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Research on the Popularization of AI Agent Development Technology and the Collaborative Enhancement of AI Literacy among Faculty and Students in Universities

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Abstract: Against the backdrop of the global iteration and upgrading of artificial intelligence (AI) technology and the accelerated arrival of the intelligent era, the popularization of AI agent development technology and the collaborative enhancement of AI literacy among faculty and students have become important supports for promoting the high-quality development of higher education. From the perspective of educational reform, this paper systematically analyzes the dilemmas faced in the process of relevant technology promotion and talent quality cultivation, such as resource imbalance, cognitive biases, and insufficient collaboration. Furthermore, it proposes collaborative enhancement strategies from four dimensions: resource supply, cultivation models, linkage mechanisms, and guarantee systems. The aim is to provide theoretical references and practical paths for promoting the in-depth integration of AI technology and higher education and improving the quality of talent cultivation in universities.

Keywords: AI agent development technology; University faculty and students; AI literacy; Collaborative enhancement

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1. Introduction

With the rapid development of AI technology, digital transformation in education has become the core direction of educational reform. As an important application form of AI technology, the popularization of AI agent development technology directly affects the depth of integration between higher education and cutting-edge technologies, while the AI literacy of faculty and students is the key foundation for realizing this integration. Currently, universities still face many adaptability issues in promoting the popularization of AI agent development technology and enhancing the AI literacy of faculty and students, and the two have not formed a synergetic development force [1]. Based on this, this paper focuses on the core proposition of their collaborative

enhancement from the perspective of educational reform, deeply analyzes the existing dilemmas, and explores solutions. This is of great practical significance for promoting the connotative development of higher education and cultivating talents who meet the needs of the digital economy era.

2. Dilemmas faced in the popularization of AI agent development technology and the enhancement of AI literacy among university faculty and students

2.1. Unbalanced allocation of development resources

Unbalanced resource allocation is the primary bottleneck restricting the popularization of AI agent development technology. From a regional perspective, universities in economically developed eastern regions, relying on strong financial strength and superior geographical advantages, are more actively building computing power resource centers and introducing advanced AI agent development platforms. Taking Zhejiang Province as an example, by the end of 2025, various universities led by Zhejiang University have successively completed the construction of integrated AI public computing power service platforms to support university-level AI teaching, smart campus management, scientific research and other fields [2]. At the same time, more than 70% of universities have completed the local deployment or procurement of agent platforms; in contrast, universities in central and western regions generally face funding shortages, lagging procurement and deployment of software and hardware resources, and a serious lack of hardware facilities and software resources required for technology popularization. From a disciplinary perspective, science and engineering disciplines such as computer science and artificial intelligence can obtain more resource inclination, and the popularization of related technologies progresses smoothly; while humanities and social sciences, medical and other disciplines, due to the lack of corresponding technical foundations and resource support, the popularization of AI agent development technology progresses relatively slowly [3].

This unbalanced resource allocation has led to significant gaps in the popularization of AI agent development technology among universities in different regions and disciplines, making it difficult to achieve the balanced development goal advocated by educational reform. At the same time, the scarcity of resources has led some universities to limit technology popularization to a small number of majors and faculty and student groups, failing to cover all faculty and students, which violates the inclusive principle of educational reform.

2.2. Cognitive biases and competency shortcomings in AI literacy

Cognitive biases and competency shortcomings in AI literacy among university faculty and students have seriously hindered the popularization and application of AI agent development technology. At the cognitive level, some teachers simply equate AI literacy with AI technology operation capabilities, ignoring the cultivation of core literacy such as AI thinking and ethical judgment; some students regard AI agent development technology as profound content in professional fields, believing it has nothing to do with their own learning and lacking the awareness of active learning . Such cognitive biases lead to a passive attitude of faculty and students when participating in the learning of AI agent development technology, making it difficult to form effective learning motivation.

At the competency level, among teachers, except for those in computer-related majors, teachers in other disciplines generally lack relevant knowledge and skills in AI agent development, unable to integrate AI technology into curriculum teaching, and thus unable to meet the requirements of interdisciplinary integrated teaching advocated by educational reform [4]; among students, even those in science and engineering disciplines

mostly only master basic AI theoretical knowledge, lacking practical agent development capabilities, and unable to transform theoretical knowledge into practical application results. In addition, the AI ethical literacy of faculty and students is also obviously insufficient, with insufficient cognition and response capabilities to ethical issues such as privacy protection and data security that may be involved in the development of AI agents [5].

