachers' self-development cognition, survey results indicate that the lowest score is in the statement "Believes that artificial intelligence will promote the professional development of teachers." This suggests that vocational college teachers lack an understanding of the potential of artificial intelligence in promoting their professional development, indicating a need for further improvement in specific cognitive aspects of applying artificial intelligence technology to their career development. Therefore, the researchers propose the following suggestions to vocational college administrators: 1) Enhance cognitive training on the application of artificial intelligence technology to career development: Schools should conduct specialized training to help teachers understand how artificial intelligence technology supports and promotes professional development, including innovations in teaching methods, enhancing research capabilities, and updating professional skills. 2) Showcase real-world applications of artificial intelligence: Provide practical examples to demonstrate how technology can assist teachers in achieving professional development in teaching and research, such as intelligent teaching aids and data analysis in research, helping teachers realize the actual benefits of technology. 3) Encourage teachers to participate in AI-related projects: Support teachers' involvement in AI-related research projects and practical applications, allowing them to deeply understand the promotion role of technology in their career development through project experiences and practical operations. 4) Establish a professional development support platform: Create a dedicated AI and teacher professional development support platform to provide teachers with resources, guidance, and opportunities for exchange, helping them improve their professional skills and grow professionally with the assistance of artificial intelligence.

Regarding teachers' self-role cognition, the survey results indicate that the lowest score is in the statement, "Believing that in the context of artificial intelligence, vocational college teachers should act as student career planners." This suggests that vocational college teachers' awareness of their role in artificial intelligence has not fully developed, especially in guiding student career planning. Therefore, the researchers propose the following suggestions to vocational college administrators: 1) Clarify the role of teachers in the context of artificial intelligence: Schools should clearly define the roles of teachers in the context of artificial intelligence, especially their responsibility as student career planners. Develop relevant guidance documents and role descriptions to help teachers understand and implement this new role. 2) Provide career planning-related training: Organize professional training focused on student career planning to help teachers understand how to use artificial intelligence technology to support students' career planning, including career development planning, skill enhancement, academic guidance, etc. 3) Establish supportive mechanisms and resources: Create a dedicated career planning support center to provide necessary technical tools and resources, such as AI-driven career planning software, data analysis tools, to assist teachers in better-applying technology in career planning. 4) Encourage teachers to practice and share experiences in role transformation: Encourage teachers to actively try and practice new roles in teaching and organize experience-sharing meetings and case studies to promote understanding and application of the new roles among teachers, thus enhancing their professional skills in the context of artificial intelligence.

Future Researches

In artificial intelligence, the sustainable development of vocational college teachers' roles is a complex and important research area involving multiple aspects such as teachers, educational institutions, and education policies. This study provides initial insights into the sustainable development of vocational college teachers' roles in the context of AI, but there are still some shortcomings. To further advance research in this field, future studies can deepen and expand from the following two aspects:

1. Broaden the scope of research. This study mainly focuses on the sustainable development of vocational college teachers' roles in AI. Future research should expand to include more types of educational institutions and different teacher populations in various regions. For example, a broader study could be conducted on the sustainable development of roles for teachers in private vocational colleges and other regions, comparing different types of schools and areas to gain a more comprehensive understanding. Additionally, the study could explore the role development of teachers at various educational levels (such as secondary vocational, vocational, undergraduate, etc.) in AI, assessing their commonalities and differences to develop more targeted policies and strategies.

2. Deepen the research content. Current research mainly focuses on the current situation and influencing factors of the roles of vocational college teachers in the AI environment. Still, there is less quantitative analysis of the sustainable development levels and differences in teacher roles. Future research should delve into these issues from a quantitative research perspective. For example, large-scale surveys or experimental studies could be conducted to quantitatively support the analysis of the sustainable development of teacher roles, exploring the specific mechanisms and strategies for teacher role adaptation under different backgrounds. Furthermore, research should focus on the application of AI technology in the professional development of teachers, analyzing how AI affects the enhancement of teachers' professional skills, changes in work methods, and how these changes impact the long- term growth of teacher roles.

Through these future research directions, a more scientific decision-making basis can be provided to vocational colleges and policymakers, promoting the sustainable development of teacher roles in artificial intelligence and providing strong support for teachers' professional development and improving educational quality. This will help address the challenges and opportunities brought about by AI technology, ensuring that the quality of education and teachers' professional development can meet the new era's requirements.

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Appendices

Appendix A

List of Specialists and Letters of Specialists Invitation for IOC Verification

List of Specialists Invitation for IOC Verification

NO.	Name	Position
1	Chollada Pongpattanayothin	Associate Professor of Bansomdejchaopraya Rajabhat University
2	Narongwat Mingmit	Associate Professor of Bansomdejchaopraya Rajabhat University
3	Patchareeporn Bangkeaw	Assistant Professor of Bansomdejchaopraya Rajabhat University
4	Qiu Jianxia	Professor of Heyuan polytechnic
5	Zeng Wengxiong	Associate Professor of Heyuan polytechnic

Ref.No. MHESI 0643.14/

.No. MHESI 0643.14/1007

Bansomdejchaopraya
Rajabhat University
1061 Itsaraparb Hirunrujee
Thonburi Bangkok 10600

20 June 2024

Subject: Invitation to validate research instrument

Dear Professor Qiu Jianxia,Heyuan Polytechnicl

Mrs.Luo Yuying is a Doctoral student in Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University.She is undertaking research entitled "Development of strategies for higher vocational Teachers'Roles based on Artificial Intelligence in Guangdong".

The thesis advisory committee has considered that you are an expert in this topic. Your recommendations would be useful for further improvement of this research instrument.

With your expertise,we would like to ask your permission to validate the attached research instrument.In this regard,we would like to avail ourselves of this opportunity to express our sincere thanks and appreciation for your help.

Yours faithfully

(Assistant Professor Akaranun Asvarutpokin)
Vice Dean of Graduate Schoot for Dean of Graduate School

Tel.+662-473-7000
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Ref.No. MHESI 0643.14/

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Bansomdejchaopraya
Rajabhat University
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Thonburi Bangkok 10600

20 June 2024

Subject: Invitation to validate research instrument

Dear Dr.Thanida Sutcharitthamt

Mrs.Luo Yuying is a Doctoral student in Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University.She is undertaking research entitled "Development of strategies for higher vocational Teachers'Roles based on Artificial Intelligence in Guangdong".

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20 June 2024

Subject: Invitation to validate research instrument

Dear Asst.Prof.Dr.Patchareeporn Bangkeaw

Mrs.Luo Yuying is a Doctoral student in Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University.She is undertaking research entitled "Development of strategies for higher vocational Teachers'Roles based on Artificial Intelligence in Guangdong".

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20 June 2024

Subject: Invitation to validate research instrument

Dear Professor TaoYing, Heyuan Polytechnicl

Mrs.Luo Yuying is a Doctoral student in Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University.She is undertaking research entitled "Development of strategies for higher vocational Teachers'Roles based on Artificial Intelligence in Guangdong".

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20 June 2024

Subject: Invitation to validate research instrument

Dear Assoc.Prof.Dr. Narongwat Mingmit

Mrs.Luo Yuying is a Doctoral student in Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University.She is undertaking research entitled "Development of strategies for higher vocational Teachers'Roles based on Artificial Intelligence in Guangdong".

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List of Invitation list for structured interviews

NO.	Name	Position
1	Qiu Jianxia	Professor of Heyuan Polytechnic
2	Zeng Wengxiong	Associate Professor of Heyuan Polytechnic
3	Luo Zhi	Assistant Professor of Guangdong Meizhou Polytechnic
4	Liu Fang	Associate Professor of Guangdong Meizhou Polytechnic
5	Liu Ying	Associate Professor of Qingyuan Polytechnic
6	Yang Guanghong	Associate Professor of Qingyuan Polytechnic
7	Feng Yaoqiang	Associate Professor of Guangdong Songshan Polytechnic
8	Li Shuai	Associate Professor of Guangdong Songshan Polytechnic
9	Chen Qingyun	Associate Professor of Luoding Polytechnic
10	Huang Xinhong	Professor of Luoding Polytechnic

Appendix B

Official Letter

List of Specialists Invitation for Strategies Evaluation

The following is a list of invited evaluation experts to evaluate the adaptability and feasibility of the sustainable development strategy of the role of teachers in higher vocational colleges in northern Guangdong under the background of artificial intelligence.

NO.	Name	Position
1	Liu Fang	Professor of Guangdong Meizhou Polytechnic
2	Zeng Wengxiong	Associate Professor of Heyuan Polytechnic
3	Taoying	AI Expert of Heyuan Polytechnic
4	Yang Guanghong	AI Expert of Qingyuan Polytechnic
5	Huang Xinhong	AI Expert of Luoding Polytechnic

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Bansomdejchaopraya
Rajabhat University
1061 Itsaraparb Hirunrujee
Thonburi Bangkok 10600

26 July 2024

Subject: Request for data collection
Dear Associate professor Chen Qingyun Luoding Polytechnic
Attachment: 1.Questionnaires
2.Structured interview

Regarding Mrs.Luo Yuying with student code 6473139016, a doctoral student majoring in the Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of strategies for higher vocational Teachers' Roles based on AI in Guangdong", supervised by the thesis advisory committee as follows.

1. Assistant Professor Dr.Luxana Keyuraphan	Major Advisor
2. Assistant Professor Dr.Pawich Pholngam	Co-Advisor
3. Assistant Professor Dr.Chollada Pongpattanayothin	Co-Advisor

In this research, the researcher requires to collect data for the said research. Therefore, the researcher requested to collect the data to be used in the research.

Sincerely,

(Assistant Professor Dr.Nukul Sarawong)
Dean of Graduate School

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Thonburi Bangkok 10600

26 July 2024

Subject: Request for data collection

Dear Associate professor Li Shuai Guangdong Songshan Polytechnic

Attachment: 1.Questionnaires
2.Structured interview

Regarding Mrs.Luo Yuying with student code 6473139016, a doctoral student majoring in the Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of strategies for higher vocational Teachers' Roles based on AI in Guangdong", supervised by the thesis advisory committee as follows.

1. Assistant Professor Dr.Luxana Keyuraphan	Major Advisor
2. Assistant Professor Dr.Pawich Pholngam	Co-Advisor
3. Assistant Professor Dr.Chollada Pongpattanayothin	Co-Advisor

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Thonburi Bangkok 10600

26 July 2024

Subject: Request for data collection

Dear Associate professor Feng Yaoqiang Guangdong Songshan Polytechnic

Attachment: 1.Questionnaires
2.Structured interview

Regarding Mrs.Luo Yuying with student code 6473139016, a doctoral student majoring in the Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of strategies for higher vocational Teachers' Roles based on AI in Guangdong", supervised by the thesis advisory committee as follows.

