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Research on paths for enhancing professional literacy among vocational college students from the perspective of artificial intelligence literacy

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Abstract: The intelligent transformation of industry puts forward new requirements for professional literacy among vocational college students, and artificial intelligence literacy has become an important foundational digital competency for workplace adaptation of technical and skilled talents. This paper focuses on dissecting the internal mechanism among artificial intelligence literacy, practical confidence for students and industry-education integration practice. Practical problems are sorted out, including students' cognitive imbalance, insufficient practical confidence, fragmented education system, and inadequate realization of educational value of industry-education integration. Educational paths are constructed along three dimensions: literacy cultivation, psychological empowerment, and deepened industry-education integration, so as to provide practical references for the cultivation of high-skilled talents in higher vocational colleges.

Keywords: artificial intelligence literacy; vocational college students; professional literacy; industry-education integration

1 Introduction

The iteration of artificial intelligence technologies reshapes the structure of professional posts. New-mode applications such as intelligent manufacturing, intelligent detection and digital operation and maintenance are continuously implemented, and the digital and intelligent transformation of posts across all industries keeps advancing. As the main front for cultivating technical and skilled talents, higher vocational education should keep pace with industrial demands to train practitioners adapted to the intelligent era. Vocational college students' professional literacy is directly related to their post adaptability and future development potential [1]. As the core literacy in the digital age, artificial intelligence literacy exerts a vital influence on the development of students' professional literacy. Based on interviews and enterprise internship visits among engineering students majoring in electrostatics, electrical engineering and numerical control, it is observed that some students majoring in numerical control can skillfully operate traditional CNC machine tools yet are unfamiliar with the newly-installed AI-assisted quality detection systems in workshops. Students majoring in electrical engineering are capable of wiring and debugging basic equipment but have cognitive blind spots concerning the integrated control systems of intelligent production lines. Many students suffer from fear of difficulties when facing enterprise intelligent equipment, and their awareness of AI ethics needs to be improved. Accordingly, this paper sorts out core concepts, analyzes practical educational problems and puts forward feasible practical cultivation paths.

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2 Core concepts and internal correlations

2.1 Definition of core concepts

Artificial intelligence literacy refers to the comprehensive competence of vocational college students to master basic artificial intelligence knowledge, apply AI tools to solve professional problems, and abide by artificial intelligence ethical norms. It covers three dimensions: knowledge cognition, skill application and ethical norms, serving as the foundation for students to adapt to intelligent working environments.

Professional literacy is the comprehensive quality demonstrated by vocational college students in professional activities, including vocational adaptability, sense of professional responsibility and vocational innovation capability. Centered on post adaptation, capability improvement and long-term career development, the talent cultivation in higher vocational colleges takes these three as its core objectives [2].

Industry-education integration practice refers to activities jointly carried out by higher vocational colleges and industrial enterprises, including practical teaching, on-post training, post internship and enterprise residency training [3].

2.2 Interrelationships among the key factors

First, artificial intelligence literacy exerts positive promoting effects on vocational adaptability for students. Students with sound artificial intelligence literacy can quickly get familiar with technical procedures for intelligent posts, better cope with technical upgrade for posts and improve vocational adaptability.

Second, students' subjective practical confidence serves as a vital internal condition for the transformation from artificial intelligence literacy to professional behaviors. Improvement of artificial intelligence literacy lays a foundation for students to apply intelligent technologies to conduct post-oriented innovation. Nevertheless, objective knowledge cannot be directly converted into practical behaviors. Only when students possess sufficient practical confidence and show willingness for proactive application of acquired knowledge within post scenarios can development of professional literacy receive effective advancement.

Finally, industry-education integration practice plays a significant facilitating role. Classroom teaching mainly realizes input of theoretical knowledge, while industry-education integration and enterprise residency training deliver authentic practical scenarios for intelligent posts. Such scenarios enable students to apply competencies related to artificial intelligence in post-based hands-on practice, bridge the disconnect between theory and practice, and amplify the facilitating effects of artificial intelligence literacy on professional literacy.

3 Practical problems in cultivating professional literacy among vocational college students from the perspective of artificial intelligence literacy

First, students exhibit unbalanced development of artificial intelligence literacy with deficiencies in post-oriented application cognition. Front-line investigation reveals uneven literacy levels among student groups, leaving considerable room for improvement. Many students are adept at general-purpose AI tools for the public but unfamiliar with industrial-scenario applications such as intelligent detection and intelligent control, which creates a mismatch between knowledge and post requirements [4].

Second, some students have insufficient practical confidence and suffer from fear of difficulties. For instance, interns majoring in numerical control can independently operate and debug traditional equipment, yet dare not debug intelligent production lines equipped with AI modules for fear of mis-operation.

Third, fragmentation exists in the on-campus education system, and the integration between ideological-political education and digital literacy cultivation is inadequate. Artificial intelligence-related teaching contents are mostly embedded in several specialized courses, while universal guiding education for all students is insufficient. Information

exchange between specialized course teachers and counsellors is inadequate.

Fourth, the practical educational value of industry-education integration has not been fully realized. Students gain limited access to intelligent equipment and workflows for intelligent production. There is no systematic reflective summary of artificial intelligence literacy and professional literacy following internships. Consequently, students can scarcely fully internalize internship-gained experience into their comprehensive literacy.