2.3. Insufficient synergy of AI popularization and literacy improvement

Currently, universities lack effective synergy between the popularization and application of AI Agent technology and the cultivation of artificial intelligence literacy among faculty and students, leading to a disconnect between development techniques and practical competence. On the one hand, technology popularization is not effectively integrated with literacy improvement. Some universities focus merely on the delivery of technical knowledge while neglecting systematic guidance on underlying algorithm logic and AI ethical risks, making it difficult to translate technical application into real problem-solving capabilities. On the other hand, literacy improvement lacks support from development practice [6]. Most artificial intelligence literacy education in universities is dominated by theoretical teaching, with insufficient practical modules on AI Agent development. As a result, the improvement of literacy remains theoretical and cannot be effectively applied to technical development.

In addition, there is a lack of coordination among various internal departments in universities. The administrative departments, such as teaching affairs and scientific research, lack linkage with information technology departments in resource allocation. The problems of “data silos” and “intelligent barriers” have not been completely eliminated, further exacerbating the disconnect between technology popularization and literacy improvement. Meanwhile, the collaboration between universities, enterprises, and research institutes is insufficiently in-depth, which fails to leverage external forces to promote the coordinated development of AI popularization and literacy improvement.

2.4. Imperfect development practice support system

In terms of the practice support system, first of all, most existing teachers lack systematic training in AI agent development. Although they generally show a high level of recognition and attitude towards AI technology, they find it difficult to effectively integrate AI into core links such as curriculum design, teaching evaluation, and educational innovation [7]. More notably, AI teaching tasks are often undertaken only by computer professional teachers. Although teachers in other disciplines encourage students to contact relevant knowledge [8], they generally lack systematic teaching planning and implementation capabilities. This fragmented teaching state seriously restricts the in-depth integration of AI and professional education.

Secondly, the functions of agent development platforms are single, and the iteration cycle is lagging. The learning cost of building agents for non-professional students is too high, and AI technology is currently in a state of rapid updating and iteration, so the platform cannot meet the needs of faculty and students for carrying out diversified AI agent development practices [9]. Finally, the evaluation and assessment system is unreasonable. The existing evaluation methods are still dominated by theoretical examinations, which cannot fully reflect the technical application capabilities and AI literacy levels of faculty and students, and it is difficult to exert the guiding role of evaluation.

3. Strategies for the collaborative enhancement of the popularization of AI agent development technology and ai literacy among university faculty and students

3.1. Improve policy guarantee and construct a public AI technology popularization resource system

To solve the problem of unbalanced resource allocation, a perfect policy guarantee and the construction of a public technology popularization resource system are important guarantees for the smooth progress of AI literacy enhancement. First, increase policy support and financial investment. The state should introduce special policies to support universities in carrying out the popularization of AI agent development technology, especially by providing financial incentives to universities in central and western regions and disciplines such as medicine, humanities and social sciences. Universities should actively respond to the current national call, vigorously promote the construction of general AI courses and interdisciplinary courses, and at the same time, integrate internal financial resources to set up special funds for building computing power resource centers and developing high-quality teaching resources [10].

Secondly, promote the construction of resource-sharing platforms. Encourage universities in economically developed eastern regions to carry out paired assistance with universities in central and western regions, establish a cross-regional AI agent development technology resource sharing platform, and realize the sharing of high-quality teaching resources, training equipment, and faculty. At the same time, build an on-campus interdisciplinary resource sharing platform, integrate AI-related resources from different disciplines, and provide equal opportunities for all faculty and students to obtain resources. Finally, enrich the forms of resource supply [11]. In addition to traditional resources such as textbooks and courseware, efforts should be made to develop digital resources such as online open courses and virtual simulation training projects, and use a combination of online and offline methods to expand the coverage of resources. Encourage enterprises to participate in resource construction, jointly develop teaching resources and training projects that meet actual application needs, and improve the practicality and pertinence of resources.