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26 July 2024

Subject: Request for data collection

Dear Associate professor Yang Guanghong Qingyuan Polytechnic

Attachment: 1.Questionnaires
2.Structured interview

Regarding Mrs.Luo Yuying with student code 6473139016, a doctoral student majoring in the Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of strategies for higher vocational Teachers' Roles based on AI in Guangdong", supervised by the thesis advisory committee as follows.

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2. Assistant Professor Dr.Pawich Pholngam	Co-Advisor
3. Assistant Professor Dr.Chollada Pongpattanayothin	Co-Advisor

In this research, the researcher requires to collect data for the said research. Therefore, the researcher requested to collect the data to be used in the research.

Sincerely,

(Assistant Professor Dr.Nukul Sarawong)
Dean of Graduate School

Tel.+662-473-7000
ext. 1814
E-mail: grad@bsru.ac.th

Ref.No. MHESI 0643.14/

.No. MHESI 0643.14/

Bansomdejchaopraya
Rajabhat University
1061 Itsaraparb Hirunrujee
Thonburi Bangkok 10600

26 July 2024

Subject: Request for data collection
Dear Associate professor Luo Zhi Guangdong Meizhou Polytechnic
Attachment: 1.Questionnaires
2.Structured interview

Regarding Mrs.Luo Yuying with student code 6473139016, a doctoral student majoring in the Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of strategies for higher vocational Teachers' Roles based on AI in Guangdong", supervised by the thesis advisory committee as follows.

1. Assistant Professor Dr.Luxana Keyuraphan	Major Advisor
2. Assistant Professor Dr.Pawich Pholngam	Co-Advisor
3. Assistant Professor Dr.Chollada Pongpattanayothin	Co-Advisor

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Bansomdejchaopraya
Rajabhat University
1061 Itsaraparb Hirunrujee
Thonburi Bangkok 10600

26 July 2024

Subject: Request for data collection

Dear professor Taoying HeYuan Polytechnic

Attachment: 1.Questionnaires
2.Structured interview

Regarding Mrs.Luo Yuying with student code 6473139016, a doctoral student majoring in the Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of strategies for higher vocational Teachers' Roles based on AI in Guangdong", supervised by the thesis advisory committee as follows.

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Bansomdejchaopraya
Rajabhat University
1061 Itsaraparb Hirunrujee
Thonburi Bangkok 10600

26 July 2024

Subject: Request for data collection

Dear professor Liu Fang Guangdong Meizhou Polytechnic

Attachment: 1.Questionnaires
2.Structured interview

Regarding Mrs.Luo Yuying with student code 6473139016, a doctoral student majoring in the Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of strategies for higher vocational Teachers' Roles based on AI in Guangdong", supervised by the thesis advisory committee as follows.

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Bansomdejchaopraya
Rajabhat University
1061 Itsaraparb Hirunrujee
Thonburi Bangkok 10600

26 July 2024

Subject: Request for data collection

Dear professor Qiu Jianxia Heyuan Polytechnic

Attachment: 1.Questionnaires
2.Structured interview

Regarding Mrs.Luo Yuying with student code 6473139016, a doctoral student majoring in the Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of strategies for higher vocational Teachers' Roles based on AI in Guangdong", supervised by the thesis advisory committee as follows.

1. Assistant Professor Dr.Luxana Keyuraphan	Major Advisor
2. Assistant Professor Dr.Pawich Pholngam	Co-Advisor
3. Assistant Professor Dr.Chollada Pongpattanayothin	Co-Advisor

In this research, the researcher requires to collect data for the said research. Therefore, the researcher requested to collect the data to be used in the research.

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.No. MHESI 0643.14/

Bansomdejchaopraya
Rajabhat University
1061 Itsaraparb Hirunrujee
Thonburi Bangkok 10600

26 July 2024

Subject: Request for data collection

Dear professor Zheng Erjun Heyuan Polytechnic

Attachment: 1.Questionnaires
2.Structured interview

Regarding Mrs.Luo Yuying with student code 6473139016, a doctoral student majoring in the Educational Management for Sustainable Development of Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of strategies for higher vocational Teachers' Roles based on AI in Guangdong", supervised by the thesis advisory committee as follows.

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2. Assistant Professor Dr.Pawich Pholngam	Co-Advisor
3. Assistant Professor Dr.Chollada Pongpattanayothin	Co-Advisor

In this research, the researcher requires to collect data for the said research. Therefore, the researcher requested to collect the data to be used in the research.

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Bansomdejchaopraya
Rajabhat University
1061 Soi Itsaraphap 15,
Itsaraphap Road, Hiranruchi,
Thonburi, Bangkok, Thailand
10600

18 Sept 2024

Subject Request for evaluation of strategyProfessor

Dear Liu Fang Qingyuan Polytechnic

Attarchment Evaluation sheets

Regarding Mrs. Luo Yuying with student code 6473139016, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

1. Assistant Professor Dr.Luxana Keyuraphan — Major Advisor
2. Assistant Professor Dr.Pawich Pholngam — Co-advisor
3. Assistant Professor Dr.Chollada Pongpattanayothin — Co-advisor

Developing strategies for the sustainable development of the role of higher vocational teachers under artificial intelligence is the focus of this study. The researchers know that you have experience in this area, so they hope that you can assist in evaluating these strategies. The researchers are eager to hear your suggestions for the sustainable development of the role of higher vocational teachers under artificial intelligence. Thank you very much for your positive response.

Thank you for your kind considerations.

Yours faithfully

(Assistant Professor Dr.Nukul Sarawong)
Dean of Graduate School

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Itsaraphap Road, Hiranruchi,
Thonburi, Bangkok, Thailand
10600

18 Sept 2024

Subject Request for evaluation of strategy Professor

Dear Zeng Wengxiong Heyuan Polytechnic

Attarchment Evaluation sheets

Regarding Mrs. Luo Yuying with student code 6473139016, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

1. Assistant Professor Dr.Luxana Keyuraphan — Major Advisor
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Thonburi, Bangkok, Thailand
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18 Sept 2024

Subject Request for evaluation of strategy Professor

Dear Taoying Heyuan Polytechnic

Attarchment Evaluation sheets

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18 Sept. 2024

Subject Request for evaluation of strategy Professor

Dear Huang Xinhong Luo Ding Polytechnic

Attarchment Evaluation sheets

Regarding Mrs. Luo Yuying with student code 6473139016, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

1. Assistant Professor Dr.Luxana Keyuraphan — Major Advisor
2. Assistant Professor Dr.Pawich Pholngam — Co-advisor
3. Assistant Professor Dr.Chollada Pongpattanayothin — Co-advisor

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Thonburi, Bangkok, Thailand
10600

18 Sept 2024

Subject Request for evaluation of strategy Professor

Dear Yang Guanghong Qing Yuan Polytechnic

Attarchment Evaluation sheets

Regarding Mrs. Luo Yuying with student code 6473139016, a doctoral student majoring in Sustainable Development Education Management at Bansomdejchaopraya Rajabhat University. The thesis is entitled "Development of Strategies to Promote Sustainable Professional Competences for University Lecturers in the Digital Era, Sichuan Province." The thesis committee is as follows:

1. Assistant Professor Dr.Luxana Keyuraphan — Major Advisor
2. Assistant Professor Dr.Pawich Pholngam — Co-advisor
3. Assistant Professor Dr.Chollada Pongpattanayothin — Co-advisor

Developing strategies for the sustainable development of the role of higher vocational teachers under artificial intelligence is the focus of this study. The researchers know that you have experience in this area, so they hope that you can assist in evaluating these strategies. The researchers are eager to hear your suggestions for the sustainable development of the role of higher vocational teachers under artificial intelligence. Thank you very much for your positive response.

Thank you for your kind considerations.

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Appendix C

Research Instrument

Questionnaire

Development of Strategies for Higher Vocational Teachers' Roles based on Artificial Intelligence in Northern Guangdong

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Direction:

1. The purpose of this questionnaire is to understand the role cognition of higher vocational teachers and the factors that affect it under the background of artificial intelligence. Further formulate a sustainable development strategy for the role of higher vocational teachers under artificial intelligence, and evaluate the sustainable development strategy for the role of higher vocational teachers under artificial intelligence.

2. A questionnaire survey was conducted on the current status and influencing factors of the sustainable development of the role of higher vocational teachers under artificial intelligence, which is divided into two parts. The first part is the personal information of the respondents, and the second part is the factors that affect the role cognition of higher vocational teachers under artificial intelligence, a total of 32 questions.

Thank you for your cooperation in answering this questionnaire.

Mrs. Luo Yuying

Bansomdejchaopraya Rajabhat University

Part I:

1.Teaching period:

☐ Freshman;

☐ Sophomore;

☐ Junior (Have to define the exactly meaning)

2.Gender :☐ Male; ☐ Female

3.Teaching experience:

☐ 0-5 years;

☐ 5-10 years;

☐ 10-15 years;

☐ 15-20 years;

☐ more than 20 years.

4.Age:

☐ 30 years old and below;

☐ 31-40 years old;

☐ 41-50 years old;

☐ 51-60 years old;

☐ 61 years old and above.

5 What are your main subjects taught :

☐ Engineering;

☐ Science;

☐ Liberal arts;

☐)Arts;

☐) Other

6 Your highest academic qualification:

☐ Junior college;

☐ Bachelor's degree;

☐ Master's degree;

☐ Doctoral degree

Part 2: Current status of role cognition of higher vocational teachers under artificial intelligence

5 = Always, it expresses that the level of sustainable professional competence among university lecturers was at the highest level

4= Often, it expresses that the level of sustainable professional competence among university lecturers was at a high level

3 =Sometimes, it expresses that the level of sustainable professional competence among university lecturers was at a middle level

2 = Rarely, it expresses that the level of sustainable professional competence among university lecturers was at a low level

1 = Never, it expresses that the level of sustainable professional competence among university lecturers was at the lowest level

Factor	Questions	Level					Remarks
		5	4	3	2	1	
1.Awareness of artificial intelligence	1.1 I have a certain understanding of the basic concepts and principles of artificial intelligence.						
	1.2 I can list some examples of AI application in education.						
	1.3 I think artificial intelligence currently has a practical impact on teacher education and teaching						
	1.4 In my opinion, artificial intelligence will have a great impact on teacher education and teaching in the future.						
	1.5 I think big data analysis should be used to obtain accurate teaching content.						