4 Practical paths for improving professional literacy among vocational college students from the perspective of artificial intelligence literacy

4.1 Optimize artificial intelligence literacy cultivation to consolidate the foundation for professional literacy development

Based on post demands, cooperate with professional teachers to improve the content of artificial intelligence literacy cultivation, covering the three dimensions of knowledge cognition, skill application and ethical norms. As the main position for students to acquire artificial intelligence knowledge, professional classrooms require teachers to reconstruct teaching content in combination with the current situation of industrial posts. The teaching content shall focus on post scenarios after intelligent transformation of the industry, explaining the operation logic of intelligent equipment, AI-aided fault diagnosis, and key points for using intelligent production systems. Meanwhile, education on artificial intelligence ethical norms shall be strengthened to guide students to establish the concept of technology for good. It must be clarified that artificial intelligence is only an auxiliary tool for posts, and human beings shall hold the leading power in technology application. Boundary issues including intellectual property rights, confidentiality and production safety in the use of intelligent tools shall be clarified.

Apart from classroom teaching, counsellors shall carry out supplementary general education via theme class meetings, second-class activities and online platforms. Complex algorithms are not required in theme class meetings. Real enterprise post cases for relevant majors can be adopted to demonstrate the practical application of artificial intelligence in equipment manufacturing, production, operation and maintenance, detection and analysis. Hierarchical guidance shall also be provided for students with different learning foundations. Students with sound foundations can be encouraged to participate in intelligent-technology-related competitions to foster the overall learning atmosphere; for under-achieving students, ideological counselling shall be offered to guide them to learn progressively from the perspective of practical post application.

4.2 Strengthen psychological empowerment for practice among students and unblock intermediate links for internalization of literacy

Practical confidence for students serves as a vital bond connecting artificial intelligence literacy and professional literacy. As front-line educators with direct insight into students' ideological and psychological conditions, counsellors shall attach importance to psychological empowerment and embed psychological guidance into whole processes of heart-to-heart talks and internships. In particular, focus should be placed on students with fear of difficulties toward intelligent technologies to help them set reasonable expectations. Meanwhile, the permissible scope for trial-and-error in post learning should be clarified, guiding students to accept imperfection in the learning process and relieve their psychological pressure.

Within teaching processes, barriers to communication between counsellors and course teachers shall be removed. Attempts from students to apply intelligent technologies for solving problems, as reportedby teachers, shall receive timely affirmation to help students accumulate successful experience. Counsellors should identify real cases from students in enterprise-based training who complete job tasks using intelligent tools, so as to eliminate students' fear of new technologies and promote conversion from knowledge reserve into internal motivation for job-oriented active innovation.

Meanwhile, experience-sharing groups consisting of students returning from internships can be established for regular exchanges of experience in operating intelligent equipment.

4.3 Deepen industry-education integration practice and give play to the boosting effect of practical scenarios

Higher vocational colleges shall continuously deepen school-enterprise cooperation, jointly build practical training platforms, and introduce real enterprise production projects, so that students have opportunities to apply artificial intelligence-related capabilities in post scenarios [5]. Both schools and enterprises shall formulate talent competency standards for intelligently upgraded jobs such as mechatronics, electrical engineering and numerical control, and integrate post requirements related to artificial intelligence into internship schemes. Enterprise technical backbones shall be invited to participate in education, integrating technical requirements and ethical norms of enterprise posts into practical teaching to bridge the gap between on-campus teaching and industrial reality.

Counsellors shall embed literacy guidance into the whole process of enterprise-residence training and incorporate artificial intelligence literacy, professional ethics and craftsman spirit into observation items for internship education. In pre-internship education, apart from safety and discipline education, contents including cognition of intelligent posts and ethical red lines for posts shall be added. During internship visits, apart from paying attention to students' safety and daily life, counsellors shall proactively understand students' adaptation to intelligent posts and identify their confusions in using intelligent auxiliary tools. Linkage with enterprise tutors shall be established to carry out education on craftsman spirit and technical ethics at production sites, turning enterprise workshops into vivid large-scale ideological-political classrooms. After internships, summary and review activities shall be organized to guide students to sort through intelligent technologies, difficulties and gains encountered in internships, and internalize post practice experience into their professional literacy. Meanwhile, multi-party collaborative education mechanisms shall be improved to promote tripartite linkage among teachers for specialized courses, counsellors and enterprises tutors and establish regular communication channels for sharing students' learning status.

5 Conclusion

Artificial intelligence literacy, practical confidence for students and practice for industry-education integration hold interrelations and jointly affect the formation of professional literacy among vocational college students. As counsellors for vocational colleges, we should base our work on respective posts, cooperate with teachers for specialized courses and tutors from enterprises, remedy deficiencies within general education, psychological guidance and literacy cultivation during internships, and integrate digital literacy, technical ethics and craftsman spirit into daily educational work. Meanwhile, we should pay attention to students' ideological dynamics and psychological dilemmas in the intelligent era, guide them to rationally understand the values and boundaries of artificial intelligence, and help them grow into high-skilled talents adapted to industry development needs.

Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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