3.2. Create a hierarchical and classified AI literacy cultivation model for faculty and students

To address the cognitive biases and competency shortcomings in AI literacy among faculty and students, a hierarchical and classified cultivation model should be created. In terms of hierarchical cultivation objects, at the teacher level, professional teachers and non-professional teachers should be distinguished. Professional teachers should focus on cultivating advanced technical capabilities and teaching integration capabilities in AI agent development, while non-professional teachers should focus on cultivating basic AI technology cognition and application capabilities to enable them to integrate AI technology into daily teaching.

At the student level, science and engineering students should focus on the cultivation of technological R&D capabilities, while students in other disciplines should focus on the cultivation of AI technology application and ethical literacy [12]. In terms of classified cultivation content, a multi-dimensional literacy cultivation content system covering basic AI theories, development technologies, application practices, ethical norms, etc., should be constructed. By promoting the in-depth cross-integration of traditional disciplines and majors with AI, actively explore the model innovation of “AI + micro-major” professional education, and guide students to truly apply AI technology in practice.

To address cognitive biases, efforts should be made to strengthen the publicity of AI literacy concepts. Through special lectures, theme salons, and other forms, help faculty and students correctly understand the

connotation and importance of AI literacy. In terms of cultivation methods, a combination of theoretical teaching and practical teaching, online learning and offline training should be adopted. Introduce advanced teaching methods such as project-based learning and case teaching, and take actual AI agent development projects as carriers to guide faculty and students to improve their technical capabilities and literacy levels in practice [13]. At the same time, establish a teacher-student mutual assistance learning mechanism, encourage professional teachers to guide non-professional teachers and students to carry out learning and practice, and form a good atmosphere of common improvement.

3.3. Construct a collaborative linkage mechanism among internal and external departments

Establishing a sound collaborative linkage mechanism is the key to realizing the in-depth integration of technology popularization and literacy enhancement. Incorporate the popularization of AI agent development technology and the enhancement of AI literacy among faculty and students into the overall goal system of university educational reform, and formulate clear collaborative development goals to ensure that the two are in the same direction and advance synchronously [14].

First, strengthen internal university department collaboration. Establish a collaborative working group composed of academic affairs departments, scientific research departments, information technology departments, and various colleges and departments, clarify the responsibilities of each department, strengthen communication and coordination, and realize the effective integration of technology popularization resources and literacy cultivation resources. The academic affairs department is responsible for incorporating the development of AI agent technology and AI literacy cultivation into the talent training program; the scientific research department is responsible for supporting related scientific research projects to provide theoretical support for technology popularization and literacy cultivation; the information technology department is responsible for building technical support platforms; each college and department is responsible for the specific implementation of teaching [15].

Secondly, deepen university-local government-enterprise collaboration. Strengthen cooperation with local governments, technology enterprises, and scientific research institutions, establish collaborative education platforms, introduce advanced technologies and practical projects from enterprises, and allow faculty and students to improve their technical capabilities and literacy levels in real project practice.

In addition, collaborate with education authorities at all levels and universities to encourage faculty and students to participate in AI agent development projects through agent development competitions. For the purpose of promoting the transformation of AI literacy education from theoretical knowledge to practical capabilities, create an influential agent innovation competition. By setting up multi-theme tracks, teacher-student collaborative development and other competition systems, continuously attract interdisciplinary teams to participate in the competition, carry out project-based exploration around real problems in teaching, scientific research and other scenarios, and promote the in-depth integration of interdisciplinary disciplines and the systematic integration of innovative capabilities [14]. At the same time, supporting sound display and reward mechanisms to ensure that excellent agent cases receive continuous support and promotion, making the competition a core engine driving AI technology learning and practical innovation on campus.

3.4. Build and iteratively upgrade the practice support system

In terms of the practice support system, first, promote the construction and iterative upgrading of agent platforms.

Focus on building an agent development platform with multiple interaction methods and an AI resource integration portal, providing full-process technical support for faculty and students with different disciplinary backgrounds from creative conception to application implementation and promotion, and providing infrastructure guarantees for AI teaching, practice and innovation work in the university. At the same time, promote the construction of a new "AI-driven agent development" auxiliary development model (as shown in Figure 1), integrating agent development assistants such as "agent process design", "prompt optimization", "tool library intelligent screening", "data cleaning", and "algorithm evaluation", covering the complete development link from agent design to result evaluation. It can provide professional and automated auxiliary support for users in various key links of agent development, significantly reduce technical thresholds, improve development efficiency and project quality, and allow faculty and students to focus more on scenario conception and innovative design [15].

