

Research on AI Empowerment Audit Professional Graduate Tutor Digital Literacy Promotion Strategy

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Abstract: Artificial intelligence is reshaping auditing practices and talent demands, necessitating enhanced digital literacy among graduate supervisors who train future professionals. This study constructs a digital literacy assessment framework for audit supervisors by integrating Chin's Teacher Digital Literacy standards and UNESCO's Teacher AI Competency Framework, covering five dimensions: digital awareness, technical knowledge and skills, digital application, social responsibility and ethics, and professional development. A survey of 146 master's supervisors nationwide reveals a moderately high overall literacy level (mean = 3.46/5), yet with marked intradimensional variation: ethics and responsibility score highest (4.16), whereas digital application (2.86) and technical skills (3.16) remain notably deficient. Significant disparities emerge across age groups, academic backgrounds, and training experiences, with supervisors aged 56+ and those from accounting backgrounds facing the most acute challenges. Three core problems are identified: skill gaps, theorypractice disconnects, and training supplydemand mismatches. In response, the study proposes a threepronged improvement strategy—restructuring institutional support, fostering supervisor-driven selfdevelopment, and leveraging AI-powered ecosystem empowerment. This framework offers both theoretical underpinnings and practical guidance for the digital transformation of auditing education.

Keywords: Artificial Intelligence; Auditing; Graduate Supervisors; Digital Literacy; Enhancement Strategies

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1. Research Background

In the third decade of the 21 st century, artificial intelligence technologies represented by deep learning, large language models, and natural language processing are penetrating into all walks of life at an unprecedented rate. Auditing, an industry that has always been based on professional judgment and experience accumulation, is also undergoing a fundamental change driven by technology. The traditional audit mode relies on manual inspection and sampling inspection of the paper vouchers and financial books of the audited units, which is not only inefficient, but also difficult to cover the hidden risk points in the massive business data. The introduction of artificial intelligence technology has opened up a new situation for audit work: at the data acquisition end, intelligent crawlers and API interfaces can automatically capture multi-source heterogeneous data; on the data processing side, machine learning algorithms can automatically complete data cleaning and standardized conversion ; at the analysis and judgment end, the risk assessment system based on the deep learning model can fully analyze the massive transaction data, identify abnormal patterns and potential fraud clues. It can be said that artificial intelligence

is pushing audit from ‘sampling inspection’ to ‘full analysis’, from ‘post-supervision’ to ‘pre-warning’ and ‘in-process control’^[1].

This change puts forward new requirements for the core competence of audit practitioners. In the past, an excellent auditor needs to be proficient in accounting standards, auditing standards and related laws and regulations, with keen professional skepticism and solid audit skills. Now, in addition to these traditional capabilities, he also needs to understand the basic logic of data mining, be able to operate intelligent audit platforms, understand how to ask effective questions to large language models, and be able to critically examine the conclusions of model output. The audit model that relies solely on human experience is being replaced by a new model of ‘human-machine collaboration’. In this context, as the main position of training high-level audit talents, the postgraduate education of auditing professional degree must face this change and rethink the two fundamental issues of “what kind of people to train” and “who to train.”^[2]

If the cultivation of audit talents is a relay race, then graduate tutors are the key figures running in the last round. The vision, ability and teaching methods of the supervisor directly shape the knowledge structure and thinking habits of the future audit backbone^[3]. However, in the current training system of Master of Auditing in China, the digital adaptability of the tutor team is worrying. On the one hand, a large number of senior tutors have been deeply engaged in the field of traditional audit practice for a long time, lacking understanding of Python, SQL, machine learning and other tools, and even unfamiliar with the concept of ‘big language model’. On the other hand, even if some young tutors have a good foundation in information technology, they often lack systematic training that deeply integrates AI technology with audit teaching. It is more noteworthy that most of the existing teacher training programs remain at the general level, and rarely touch the core issue of “what kind of digital literacy is needed for audit tutors.”

