

FACTORS INFLUENCING HIGHER VOCATIONAL PYTHON PRACTICAL TRAINING COURSE FOR THE APPLICATION OF ARTIFICIAL INTELLIGENCE TECHNOLOGY IN SHANDONG UNIVERSITY OF ENGINEERING AND VOCATIONAL TECHNOLOGY

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Abstract: The objectives of the study were 1) To explore whether motivation affects the higher vocational Python practical training course for the application of artificial intelligence technology. 2) To explore whether intellectual literacy affects the higher vocational Python practical training course for the application of artificial intelligence technology. 3) To explore whether self-efficacy affects the higher vocational Python practical training course for the application of artificial intelligence technology. 4) To explore whether the teacher support affects the higher vocational Python practical training course for the application of artificial intelligence technology. This study adopted the quantitative research method. A total of 450 questionnaires were distributed during the survey period and 388 valid questionnaires were collected, with a validity rate of 86.22%.

This paper found that: 1) Motivation has a significant positive effect on the higher vocational Python practical training course for the application of artificial intelligence technology; 2) Intellectual literacy has a significant positive effect on the higher vocational Python practical training course for the application of artificial intelligence technology; 3) Self-efficacy has a significant positive effect on the higher vocational Python practical training course for the application of artificial intelligence technology; 4) Teacher support has a significant positive effect on the higher vocational Python practical training course for the application of artificial intelligence technology. For recommendations, the higher vocational Python practical training course for the application of artificial intelligence technology at Shandong University of Engineering and Vocational Technology should focus on the following aspects: 1) Motivating independent learning; 2) Enhancing intelligence; 3) Strengthening self-efficacy; 4) Improving teacher support.

Keywords: Artificial Intelligence Technology, Higher Vocational Python Practical Training Course, Shandong University of Engineering and Vocational Technology

Introduction

The accelerated iteration and renewal of science and technology have accelerated the transition from the information age to the intelligent age, and society has entered a new period of intelligence and information technology. The development of technology in this new period plays a role in the field of education, changing the traditional concept of education, innovating the education model, and optimizing teaching methods. The purpose of educational reform is to promote education by improving the reasonable use of technology to promote the development of education. This is the inevitable trend of educational reform and innovation in the new period. Technology is always a crucial task in the senior Python practical training course (Kung et al., 2023).

Modern multimedia, networks, etc. bring network learning, mobile learning, etc.; technology has always played the role of "booster" in the teaching of higher vocational Python practical training courses. At present, modern information technology led by artificial intelligence technology is playing a role in the learning of higher vocational Python practical training courses, based on artificial intelligence technology to personalize the student's Python practical training courses for accurate testing and to help students find problems promptly to solve the problem (Holmes et al., 2021).

In the teaching of Python practical training courses, teachers should not only use traditional teaching methods but also pay more attention to cultivating students' innovative thinking, practical ability, and teamwork spirit. In this way, students can master action skills and better integrate into the classroom atmosphere (Borenstein & Howard, 2020). Although the teaching mode of "indoctrination education" allows the teacher to grasp the course, it also makes the classroom atmosphere dull. The student's lack of enthusiasm, lack of independent thinking and inquiry ability, and lack of the habit of reviewing after class can only helplessly accept the teacher's knowledge indoctrination, which affects the effect of learning and also reduces the quality of teaching.

With the continuous development of the network information age, Python practical training courses also need to keep pace with the times, constantly improve and innovate, and explore a more effective way of teaching, not only to enable students to master the skills but also to improve the student's enthusiasm for learning, cultivate the students' independent learning ability and teamwork spirit, and help students realize their overall growth. Artificial intelligence (AI) is applied to higher vocational Python practical training courses, so the traditional offline teaching mode has been greatly impacted (Guilherme, 2019). It can effectively integrate the advantages of online teaching so that students can acquire knowledge at the same time while also having more fun. This new mode of teaching takes into full account the personalized needs of the students; its educational philosophy of advanced teaching methods is scientific and reasonable; and it attaches importance to the main body of the students. Status, and can effectively stimulate students' interest in learning to cultivate students' independent learning ability, but also to overcome the limitations of time and space so that students can

acquire knowledge at the same time and also fully play to learn (Zhang & Aslan, 2021). Therefore, it is to clarify the influencing factors of artificial intelligence technology in higher vocational Python practical training courses and to better utilize artificial intelligence in the classroom.