Factor	Questions		Level					Remarks
			5	4	3	2	1	
2.Artificial literacy level awareness	2.1 I am skilled in using at least one artificial intelligence tool or platform to assist teaching.							
	2.1 I often organize students to use smart devices in my education and teaching.							
	2.3 I think my AI literacy can meet the current teaching needs.							
	2.4 In my opinion, in the era of artificial intelligence, vocational teachers should have the following abilities	Higher vocational teachers should have data analysis ability.						
		Higher vocational teachers should have Programming ability.						
		Higher vocational teachers should have innovation ability.						
		Higher vocational teachers should have interdisciplinary integration ability.						
	2.5 Higher vocational teachers should have lifelong learning ability.							

Factor	Questions		Level					Remarks
			5	4	3	2	1	
3.Knowledge of teaching content and methods	3.1 I think AI can enrich the content and form of teaching.							
	3.2 I think artificial intelligence technology should be used to develop new teaching methods.							
	3.3 I think artificial intelligence can improve the teaching effect and students' learning experience.							
	3.4 I think AI can provide more personalized learning support for students.							
	3.5 I think al elps to create a more interactive and interesting teaching environment.							
	3.6 I think the artificial intelligence technology can promote the interaction and communication between teachers and students.							
4.Teachers' awareness of self-develop ment	4.1 I believe that artificial intelligence can change the teaching mode and role positioning of higher vocational teachers.							
	4.2 I think artificial intelligence will promote the professional development of teachers.							
	4.3 I look forward to more applications of artificial intelligence in education and teaching.	Smart Tutor						
		Big data mining						
		Intelligent test and evaluation						
		Smart Education						
		Big data mining						

Factor	Questions		Level					Remarks
			5	4	3	2	1	
	4.4 I think artificial intelligence will provide more teaching resources and support for higher vocational teachers.							
5.Self-role awareness.	5.1 I think the emergence of artificial intelligence will have a great impact on the role and status of teachers.							
	5.2 I think artificial intelligence will not completely replace higher vocational teachers, but it will change our job responsibilities.							
	5.3 I think we should use big data and cloud computing to evaluate students' learning							
	5.4 In the era of artificial intelligence, I think the role of teachers should be:	Education and teaching researcher						
		Student Growth Data Analyst						
		Student learning career planner						
		Mental and emotional caregiver						
		A guide to values and beliefs						
	5.5 I think the factors that affect the sustainable development of the role of higher vocational teachers are:	Teachers' AI literacy level						
		Changes in teaching content and course design						
		Changing student needs						

Factor	Questions		Level					Remarks
			5	4	3	2	1	
		Teachers' own development needs						
		National and social policy environment						
		Other factors						

Recommendation

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Validity evaluation form of the interview form on factors affecting the sustainable development of the roles of higher vocational teachers in northern Guangdong under artificial intelligence

Direction:

1. This evaluation form is an expert evaluation and suggestion on the feasibility and adaptability of the sustainable development strategy of the role of higher vocational teachers under artificial intelligence. This is part of the doctoral dissertation in sustainable development education. This study aims to understand the role cognition of higher vocational teachers under artificial intelligence, formulate sustainable development strategies for the role of higher vocational teachers under artificial intelligence, and evaluate the sustainable development strategies for the role of higher vocational teachers under artificial intelligence.

2. This questionnaire validity evaluation form has 8 questions and suggestions.

3. Please respond to this questionnaire. The validity comments of the evaluation form will help formulate development strategies to promote the sustainable development of the role of higher vocational teachers under artificial intelligence.

Thank you for your cooperation in answering this assessment form for validity.

Mrs. Luo Yuying
Bansomdejchaopraya Rajabhat University

Assessment form for The validity evaluation table of the strategy of sustainable development of the role of higher vocational teachers under artificial intelligence.

Research Title: Development of strategies for higher vocational Teachers ' Roles based on Artificial Intelligence in Guangdong

Research Objectives:

1. To identify the role cognition of higher vocational teachers under artificial intelligence.

2. To explore strategies for the sustainable development for the roles of higher vocational teachers in the era of artificial intelligence.

3. To evaluate the effectiveness of the sustainable strategies for higher vocational teachers and make them universally recognized.

When using the questionnaire, please consider whether the content of each questionnaire meets the current situation of "Perception of the Role of Vocational Teachers under Artificial Intelligence". After consideration, please tick the corresponding box and use the following criteria for consideration.

Rating is+1.There is an opinion that "Corresponds to definition."

Rating is 0.There is an opinion that "Not sure it corresponds to definition."

Rating is -1.There is an opinion that"Inconsistent with definition."

Factor	Questions	Assessment result			Remarks
		-1	0	+1	
1.Awareness of artificial intelligence	1.1 I have a certain understanding of the basic concepts and principles of artificial intelligence.				
	1.2 I can list some examples of AI application in education.				
	1.3 I think artificial intelligence currently has a practical impact on teacher education and teaching				
	1.4 In my opinion, artificial intelligence will have a great impact on teacher education and teaching in the future.				
	1.5 I think big data analysis should be used to obtain accurate teaching content.				

Factor	Questions		Assessment result			Remarks
			-1	0	+1	
2.AI Literacy	2.1 I am skilled in using at least one artificial intelligence tool or platform to assist teaching.					
	2.1 I often organize students to use smart devices in my education and teaching.					
	2.3 I think my AI literacy can meet the current teaching needs.					
	2.4 In my opinion, in the era of artificial intelligence, vocational teachers should have the following abilities	Higher vocational teachers should have data analysis ability.				
		Higher vocational teachers should have programming ability.				
		Higher vocational teachers should have innovation ability.				
		Higher vocational teachers should have interdisciplinary integration ability.				
		Higher vocational teachers should have lifelong learning ability.				
3.Teaching content and methods	3.1 I think AI can enrich the content and form of teaching.					
	3.2 I think artificial intelligence technology should be used to develop new teaching methods.					
	3.3 I think artificial intelligence can improve the teaching effect and students' learning experience.					

Factor	Questions		Assessment result			Remarks
			-1	0	+1	
	3.4 I think AI can provide more personalized learning support for students.					
	3.5 I think al elps to create a more interactive and interesting teaching environment.					
	3.6 I think the artificial intelligence technology can promote the interaction and communi cation between teachers and students.					
4.Teacher-student relationship 3.8	4.1 I think the emergence of artificial intelligence greatly affects the role and status of teachers.					
	4.2 I think big data and cloud computing should be used to evaluate students' learning.					
	4.3 In the context of artificial intelligence, the role of vocational teachers should be	Researchers of education and teaching				
		Student growth data analysts				
		Student learning career planners				
		Psychological and emotional care person				
		The guide of value and faith				
	4.4 I think artificial intelligence will enable higher vocational teachers to better understand and meet the needs of students.					
	4.1 I think AI will promote the professional development of teachers.					

Factor	Questions		Assessment result			Remarks
			-1	0	+1	
4.Self-development awareness.	4.2 I think artificial intelligence can change the teaching mode and role positioning of higher vocational teachers.					
	4.3 In education and teaching, I look forward to more applications of artificial intelligence on	Intelligent mentors				
		Big data mining				
		Intelligent evaluation				
		Intelligent education and other platforms.				
	4.4 I think AI will provide more teaching resources and support for higher vocational teachers.					
	4.5 I am willing to actively adapt to this role change and constantly improve myself to meet the new teaching needs.					
5.Teachers' self-role cognition	5.1 I think the emergence of artificial intelligence will have a great impact on the role and status of teachers.					
	5.2 I think artificial intelligence will not completely replace higher vocational teachers, but it will change our job responsibilities.					
	5.3 I think we should use big data and cloud computing to evaluate students' learning					
	5.4 In the context of artificial intelligence, the role of vocational teachers should be	Education and teaching researcher				
		Student Growth Data Analyst				
		Student learning career planner				
		Mental and emotional caregiver				
		A guide to values and beliefs				

Factor	Questions		Assessment result			Remarks
			-1	0	+1	
	5.5 I think the factors that affect the sustainable development of the role of higher vocational teachers are:	Teachers' AI literacy level				
		Changes in teaching content and course design				
		Changing student needs				
		Teachers' own development needs				
		National and social policy environment				
		Other factors				

Suggestions .....

.....

Effectiveness evaluation of sustainable development interviews on the roles of teachers in higher vocational colleges in northern Guangdong under artificial intelligence

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Directions:

1. This "Interview Form Validity Evaluation Form for Sustainable Development Strategies of the Role of Vocational Teachers in Northern Guangdong under Artificial Intelligence" is a form for experts to consider the consistency of the questionnaire and make suggestions. It is part of the doctoral dissertation on educational management at Bansongdechaopraya Rajabhat University, Thailand. The purpose of this study is to explore the components of sustainable development strategies for the roles of vocational teachers in northern Guangdong under artificial intelligence, formulate sustainable development strategies for the roles of vocational teachers in northern Guangdong under artificial intelligence, and evaluate sustainable development strategies for the roles of vocational teachers in northern Guangdong under artificial intelligence.

2. This questionnaire validity evaluation form has 8 questions and suggestions.

3. Your comments on the interview form validity evaluation form will help develop management strategies to promote the sustainable development of the roles of vocational teachers in northern Guangdong under artificial intelligence. Answering this questionnaire will not affect you personally. The proposed data will be an overview, and the researcher intends to use the data for research purposes only.

Thank you for your cooperation in answering this assessment form for validity.

Mrs. Luo Yuyingi

Bansomdejchaopraya Rajabhat University

When using the questionnaire, please consider whether the content of each questionnaire meets the current situation of "Perception of the Role of Vocational Teachers under Artificial Intelligence". After consideration, please tick the corresponding box and use the following criteria for consideration.

Rating is+1.There is an opinion that "Corresponds to definition."

Rating is 0.There is an opinion that "Not sure it corresponds to definition."

Rating is -1.There is an opinion that"Inconsistent with definition."

No.	Questions	Assessment result			Remarks
		-1	0	+1	
1	How is the level of AI cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?				
2	How about the level of AI literacy of vocational college teachers under artificial intelligence? What are the suggestions for improvement?				
3	How about the level of teaching cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?				
4	How about the self-development awareness of vocational college teachers under artificial intelligence? What are the suggestions for improvement?				
5	How is the self-role cognition of higher vocational teachers under artificial intelligence? What are the optimization suggestions?				

Suggestions ……

……

Strategic evaluation form for sustainable development of the role of teachers in higher vocational colleges in northern Guangdong under artificial intelligence

---

Directions:

1. This interview form validity evaluation form for the "Sustainable Development Strategy for the Role of Teachers in Higher Vocational Colleges in Northern Guangdong under Artificial Intelligence" is a form for experts to consider the consistency of the questionnaire and make suggestions. It is part of the doctoral dissertation on sustainable development education management at Bansomdejchaopraya Rajabhat University, Thailand. The purpose of this study is to explore the elements of sustainable development of the role of teachers in higher vocational colleges in Northern Guangdong under artificial intelligence, formulate sustainable development strategies for the role of teachers in higher vocational colleges in Northern Guangdong under artificial intelligence, and evaluate the sustainable development strategies for the role of teachers in higher vocational colleges in Northern Guangdong under artificial intelligence.