Through the combing of the existing literature, it is found that although there are many studies on teachers’ digital literacy, most of them focus on primary and secondary school teachers or general teachers in colleges and universities^[4]. The research on the specific group of ‘auditing graduate tutors’ is almost absent, and the results of empirical analysis combined with questionnaire survey are even less. The digital transformation of the audit industry is in full swing, and the requirements for talents are increasing day by day. However, the tutors who train talents themselves lack a systematic digital literacy improvement path. Based on the understanding of this contradiction, this study focuses on the topic of “AI-enabled audit graduate tutor digital literacy improvement,” trying to explore a way to improve the digital literacy of tutors that is in line with the characteristics of the audit discipline and operable through the combination of theoretical analysis and empirical research.

2. Research Design

2.1 Research Questions and Methods

This study focuses on three core issues: (1) What are the core dimensions of audit tutors’ digital literacy in the era of artificial intelligence? (2) What is the current status of audit tutors’ digital literacy? Are there significant differences among different groups? (3) How to systematically improve the digital literacy of audit tutors?

The research follows the logical route of ‘theoretical construction-current situation investigation-problem diagnosis-strategy proposal’. First of all, using the literature research method, combing the domestic and foreign teachers’ digital literacy framework and the relevant achievements of audit personnel training^[5], combined with the characteristics of the audit discipline to build an audit tutor’s digital literacy analysis framework. Secondly, a questionnaire is designed based on the framework, and a questionnaire survey is conducted for college tutors who have a master’s degree in auditing in the country. Finally, SPSS software is used to analyze the descriptive statistics and differences of the collected data, and the promotion strategy is proposed accordingly.

2.2 Questionnaire Design and Data Collection

This research questionnaire is based on the Ministry of Education’s “Teacher Digital Literacy” industry standard, combined with the UNESCO’s “Teacher Artificial Intelligence Capability Framework” and the characteristics of the audit discipline^[6]. The questionnaire consists of three parts: the first part is the basic information (8 questions); the second part is the core scale of digital literacy, covering five dimensions: digital awareness (4 questions), digital technology knowledge and

skills (4 questions), digital application (4 questions), digital social responsibility and ethics (3 questions), and professional development (2 questions). The Likert five-point scale (1 = very disagree, 5 = very agree); the third part is the training needs survey (5 multiple-choice questions) and open opinions (1 open question). See Table 1 for details. The overall questionnaire has a total of 31 questions, and the filling time is controlled at 5-8 minutes.

Table 1: Questionnaire Structure

Module	Content	Number of Items
Demographic Information	Gender, Age, Years of Teaching Experience, Educational Background, Professional Title, Type of Supervisor, Academic Background, Whether Has Received Systematic Digital Training	8
Teachers' Digital Literacy	Digital Awareness	4
	Knowledge and Skills in Digital Technology	4
	Digital Applications	4
	Digital Social Responsibility and Ethics	3
	Professional Development	2
	Training Needs Survey	5
Open-ended Opinion	What additional suggestions or ideas do you have for enhancing the digital literacy of AI-powered audit mentors?	1

This survey was distributed to university tutors with master's degree in auditing authorized points throughout the country through the online platform (questionnaire star). It lasted for two months. A total of 178 questionnaires were collected. After eliminating invalid questionnaires (incomplete and regular answers, etc.), 146 valid questionnaires were obtained, and the effective recovery rate was 82.0 %. The distribution of samples in all aspects is reasonable, which basically meets the requirements of sampling survey, and further analysis of the current situation of teachers' digital literacy can be carried out.

2.3 Reliability and Validity Testing

SPSS27.0 was used to test the reliability of the questionnaire core scale. The results showed that the Cronbach's α coefficient of the total scale was 0.946, and the α coefficients of each dimension were : digital consciousness (0.872), digital technology knowledge and skills (0.915), digital application (0.901), digital social responsibility and ethics (0.863), professional development (0.884), which were all greater than the evaluation standard of 0.8, indicating that the questionnaire had excellent internal consistency reliability. In terms of validity test, the KMO value is 0.921, and the significance of Bartlett's sphericity test is 0.000, indicating that the data is suitable for factor analysis. The cumulative variance interpretation rate of the five factors extracted by principal component analysis was 68.73 %, and the factor loads of each item were greater than 0.6, indicating that the questionnaire had good structural validity.