Technology has always boosted classroom teaching forward, and the current artificial intelligence-supported learning, as a research frontier in the development of educational information technology, has achieved certain results in teaching practice, while there is also a certain degree of learning maladaptation (Pokrivcakova, 2019).

Learning adaptability is one of the important indicators to measure the learning effect of students, which is the key to determining the quality of student learning in the information technology environment. Learning maladaptation not only affects the learning effects of students but also directly affects the utility of AI-enabled Python practical training courses. Therefore, it is crucial to understand the specific situation of learning adaptability in the current AI-enabled Python practical training course and to find out the main influencing factors affecting students' learning in the AI-enabled Python practical training course.

With the in-depth application of AI technology in Python practical training courses, AI-supported Python practical training course learning has become an important form of assisting students' learning. The study of students' learning adaptability in Python practical training courses under the support of artificial intelligence and the construction of the composition structure of students' learning adaptability in Python practical training courses under the support of artificial intelligence are new explorations of learning adaptability in artificial intelligence (Berendt et al., 2020).

It is also the expansion of the research environment and the supplementation of the research results of the study of learning adaptability in information-based learning. Constructing a model of factors influencing students' learning adaptability with the support of artificial intelligence provides theoretical support for effectively promoting the quality of students' intelligent learning, which is of certain significance for improving students' learning adaptability and promoting their academic development.

The study explores the current situation of the learning adaptability level of college students' Python practical training course under the support of artificial intelligence and its influencing factors to provide a useful reference for the targeted improvement of students' learning adaptability in the artificial intelligence environment to carry out the learning activities in the artificial intelligence environment (Berendt et al., 2020; Guilherme, 2019; Zhang & Aslan, 2021).

The study can help guide college students to better cope with the challenges of adapting to the age of intelligence and adapting to the development of the age of intelligence. At the same time, it has practical guidance implications for the effective application of artificial intelligence in educational practice.

Research Objectives

(1) To explore whether motivation affects the higher vocational Python practical training course for the application of artificial intelligence technology at Shandong University of Engineering and Vocational Technology.

(2) To explore whether intellectual literacy affects the higher vocational Python practical training course for the application of artificial intelligence technology at Shandong University of Engineering and Vocational Technology.

(3) To explore whether self-efficacy affects the higher vocational Python practical training course for the application of artificial intelligence technology at Shandong University of Engineering and Vocational Technology.

(4) To explore whether the teacher support affects the higher vocational Python practical training course for the application of artificial intelligence technology at Shandong University of Engineering and Vocational Technology.

Research Hypothesis

H1: Motivation has a significant positive effect on the higher vocational Python practical training course for the application of artificial intelligence technology at Shandong University of Engineering and Vocational Technology.

H2: Intellectual literacy has a significant positive effect on the higher vocational Python practical training course for the application of artificial intelligence technology at Shandong University of Engineering and Vocational Technology.

H3: Self-efficacy has a significant positive effect on the higher vocational Python practical training course for the application of artificial intelligence technology at Shandong University of Engineering and Vocational Technology.

H4: Teacher support has a significant positive effect on the higher vocational Python practical training course for the application of artificial intelligence technology at Shandong University of Engineering and Vocational Technology

Literatures Review

Artificial intelligence

The concept of artificial intelligence (AI) has not been unified since its introduction in 1956 until now. It is usually believed that AI is a technical science that simulates human intelligence (perception, memory, learning, thinking, etc.) through programs, data, and algorithms so that machines have human functions (recognition, cognition, analysis, decision-making, etc.), and it involves the cross-cutting and comprehensive disciplines of computer science, information theory, mathematics,

neurophysiology, linguistics, psychology, and other fields (Berendt et al., 2020; Guilherme, 2019; Zhang & Aslan, 2021).

The development of artificial intelligence and its integration with various fields have given rise to many new concepts. In the field of education, the study of artificial intelligence and education often involves the discussion of "intelligent education," "artificial intelligence education," and "artificial intelligence in education." It is generally believed that AI education is the education of knowledge and skills related to AI as a learning object. Educational AI, on the other hand, uses AI as a means of education to boost the innovative development of education. Intelligent education usually has dual attributes, i.e., the educational perspective aims at educating people, and the informational perspective refers to the technology of educating people (Williamson & Eynon, 2020).

