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The Impact of an AI-Integrated Workplace on the Career Competence of Business English Majors: A Case Study of Nanjing Engineering Vocational College

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Abstract: *In the context of accelerating intelligence in the workplace, artificial intelligence (AI) has become a major driver of change in all industries, including Business English-related professions. This study investigates the impact of an AI-integrated workplace on the professional competence of Business English students, using xx College as a case study. Using a mixed research approach, the study explores how students' awareness of, exposure to, and adaptability to AI technology affects their communication skills, intercultural competence, and digital literacy - all core components of occupational competence in the global job market. The study collected data through a structured questionnaire and semi-structured interviews with senior students. The findings suggest a positive correlation between AI awareness and occupational competence, especially in areas such as digital communication and information processing. In addition, students who were more involved in AI-related learning activities demonstrated greater ability to adapt to AI-enhanced vocational environments. The study highlights the need for business English curriculum reform to incorporate AI literacy and workplace simulation training. The study discusses the impact of higher education policies and instructional design, providing practical insights for enhancing the career competence of Business English graduates in the age of AI.*

Keywords: *Artificial Intelligence, Career Competence, Business English Majors, Higher Education, Workplace Integration, AI Literacy*

1. Introduction

1.1 Background

With the rapid development of Artificial Intelligence (AI) technology, the global workplace is experiencing profound structural changes.AI is widely used in the fields of data analysis, language processing, and customer service, and is reshaping the operation mode and talent demand of enterprises [1]. Especially in business communication and language positions, AI tools such as machine translation, intelligent writing assistance systems and semantic analysis platforms are gradually changing the traditional work style and occupational skill structure. This trend poses new challenges to Nanjing higher education [2]. Colleges and universities need to accelerate curriculum reform to enhance students' AI literacy and technology adaptability, especially for higher-level Business English majors, who will face a deeply AI-integrated international workplace environment in the future. While possessing cross-cultural communication skills, how to work with AI and use smart tools to improve work efficiency is becoming the new core of their career competency [3].

Taking Nanjing Engineering Vocational College as an example, this study explores the impact of AI-integrated workplace on the professional competence of Business English majors, and provides theoretical support and practical insights for professional teaching reforms and talent cultivation strategies.

1.2 Research Questions

In the context of the deep integration of AI technology into the workplace, how Business English students can adapt to the intelligent work environment and enhance their professional competence has

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become a key issue in educational practice. This study focuses on the following questions:

RQ1: Does AI awareness positive affect the career competence of Business English students?

RQ2: Whether does AI application competence predict students' career competence?

RQ3: Do AI training programme play a moderating role between AI literacy and career competence?

By exploring these questions, we aim to clarify the actual impact of AI integration on students' career development paths, and provide data support and direction suggestions for education reform.

1.3 Research Objects

The purpose of this study is to systematically explore the impact of AI-integrated workplaces on the professional competence of Business English students, with specific objectives including:

RO1: To assess the level of AI awareness among Business English students and its impact on career competence.

RO2: To explore the relationship between the ability to apply AI tools and students' professional competence.

RO3: To test the moderating effect of AI training courses in the relationship between AI literacy (awareness and application) and career competence.

1.4 Significance of the Study

This study has certain theoretical and practical value. At the theoretical level, the study expands the application perspective of professional competence in the context of AI, especially fills the gap in the research on the integration of AI technology and language majors, and helps to promote the academic development in the intersection of AI and higher education [4]. At the practical level, the results of the study can provide a basis for the College of Engineering to optimize the talent cultivation mode of Business English majors, especially in terms of curriculum, competency-based teaching and AI literacy development, and provide a specific reference for enhancing students' adaptability and employment competitiveness in the intelligent workplace [5].

2. Literature Review

2.1 Changes in the Workplace in the Context of AI Integration

With the rapid development of AI technology, the global workplace is undergoing a deep change from "technology-assisted" to "intelligent collaboration." AI tools have been widely used in the fields of language translation, content generation, and customer service [6]. AI tools have been widely used in language translation, content generation, customer service and other fields, which puts higher demands on the skill structure of language talents [7,8]. In this context, Business English students must have the ability to understand and apply AI in order to adapt to the new working mode.

2.2 Composition and Cultivation of Career Competence

Career Competence refers to the combination of knowledge, skills and attitudes required for an individual to perform a job task competently, and often includes dimensions such as verbal communication, intercultural communication, problem solving and technology adaptation[9-11]. For business English students, their competence is not only in terms of language proficiency, but also in terms of their ability to integrate technology effectively and complete tasks independently in an international business environment[12].