2. This questionnaire validity evaluation form revolves around five aspects, including all strategies.

3. Your comments on the interview form validity evaluation form will help develop management strategies to promote the formulation of sustainable development strategies for the role of teachers in higher vocational colleges in Northern Guangdong under artificial intelligence. Answering this questionnaire will not affect you personally. The data provided will be an overview, and the researcher intends to use the data for research purposes only.

Thank you for your cooperation in answering this validity evaluation form.

Mrs. Luo Yuying
Bansomdejchaopraya Rajabhat University

Instruction:

The tool used this time is a questionnaire to evaluate the sustainable development strategy of the role of teachers in higher vocational colleges in northern Guangdong under artificial intelligence.

Please consider using the questionnaire to evaluate various aspects of the sustainable development strategy of the role of teachers in higher vocational colleges in northern Guangdong under artificial intelligence.

Please check each comment box and the scores are as follows:

5 indicates the highest adaptability and feasibility.

4 indicates high adaptability and feasibility.

3 indicates average adaptability and feasibility.

2 indicates low adaptability and feasibility;

1 indicates the lowest adaptability and feasibility.

Evaluation checklist	Adaptability					Feasibility				
	5	4	3	2	1	5	4	3	2	1
Strategies for Awareness of artificial intelligence										
1.IStrengthen policy support										
2.Strengthen publicity efforts										
3.Organize professional training										
4.Strengthen ethics and privacy protection education										
5.Strengthen career stability and reduce the impact of regional differences										
Strategies for Improving Teachers' AI Literacy										
1.Increase investment in construction funds										
2.Strengthening training on intelligence literacy										
3.Promote collaboration between schools and society										

Evaluation checklist	Adaptability					Feasibility				
	5	4	3	2	1	5	4	3	2	1
4.Promote interdisciplinary integration										
5.Regional support plan to improve AI literacy of teachers in backward areas										
Strategies to Improve teachers ' teaching awareness										
1.Promoting teaching innovation of human-computer collaboration										
2.Optimizing teaching resources to promote educational equity										
3.Establish a learning community and share resources										
4.Improve the teaching evaluation mechanism										
Strategies for Self-development awareness										
1. Enhanced awareness of technological change										
2.Improving teachers ' career development planning										
3.Enhance scientific research and innovation capabilities										
4.Promoting teachers ' professional growth and lifelong learning										
Strategies for Self-role										
1.Help teachers change and adapt their roles										
2.Establish a life-oriented role consciousness										
3.Improve teachers' professionalism and abilities										
4.Improve teachers' self-efficacy										
5.Develop a personalized role recognition improvement plan										

Suggestions .....

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Appendix D

The Results of the Quality Analysis of Research Instruments

Consistency evaluation results of questionnaire survey on the cognizable status of higher vocational teachers' roles under artificial intelligence.

1. The quality analysis results of Questionnaire.

clause	Role cognition of teachers in higher vocational colleges in northern Guangdong under artificial intelligence	Experts					IOC	Conclusion
		1	2	3	4	5		
Awareness of artificial intelligence								
1	I have a certain understanding of the basic concepts and principles of artificial intelligence.	1	1	1	1	1	1.00	consistent
2	I can list some examples of AI application in education.	1	1	1	1	1	1.00	consistent
3	I think artificial intelligence currently has a practical impact on teacher education and teaching	1	1	1	1	1	1.00	consistent
4	In my opinion, artificial intelligence will have a great impact on teacher education and teaching in the future.	1	1	1	1	1	1.00	consistent
5	I think big data analysis should be used to obtain accurate teaching content.	1	1	1	1	1	1.00	consistent
Artificial literacy level awareness								
1	I am skilled in using at least one artificial intelligence tool or platform to assist teaching.	1	1	1	1	1	1.00	consistent
2	I often organize students to use smart devices in my education and teaching.	1	1	1	1	1	1.00	consistent
3	I think my AI literacy can meet the current teaching needs.	1	1	1	1	1	1.00	consistent

clause	Role cognition of teachers in higher vocational colleges in northern Guangdong under artificial intelligence		Experts					IOC	Conclusion
			1	2	3	4	5		
4	In my opinion, in the era of artificial intelligence, vocational teachers should have the following abilities	Should have data analysis ability.	1	1	1	1	1	1.00	consistent
		Should have programming ability.	1	1	1	1	1	1.00	consistent
		Should have innovation ability.	1	1	1	1	1	1.00	consistent
		Should have interdisciplinary integration ability.	1	1	1	1	1	1.00	consistent
		Should have lifelong learning ability.	1	1	1	1	1	1.00	consistent
Knowledge of teaching content and methods									
1	I think AI can enrich the content and form of teaching.		1	1	1	1	1	1.00	consistent
2	I think artificial intelligence technology should be used to develop new teaching methods.		1	1	1	1	1	1.00	consistent
3	I think artificial intelligence can improve the teaching effect and students' learning experience.		1	1	1	1	1	1.00	consistent
4	I think AI can provide more personalized learning support for students.		1	1	1	1	1	1.00	consistent
5	I think al elps to create a more interactive and interesting teaching environment.		1	1	1	1	1	1.00	consistent
6	I think the artificial intelligence technology can promote the interaction and communication between teachers and students.		1	1	1	1	1	1.00	consistent

clause	Role cognition of teachers in higher vocational colleges in northern Guangdong under artificial intelligence		Experts					IOC	Conclusion
			1	2	3	4	5		
Teachers' awareness of self-development									
1	I believe that artificial intelligence can change the teaching mode and role positioning of higher vocational teachers.		1	1	1	1	1	1.00	consistent
2	I think artificial intelligence will promote the professional development of teachers.		1	1	1	1	1	1.00	consistent
3	I look forward to more applications of artificial intelligence in education and teaching.	Smart Tutor	1	1	1	1	1	1.00	consistent
		Big data mining	1	1	1	1	1	1.00	consistent
		Intelligent test and evaluation	1	1	1	1	1	1.00	consistent
		Smart Education	1	1	1	1	1	1.00	consistent
4	I think artificial intelligence will provide more teaching resources and support for higher vocational teachers.		1	1	1	1	1	1.00	consistent
Self-role awareness									
1	I think the emergence of artificial intelligence will have a great impact on the role and status of teachers.		1	1	1	1	1	1.00	consistent
2	I think artificial intelligence will not completely replace higher vocational teachers, but it will change our job responsibilities.		1	1	1	1	1	1.00	consistent
3	I think we should use big data and cloud computing to evaluate students' learning		1	1	1	1	1	1.00	consistent

clause	Role cognition of teachers in higher vocational colleges in northern Guangdong under artificial intelligence		Experts					IOC	Conclusion
			1	2	3	4	5		
4	In the era of artificial intelligence, I think the role of teachers should be:	Education and teaching researcher	1	1	1	1	1	1.00	consistent
		Student Growth Data Analyst	1	1	1	1	1	1.00	consistent
		Student learning career planner	1	1	1	1	1	1.00	consistent
		Mental and emotional caregiver	1	1	1	1	1	1.00	consistent
		A guide to values and beliefs	1	1	1	1	1	1.00	consistent
5	I believe that the sustainable development of the teacher's role can be promoted through the following methods:	By strengthening the construction of artificial intelligence	1	1	1	1	1	1.00	consistent
		Improve teachers' professional qualities and abilities	1	1	1	1	1	1.00	consistent
		Learn artificial intelligence technologies and methods	1	1	1	1	1	1.00	consistent

2. The quality analysis results of Interview.

clause	The factors promoting development	Experts					IOC	Conclusion
		1	2	3	4	5		
1	How is the level of AI cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?	1	1	1	1	1	1.00	consistent
2	How about the level of AI literacy of vocational college teachers under artificial intelligence? What are the suggestions for improvement? 3. What is the level of teaching cognition of vocational college	1	1	1	1	1	1.00	consistent
3	How about the level of teaching cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?	1	1	1	1	1	1.00	consistent
4	How about the self-development awareness of vocational college teachers under artificial intelligence? What are the suggestions for improvement?	1	1	1	1	1	1.00	consistent
5	How is the self-role cognition of higher vocational teachers under artificial intelligence? What are the optimization suggestions?	1	1	1	1	1	1.00	consistent

3. The quality analysis results of evaluation form.

clause	The factors promoting development	Experts					IOC	Conclusion
		1	2	3	4	5		
Strategies for Awareness of artificial intelligence								
1.IStrengthen policy support		1	1	1	1	1	1.00	consistent
2.Strengthen publicity efforts		1	1	1	1	1	1.00	consistent
3.Organize professional training		1	1	1	1	1	1.00	consistent
4.Strengthen ethics and privacy protection education		1	1	1	1	1	1.00	consistent
5.Strengthen career stability and reduce the impact of regional differences		1	1	1	1	1	1.00	Consistent
Strategies for Improving Teachers' AI Literacy								
1.Increase investment in construction funds		1	1	1	1	1	1.00	consistent
2.Strengthening training on intelligence literacy		1	1	1	1	1	1.00	consistent
3.Promote collaboration between schools and society		1	1	1	1	1	1.00	consistent
4.Promote interdisciplinary integration		1	1	1	1	1	1.00	consistent
5.Regional support plan to improve AI literacy of teachers in backward areas		1	1	1	1	1	1.00	Consistent
Strategies to Improve teachers ' teaching awareness								
1.Promoting teaching innovation of human-computer collaboration		1	1	1	1	1	1.00	consistent
2.Optimizing teaching resources to promote educational equity		1	1	1	1	1	1.00	consistent
3.Establish a learning community and share resources		1	1	1	1	1	1.00	consistent
4.Improve the teaching evaluation mechanism		1	1	1	1	1	1.00	consistent

clause	The factors promoting development	Experts					IOC	Conclusion
		1	2	3	4	5		
Strategies for Self-development awareness								
1. Enhanced awareness of technological change		1	1	1	1	1	1.00	consistent
2.Improving teachers ’ career development planning		1	1	1	1	1	1.00	Consistent
3.Enhance scientific research and innovation capabilities		1	1	1	1	1	1.00	consistent
4.Promoting teachers ’ professional growth and lifelong learning		1	1	1	1	1	1.00	Consistent
Strategies for Self-role								
1.Help teachers change and adapt their roles		1	1	1	1	1	1.00	consistent
2.Establish a life-oriented role consciousness		1	1	1	1	1	1.00	consistent
3.Improve teachers' professionalism and abilities		1	1	1	1	1	1.00	consistent
4.Improve teachers' self-efficacy		1	1	1	1	1	1.00	consistent
5.Develop a personalized role recognition improvement plan		1	1	1	1	1	1.00	consistent

Reliability analysis of research instruments
Results of variable reliability correlation analysis

Reliability

Scale: all variables

Case handling summary			
		N	%
case	effective	338	100
	Excludeda	0	0
	Total	331	100
a. List deletion based on all variables in this program.			