3. Analysis of the Current State of Digital Literacy Among Audit Mentors

3.1 The Overall Level of Digital Literacy among Audit Supervisors

The results of descriptive statistics show that the overall average score of digital literacy of postgraduate supervisors in auditing major is 3.46 points (out of 5 points), which is above the middle level, but there is still much room for improvement. The scores of each dimension from high to low are: digital social responsibility and ethics (4.16 points), digital consciousness (3.72 points), professional development (3.41 points), digital technology knowledge and skills (3.16 points), and digital application (2.86 points). This distribution shows a clear 'high-low' gap : digital social responsibility and ethics score the highest, indicating that audit tutors generally have a strong sense of data security and ethical responsibility, which is closely related to the high emphasis on independent, objective and fair industry culture of the audit profession itself ; the scores of digital technology knowledge and skills and digital application are significantly lower, which has become the most prominent shortcoming of the current audit tutor's digital literacy. Specifically, in the dimension of digital technology knowledge and skills, the scores of general skills (such as office software, online meetings) are acceptable, but the scores of unique skills in the audit field (such as Python / SQL data analysis, intelligent audit platform operation, large language model

assisted audit text analysis) are obviously insufficient. In the digital application dimension, the sub-dimensions of ‘digital teaching evaluation’ and ‘digital collaborative education’ scored the lowest, reflecting that the phenomenon of ‘technology’ and ‘teaching’ still exists.

3.2 Analysis of Differences in Digital Literacy Among Different Groups of Mentors

In order to further explore which mentor groups need more attention and support, this study conducted a difference test (independent sample t test and one-way analysis of variance) on mentors with different backgrounds.

In terms of age differences, one-way analysis of variance showed that there were extremely significant differences in digital literacy among tutors of different ages ($F = 12.84$, $p < 0.001$). Post-hoc multiple comparisons showed that tutors aged 35 and below had the highest digital literacy score (4.19 points), followed by those aged 36-45 (3.72 points), 46-55 (3.32 points), and those aged 56 and above had the lowest score (2.87 points). This “age cliff” phenomenon is very obvious, especially in the dimension of “digital technology knowledge and skills,” the average score of tutors over 56 years old is only 2.54 points, which is significantly lower than the theoretical median (3 points) under the 5-point system. This shows that the senior mentor group is the difficulty and focus of digital literacy improvement.

In terms of the difference between professional title and teaching age, the analysis results of professional title and teaching age are highly correlated with age. The tutors with professor titles (average teaching age of 22 years) and teaching age of more than 16 years have little difference with young tutors in the dimensions of ‘digital consciousness’ and ‘professional development’, indicating that they recognize the importance of digital technology, but are significantly backward in the dimension of ‘digital technology knowledge and skills’. This verifies that senior tutors do not lack ‘consciousness’, but lack systematic and low-threshold technical support.

In terms of subject background differences, the tutor is divided into two groups according to the subject background: ‘accounting / audit background’ and ‘computer / information technology background’. The results of independent sample t test showed that in the dimension of ‘digital technology knowledge and skills’, the score of computer / information technology background tutors (4.29 points) was significantly higher than that of accounting / auditing background tutors (3.01 points) ($t = 9.34$, $p < 0.001$). This result is in line with expectations, but it also reveals a serious problem: the vast majority of accounting background tutors have a serious shortage of hard-core technical skills and need to ‘make up’.

In terms of differences in training experience, tutors who have received systematic digital training are compared with tutors who have not received systematic digital training. The results of independent sample t-test showed that the scores of the trained tutors in the five dimensions were significantly higher than those of the untrained tutors ($p < 0.01$). This finding has strong policy implications: systematic training is effective and supply should be increased. However, further analysis found that 68 % of the trained tutors still believe that the training content is out of touch with the audit discipline and is not highly targeted, which indicates that the quality and pertinence of the training need to be improved urgently.

