Research on the Current Situation, Issues, and Countermeasures of AI Higher Education Literacy Training for Normal University Students: A Case Study of Wenzhou

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Abstract. With the rapid development and updating of Artificial Intelligence (AI) technology, the field of higher education is experiencing unprecedented and profound changes. This situation is particularly significant in AIHEd. Normal University Students, as an important part of the future education faculty, have a high or low AIL (AIL) that is directly related to the quality and effectiveness of future education. Focusing on China Wenzhou, this research aims to deeply explore the current situation of AIL among teacher educators in the region. According to the statistical analysis of the data, the current Normal University Students in AIL have problems such as weak technical knowledge of AI use and insufficient practical application ability of AI. Aiming at these problems, this study proposes specific countermeasures such as improving the curriculum system and strengthening the practical teaching links. To promote the comprehensive improvement of Normal University Students in AIL and lay the foundation for the sustainable development of future education and the continuous progress of AIHEd.

Keywords: AIL, AI Higher Education, Normal University Students.

1 Introduction

As the core driving force of the fourth industrial revolution, AI has strongly invaded various industries and become the new focus of international competition. Since Kandlhofer et al. first explicitly proposed and elaborated "AIL" (AIL), countries have deployed AIL enhancement strategies[3]. The Finnish Government released a report pointed out in "Finland's Artificial Intelligence Era" that AI is closely related to everyone in Finland, and AIL is something that every Finn should have; The German government released its "AI Strategy" and took multiple measures to promote the implementation of AIL for citizens; and UNESCO published "AI and Education: A

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Guide for Policymakers", which pointed out that "future learning and training systems must equip all people with core AIL".

Normal University Students play the dual roles of students and future teachers while acting as ordinary citizens, and paying attention to the development of their AIL is significant for advancing the modernization of education and teaching in China. While China has elevated AI to a national strategy, it also attaches great importance to the cultivation of citizens AIL. China's State Council issued the New Generation of Artificial Intelligence Development Plan , which explicitly pointed out that it would build AI disciplines in institutions of higher education, set up AI-related majors, and accelerate the cultivation of AI talents; and so on. From a series of national policy documents, the field of higher education is mentioning AI more and more frequently, emphasizing the integration of AI and education, the information technology education competence in teacher education and teaching, the education of new type of information literacy in the age of teacher intelligence and the cultivation and enhancement of Normal University Students AIL.

The cultivation and development of Normal University Students AIL is an important way for schools to implement the teaching of AI and promote the construction of the educational system of AI[2]. Clarifying the requirements of Normal University Students AIL is the main focus of teacher training and enhancement of their abilities, and it is also the key link for Normal University Students to quickly change their roles and better integrate into AI teaching activities. After an extensive literature survey and research, it is found that the following problems mainly exist in the training and development of AIL for Normal University Students: first, there is a lack of intelligent teachers; second, there is less relevant literature on intelligent educational literacy that can be used as a reference for AI teaching teacher training colleges[5] and universities, teachers as well as Normal University Students, and the existing relevant literature Research on intelligent educational literacy is not perfect enough[1]; to solve these problems, it is necessary to integrate the concepts of Normal University Students' education and teaching with the contemporary characteristics of AI technology[8], and to be oriented to Normal University Students' learning and practicing tasks. This is conducive to improving the comprehensive literacy of Normal University Students and better aligning the training and development of Normal University Students with the new era.

This study aims to follow the trend of educational reform driven by the rapid development of AI technology and provide a solid theoretical foundation and strategic guidance for the innovation of teacher education. Its core value lies in promoting the in-depth development of educational modernization and helping to comprehensively improve the comprehensive quality of Normal University Students, especially enhancing their ability to apply AI technology in future educational practice, to better cope with opportunities and challenges in the field of education. In addition, this study is also committed to filling the gap in regional research on AIL of Normal University Students and providing a series of targeted and actionable suggestions for educational practitioners, aiming to promote the balanced allocation of regional educational resources and the overall leap in education quality.

2 Literature Review

In academia, Scholars generally use three terms: "Artificial Intelligence Education" (AIE), "Education Artificial Intelligence" (EAI), and "Artificial Intelligence in Education" (AIEd) to characterize AI in education. No matter which concept is described above, it contains the following meaning: recognizing the reshaping of the form of education by AI technology, the application of AI and other technologies in the field of education, the transformation of educational content, teaching methods, learning methods, etc., is the only way to cultivate talents in the era of intelligence.