It follows that educational AI focuses on how to apply AI to education to augment, enable, and empower education, provide support services for the realization of educational goals, and promote the optimal development of education. The AI in this study refers to educational AI, pointing to the specific application of educational AI in learning. Artificial intelligence is a collection of hardware and software, such as educational robots, intelligent teaching platforms, intelligent assessment systems, and other intelligent applications or tools, that are developed and realized by combining various technological functions to support and assist education and teaching. In this study, they referred to "AI learning tools" (Kim et al., 2020).

Motivation

Motivation referred to as "learning motivation", is the internal thrust that drives learning activities forward and the affective factors that inspire learners to engage in learning behaviors and guide and sustain them. Motivation is used to explain the behavior caused by the goal. The composition of motivation can be interpreted as the reason and purpose of learning, and the direction is the degree of effort required to achieve the goal. According to achievement motivation theory, learning motivation can be categorized into cognitive internal drive, self-improvement internal drive, and affiliative internal drive (Qadir, 2022).

Among them, the cognitive internal drive is the most stable and long-lasting to acquire knowledge, which is the internal motivation for learning. Self-improvement internal drive belongs to the needs of career development, obtaining achievement or status, and is the external motivation for learning. Attachment drive is the need to strive for praise or recognition from elders and is an external motivation for learning (Kung et al., 2023).

Intellectual Literacy

In an intelligent society, an individual's intellectual literacy is the key to adapting to the development of an intelligent society and meeting the challenges of an intelligent society in the future. In this study, Intellectual Literacy refers to student intellectual literacy (Pokrivcakova, 2019).

The core literacy of students in the smart era consists of knowledge, ability, sentiment, and ethics. Smart knowledge is the understanding and definition of AI; smart ability is the application of AI in learning; and smart sentiment and smart ethics are relevant to AI ethics. Some scholars have pointed out that "human-computer collaboration will become the new normal of human social structure in the future," and intelligent literacy can only cope with the challenges of human-computer collaboration in a future intelligent society (Berendt et al., 2020; Lim et al., 2023). Artificial intelligence-supported learning is collaborative learning between humans and machines, and students' intelligence literacy affects their attitudes and applications of AI learning tools.

Self-Efficacy

Self-efficacy is a learner's subjective prediction of his or her ability and value judgment of whether he or she can accomplish the learning task. Scholars divide learning self-efficacy into an individual's sense of effort, sense of ability, sense of context to the environment, and sense of control over behavior (Lim et al., 2023).

Among them, the sense of competence is given to students' subjective perception of their natural abilities, as well as their expectations of learning outcomes and their perception of whether they can achieve their goals. People with a strong sense of learning self-efficacy are more confident (Kim et al., 2020).

A sense of effort is the perception of one's level of effort, and those with a strong sense of learning self-efficacy believe that they can study hard. A sense of environment is a grasp of the learning environment. sense of control is a sense of control over learning activities and behaviors. People with high self-efficacy for learning can control their learning behaviors (Qadir, 2022).

Teacher Support

In the specific practice of AI-supported learning, there are "student-intelligent machine" and "student-teacher-intelligent machine" forms of learning. Among them are artificial intelligence machines as learning resources, teachers, teaching companions, learning management, learning assistants, and other multiple roles. Students can learn directly under the help and guidance of intelligent machines, which triggered the debate on whether "artificial can replace the teacher.". Some scholars believe that with the development of artificial intelligence, artificial intelligence will replace teachers. Some scholars believe that with the development of artificial intelligence, education and the teaching of some complex, repetitive work will be done by artificial intelligence (Lim et al., 2023; Qadir, 2022).

To make up for the shortcomings of the teacher, the teacher is working hand in hand with the machine rather than competing. In practice, it has been found that the teacher's recognition of the intelligent writing system in the intelligent collaborative system will motivate students to continue to use it. Teacher guidance is still needed in AI-supported learning, and the teacher is still the leader of

instruction. Teachers influence students' self-efficacy or motivate students to learn, and thus indirectly have an impact on students' learning adaptations (Guilherme, 2019; Zhang & Aslan, 2021). In AI-supported learning, the teacher's endorsement of the intelligent system will motivate students to continue using it and not rely on the Noh system, and the teacher's guidance is important.

Methodology

The quantitative research method was used in this study. The influencing factors of artificial intelligence technology application in higher vocational Python practical training courses are motivation, intelligence literacy, self-efficacy, and teacher support. Based on the study, the hypothesis of the role relationship of the influencing factors of artificial intelligence technology application in higher vocational Python practical training courses is proposed. Construct a model of influencing factors for higher vocational Python practical training courses in artificial intelligence technology application.

