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PREPARING HIGHER EDUCATION STUDENTS WITH AI WORK-BASED SKILLS

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INTRODUCTION

Artificial intelligence (AI) refers to the capability of computer systems and machines to perform tasks that typically require human intelligence, including problem-solving, learning, reasoning, and decision-making. In recent years, AI technologies, algorithms, and intelligent systems have become integral to teaching, learning, and institutional management in higher education, thereby transforming educational practices worldwide (Alkan, 2024; Wang et al., 2024). The rapid emergence of AI applications in education has created an urgent need to equip higher education students with the technical and practical AI competencies required to thrive in an increasingly AI-driven workplace. AI-powered tools such as ChatGPT, Gemini, Microsoft Copilot, Khanmigo, and other intelligent applications are now widely used by students to support learning, research, and academic productivity. Beyond enhancing academic performance, AI has the potential to prepare students to become critical thinkers, innovative problem-solvers, and productive members of the future workforce. Despite these opportunities, evidence suggests that many higher education institutions have not fully integrated AI work-based skills into their teaching and learning processes (Ravinshakar & Logasakthi, 2023). As a result, students often develop proficiency in using AI for academic purposes but receive limited exposure to the technical and practical AI skills required in modern workplaces, such as programming, machine learning, data analytics, robotics, and computational thinking. This disconnect has created a noticeable gap between classroom learning and workplace expectations.

Although the educational benefits of AI have been widely documented, insufficient attention has been given to its role in developing the technical and work-based competencies required for employment in AI-driven industries. Consequently, this article seeks to address this gap by examining how higher education institutions can better prepare students with AI work-based skills that align classroom experiences with career realities. Using a discussion-based research framework supported by professional observations, relevant literature, and conceptual models, the article provides new insights into strategies for developing an AI-ready workforce and extends current scholarship on AI in higher education.

The research framework

Preparing higher education students through effective teaching, learning, and scholarship can significantly enhance their acquisition of AI work-based skills. However, a noticeable gap exists

between the knowledge and experiences students gain in the classroom and the competencies required in today's AI-driven workplace. This article addresses this gap by adopting a discussion-based approach supported by professional observations, a review of relevant literature, and conceptual models. The findings derived from these approaches are presented in the following sections.

FINDINGS

Research on artificial intelligence has grown remarkably in recent years, resulting in an extensive body of literature that explores various aspects of AI in education, including AI system design, teaching and learning, educational outcomes, research, and institutional practices (Chen et al., 2022; Chiu et al., 2023; Guan et al., 2020; Luan & Chin-Chung, 2021; Srinivasan, 2022; Sun et al., 2021; Wang et al., 2024). This growing body of research has reinforced the importance of AI in higher education. Nevertheless, relatively few studies have specifically examined how equipping students with AI work-based skills can bridge the gap between classroom learning and career realities. Consequently, this article contributes to the literature by highlighting strategies for preparing students for an AI-driven workforce.

Based on our professional observations and experiences at Delta State University (DELSU) and Southern Delta University (SDU), Nigeria, there is limited evidence that AI work-based skills have been systematically integrated into teaching and learning. Although AI technologies are increasingly available, instructional practices remain largely centred on traditional classroom approaches. We therefore argue that higher education institutions should redesign their instructional practices to incorporate AI work-based skills that better prepare students for the realities of the modern workplace.

AI has demonstrated considerable potential for improving learners' digital competencies and enhancing productivity (Damioli et al., 2021). Mahmoud (2020) and Edewor (2024) further contend that the application of AI work-based skills can create greater educational and professional opportunities. Consequently, integrating AI work-based learning into higher education is essential for preparing graduates to meet the evolving demands of today's labour market. Such integration can provide students with authentic workplace experiences, personalised learning opportunities, intelligent feedback, performance monitoring, and practical exposure to solving real-world problems. For example, medical students can learn through AI-powered patient simulators, while engineering students can develop technical competencies using AI-supported virtual laboratories.

Accordingly, there is a need to establish a stronger connection between classroom instruction and workplace practice. Our professional observations indicate that although students frequently use AI tools such as ChatGPT, Gemini, Microsoft Copilot, QuillBot, Notion AI, and Claude for academic purposes, they receive limited training in technical AI competencies such as programming, coding, machine learning, robotics, and data analytics. Addressing this gap should become a priority for higher education institutions seeking to prepare graduates for AI-driven careers.

Hakansson et al. (2025) emphasise that learner-centred approaches such as project-based learning, simulation environments, and micro-credential programmes are effective strategies for developing AI-relevant work-based skills. These approaches enable students to bridge theory and practice by engaging with authentic workplace problems while promoting motivation, lifelong learning, and continuous professional development (Dubey et al., 2021). However, based on our

professional observations, these instructional approaches are not being used nor implemented at DELSU and SDU.