2.3 AI Awareness and Career Competence

AI Awareness refers to the level of an individual's knowledge of AI-related knowledge, development trends, and their workplace implications. Research has shown that students with higher AI Awareness are better able to understand the changing trends in the industry and enhance their career planning and resilience [13]. According to the Technology Acceptance Model (TAM), users'

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perceptions of technology directly affect their willingness to use and behaviour [14,15]. Therefore, AI awareness can be regarded as an important antecedent variable influencing students' vocational competence.

2.4 AI Application Ability and Career Competence

AI Application refers to an individual's ability to actively use AI tools to solve problems in learning or work, such as the use of Chat GPT for linguistic touch-ups and translation tools to assist cross-cultural communication, etc[16]. The TAM model considers the perceived ease of use and usefulness of technology as key factors influencing usage behaviour, suggesting that students' level of application of AI tools will affect their job competency performance to some extent [17,18].

2.5 The Moderating Effect of AI Training Courses

Theory of Planned Behaviour (TPB) states that behavioral intentions are influenced by attitudes, subjective norms and perceptual behavioral control [19].AI training courses can enhance students' positive attitudes and sense of control towards AI, thus improving their practical application[20]. In this study, AI training courses are considered as moderating variables to test whether they strengthen the path of AI awareness and AI application on career competence.

2.6 Literature Review and Research Innovations

Existing studies have mostly focused on the overall impact of AI on education or industry, but there is a lack of empirical explorations on the relationship between AI literacy and workplace competence of Business English students, especially in the context of higher education in China[21]. Based on the TAM and TPB theories[22,14], this study tries to establish a structural model of "AI awareness and application → professional competence", and introduces AI training courses as moderating variables to fill the research gap between theory and application.

2.7 Hypothesis Development

From the above literature discussion, the hypothesis of this study was derived:

H1: AI Awareness (AI Awareness) has a significant positive effect on students' career competence.

H2: AI Application has a significant positive effect on students' career competence.

H3: AI Training Lesson moderates the relationship between AI Awareness and occupational competence.

H4: AI Training Lesson moderates the relationship between AI Application ability and occupational competence.

The specific hypotheses are structured as follows Figure 1:

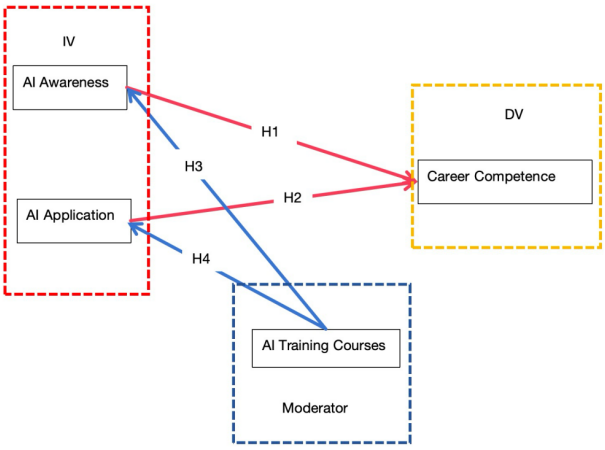

Figure 1 Research Framework

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3. Research Design

3.1 Research Object and Sample

This study takes the third- and fourth-year students majoring in Business English in Nanjing Engineering Vocational College as the research object, focusing on the current status of their professional competence in the context of AI and its relationship with AI literacy.

Using the questionnaire survey method, whole cluster sampling was used to distribute questionnaires to 100 business English majors at school, and 92 valid questionnaires were collected. The questionnaire was designed using a 5-point Likert scale (1=strongly disagree, 5=strongly agree) and some of the questions were corrected through expert interviews to ensure that it was applicable to the language student population. To ensure the representatives of the sample, the respondents covered background variables such as different genders, grades, academic performance and whether they had participated in AI-related courses or projects.