Reliability statistics		
Cronbach's Alpha	Based on standardized items Cronbachs Alpha	Number of terms
0.961	0.961	60

Interviewee

Interviewer 1

1.How is the level of AI cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think some teachers have basic AI knowledge and have integrated AI tools into their courses, but they lack in-depth technical understanding, and most teachers are not familiar with the actual application scenarios of AI. Policies support the integration of higher vocational education and AI and provide training resources, but at the same time, due to the rapid development of technology, it is difficult for teachers to continue to follow up and learn.

I think 1) Regularly hold special lectures on AI technology, 2)Carry out school-enterprise cooperation, get in touch with the latest AI practices in the industry, and use online platforms such as Coursera and edX to learn basic AI courses, 3)Promote experience sharing among teachers by establishing an AI

education community, and further improve the level of AI cognition of higher vocational teachers.

2.How about the level of AI literacy of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think 1) the government has gradually increased its support for AI education, and some colleges and universities have begun to build AI laboratories. However, due to insufficient funding and lack of resources in remote areas, it is difficult to conduct effective AI teaching. 2) As the demand for AI education increases, the government and enterprises have more opportunities to invest in AI education. However, due to the uneven use of funds, the popularization and improvement of AI literacy have been affected. 3) The government's policy support for AI education is increasing, but a comprehensive funding support system has not yet been formed, and the funding of higher vocational colleges cannot meet the needs of AI technology education.

Therefore, I suggest: 1) Increase funding and increase government and school investment in AI education; 2) Set up special funding support to ensure that all teachers can participate in AI training.Optimize the use of funds and plan the allocation of funds reasonably.3) Introduce social capital and encourage enterprises and social capital to participate in the funding and cooperation of AI education; 4) Build an AI education resource platform: Promote the popularization and sharing of AI education resources through the joint construction of an online platform by the government and enterprises.

3.How about the level of teaching cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think that 1) some higher vocational colleges have made initial investments in AI education, but there is still a gap in overall development.

2) Insufficient funding, many schools lack modern AI equipment, and the improvement of teachers' literacy is limited.

3) The government and society pay more and more attention to AI education, and funding is gradually increasing, but the funding is unevenly distributed, especially schools in remote areas lack sufficient funding support.

4) The government's support for AI education continues to increase, but the implementation of policies is inconsistent and there are large local differences.

Therefore, I suggest: 1) Increase funding, the government and schools should strive for more education funds, especially the purchase of AI education equipment; 2) Establish special funding support: Provide special funds for remote areas and schools with tight funding to ensure equal opportunities for AI literacy improvement; 3) Optimize the use of funds: Ensure that funds are used first for the construction of AI teaching resources and equipment; 4) Encourage social capital participation, attract enterprises and social capital to jointly participate in AI education projects and share resources.

4.How about the self-development awareness of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think that teachers in higher vocational schools do not fully understand the transformative potential of AI technology. Many teachers only regard it as a teaching tool, but do not realize its profound impact on teaching methods and educational ecology. Some teachers lack sensitivity to technological change and find it difficult to actively adapt to the rapidly changing teaching environment, resulting in the neglect of opportunities to combine AI technology in their career development.

I think that we should: 1) strengthen the publicity and training of technological change, and let teachers have a deep understanding of the impact of AI on education through seminars, case analysis and technical practice. 2) Promote teachers to participate in research and forum activities related to technological change to keep pace with the forefront of the industry. 3) Support teachers to develop courses and teaching resources that adapt to technological change to help them better integrate into the teaching changes in the AI era.

5.How is the self-role cognition of higher vocational teachers under artificial intelligence? What are the optimization suggestions?

The role cognition of teachers in higher vocational colleges in the era of artificial intelligence is generally lagging behind. Most teachers still regard themselves as traditional "knowledge transmitters" and fail to realize that they need to transform themselves into "learning promoters" or "technology guides". Some teachers show a negative attitude when facing the challenges of AI technology, believing that technology is difficult to replace the traditional education model. Although some schools have carried out training on AI teaching, teachers are still confused in practical applications.

I think: 1) Improve role cognition, such as through seminars and role-playing activities, to help teachers understand their role positioning in the AI era.

2) Provide transformation support by simulating AI teaching scenarios to strengthen teachers' adaptability.

3) Strengthen the sharing of successful cases to let teachers feel the actual effect and value of the transformation.

4) Promote contextualized teaching to help teachers adapt to new teaching roles supported by AI.

5) Establish a continuous feedback mechanism to guide teachers to gradually complete the role transformation.

Interviewer 2

1.How is the level of AI cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think teachers are more receptive to educational technology, but they have limited knowledge of AI technical terms and concepts; the growing demand for AI talents in society will promote the development of AI education, and teachers in other regions may be more competitive in AI technology.

I think: 1) Include basic AI knowledge in the regular assessment of teachers; 2) Introduce corporate lecturers to teach, bridge the technology gap and form AI interest groups in schools; 3) Stimulate teachers' interest in active learning and help them understand AI teaching by developing simple teaching toolkits.

2.How about the level of AI literacy of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think that: 1) Some higher vocational colleges have begun to provide teachers with basic training on AI literacy, but the training content is too basic to meet the teachers' advanced learning needs, and most teachers fail to continue learning. 2) The popularity of online learning platforms and distance education has made training more flexible and convenient, but the training system lags behind, teachers are not motivated enough to participate in training, and cannot meet the needs of rapidly developing AI technology. 3): The government has issued policies on improving teacher literacy, but detailed measures and

implementation efforts are still insufficient. 4) The construction of training resources and platforms requires a large amount of capital investment, and some schools are facing a shortage of funds.

Therefore, I suggest: 1) Design training courses suitable for teachers at different levels; 2) Increase online training efforts, reduce geographical restrictions, and promote teachers' continuous learning; 3) Introduce practical courses to provide specific cases and projects, so that teachers can learn AI technology in practice. 4) Strengthen the evaluation and feedback mechanism, and adjust the training content based on the evaluation results.

3.How about the level of teaching cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think some teachers are already familiar with the operation of intelligent teaching equipment, but lack systematic practical experience in teaching model reform; the school's investment in AI-assisted teaching is increasing year by year, but the teaching model is too dependent on tools, which may affect the cultivation of students' thinking ability; the traditional teaching model restricts the teaching innovation of higher vocational teachers in the classroom, and teachers encounter technical bottlenecks in practice.

Therefore, I think we should: 1) open AI teaching practice workshops, combine case studies, regularly hold teacher teaching achievement exhibitions, promote successful experiences, and provide teachers with phased AI tool use guides; 2) introduce AI teaching model research projects to encourage teachers to participate in innovation. 3) Promote innovative teaching models, combine the interactivity and personalization of AI technology, and promote human-computer collaborative teaching. 4) Provide technical support and tools to help teachers solve practical difficulties in innovative teaching and improve classroom effectiveness.

4.How about the self-development awareness of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think many teachers in higher vocational colleges lack clear career development plans and fail to include AI technology learning in their personal development goals. Their career development awareness is relatively passive, and in practice, it is difficult to combine their own career needs with the growth path of AI technology, resulting in a disconnect between personal skills and industry needs.

Therefore, I think we should: 1) establish a systematic career development guidance system to help teachers set clear career goals and include AI technology learning and application in their plans. 2) Establish career development incentives to encourage teachers to take the initiative to learn through scholarships, further study opportunities, etc. 3) Provide rich career development resource support to promote the all-round development of teachers in teaching, scientific research and technology application.

5.How is the self-role cognition of higher vocational teachers under artificial intelligence? What are the optimization suggestions?

I think teachers generally lack the role recognition of "student-centered" in teaching, and are more concerned with completing teaching tasks rather than meeting students' personalized learning needs. AI technology provides tools to support differentiated teaching, but teachers do not know enough about how to use these tools to help students improve their learning outcomes. In addition, the teacher-centered concept in traditional teaching methods still dominates, hindering the cultivation of students' autonomous learning ability.

I suggest: 1) Strengthen the subject status of students: help teachers understand the core role of students in learning through teaching training and case analysis.

2) Promote personalized teaching tools: provide AI-based personalized learning platforms to support teachers in designing learning plans suitable for different students.

3) Guide students to learn independently: train teachers on how to guide students to actively explore knowledge and enhance their interest in learning in class.

4) Conduct learning needs analysis regularly: help teachers understand students' personalized needs and adjust teaching content and rhythm.

5) Encourage interaction between teachers and students: enhance interaction and collaboration between teachers and students through AI-supported classroom tools.

Interviewer 3

1.How is the level of AI cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think that AI education resources in higher vocational colleges are limited, and there is a lack of cross-school sharing and cooperation mechanisms. Teachers are facing a shortage of resources; resources are unevenly distributed, especially for colleges and teachers in remote areas, it is difficult to obtain high-quality AI education resources;

I think we should 1) share AI teaching resources, courseware and practical tools through online platforms to promote knowledge exchange among teachers; 2) encourage higher vocational colleges to share educational resources, conduct joint teaching and training; 3) cooperate with enterprises to provide teachers with the latest teaching tools and practice opportunities; 4) establish a practice base: establish an AI technology application practice base outside the school to provide teachers with more practice opportunities.

2.How about the level of AI literacy of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think 1) some colleges and universities have begun to try interdisciplinary AI education, but AI education in many colleges and universities is still limited to computer majors, and there are few practices of interdisciplinary integration.

2) Teachers' interdisciplinary application ability is weak, and the teaching platform and resources are not rich enough.

3) The government advocates interdisciplinary education, but it needs to be further strengthened in policy guidance and resource allocation.

4) Interdisciplinary education has become the key to promoting AI talent training, but it faces the problem of tight implementation investment funds.

Therefore, I suggest: 1) Design interdisciplinary courses, combine AI technology with other disciplines such as machinery, medicine, and art, and design interdisciplinary teaching content; 2) Encourage interdisciplinary cooperation and promote computer and other professional teachers to jointly design AI courses and teaching projects; 3) Organize interdisciplinary training to enhance their cross-field teaching ability; 4) Strengthen cooperation between higher vocational colleges and share resources.