Similarly, AI-powered adaptive learning systems, including Khanmigo, ALEKS, and CENTURY Tech, together with intelligent tutoring systems such as AutoTutor, Cognitive Tutor, and SQL-Tutor, have demonstrated significant potential for enhancing personalised learning, self-regulation, and digital competence (Huang et al., 2023). Greater attention should therefore be given to integrating these technologies into higher education to strengthen students' AI work-based skills and prepare them for the ethical and effective use of AI in future workplaces. Hence, from our professional observations, increased attention should be paid to nurturing effective work-based skills that can instill AI efficiency into higher education students at DELSU and SDU. Special emphasis should be placed on adaptive learning systems and intelligent tutoring technologies, since these AI capabilities can enable students to critically evaluate, contextualise, and ethically guide the use of AI in their education and by extension the workspace.

As countries move towards increasingly AI-driven economies, the demand for a technologically competent workforce will continue to grow (Okebukola, 2025a). AI is widely recognised as a transformative technology underpinning the Fifth Industrial Revolution and driving economic growth and innovation (Golic, 2019). Consequently, higher education institutions such as DELSU and SDU should prioritise the development of AI work-based competencies to ensure that graduates possess the knowledge, skills, and adaptability required for success in twenty-first-century workplaces. DELSU and SDU higher education students, who are expected to provide a high-level labour force, should be prepared with work-based AI skills to cover the gap between what they are presently experiencing in the classroom and what they will meet in the twenty-first century workspace.

The labour force in key sectors such as finance, education, agriculture, health, and national security stands to increase productively with proper AI mobilisation at the higher education level. Failing to build a work-based labour force driven by AI at that level could represent a huge risk of low productivity (Al-Zahrani & Alasmari, 2024). This is because the world is striving towards technological advancement in industrialisation, innovation, infrastructural development, clean energy, transportation, and logistics. The role of artificial intelligence in building an efficient, prepared labour force of students should become an area of major concern for higher education because AI can be leveraged in all sectors of the economy (Okebukola, 2025b). As the demand for artificial intelligence is increasing, the management team and faculty members at DELSU and SDU might have to step up their game by ensuring that AI is used to propel efficient work-based learning for future workforce innovations and a global competitive AI labour force.

Bridging the AI gap between classroom and career realities

Bridging the gap between classroom learning and career realities requires higher education institutions to ensure that students can effectively transfer the AI knowledge acquired during their studies into practical workplace competencies. Achieving this objective demands deliberate institutional reforms, curriculum innovation, and the adoption of learner-centred strategies. The major approaches proposed in this article are illustrated in Figures 1 and 2 and discussed below. Figure 1 implies that through a combination of AI skills and technologies, higher education graduates can contribute to global competitiveness, create employment, and achieve sustainable development.

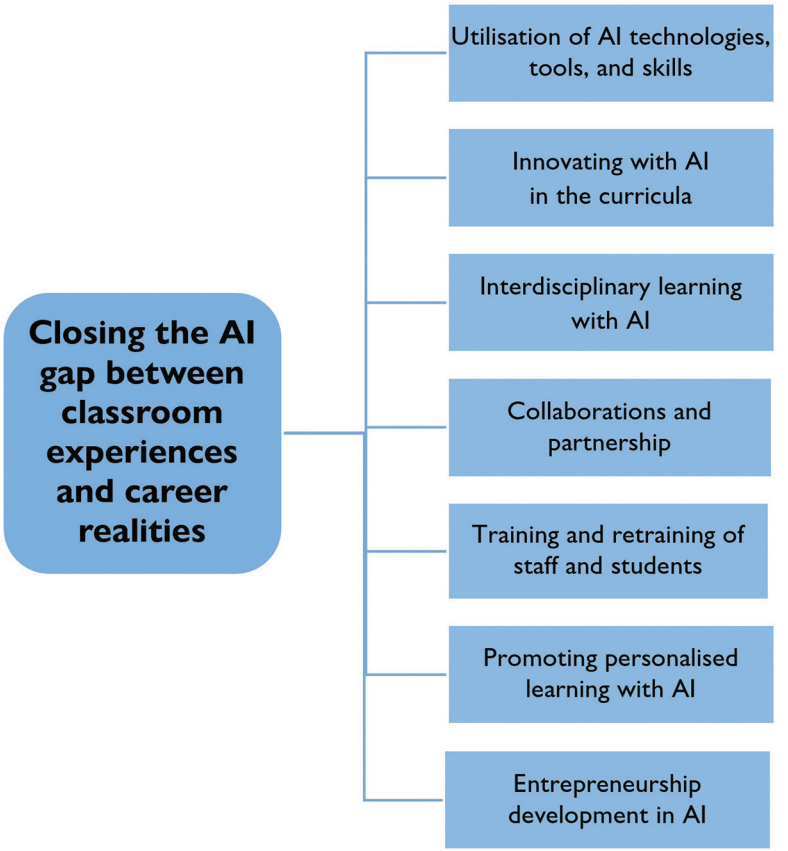


Figure 1. A conceptual model for closing the AI gap between classroom and career realities.