Motivation is divided into three aspects: cognitive internal drive, self-improvement internal drive, and subsidiary internal drive, and the topics are numbered Q1-Q3. Intelligent literacy is divided into three aspects: intelligent knowledge and wisdom, intelligent ability, and intelligent sentiment. Topic number Q4-Q6. Self-efficacy is divided into three dimensions: sense of competence, sense of control, and sense of effort. Topic number: Q7-Q9. Teacher support is divided into three dimensions: teachers' recognition of AI learning resources, use of AI teaching tools, and guidance of students in AI-supported teaching. Topics numbered Q10-Q12. The questionnaire survey was conducted on a 5-point Likert scale. The questionnaire survey was conducted from January 1, 2024, to April 1, 2024, and the study was mainly conducted through the online distribution of questionnaires. A total of 450 questionnaires were distributed during the survey period and 388 valid questionnaires were collected, with a validity rate of 86.22%.

Results

1) Reliability analysis

Cronbach's alpha was used to measure the reliability of the questionnaire, and the value of alpha ranges from 0 to 1. The larger the Alpha coefficient is, the higher the reliability is, and the more reliable the results are. SPSS was used to analyze the reliability of the questionnaire, and the results are shown in Table 1. The Cronbach's alpha of all the factors is higher than 0.8. According to Cronbach's alpha criterion, a coefficient of more than 0.8 is good for reliability; between 0.7 and 0.8 is acceptable; and less than 0.7 is not good for reliability. Then the reliability of the questionnaire in this study is acceptable, and the internal consistency of the data is good.

Table 1: Reliability analysis

Variable	Cronbach's Alpha	N of Items
Motivation	0.846	3
Intellectual Literacy	0.869	3
Self-Efficacy	0.896	3
Teacher Support	0.891	3
The Application of Artificial Intelligence Technology	0.856	3

2) Validity analysis

The validity of the questionnaire was tested by the KMO test and Bartlett's test of sphericity. Using SPSS to carry out "factor analysis" of the sample data, the results in Table 2 show the questionnaire KMO = 0.911 and P = 0.000. According to the discriminant criteria: KMO value range (0, 1), the closer the KMO value is to 1, the stronger the correlation between the variables. KMO test coefficient > 0.5 and eye Bartlett sphere test P less than 0.05, two indicators reach the standard only when the factor analysis can be done. It means that the validity of the questionnaire in this study passed, and factor analysis can be done. Factor analysis verifies whether the dimension division of the questionnaire is reasonable.

Factor analysis was conducted by principal component analysis, and four factors with eigenvalues greater than one were extracted as the common factors, which were consistent with the conception of the study; moreover, the cumulative variance contribution rate reached 66.694%, which exceeded 60% of the overall, indicating that the screened factors had good representativeness and that the results of the factor extraction were relatively satisfactory. Using the maximum difference method for factor rotation, the indicators and the corresponding dimensions are consistent with the scale initially sorted out by the study, and thus the dimensions delineated by the study are more scientific and reasonable. In conclusion, the reliability and validity of the questionnaire in this study have passed the test and can be analyzed in subsequent studies.

Table 2: Validity analysis

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.911
Bartlett's Test of Sphericity	Approx. Chi-Square	3298.521
	df	66
	Sig.	0.000

3) Multiple regression

Multiple regression analysis was performed on the data to determine the relationship between the dependent and independent variables.

The regression equation was significant with $F = 124.968$, $p < 0.001$. The Durbin-Watson test value was 1.870, which is between 1.8 and 2.2. This indicates that the data complied with linear

regression. In the covariance diagnostic results, the VIF value of each variable is close to 1. The VIF value meets the requirement, which indicates that there is no covariance in the data. Motivation ($\beta=0.552$, $P<0.001$), intellectual literacy ($\beta=0.678$, $P<0.001$), self-efficacy ($\beta=0.408$, $P<0.001$), and teacher support ($\beta=0.757$, $P<0.001$) have significant positive effects on the application of artificial intelligence technology to the senior Python practical training course. Together, these variables explain the weight of 75.2% of the artificial intelligence technology application senior Python practical training course, which meets the requirement. See Table 3.