AIL in a broad sense refers to the basic literacy that individuals need to possess in the era of AI. According to Liu & Xie, "Intelligent Literacy" can be used to dominate the basic literacy required in the AI era, such as information literacy, computational thinking, interactive literacy, and data literacy[6]. AIL in the narrow sense only refers to the literacy related to AI technology. It been argued that AIL consists of three parts: " AI knowledge, AI capability, and AI consciousness ", in which " AI knowledge " mainly refers to the understanding of basic AI knowledge and its origin, and " AI capability " refers to the application of AI technology in the real world. " AI consciousness " refers to the ethical challenges and safety issues facing the application of AI technology in practice, etc[12].

To improve the application ability of Normal University Students AI, the professional ability and knowledge of Normal University Students will change greatly in the future era. The development of Normal University Students' AI application ability refers to the ability to integrate AI into academic teaching methods or use AI to promote education, including improving the application ability of intelligent educational technology[6]. However, Mei emphasized that in the training process, Normal University Students have a limited understanding of the specific meaning of AI language teaching, and the application level of AI needs to be improved[7]. "AI+ Teacher Education" will optimize the training system of Normal University education and improve the quality of Normal University Students. More Normal University Students should be aware of the necessity of AIL in the intelligent era. Also should pay more attention to this field in daily learning and actively improve their AIL and even comprehensive literacy[11]. Normal University Students have a stronger competitive edge in future jobs.

3 Methodology & Result

The design of the scale in the study is based on the combination of in-depth academic research and practical experience. The content of the scale is extracted from the questionnaire "Self-Assessment Tool for Artificial Intelligence Literacy of Normal Students"[9]. The questionnaire mainly examines the artificial intelligence literacy of normal students from three aspects: AI Knowledge Dimensions, AI Capability Dimensions, and AI Consciousness Dimensions. The study took undergraduate normal students and graduate students in Wenzhou as the research subjects, with a total of 223 valid questionnaires, and scored using the Likert 5-point scale.

In this study, public schools accounted for 36.32%; Private schools accounted for 63.68%. Males accounted for 34.53%; while females accounted for 65.47%. This gender distribution characteristic reflects the actual situation of the gender ratio in the field of normal education. Science and engineering majors have become the mainstream, accounting for 65.02%; while literature and history majors account for 34.98%. This reflects the preferences and choices of students in normal education for different subject areas. Juniors accounted for the largest proportion (34.98%) in the study; the specific content is shown in Table 1 for the analysis of valid samples.

Table 1. Analysis of valid samples.

Variable	Options	Frequency	Percent
1.Type of normal school you are in?	Public school	81	36.30%
	Private school	142	63.70%
2.Your gender?	Male	77	34.50%
	Female	146	65.50%
3.Your normal major is?	Science and engineering	145	65%
	Literature and history	78	35%
4. Your grade is?	Freshman	15	6.70%
	Sophomore	21	9.40%
	Junior	78	35%
	Senior	36	16.10%
	Graduate student	73	32.70%

The study used Pearson's correlation coefficient for analysis in exploring the correlation between the multiple dimensions of AIL and heat maps to quantify the strength of the linear relationship between the different dimensions. (Figure 1). The correlation coefficient between AI Knowledge Dimensions and AI Capability Dimensions is 0.533 with $P<0.01$ (Sig.<.001); the correlation coefficient of AI Consciousness Dimensions is 0.461 with $P<0.01$ (Sig.<. 001), indicating that there is also a significant positive effect between AI Knowledge Dimensions and AI Consciousness Dimensions. The correlation coefficients between AI Capability Dimensions AI Knowledge Dimensions and AI Consciousness Dimensions are 0.533 and 0.689, respectively, and $P<0.01$, which shows a significant positive correlation between these dimensions. The correlation coefficients of AI Consciousness Dimensions with AI Knowledge Dimensions and AI Capability Dimensions are 0.461 and 0.689, respectively, and all of them reach significance at the two-tailed significance level of 0.01.