3.2 Research Process

This study adopts quantitative research methodology, and the overall research process is divided into five stages. First, through systematically combing domestic and international literature on AI literacy, professional competence and the application of AI courses in higher education, the theoretical basis of the study is clarified, and the hypothetical model of this study is constructed based on the Technology Acceptance Model (TAM) and the Theory of Planned Behaviour (TPB)[14.22,23]. Secondly, questionnaires containing AI awareness, AI application competence, career competence and AI training course participation were designed by combining established and mature scales and pretested on a small scale to ensure that the questions were clearly formulated and the measurement dimensions were reliable[24]. In the third stage, the questionnaire survey was conducted among the business English majors of Nanjing Engineering Vocational College through a combination of online and offline methods to collect valid data samples. In the fourth stage, SPSS 27.0 was used to process and analyse the data. Finally, a discussion is held based on the empirical results to analyse the specific path of AI literacy's influence on professional competence and put forward corresponding suggestions for educational practice.

3.3. Reliability Results

The research based on the questionnaire data, the sample was tested for reliability using SPSS 27.0 software, the results is in Table 1.

Table 1 Reliability analysis

Variables	Items	Cronbach's α	Rating
AI Awareness	5	0.860	High
AI Application	5	0.874	High
Career Competence	6	0.913	High

*Notes: the result of reliability analysis from SPSS27

According to Nunnally's (1978) criteria, a scale is considered to have good reliability if the alpha value is greater than 0.7 and high reliability if the alpha value is greater than 0.8. The alpha values of all variables in this study were greater than 0.860, indicating that the internal consistency of the scale was good and suitable for subsequent analyses.

3.4 Descriptive Statistics

Table 2 Descriptive Analysis

Variable	Items	M	SD	Minimum Value	Maximum Value
AI Awareness	5	3.94	0.52	2.6	5
AI Application	5	3.71	0.6	2.2	5
Career Competence	6	3.85	0.58	2.4	5

*Note: Data based on a sample of College of Engineering Business English students (N = 92) on a five-point scale (1 = strongly disagree, 5 = strongly agree).

As the ratio of male and female students in Business English majors of Nanjing Engineering

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Vocational College is 1:9, the sample of this study has a total of 92 valid questionnaires, of which 93.5%are female and 6.5% are male, which is a reasonable gender ratio. The distribution of students' grades was relatively balanced. The mean scores of each variable are as follows: AI awareness (M = 3.94, SD = 0.52), AI application ability (M = 3.71, SD = 0.60), and career competence (M = 3.85, SD = 0.58). The overall level is high, indicating that most students have some AI literacy and workplace competence. Seeing table2.

3.5 Correlation Analysis

Pearson's correlation coefficient was used to analyse the relationship between the variables. The results showed that AI awareness was significantly and positively correlated with occupational competence ($r = 0.486$, $p < 0.01$), and AI application ability was also positively correlated with occupational competence ($r = 0.512$, $p < 0.01$), indicating that both independent variables had a positive relationship with the dependent variable.

Table 3 Correlation Analysis

Variables	AI Awareness	AI Application	Career Competence
AI Awareness	1		
AI Application	0.542***	1	
Career Competence	0.486***	0.512***	1

*Note: N = 92, *p < 0.05, **p < 0.01, ***p < 0.001; blanks above diagonal.

The results of this table3 show that: AI awareness is significantly and positively correlated with AI application competence ($r = 0.542$, $p < 0.001$); A significant positive correlation was found between AI awareness and occupational competence ($r = 0.486$, $p < 0.001$); There was also a significant positive correlation between AI application competence and occupational competence ($r = 0.512$, $p < 0.001$).

3.6 Regression Analysis and Hypothesis Testing

3.6.1 Regression Analysis

Regression analyses in table4 were conducted separately for AI awareness and AI application ability with occupational competence as the dependent variable. The results show table4: H1: The regression coefficient of AI awareness on occupational competence is $\beta = 0.342$ ($p < 0.001$), and the hypothesis is valid; H2: The regression coefficient of AI application competence was $\beta = 0.396$ ($p < 0.001$), and the hypothesis was valid.

Table 4 Regression Analysis

Career Competence	Model1	Model2	Model3
Gender	0.053	0.031	0.022
Grade	0.086	0.072	0.065
AI Awareness	——	0.342***	0.301***
AI Application	——	0.396***	0.358***
AI Training Courses	——	0.113*	0.098*
AIAW × AITR	——	——	0.178*
AIAP × AITR	——	——	0.201**
R^2	0.091	0.412	0.482
ΔR^2	——	0.321	0.07
F-value	4.85**	18.92***	20.44***

*Note: *p < 0.05, **p < 0.01, ***p < 0.001

It indicates that both students' level of knowledge and ability to use AI can significantly predict their workplace competence.