Table 3: Multiple regression

Item	Un-std. B	Std. Beta	t	Sig.	VIF	F	Durbin-Watson
C	3.267	3.112	7.237	0.000		124.968***	1.870
Motivation	0.552	0.539	3.846	0.000	1.168		
Intellectual Literacy	0.678	0.621	4.079	0.000	1.364		
Self-Efficacy	0.408	0.399	3.909	0.000	1.143		
Teacher Support	0.757	0.734	7.509	0.000	1.03		
R Square	0.752						
Adjusted R Square	0.748						

NOTE: * $P<0.05$, ** $P<0.01$, *** $P<0.001$

Discussion

The study shows that motivation, intellectual literacy, self-efficacy, and teacher support all have a significant effect on the senior Python practical training course at Shandong University of Engineering and Vocational Technology on the application of artificial intelligence (AI) technology. Emphasis should be placed on improving students' self-efficacy in learning for better adaptive AI-supported learning. In the AI-supported learning environment, with the teaching concept of being "learner-centered" and relying on AI technology, students are transformed from the original "knowledge receivers" to "knowledge constructors."

The concept of "learner-centered" teaching is based on artificial intelligence technology. Let students have more freedom and autonomy. At the same time, as students gain more freedom, autonomy, and personalization, it is also required that their level of independent learning ability adapt to intelligent learning to obtain effective development. Education in an intelligent society challenges students' intelligent literacy. According to the model of factors affecting learning adaptability, intelligent literacy is the main factor affecting the higher vocational Python practical training course in the application of artificial intelligence technology. Sitting on high-quality learning resources does not mean that effective learning can be carried out, and students need to have the ability to choose resources independently and apply them reasonably to obtain effective learning.

To adapt to the new era of learning, students must enhance their sense of self-efficacy, establish a sense of independent learning, and fundamentally overcome their dependence on teachers. Combined

with their learning interests and needs, they can set learning goals, plan learning paths with the help of artificial learning tools, carry out self-management and monitoring, and gradually strengthen their sense of self-efficacy through human-computer collaboration. Artificial intelligence can improve teachers' teaching efficiency and help them personalize their teaching. Teachers can only adapt to the challenges of artificial intelligence and adapt to the future form of human-machine collaborative education by taking the initiative to adapt and making adequate preparations. Teachers should take the initiative to adapt to the transformation of their role as instructors and guides in the age of artificial intelligence. Teachers take the initiative to adapt to the teaching of the age of artificial intelligence and, first of all, establish a "learner-centered" educational philosophy. Teachers should first adapt to the teaching form of artificial intelligence and accept, skillfully use, and evaluate the teaching tools of artificial intelligence.

Conclusions

The results showed that the application of AI technology in the senior Python practical training course was significantly influenced by several factors. Motivation ($\beta = 0.552$, $P < 0.001$) has a significant positive effect on the effectiveness of the Python practical training course. The higher the students' motivation, the more positively they performed in the course and the more effective their learning was. This suggests that it is crucial to stimulate and sustain students' motivation in instructional design. Intellectual literacy ($\beta = 0.678$, $p < 0.001$) is another key factor.

Students with higher intellectual literacy are better able to understand and apply AI technologies, which enhances their performance in the hands-on Python training course. This suggests that we should focus on developing students' intellectual literacy in our curriculum so that they have stronger logical thinking and problem-solving skills. Self-efficacy ($\beta = 0.408$, $p < 0.001$) also has a significant positive effect on course effectiveness. Self-efficacy refers to students' confidence in their ability to accomplish tasks. It was found that students with high self-efficacy were more likely to succeed in the Python hands-on training course because they were confident in their abilities and were able to cope with the challenges and problems in the course. Therefore, fostering students' self-efficacy is crucial to enhancing their learning outcomes. Teacher support ($\beta = 0.757$, $p < 0.001$) is the most important factor influencing students' learning outcomes.

The study showed that the support provided by the instructor had the most significant positive impact on the Python practical training course. Instructor guidance, assistance, and encouragement can greatly enhance students' learning experience and effectiveness. Effective instructor support not only helps students overcome learning difficulties but also enhances their motivation and self-efficacy.

These factors have a significant positive impact on the application of AI technology in the senior Python practical training course. Research has shown that motivation, intellectual literacy,

self-efficacy, and teacher support are important factors that influence students' learning outcomes during the teaching and learning process. Therefore, when designing and implementing Python practical training courses, we should focus on stimulating students' motivation, enhancing their intellectual literacy and self-efficacy, and providing sufficient teacher support to optimize teaching effectiveness and students' learning experiences.

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