3.How about the level of teaching cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement? I think 1) some teachers have basic AI knowledge, but lack depth and practical skills.

2) The popularity of online training platforms and self-learning resources provides teachers with flexible learning opportunities, but the training format is single and lacks depth, which cannot meet the actual needs of teachers. The training content is lagging behind and not updated in time, and cannot keep up with the rapid development of AI technology. 3) The government's attention to teacher training has gradually increased, but the training system and evaluation system need to be improved. 4) Limited education funds affect the quality and coverage of training.

Therefore, I think it should be: 1) Conduct regular AI training courses to provide teachers with systematic AI training courses from basic to advanced; 2) Provide teachers with flexible learning opportunities through online platforms to reduce geographical restrictions; 3) Design practical courses: The training content should focus on practical operations to help teachers transform AI theoretical knowledge into teaching practice. Provide interdisciplinary training opportunities: Design interdisciplinary AI training courses to help teachers apply them flexibly.

4.How about the self-development awareness of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think the overall scientific research and innovation capabilities of teachers in higher vocational colleges are relatively weak. Most teachers have a low degree of participation in scientific research, and the direction of scientific research is out of touch with actual needs. AI technology is developing rapidly, but teachers have failed to seize the opportunities of scientific research and innovation, resulting in a low conversion rate of scientific research results in teaching.

I think we should: 1) encourage teachers to actively participate in AI scientific research projects and provide them with sufficient scientific research resources and technical support. 2) Through innovative ability training and incentive mechanisms, improve teachers' ability to propose and implement innovative teaching plans. 3) Promote school-enterprise cooperation and jointly carry out scientific research projects so that teachers can better combine scientific research with actual teaching needs.

5.How is the self-role cognition of higher vocational teachers under artificial intelligence? What are the optimization suggestions?

I think the professional quality of teachers in higher vocational colleges faces severe challenges in the AI era, and many teachers fail to update their teaching

content and methods in time to adapt to technological progress. Some teachers have weak technical capabilities and lack a deep understanding of the application of AI in teaching, which leads to a disconnect between their teaching content and industry development. In addition, teachers have a weak awareness of lifelong learning and fail to improve their professional ability through active learning.

I think we should: 1) Develop a systematic training plan: Carry out AI skill training courses from basic to advanced to improve teachers' technical literacy. 2) Promote discipline integration: Encourage teachers to integrate AI technology into different disciplines to improve the innovation and practicality of the course. 3) Strengthen industry practice: Through school-enterprise cooperation, provide teachers with opportunities to go deep into the industry and help them master the latest technology applications. 4) Support teachers to participate in scientific research: Provide financial and resource support to encourage teachers to integrate scientific research results into teaching practice. 5) Regularly hold exchange activities: Organize teachers to share experiences and achievements to promote common growth.

Interviewer 4

1.How is the level of AI cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think most teachers in higher vocational schools have insufficient understanding of AI ethics and privacy protection, especially in terms of data security and student privacy protection; in current AI education, ethics and privacy protection are often neglected, and there is a lack of sufficient guidance and norms in the teaching process.

Therefore, I suggest: 1) Add AI ethics, data protection and other content to AI education and training to improve teachers' ethical awareness; 2) Formulate ethical standards to regulate the behavior of teachers and students in the application of AI technology.Regularly conduct ethics seminars to help teachers understand the moral and privacy issues in technology applications. 3) Strengthen privacy protection training to enhance teachers' sense of responsibility. 4) Encourage teachers to participate in ethics education training and certification to improve their ethical ability in AI teaching.

2.How about the level of AI literacy of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think 1) some colleges and universities have cooperated with enterprises to provide teachers with AI technology support and practical opportunities. But the depth of cooperation is insufficient. 2) The demand for AI technology in society has increased dramatically, and there is huge space for school-enterprise cooperation. However, the cooperation resources have not been effectively integrated, resulting in limited practical opportunities for teachers. 3) The government encourages school-enterprise cooperation and talent training, but lacks policy support and cooperation norms. 4) Enterprises invest unevenly in education, and some schools cannot get sufficient support. I think we should: 1) Strengthen the in-depth cooperation between schools and enterprises, establish long-term cooperative relationships with enterprises, and provide practical opportunities for teachers; 2) Build a school-enterprise cooperation platform to promote resource sharing and the wide provision of practical opportunities. 3) Regularly hold corporate lectures and exchanges to convey the latest technology trends and needs; 4) Promote enterprises to participate in curriculum development and help teachers design more industry-practical AI courses; 5) Jointly build practice bases with enterprises to provide teachers with the latest AI technologies and tools used in actual teaching.

3.How about the level of teaching cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think the teaching content of higher vocational colleges is not well connected with social needs, and teachers do not have a deep understanding of industry dynamics and technological development, which affects the practical application of AI technology in teaching. Although society has a strong demand for AI talents, teachers' teaching cognition has not kept pace with market demand in a timely manner.

I think: 1) Strengthen the cooperation between schools and industries, and jointly develop AI courses that meet market needs through schools and enterprises. 2) Invite industry experts to teach the latest technology trends in schools to help teachers improve their industry cognition. 3) Promote teachers to participate in industry research and understand the actual needs of enterprises for the application of AI technology. 4) Strengthen the linkage between teaching content and social needs through industry-university-research cooperation projects.

4.How about the self-development awareness of vocational college teachers under artificial intelligence? are the suggestions for improvement?

I think that the lifelong learning awareness of teachers in higher vocational colleges is weak. Most teachers lack the motivation to learn after completing basic teaching tasks, which leads to the lag of skill updating behind technological development. 2) The concept of lifelong learning has not been deeply integrated into the career of teachers. Insufficient learning resources and incentive mechanisms further restrict the continuous development of teachers.

I think we can: 1) Promote the popularization of the concept of lifelong learning among teachers and help teachers realize the importance of continuous learning. 2) Provide flexible online learning platforms and rich learning resources to facilitate teachers to improve their skills at work. 3) Encourage teachers to continuously update their knowledge and keep up with the pace of technological development by establishing learning incentives and evaluation systems.

5.How is the self-role cognition of higher vocational teachers under artificial intelligence? What are the optimization suggestions?

I think that with the rapid development of AI technology, some teachers in higher vocational colleges feel that the teaching pressure is increasing and their self-efficacy is decreasing. Some teachers are afraid of the complexity of AI technology and believe that they cannot master the relevant skills. This belief further affects their teaching confidence. In addition, the lack of recognition of their own value also makes some teachers lack initiative in teaching innovation.

I think we can: 1) Enhance confidence building: help teachers overcome their fear of AI technology through psychological support and technical training. 2) Share success stories: show the achievements of teachers in AI teaching and enhance their confidence in their own abilities. 3) Establish honorary incentives: commend teachers who have performed well in the application of AI technology through teaching innovation awards. 4) Provide continuous support: establish a technical support team to help teachers solve technical problems in teaching in a timely manner. 5) Cultivate a positive feedback culture: let teachers see their contributions and progress through teaching evaluation and student feedback.

Interviewer 5

1.How is the level of AI cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, the AI education and teaching model of higher vocational colleges is relatively traditional, lacking in innovation and interactivity, and it is difficult to inspire teachers' enthusiasm for teaching. Most teachers have not yet mastered how to combine AI technology with innovative teaching models.

Therefore, I think we can: 1) Promote the teaching model of human-computer collaboration and improve classroom interactivity; 2) Design project-based learning courses related to AI to encourage students to apply what they have learned in actual projects; 3) Implement personalized teaching plan design to achieve precision education; 3) Promote online and offline hybrid learning and provide flexible and diverse learning methods; 4)

Innovate evaluation methods, use AI technology to monitor students' learning effects in real time, and optimize the teaching evaluation system.

2.How about the level of AI literacy of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion: 1) Some colleges and universities have certain technical support teams, but the overall support is insufficient. 2) Teachers lack effective technical support in the process of applying AI technology. The professional level of AI technical support personnel is low, and it is difficult to meet the growing technical needs of teachers. 3) The government gradually encouragesthe construction of an educational technology support system, but the implementation details have not yet been perfected.4) The

construction of technical support teams and equipment requires a large amount of capital investment, and many colleges and universities lack resources.

Therefore, I think: 1) Establish a dedicated technical support team to help teachers solve technical problems; 2) Provide AI technology training regularly to improve the technical application capabilities of higher vocational teachers; 3) Strengthen the technical support of the teaching platform to ensure smooth teaching; 3) Promote the sharing and circulation of technical

resources and improve the overall technical support level; 4) Provide teachers with timely updated teaching equipment and technical tools to ensure the effectiveness of AI teaching.

3.How about the level of teaching cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, some vocational college teachers have a strong sense of self-learning, but overall they lack a systematic career development plan and learning path. Teachers' learning of AI technology mostly stays at the theoretical level, and they fail to effectively combine their career development goals for self-improvement, which affects the overall development of teaching cognition.

Therefore, I think: 1) Help teachers establish career development plans and incorporate AI literacy improvement into personal development goals. 2) Provide flexible learning resources to support teachers to learn AI technology anytime and anywhere. 3) Establish a learning incentive mechanism to encourage teachers to participate in lifelong learning projects through scholarships and training subsidies. 4) Encourage teachers to set phased learning goals and continuously optimize their teaching cognition.

4.How about the self-development awareness of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, teachers are more concerned about improving their personal abilities, but their overall awareness of development is low and they lack self-motivation. Policies and technology provide impetus for career development, but the pressure of competition among peers increases.

I think we can: 1) open AI-driven career development planning courses; 2) implement an in-school mentor system to provide personalized guidance for teachers; 3) encourage teachers to write research papers to improve their professional skills; 4) regularly hold cross-school exchange meetings to share growth experiences.

5.How is the self-role cognition of higher vocational teachers under artificial intelligence? What are the optimization suggestions?

In my opinion, teachers do not fully understand the importance of AI technology-driven teaching reform. Some teachers still believe that technology is only an auxiliary tool and are skeptical about its transformative potential. The lack of technical knowledge makes it difficult for teachers to actively adopt AI technology in teaching practice, missing the opportunity to improve teaching effectiveness.

I think we should: 1) Strengthen technical awareness training: popularize the application value of AI technology in the field of education and help teachers

recognize its driving force. 2) Provide practical opportunities: Through technical pilot projects, let teachers feel the role of AI in promoting teaching in practice. 3) Develop a technical application guide: Provide teachers with an easy-to-use AI technology teaching guide to lower the threshold for technology use. 4) Promote the popularization of AI teaching platforms: Equip teachers with modern teaching platforms and tools to enhance their ability to apply technology. 5) Establish a technical support network: Help teachers solve problems in actual operations through technical support teams inside and outside the school.