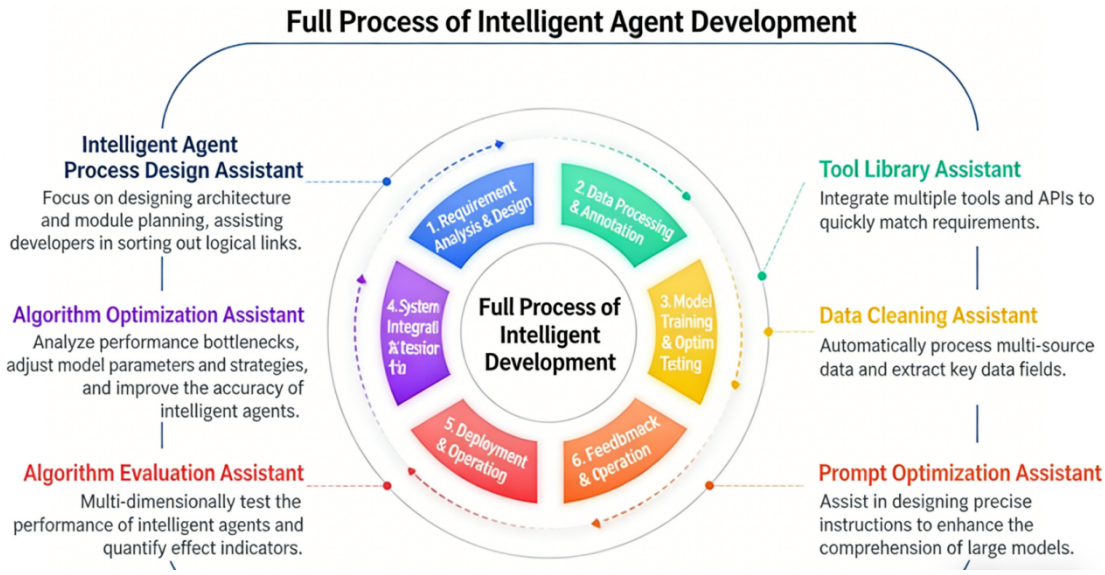

Figure 1. New model of agent-assisted development.

Second, strengthen the construction of a professional faculty team. Regularly organize teachers to participate in special training on AI agent development technology, invite experts and industry scholars to give lectures and teaching guidance, and through the implementation of a modular training path for AI literacy improvement, introduce and train the latest AI technologies to teachers in stages and systematically, guiding them to carry out interdisciplinary cross-integration innovation and improve teachers' professional capabilities and practical levels [16].

Third, optimize the evaluation and assessment system. Establish a diversified evaluation and assessment mechanism, comprehensively adopt various evaluation methods such as theoretical examinations, practical operations, project results, and teaching applications to fully evaluate the technical capabilities and AI literacy levels of faculty and students [17]. Emphasize process evaluation, strengthen the supervision and guidance of the learning and practice processes of faculty and students, and give full play to the guiding and incentive role of evaluation.

4. Conclusion

From the perspective of educational reform, the popularization of AI agent development technology and the collaborative enhancement of AI literacy among university faculty and students are an inevitable requirement for promoting the digital transformation of higher education and improving the quality of talent cultivation.

Currently, the collaborative development of the two still faces many dilemmas, such as unbalanced resources, cognitive biases, insufficient collaboration, and imperfect guarantees. By improving policy guarantees, constructing a public AI technology resource system, creating a hierarchical and classified cultivation model, establishing a collaborative linkage mechanism, launching agent competitions, and upgrading the practice support system, these dilemmas can be effectively solved, and the two can form a synergetic development force. In the future, universities should continue to deepen reforms, constantly explore collaborative enhancement paths that adapt to the needs of the times, give full play to the enabling role of AI technology in higher education, cultivate more outstanding talents with high-level AI literacy, and provide strong support for the construction of an educational power and the development of the digital economy.

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