3.3 Summary of Key Issues

Based on the above data analysis, we can extract the three core dilemmas faced by the digital literacy of the current audit graduate tutors:

First, there is a serious gap in technical skills and insufficient mastery of subject-specific tools. Tutors do not lack the general skills of online courses and PPT, but they seriously lack the professional and technical ability to deeply integrate with the audit discipline (such as Python data analysis, intelligent audit platform operation). This leads to their ‘lack of strength’, and it is difficult to really apply AI technology in teaching.

Secondly, ‘knowledge’ and ‘action’ are disconnected, and the level of digital application is shallow. Instructors generally recognized the importance of AI (digital awareness score 3.72), but encountered huge obstacles in translating technology into specific teaching practices (digital application score 2.86). At present, most of the applications stay in the shallow level of “using AI to search data,” and fail to go deep into the high-level application of “using AI to design personalized learning paths and carry out human-computer collaborative teaching.”

Third, the supply and demand of the training system is misplaced, and the care for senior tutors is insufficient. The existing training has the problem of “flood irrigation,” and there is no hierarchical design for the special needs of accounting

background and senior tutors. The group of senior tutors over 56 years old is a valuable asset of audit education, but it is also the weakest group of digital literacy, which needs more patient and targeted support programs.

4. Strategies for Enhancing Audit Mentors' Digital Literacy Through AI Empowerment

4.1 Systematic Restructuring of the School Support Framework

The improvement of tutors' digital literacy is inseparable from the institutional environment, resource conditions and organizational culture provided by the school. At the school level, it is necessary to build a systematic support system from four aspects: hardware, training, motivation and culture.

At the hardware level, many colleges and universities have invested a lot of money in the construction of 'smart campus', but the utilization rate of facilities is not high, because of the complex operation and the disconnection from the teaching process. In the face of highly specialized teaching scenarios, the school should cooperate with software developers in the audit practice community to introduce or customize a data analysis platform and intelligent audit simulation system specifically for audit teaching to ensure intuitive interface and smooth operation. At the same time, it is equipped with specialized technical support personnel to provide immediate help.

At the level of training system, in view of the current problem of "one size fits all" training, a hierarchical and classified training system should be established. According to the technical basis, the novice tutor starts from the 'literacy class' and learns the basic principles and basic operations of AI; advanced tutor in-depth study of man-machine collaborative teaching design; high-level mentors participate in cutting-edge research and tool development. According to the subject direction: emphasis on social audit and emphasis on national audit mentor, training content should be focused. For senior tutors over the age of 56, we should design low threshold, experience, strong support of exclusive training programs.

At the level of incentive mechanism, the digital literacy of tutors is included in the evaluation system of key links such as professional title evaluation, post appointment, evaluation and evaluation^[7]. The specific practices include: adding 'digital teaching ability' observation points in the title evaluation; in the performance appraisal, digital teaching is included in the workload; the establishment of 'digital teaching innovation award'. The key is to make the tutor feel that improving digital literacy is 'valuable and recognized'.

At the level of cultural construction, 'AI + Audit Teaching Innovation Forum' is held regularly, 'Digital Teaching Learning Community' is set up, and 'Digital Transformation Pilot Course' is set up. The core of cultural construction is 'de-fearing' -to let the tutor understand that it is normal to try new things and it is important to learn from failure.

4.2 Proactive Self-Development of the Supervisor's Personal Competencies

If the system is further improved, it is difficult to make substantial progress if the tutor himself has no internal motivation. The tutor should start from three aspects: cognition, action and reflection. At the cognitive level, two kinds of prejudices need to be broken. The 'technology useless theory' stems from overconfidence in their own experience; 'Technophobia' stems from the overestimation of learning difficulty^[8]. Through 'successful case demonstration' and 'experiential workshop', the tutors can see the practical benefits of AI tools, eliminate fear and build confidence in 'learning by doing'. At the action level, we should find the entry point of 'low threshold, high frequency, strong feedback'. Start with simple and easy-to-use tools, such as using large language models to generate the first draft of the syllabus, assisting in correcting homework, and quickly searching for literature. These tools can be used at high frequencies and can provide immediate positive feedback (such as saving time). Start from these small places, gradually accumulate confidence and experience, and then expand to high-level applications. At the level of reflection, it is necessary to establish an improvement cycle of 'practice-reflection-iteration'. After each use of AI tools, develop a habit of reflection: where is it? Where's it stuck? Is there a better way? Turn the reflective record into action, find a solution and then practice. This 'action research' approach makes digital literacy promotion an endogenous and sustainable professional lifestyle.