Interviewer 6

1.How is the level of AI cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, political support and rapid technological development bring opportunities for AI education. Economic and technical aspects pose challenges to teachers.

I think it is possible to: 1) reduce training costs through government subsidies; set phased goals, such as mastering basic tools in 3 months and developing course cases in 6 months; 2) use social resources, such as jointly providing on-site training with industry associations; 3) use AI-assisted tools to recommend personalized learning paths for teachers.

2.How about the level of AI literacy of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

I think 1) some colleges and universities have already developed preliminary AI courses, but the course content is still relatively basic, lagging behind the development of AI technology, and teachers have little experience in course development.

2) The development of AI technology provides rich resources for updating and innovating course content, but the speed of course updating cannot keep up with the rapid changes in AI technology, affecting the quality of education.

3) The government supports AI education, but specific support and policy guidance for course development are still insufficient.

4) AI course development requires financial investment, while the budget of higher vocational colleges is limited.

Therefore, I think we should: 1) develop diversified AI courses to meet the learning needs of various teachers; 2) regularly update course content to ensure the cutting-edge nature of teaching.

Design courses in combination with industry needs: course development should keep up with the actual needs of the industry to ensure that students can apply the AI technology they have learned in practice;

3) strengthen the setting of practical courses and enhance teachers' application capabilities; 4) introduce international standards and develop AI courses that meet global standards.

3.How about the level of teaching cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, AI technology has great potential for interdisciplinary applications, but the teaching cognition of higher vocational teachers is mostly limited to the scope of their own disciplines, and they lack the ability to integrate AI into other disciplines. Some colleges and universities have tried interdisciplinary teaching projects, but due to insufficient resource integration and insufficient teacher training, progress has been slow.

I think we can: 1) Promote interdisciplinary integrated teaching, design AI interdisciplinary courses, encourage teachers to expand their thinking in teaching, and explore the multi-field application of AI technology. 2) Form an interdisciplinary teaching team to achieve resource integration through collaborative development of AI teaching content. 3) Regularly hold interdisciplinary practical activities to enhance teachers' comprehensive ability and interdisciplinary teaching level.

4. How about the self-development awareness of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, although the government has introduced a number of policies to support the development of AI education, in actual operation, the policy support for teachers' self-development lacks specificity and operability. The publicity and implementation of education policies are insufficient, resulting in teachers' insufficient understanding of policy content and resource support.

I think it is possible to: 1) improve education policy support, formulate clear implementation rules and special funding support. 2) Promote the publicity and interpretation of policies so that teachers can fully understand the relevant resources and support measures. 3) Through the policy evaluation mechanism, ensure the implementation effect of the policy, and at the same time

strengthen the policy connection between schools and enterprises to help teachers' professional development.

5.How is the self-role cognition of higher vocational teachers under artificial intelligence? What are the optimization suggestions?

In my opinion, the role cognition of teachers in higher vocational colleges is often limited to a single subject, and they fail to explore the possibility of interdisciplinary teaching with the support of AI technology. Some teachers lack interest or ability in interdisciplinary collaboration, which affects the innovation and comprehensiveness of teaching.

I think we can: 1) Encourage interdisciplinary integration: support teachers to explore the application of AI technology in different disciplines and promote teaching innovation. 2) Create collaborative teams: establish interdisciplinary teaching teams to promote resource sharing and collaborative innovation among teachers. 3) Carry out joint projects: through interdisciplinary teaching and scientific research projects, let teachers accumulate experience in practice. 4) Provide collaborative training: design capacity-enhancing courses for interdisciplinary teaching to enhance teachers' collaborative awareness and ability. 5) Promote resource sharing: build an interdisciplinary resource sharing platform to promote knowledge exchange in different fields.

Interviewer 7

1.How is the level of AI cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, there is a big gap in the understanding of artificial intelligence among teachers in higher vocational colleges, and some teachers lack a basic understanding of AI technology. The government's support policy for AI education is not clear enough, local implementation standards are inconsistent, and there is a lack of unified AI education standards and evaluation systems.

I think that: 1) The government should issue clear AI education policies to guide AI teacher training in higher vocational colleges; 2) Increase funding for higher vocational colleges to support AI technology applications and teacher training programs; 3) Promote cooperation between the government and enterprises to provide teachers with more training and practice opportunities; 4) Add relevant content on ethics and privacy protection to AI education policies to ensure that the application of technology in teaching meets ethical standards.

2.How about the level of AI literacy of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion: 1) The society has an increasing demand for the application of AI technology, especially interdisciplinary applications, but the teaching content of higher vocational colleges has not been fully connected with industry needs, and the talents cultivated are not matched with market demand. 2) The rapid development of AI technology has led to a surge in demand for AI talents from enterprises and society, providing unprecedented opportunities for higher vocational colleges, but if the teaching content cannot keep up with the development of the industry in a timely manner, the AI talents cultivated by teachers may not meet market demand. 3) The government has gradually introduced policies to support the cultivation of AI talents and the connection between education and industry needs, and promote AI education reform. 4) The demand for talents in the AI industry has grown rapidly, and companies are willing to invest funds to support schools in cultivating suitable talents.

Therefore, I think: 1) Strengthen the cooperation between schools and industries to ensure that students have the skills needed by enterprises; 2) Conduct industry demand surveys regularly to ensure that the curriculum is connected with market demand; 3) Add industry cases to the curriculum to help teachers and students better understand the practical application of AI technology; 4) Regularly invite industry experts to give lectures to promote

teachers' learning and communication; 5) Promote industry-university-research cooperation and establish long-term cooperative relations between schools and enterprises.

3.How about the level of teaching cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion: 1) The construction of teacher learning communities in higher vocational colleges is still in its infancy, and there is little exchange of teaching experience and AI application experience among teachers. 2) The learning community is not very active, and there is a lack of effective support mechanisms and incentive policies. 3) Although some colleges and universities have tried to establish online learning platforms, the utilization rate and influence are limited.

Therefore, I think: 1) Establish a learning community and resource sharing mechanism to promote knowledge exchange and cooperation among teachers. 2) Regularly hold online seminars and sharing activities through AI technology platforms to stimulate teachers' enthusiasm for participation. 3) Provide

a reward mechanism for community construction to encourage teachers to share teaching practice experience and AI application cases in the community. 4) Support cross-school community cooperation to broaden teachers' learning horizons and teaching cognition.

4.How about the self-development awareness of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, technical training for teachers in higher vocational colleges is mostly focused on basic knowledge, lacking depth and practicality. The coverage of technical training is limited, and the training content lags behind the development of AI technology, making it difficult for teachers to effectively apply new technologies in teaching and scientific research.

I think: 1) Design tiered technical training courses for teachers, and provide basic and advanced training according to their different technical levels. 2) Improve the quality and coverage of technical training through inter-school joint training and international cooperation. 3) Establish a training certification system to encourage teachers to participate in training and improve their practical application capabilities of AI technology.

5.How is the self-role cognition of higher vocational teachers under artificial intelligence? What are the optimization suggestions?

In my opinion, the role of teachers in school-enterprise cooperation is vague. Many teachers only participate in basic teaching and fail to play a greater role in student skills training and enterprise projects. There is a gap between the expectations of enterprises for the role of teachers and their actual performance, which affects the effect of school-enterprise cooperation.

I think: 1) Clarify the role positioning: Strengthen the bridge role of teachers in school-enterprise cooperation and promote the connection between students and enterprises. 2) Promote joint projects: Through cooperative projects between enterprises and schools, let teachers participate in actual production and management work. 3) Strengthen skills training: Provide teachers with training on the skills required by enterprises so that they can better adapt to the requirements of school-enterprise cooperation. 4) Establish a cooperative feedback mechanism: Regularly evaluate the performance of teachers in school-enterprise cooperation and provide suggestions for improvement. 5) Promote experience exchange: Organize school-enterprise cooperation case sharing to enhance teachers' role awareness in cooperation.

Interviewer 8

1.How is the level of AI cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, teachers in higher vocational colleges have a superficial understanding of AI, and most teachers lack an in-depth understanding of the potential of AI education. Due to insufficient publicity, many teachers have failed to understand the teaching value of AI technology through effective channels.

I think we can: 1) Use multiple platforms to promote the successful cases and value of AI education; 2) Open online and offline public lectures to help teachers understand the basic concepts and application prospects of AI. 3) Organize AI knowledge competitions to encourage teachers to improve their cognitive and application abilities through participation. 4) Show AI application cases to help teachers better understand the application of AI technology in teaching. 5) Strengthen publicity for cooperation with the industry to enhance teachers' interest in AI technology.

2.How about the level of AI literacy of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion: 1) Some higher vocational colleges have begun to try innovative teaching models, but they are still mainly based on traditional teaching and lack innovation. 2) The combination of the application of AI technology and innovative teaching models is still in its initial stage, and teachers have a low degree of acceptance. 3) Traditional teaching models are difficult to adapt to the application of AI technology, and teachers are difficult to adapt to the rapidly changing teaching methods. 4) The government encourages and supports innovative teaching models, but relevant policies and financial support are still not perfect. In addition, some schools are facing a shortage of funds and it is difficult to carry out large-scale innovation.

Therefore, I think we should: 1) promote innovative teaching models, promote human-computer collaborative teaching models, and improve classroom interactivity; 2) encourage project-based learning, so that students can apply AI technology in actual projects to improve learning effects; 3) introduce flipped classrooms to improve students' autonomous learning ability and classroom participation; 4) design diversified teaching activities to

stimulate students and teachers' interest in learning; 5) use AI technology to monitor students' learning progress and effects in real time, innovate evaluation methods, and improve teaching quality.

3.How about the level of teaching cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion: 1) The teaching evaluation method of higher vocational teachers is still mainly traditional, lacking intelligent evaluation tools based on AI technology, which makes it difficult to fully reflect the teacher's teaching cognition level and student learning effect. 2) Some schools have begun to introduce intelligent evaluation tools, but the coverage is limited and the application depth is insufficient. 3) The feedback mechanism of evaluation results is imperfect, resulting in lagging teaching improvement.

Therefore, I think: 1) Improve the teaching evaluation mechanism and promote real-time evaluation tools based on AI technology to help teachers more accurately grasp students' learning progress and effects. 2) Establish a teacher AI literacy evaluation system to regularly feedback teachers' teaching cognition level and improvement suggestions. 3) Develop personalized teaching evaluation methods and use AI data analysis to help teachers optimize teaching strategies and improve classroom efficiency.

4.How about the self-development awareness of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion: 1) Vocational college teachers have weak connections with the industry and lack understanding of the practical application of AI technology in the industry. The teaching and scientific research content is out of touch with industry needs, and it is difficult for teachers to transform theoretical knowledge into application skills through industry practice, which affects the teaching effect.