First, universities such as DELSU and SDU should integrate AI technical competencies including machine learning, data analytics, coding, programming, robotics, computational thinking, and digital literacy into work-integrated learning programmes across all academic disciplines. Such integration will expose students to practical AI applications that align with contemporary labour market expectations (Al-Enezi & Al-Shammari, 2024; Yetişensoy, 2024). As technological advancement continues to reshape industries, employers increasingly seek graduates who possess not only theoretical knowledge but also practical AI competencies that enhance workplace productivity and innovation (Finley, 2021; Forero-Corba & Negre, 2024).

Second, higher education institutions should review and modernise their curricula by introducing dedicated AI work-based courses and embedding AI competencies within existing programmes. Curriculum innovation is essential for equipping graduates with the technical expertise required in rapidly evolving labour markets (Atubi, 2021; George, 2025). Universities should also promote AI literacy across all disciplines by replacing outdated course content with contemporary AI-related learning experiences that reflect current technological developments (Kumar & Rewari, 2022). By implication, higher education curricula in DELSU and SDU should reflect real career prospects

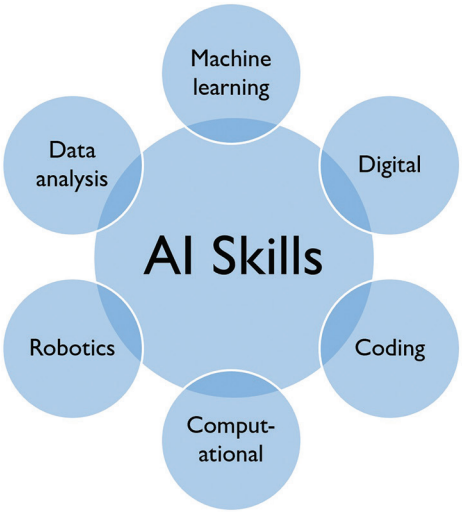


Figure 2. A conceptual model showing AI work-based skills.

in order to equip students with essential AI work-based skills and core academic knowledge in AI as it relates to their various disciplines of study. Bridging this employability gap will need a collaborative effort from the management of these institutions through revamping their curricula.

Furthermore, interdisciplinary learning should be strengthened by integrating AI into diverse fields such as education, engineering, the social sciences, business, the arts, and the humanities. Previous studies have shown that students' engagement with AI varies across disciplines (Elshaer et al., 2024; Raman et al., 2024; Starkey et al., 2023; Stöhr et al., 2024). While engineering and computing students often demonstrate higher levels of AI adoption, students in other disciplines generally have fewer opportunities to develop AI competencies (Qu et al., 2024). An interdisciplinary approach would enable students to acquire transferable AI knowledge and skills that support innovation, collaboration, and professional adaptability across multiple career pathways.

The authors therefore suggest that the application of AI in interdisciplinary learning at DELSU and SDU can aid the performance of work-based tasks and help higher education students exhibit skills across disciplines, as interdisciplinary culture might significantly influence the way these students can utilise AI technologies. An interdisciplinary approach with AI would ground students in different AI concepts, methods, skills, and technologies that can shape their professional efficiencies and identities. However, while most studies emphasise the importance of considering an interdisciplinary approach in students' engagement with AI, these studies do not address how interdisciplinary learning can bridge the gap between classroom experiences and career gains. This is a crucial research gap that calls for deeper investigation.

In another vein, higher education institutions should establish strategic partnerships with AI technology companies through internships, industrial attachments, mentorship programmes, collaborative research projects, and memoranda of understanding. These partnerships provide students with authentic workplace experiences while strengthening the alignment between academic training and industry expectations (Chatterjee et al., 2022; Downes et al., 2021).

Collaborations with industry also promote knowledge exchange, creativity, ethical awareness, and practical problem-solving, thereby enhancing students' readiness for AI-driven employment (Amoako et al., 2021; Liu et al., 2020).