4.3 Ecosystem-Driven Empowerment through the Integration of AI Technologies

In addition to school support and personal efforts, AI technology itself can also be used as an 'enabler' to directly intervene in the process of mentor professional development.

First of all, we should create an intelligent tutor learning space. Build an 'intelligent tutor learning platform' to gather the

frontier literature, high-quality courses, teaching cases and other resources of the audit discipline, recommend personalized learning content for each tutor through the AI algorithm, record learning behavior data, analyze knowledge structure and ability shortcomings, and dynamically adjust the recommendation strategy. At the same time, it also provides immediate help for embedded workflows. AI assistants are embedded into the tutor's workflow (such as integrated into the teaching platform, document editing software), and the tutor can evoke assistants, ask questions, and get instant help at any time. This 'embedded, real-time' help is more in line with the characteristics of adult learning than centralized training. Finally, it is necessary to build a cross-school and cross-border intelligent network system. Establish an 'AI audit education open source community' to allow tutors from different universities to share digital teaching resources; organize 'online co-creation workshops' and learn from each other in collaboration; invite experts in the audit practice to answer questions online. This open, shared and collaborative ecology is irreplaceable by the traditional 'top-down' training model.

5. Conclusion and Prospects

This study focuses on the core issue of "AI-enabled audit graduate tutors 'digital literacy improvement,'" and conducts systematic research from three levels: theoretical construction, current situation investigation and strategic suggestions. The following main conclusions are drawn:

First, artificial intelligence technology is profoundly changing the operation logic and talent demand of the audit industry. As the key subject of high-level audit talent training, the digital literacy of audit tutors must be systematically improved. This promotion involves the reconstruction of multi-dimensional capabilities such as consciousness, knowledge, skills, ethics, and development.

Secondly, the five-dimensional analysis framework of digital literacy (digital awareness, digital technology knowledge and skills, digital application, digital social responsibility and ethics, professional development) constructed in this study has good theoretical explanatory power and discipline pertinence, which provides an effective tool for follow-up empirical research and practical guidance.

Third, the questionnaire survey found that the current audit tutor's digital literacy is generally at the upper-middle level (3.46 / 5), but there are significant 'age gaps' and 'technical skills shortcomings'. Digital social responsibility and ethics are the advantages (4.16), while digital technology knowledge and skills (3.16) and digital application (2.86) are the weaknesses. There are significant differences in digital literacy among tutors of different ages, subject backgrounds and training experiences. The core dilemma is as follows: serious technical skills fault, 'knowledge', 'action' disjointed, training system supply and demand dislocation.

Fourth, the improvement of the digital literacy of audit tutors requires the joint efforts of schools, individual tutors and technical ecology. At the school level, a three-in-one support system of 'hardware support-training drive-cultural guidance' should be constructed; instructors should get rid of cognitive bias and establish a progressive action path and a reflective iteration mechanism. AI technology itself should be designed as an embedded, intelligent enabling tool.

There are some limitations in this study: the sample coverage of the questionnaire survey is limited, and it may not fully represent the status of all audit tutors in the country; it mainly adopts quantitative investigation and lacks qualitative excavation of deep mechanism. The strategy recommendation has not been tested in the actual environment. Future research can carry out follow-up surveys on a larger scale, use mixed research methods to reveal the internal psychological mechanism, and carry out action research to test the effectiveness of the strategy. Audit is the 'guardian' of the market economy. It is the mission of every audit educator to cultivate high-quality audit talents to meet the needs of the development of new quality and productivity. The improvement of tutor's digital literacy is the key link in this mission.

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Conflict of Interests

The authors declare that there is no conflict of interest regarding the publication of this paper.

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