I think we should: 1) strengthen school-enterprise cooperation and enhance teachers' industry awareness by jointly developing AI courses and scientific research projects. 2) Organize industry practice activities to help teachers understand the application of AI technology in actual production. 3) Regularly invite industry experts to the school to share technical dynamics to help teachers grasp the latest industry needs and technology development trends.

5.How is the self-role cognition of higher vocational teachers under artificial intelligence? What are the optimization suggestions?

In my opinion, the role of teachers in higher vocational colleges in guiding students is mostly limited to classroom teaching, and they fail to give

full play to the role of mentors and planning guides. Especially under the empowerment of AI technology, teachers lack clear guidance strategies and find it difficult to provide comprehensive growth support for students.

Therefore, I think we should: 1) Strengthen guidance capabilities: Improve teachers' guidance capabilities in student employment and development planning through training. 2) Provide AI support tools: Equip students with growth management platforms to help teachers efficiently manage student development plans. 3) Promote case teaching: Use real cases to enhance teachers' practical ability and confidence in guidance. 4) Promote personalized guidance: Analyze student characteristics through AI technology to help teachers provide customized guidance plans. 5) Support career planning guidance: Help teachers understand industry trends and improve the level of guidance for students' career development.

Interviewer 9

1.How is the level of AI cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, teachers in higher vocational schools have a weak understanding of the practical application of AI. Most training courses are simple in content and lack depth and systematization. Current training programs are often not targeted, and teachers are not very involved in the training content.

I think we should: 1) formulate AI skills training courses according to the needs of different disciplines and teachers, and the content should include basic and advanced technologies. 2) Provide a flexible online learning platform to facilitate teachers to conduct self-study and advanced learning at

any time. 3) Encourage teachers to participate in AI training through a certification system and improve their professional competitiveness. 4) Encourage teachers to participate in international AI training to broaden their horizons. 5) Enhance teachers' practical operation capabilities of AI applications through workshops and seminars.

2.How about the level of AI literacy of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, 1) some schools have begun to explore the application of AI technology in education evaluation, but the evaluation system is not yet perfect. The existing evaluation system is traditional and fails to fully reflect the actual application of AI technology in education. 2) AI technology can provide more accurate and real-time teaching evaluation and promote the intelligence of

education evaluation, but traditional evaluation methods cannot accurately reflect the AI teaching effect of teachers, affecting the quality of AI education and the improvement of teachers' literacy. 3) The government's attention to education evaluation has increased, but specific policies and standards still need to be further improved. 4) The construction of the education evaluation system requires a large amount of capital investment, while the resources of higher vocational colleges are limited.

I think it should be: 1) Establish a scientific AI literacy evaluation

standard and regularly evaluate teachers' mastery of AI technology and teaching effectiveness; 2) Promote the application of AI technology in evaluation, monitor students' learning effects in real time, and improve the accuracy of teaching evaluation; 3) Establish a teacher AI literacy archive to comprehensively record the improvement of teachers' AI literacy; 4) Increase capital investment and improve the education evaluation system. Conduct peer review, promote teaching interaction and feedback among teachers, and improve AI literacy.

3.How about the level of teaching cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, 1) there are significant differences in the optimization of teaching resources among higher vocational colleges, and the lack of resources in remote schools has affected the improvement of teachers' teaching cognition. 2) Although the popularization of AI technology has provided new opportunities for resource optimization, the distribution and utilization efficiency of teaching resources are low. 3) It is difficult for teachers to fully utilize AI technology support in the education process, and the teaching effect is limited.

Therefore, I think we can: 1) optimize the allocation of teaching resources through AI technology to achieve educational equity. 2) Build a shared AI education resource platform to promote resource sharing and experience exchange among teachers. 3) Use intelligent technology to analyze the efficiency of teaching resources and improve the accuracy of teaching content. 4) Increase online education resources, enrich teachers' teaching tools, and provide more high-quality resource support for teachers in remote areas.

4.How about the self-development awareness of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, vocational college teachers have limited knowledge of AI teaching applications. Most teachers only regard AI as a teaching auxiliary tool and fail

to explore its in-depth application in curriculum design and teaching practice. 2) The lack of specific teaching application cases and practical guidance has affected the teaching innovation of AI technology.

Therefore, I think we should: 1) Improve teachers' awareness and ability of AI teaching applications, and provide practice-based training courses and teaching tool support. 2) Through teaching experience sharing platforms and case analysis of project-based learning, encourage teachers to explore the application of AI technology in different disciplines. 4) Support interdisciplinary collaboration among teachers and jointly develop innovative AI teaching models.

5.How is the self-role cognition of higher vocational teachers under artificial intelligence? What are the optimization suggestions?

In my opinion, teachers do not fully understand their own and students' lifelong learning roles and fail to fully play the role of lifelong learning advocates. Teachers lack the initiative to spread the concept of lifelong learning in teaching, which affects the sustainability of students' learning motivation.

I think we should: 1) Popularize the concept of lifelong learning: help teachers integrate lifelong learning into teaching and become a learning role model for students. 2) Build a learning community to promote knowledge sharing among teachers. 3) Provide continuous learning opportunities, design phased learning plans for teachers, and support them to continuously improve their own literacy. 4) Encourage lifelong learning practices and encourage teachers to actively participate in lifelong learning activities through rewards and certification. 5) Guide students in combination with professional development, help students understand the importance of lifelong learning to professional development, and reflect it in the curriculum.

Interviewer 10

1.How is the level of AI cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion, AI education in many vocational colleges is still limited to computer majors, and there is little practice of interdisciplinary integration. Some teachers remain at the level of theoretical knowledge in AI applications and lack practical application experience in interdisciplinary fields.

I think we can: 1) Organize interdisciplinary cooperation among teachers to jointly explore innovative applications of AI technology. 2) Promote cross-

school cooperation to promote the development of AI education. 3) Encourage industry cooperation: Cooperate with industries and enterprises to carry out AI training projects based on actual needs.

2.How about the level of AI literacy of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion: 1) Some teachers have realized the impact of AI technology on their career development. However, they lack a clear career development plan and fail to organically combine AI literacy with career development. 2) The improvement of AI technology provides new opportunities for teachers' career development, but without systematic career development guidance, many teachers fail to establish the motivation to learn AI technology in the long term, which affects their career development. 3) The government's attention and policy support for vocational education have gradually increased, but the specific career development path for improving AI literacy has not yet been fully clarified. 4) The society's demand for AI talents is increasing, and teachers need to enhance their professional competitiveness by improving AI literacy.

I think it should be: 1) Help teachers to improve AI literacy as the core part of their career development and design clear learning paths and goals; 2) Provide teachers with a lifelong learning platform to encourage them to

continuously improve their AI technology literacy and enhance their professional competitiveness; 3) Establish a career development guidance system to help teachers plan AI learning paths; 4) Encourage teachers to continue to learn AI technology by providing incentives such as scholarships and training subsidies; 5) Help teachers set learning goals, gradually improve AI literacy, and form a career development path.

3.How about the level of teaching cognition of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion: 1) It is difficult to effectively improve the teaching cognition level of higher vocational teachers under the constraints of traditional teaching models; 2) Although some teachers have begun to try to combine AI technology for teaching innovation, their understanding and application ability of human-computer collaboration is insufficient, resulting in limited improvement in classroom interactivity and student participation. 3) AI technology provides abundant opportunities for innovation in teaching models, but

teachers lack sufficient technical support and innovation awareness, which affects the improvement of teaching cognition level.

I think we should: 1) promote the teaching innovation model of human-computer collaboration, and combine AI technology with traditional teaching methods to improve teaching effectiveness; 2) improve students' practical ability and classroom participation by encouraging hybrid learning and project-based teaching methods; 3) provide more innovative teaching tools and training opportunities to help teachers integrate AI technology into teaching more effectively; 4) support teachers to continuously improve and innovate teaching methods.

4.How about the self-development awareness of vocational college teachers under artificial intelligence? What are the suggestions for improvement?

In my opinion: 1) Vocational college teachers have limited international vision and lack opportunities to participate in international educational technology projects. Most teachers lack knowledge of global educational technology development, which leads to a lack of international vision and competitiveness in teaching cognition and scientific research direction.

I think we should: 1) promote international exchanges and cooperation, and support teachers to participate in international educational technology forums and training programs. 2) Introduce international advanced course resources to help teachers expand their global vision. 3) Cooperate with international educational technology institutions to jointly carry out AI research projects to enhance the international competitiveness of teachers.

5.How is the self-role cognition of higher vocational teachers under artificial intelligence? What are the optimization suggestions?

In my opinion, teachers lack initiative in teaching innovation. Some teachers believe that teaching innovation mainly relies on technical support, while ignoring their core role in innovative design. The application of AI technology has failed to fully tap its teaching potential, resulting in insufficient innovation in teaching methods.

Therefore, I think we should: 1) Cultivate innovation awareness: help teachers establish the awareness of actively participating in teaching

innovation and encourage them to try new models. 2) Support teaching experiments: provide teachers with resources and time to support them in conducting teaching innovation experiments in an AI environment. 3) Promote innovative cases: stimulate teachers' interest in exploring new methods by sharing innovative teaching cases. 4) Promote cross-school exchanges: promote cooperation and experience sharing among teachers in teaching innovation through inter-school exchanges. 5) Establish an innovation incentive mechanism: provide rewards for teachers who propose and implement innovative teaching plans to encourage continuous innovation.

Appendix E

Certificate of English

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RAJABHAT UNIVERSITY

This is to certify that

Ms.Luo Yuying

Achieved BSRU English Proficiency Test (BSRU-TEP) level

C2

Given on 9th August 2022

(Assistant Professor Dr Kulsirin Aphiratvoradej)

Director

Appendix F

The Document for Acceptance Research

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ACCEPTANCE OF MANUSCRIPT

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Dear Authors,

I am pleased to inform you that your paper has passed the review process after a careful and thorough perusal of the manuscript. The journal Editor-in-Chief, and reviewers have recommended your manuscript, titled **Development of Strategies for Higher Vocational Teachers' Roles based on Artificial Intelligence in Northern Guangdong**, authored by **Luo Yuying*, Phadet Kakham, Luxana Keyuraphan, Pawich Phon-ngam**, and **Chawalit Jujia** for publication in *International Journal of Education & Literacy Studies*. It is an excellent paper that will improve the readership of the journal. The paper will be published in Volume 12 Issue 4 of *IJELS* on 31/10/2024.

Yours sincerely,

Vahid Nimehchisalem, PhD
Editor-in-Chief
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