To buttress the positive impact of collaborations and partnerships on the AI work-based skills of higher education students, studies by Liu et al. (2020) and Amoako et al. (2021) have demonstrated practical examples of such relationships. Jiang et al. (2019) confirm that collaboration between higher education institutions and AI experts can serve as a channel for students to successfully adopt and incorporate AI skills and technologies in the workplace. Collaboration can bring about the exchange of different perspectives and experiences. Educational organisations should therefore maximize the advantages of collaborations for developing the AI work-based skills of higher education students. For these reasons and more, institutions such as DELSU and SDU and AI organisations should give high priority to collaborative programmes and equip students with AI work-based skills to provide an efficient labour workforce and boost socioeconomic development. In order for students at DELSU and SDU to become competitive and gainfully employed in AI-dominated economies, there should be collaborations with AI tech companies that are willing to partner through student internships and mentorships. Collaboration with AI tech companies is emphasised in this article as a solution to the problem of how to link classroom experience with career goals.

Similarly, continuous training and retraining programmes should be provided for both students and academic staff. Professional development initiatives, including short certification courses in programming, robotics, machine learning, coding, and data analytics, can ensure that higher education institutions remain responsive to rapid technological change. Such programmes will equip both lecturers and students with current AI competencies that support lifelong learning and workplace relevance. The management teams at DELSU and SDU should spend time and resources on training and retraining their students and new and established employees. The goal of this training is to set them on the right trajectory to prepare for adopting and devising effective AI solutions in the workplace. Training and retraining will enable them to apply the knowledge and skills gained in the university with little or no guidance.

Additionally, institutions should promote personalised AI-supported learning environments that enable students to strengthen critical thinking, problem-solving, communication, creativity, and decision-making skills. AI technologies can facilitate personalised career guidance, virtual workplace simulations, mock interviews, adaptive learning experiences, and performance feedback, thereby improving students' confidence and career readiness in AI-enabled work environments (Al-Zahrani & Alasmari, 2024; George, 2025). When DELSU and SDU students practice personalised learning in an AI environment, it can aid the development of decision-making, critical thinking, and problem-solving skills, which are core essentials for achieving career success in any AI work-based environment.

Finally, entrepreneurship education should be integrated with AI work-based learning to encourage innovation, self-employment, and business development. AI technologies can support entrepreneurial activities through business intelligence, customer relationship management, automation, predictive analytics, marketing optimisation, and strategic decision-making (Elia et al., 2020; Ibrahim, 2025; Uriarte et al., 2026). Equipping students with AI-driven entrepreneurial competencies will not only improve graduate employability but also contribute to economic growth and job creation. Bearing in mind that not all undergraduates of DELSU and SDU may

have the opportunity to be employed in already established private or public agencies, companies, or industries, it has become necessary to leverage the benefits of AI for entrepreneurship, as this can also help curb unemployment.

While these strategies offer considerable potential for bridging the gap between classroom learning and career realities, their successful implementation requires careful attention to ethical considerations, equitable access to AI technologies, data privacy, institutional readiness, staff capacity development, and long-term sustainability. Addressing these challenges will enable higher education institutions to maximize the benefits of AI while preparing graduates for productive participation in an increasingly technology-driven global workforce.

CONCLUSION

This article has demonstrated that equipping higher education students with AI work-based skills is essential for preparing a competent workforce capable of meeting the demands of an increasingly AI-driven global economy. Although AI technologies are becoming more prevalent in higher education, a significant gap remains between students' classroom experiences and the practical competencies required in contemporary workplaces. Addressing this disconnect requires higher education institutions to move beyond the use of AI as a tool for academic support and intentionally integrate AI work-based competencies into teaching, learning, and curriculum development.

The discussion identified several practical strategies for bridging this gap, including integrating AI technical skills into work-integrated learning, modernising higher education curricula, promoting interdisciplinary AI education, strengthening collaborations between universities and AI technology companies, providing continuous training and professional development, encouraging personalised AI-supported learning, and fostering AI-driven entrepreneurship. Collectively, these strategies can enhance graduates' employability, workplace readiness, innovation, and lifelong learning while contributing to sustainable socioeconomic development.

This article makes both theoretical and practical contributions to the growing literature on artificial intelligence in higher education. It extends current scholarship by proposing practical pathways through which AI work-based skills can bridge the gap between classroom learning and career realities. The conceptual models presented in this article also provide a useful framework for researchers, university administrators, policymakers, and educators seeking to design AI-integrated work-based learning initiatives. Future research should empirically validate the conceptual framework proposed in this article across different higher education contexts and disciplines. Such studies could examine the effectiveness of AI work-based learning in improving students' employability, workplace performance, career readiness, and professional competencies. By implementing the recommendations presented in this article, higher education institutions such as DELSU and SDU can produce graduates who are better prepared to thrive in AI-enabled workplaces and contribute meaningfully to national and global development.

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