3.6.2 Moderating Effect Test

To test the moderating effect, the interaction term models of 'AI awareness × AI training course' and 'AI application × AI training course' were constructed respectively. The results are as follows:

H3: The moderating effect of AI training courses on the relationship between AI awareness and occupational competence is significant (interaction term $\beta = 0.178$, $p < 0.05$), indicating that students who have participated in AI training courses have a stronger influence of AI awareness on occupational competence;

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H4: The moderating effect of AI training courses on the relationship between AI application competence and occupational competence was significant (interaction term $\beta = 0.201$, $p < 0.01$), further validating the moderating effect.

The slope diagram of the moderating effect of artificial intelligence training courses is seeing Figure 2:

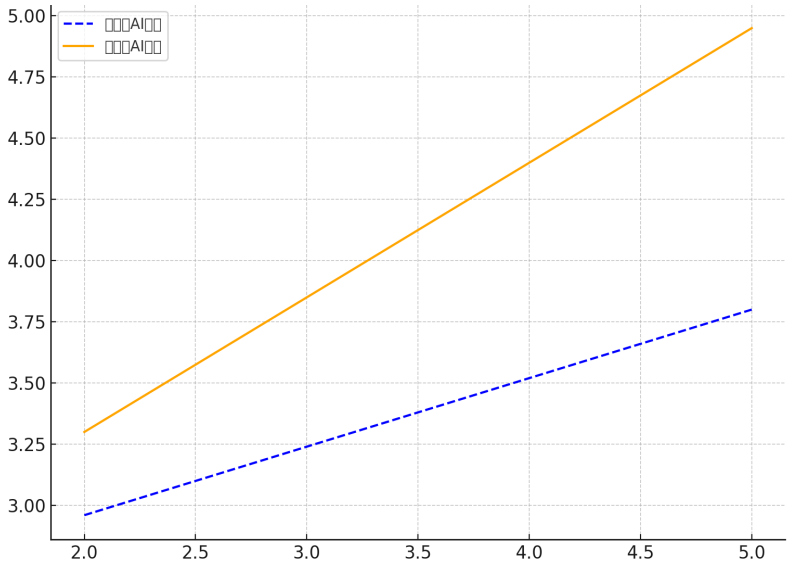

Figure 2 Slope diagram of the moderating effect of artificial intelligence training courses

(Notes: The horizontal axis is: AI Application Competence, The vertical axis is Career Competence. The two lines show the difference in career competence between students who received high and low levels of AI training programme.)

Figure 2 demonstrates the moderating effect of AI training courses on the relationship between AI application ability and occupational competence. From the figure, it can be seen that, with AI application ability at the same level, the occupational competence scores of students who receive high-level AI training courses are significantly higher than those of students who do not receive or only receive low-level training. This indicates that AI training not only enhances students' ability to apply AI knowledge to practical work, but also significantly improves their overall career competency performance. In addition, as the AI application ability increases, the occupational competence of students who received high-level training increases more, indicating that the AI training programme has an enhancing moderating effect on the "AI application ability-occupational competence" pathway.

This result confirms Hypothesis H3, which states that AI training courses play a positive moderating role between AI application and occupational competence.

4. Conclusion

This study explores the effects of AI Awareness and AI Application on students' Career Competence in the context of AI-integrated workplaces with students majoring in Business English at Nanjing Engineering Vocational College, and further examines the moderating role of AI Training Courses) moderating role in it. The study conducted a systematic statistical analysis based on the Technology Acceptance Model (TAM) and Theory of Planned Behaviour (TPB), combined with empirical questionnaire data[14,22,25].

It was found that both AI awareness and AI application had a significant positive effect on students‘ career competence, indicating that as students’ understanding of AI-related knowledge and their ability to apply it in real-world scenarios improved, their career adaptability and core competence increased simultaneously[26]. Meanwhile, the moderating effect analysis shows that AI training courses play a positive moderating role between AI awareness and career competence, i.e., when students receive more systematic AI training, AI awareness has a more significant effect on their career competence[27].

This study enriches the empirical research on the influence mechanism of occupational competence in the context of AI technology, and provides a realistic basis and an improvement path for the training

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of business English majors in colleges and universities[28]. It is suggested that colleges and universities should strengthen the design of AI training courses to enhance students' awareness and application of AI technology in order to enhance their comprehensive competitiveness in the future workplace.

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