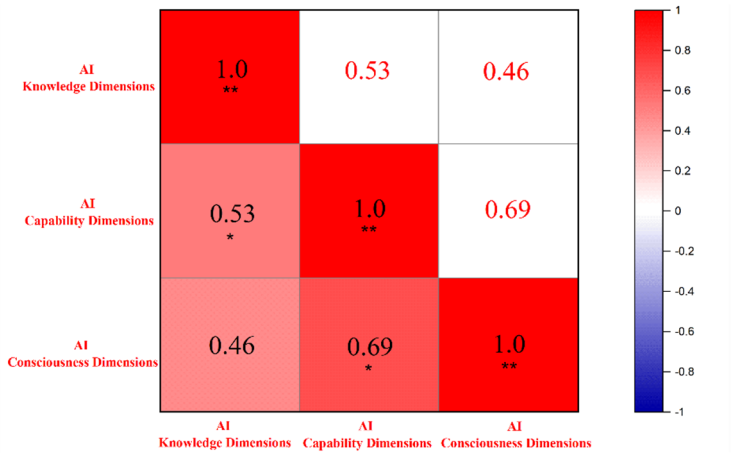

Fig. 1. Pearson correlation coefficient analysis.

Statistical analysis explored the impact of three dimensions on DV-AIL (Table 2). The overall fit is excellent (R^2=0.7922), and there is no multicollinearity problem among IVs. The specific impact analysis is as follows: AI Knowledge Dimension has a significant positive impact on DV (β=0.427, P<0.001), but the degree of impact is relatively small. AI Capability Dimensions have a significant positive impact on DV (β=0.798, P<0.001), and the impact is relatively large. AI Consciousness Dimensions have the most significant impact on DV-AIL and have a positive relationship (β=0.856, P<0.001), indicating that increasing AI awareness plays a key role in improving the dependent variable. Finally, according to the regression analysis results, the following regression equation can be derived:

DV= 2.357 + 0.819AI Knowledge Dimensions + 0.911AI Capability Dimensions + 0.762*AI Consciousness Dimensions

Table 2. Analysis of impact factors for scale data and results.

Model	Unstandardized Coefficients		Standardized Coefficients	Sig.	Collinearity Statistics
	B	Std. Error	Beta		VIF
(Constant)	2.357	0.255		0	
AI Knowledge Dimensions	0.819	0.028	0.427	<.001	1.43
AI Capability Dimensions	0.911	0.035	0.798	<.001	2.143
AI Consciousness Dimensions	0.762	0.29	0.856	<.001	1.949
R Square				0.415	
F				7.922	
P				<.001	

4 Discussion

The analysis results show that AI Knowledge Dimensions has a significant positive impact on AIL, providing important support for improving the AIL of Normal University Students. AI Capability Dimensions have a more significant impact on AIL and a greater degree of impact. In addition, AI Consciousness Dimensions have the most significant impact on AIL.

As stated by Wu, the current state of talent cultivation in higher education still needs to be improved in the era of AI[10]. The integration of AI with traditional classrooms and the introduction of innovative teaching methods are all directions that future educators need to consider in depth and are the foundation that NUS needs to build upon firmly in higher education.

Although the impact of the AI knowledge dimensions is relatively minor, the ability of NUS to collect, manage, and communicate knowledge still needs attention. Education departments should add AI theory courses to teacher education and give them equal importance to professional courses to help students improve their theoretical knowledge and practical abilities.

In the dimensions of AI capability, it is especially important to provide NUS with sufficient practice opportunities and establish reasonable evaluation standards. The education model should be adjusted promptly with the integration of AI technology to build a modular learning system that includes professional courses and excellent teacher design, and to strengthen the core literacy of NUS in the areas of instructional design, facility utilization, assessment, and critical reflection[4].

The AI consciousness dimensions not only emphasize the understanding of the potential of AI in education but also encompass the innovation of NUS in applying AI in their teaching practice. As part of an information-based society, NUS is supposed to have a deeper understanding of the multidimensional functions of AI and recognize that AI is not only a basis for scientific decision-making, but also an important resource for information-based education.

In conclusion, based on the results of the analysis of the status of AIL among Wenzhou NUS, together with previous studies, it is revealed that the overall improvement of NUSs' AIL can be effectively promoted by enhancing the dimensions of AI knowledge, capability, and consciousness.

5 Conclusion

To enhance the quality of China's future basic education teaching force, as well as to cope with the needs of the future development of information technology teaching integration and innovation, it has become an inevitable trend in today's era to scientifically assess and promote the improvement of NUSs' AIL. This study is of great significance and contributes to promoting the improvement of AIL at NUS and the modernization of education. Based on this, future research directions will include combining qualitative research methodology, expanding the sample size, and adopting longitudinal research methods. These approaches will contribute to a further in-depth

understanding of the trends and influencing factors of AIL, to better respond to the challenges and opportunities in the field of education.

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