AIGC and the Reshaping of Graduate Employability and Entrepreneurial Competencies: A Literature Review

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Abstract: Artificial Intelligence Generated Content (AIGC) is changing how graduate employability and entrepreneurial competence are understood. This change is not only about adding a new tool to learning or work. It also asks what kinds of abilities graduate students need when studying, working, and trying to create value. Based on studies of employability, entrepreneurship education, digital learning, and competence frameworks, this review discusses how AIGC may influence graduate training. The literature suggests that the focus of ability is moving from simply producing content to judging, selecting, and using content in specific contexts. It also shows that students need to learn how to work with AI tools, connect them with their own disciplines, and keep a basic sense of ethics and responsibility. Existing teaching methods, such as project-based learning, open innovation training, service learning, blended learning, and university incubators, can still be useful, but they need to be adjusted when AIGC becomes part of the learning process. At the same time, there are still problems, including generic entrepreneurship training, weak assessment of AI-assisted work, unequal digital competence, fragmented school-level strategies, and the lack of a clear AIGC competence framework. This review finally suggests that future training should pay more attention to competence redefinition, teaching design, process-based assessment, and institutional support.

Keywords: AIGC; Graduate Employability, Entrepreneurship Competencies; Higher Education; Digital Transformation; Human-AI Collaboration; Competence Framework

1. Introduction

Higher education is now facing two changes at the same time. One is the rapid development of Artificial Intelligence Generated Content (AIGC), such as large language models, multimodal generation systems, and AI agents. The other is the continuing problem of graduate employability. These two issues are connected. AIGC has made many routine tasks easier to complete, including basic writing, simple coding, information sorting, and some data analysis [1,2]. Because of this, the value of graduate students can no longer be judged only by whether they can finish these tasks. At the same time, the mismatch between what universities teach and what employers need still exists. Abelha et al. show that this mismatch has been a long-term problem in higher education [3]. From this point of view, AIGC makes the problem more obvious, but it may also provide a new way to improve training.

2. Conceptual Foundations: Graduate Employability and Entrepreneurship Competence Frameworks

2.1 Graduate Employability–Beyond "Getting a Job"

Some earlier models usually examined employability through school-taught skills, professional knowledge, and personal strengths. Recent studies pay more attention to whether graduates can offer abilities that are difficult to replace in real work. In other words, they need to cooperate with others and create value in a changing work environment and wider social context. In the current period of fast AI development, a degree alone is not enough for employers. Employers care more about the match between graduates and real work, and this cannot be fully achieved only through classroom knowledge. fast AI development, a degree alone is not enough for employers. Employers care more about the fit between graduates and real work, and this cannot be fully achieved only through classroom knowledge.

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Van der Klink et al. argue that sustainable ability is reflected not only in creating value for employers, but also in improving one's own core competitiveness [1]. This also requires employers and organizations to provide suitable environments for growth and skills training. From this point of view, introducing AIGC into graduate education is meaningful. If AIGC can only help graduates write papers but cannot support other work-related tasks, then its contribution to employability will be limited. Abelha et al., after analyzing 69 studies, also show that innovation and cooperation have become core themes in employability research [3]. This suggests that we should pay attention to skills training in real work settings and consider the role of AIGC in these settings.

2.2 Entrepreneurship Competencies–From Traits to Competence Frameworks

Similarly, research on entrepreneurship has gone through a similar change. In early studies, people often regarded entrepreneurs as natural risk-takers. Contemporary research is more likely to consider learning willingness, competence improvement, and the training environment. The following three aspects are useful for understanding AIGC-related changes.

a) General entrepreneurship competence frameworks.

Lans et al. link education for sustainability with entrepreneurship education and identify competencies such as opportunity recognition, systems thinking, normative commitment to sustainability, and stakeholder empathy [4]. These competencies translate readily into the AIGC context. A graduate entrepreneur who uses generative tools must still be able to identify meaningful opportunities, judge their social and environmental implications, and avoid reducing innovation to technical production. Ploum et al. extend this discussion by validating a sustainable-entrepreneurship competence framework with 402 would-be entrepreneurs and confirming a good model fit for six core competencies [5]. Their framework offers a useful starting point for future AIGC-oriented models, which may need to add dimensions such as AI-augmented opportunity sensing and human-AI value-alignment judgment.

b) Open-innovation and experiential paradigms.

Iglesias-Sanchez et al. remind us that entrepreneurial competence is not best developed only through lectures [6]. Their study highlights open-innovation teaching methods such as hackathons, team building, role play, and real cases involving entrepreneurs. Based on 329 students, their regression analysis shows that collaborative and competence-focused activities can improve the skills valued by companies. For AIGC integration, this means that AIGC should not be added only as a short tool demonstration. It should be placed in team-based, open-innovation, and real-client projects, where students need to make their own judgments.

c) Intention and mindset pathways.

Lee and Jung find that entrepreneurial mindset mediates the relationship between intolerance of uncertainty and career adaptability, a key outcome of graduate employability [7]. This finding is instructive because both pandemic disruption and AIGC-driven change can increase uncertainty. In an AIGC setting, literacy with generative tools may help reduce paralyzing uncertainty, strengthen entrepreneurial mindset, and support career adaptability. Jia and Zhao, using computational methods to examine innovation-entrepreneurship education and employability [8], further show that employability success is multidimensional rather than reducible to GPA. Their work points to the need for differentiated development pathways, and it is here that AIGC-supported coaching may have practical value if it is designed carefully.

3. The AIGC Disruption: How Generative AI Reshapes the Employment–Entrepreneurship Terrain

Only a limited number of the reviewed studies use the term AIGC directly. Even so, the literature on digital transformation, e-learning, and AI-enabled education helps map the terrain into which generative AI is now entering.

3.1 From Digitization to Generative Co-Creation

Kim et al. show that the improvement of ability is influenced by personal learning willingness and the development of digital competence [9]. This also means the ability to transfer one's working ability to other situations. This gives us an interesting angle for understanding AIGC. Today, many AI tools appear one after another, and new tools are released almost every day. But what is more important is how people understand, master, and use these tools. This decides whether a person can use the tools to produce useful results.

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3.2 AI-Specific Inflection Points

Yin and Sun extend the empirical discussion by proposing TabNSA, a hybrid deep-learning framework that can predict students' adaptability and mastery in AIGC-supported online entrepreneurship education, with an accuracy of 93.6% [10]. From this study, a more important issue can be seen: in the current AIGC period, a person's ability to adapt to and use AIGC may be more important than the knowledge already mastered. Therefore, graduate students need to give more attention to AIGC tools and to the way these tools are used in real learning and work.

3.3 Labor-Market Scarcities and the Skills Mismatch

The structural employability literature also reminds us that AIGC will not affect all graduates in the same way. Amalu et al., in a review of critical skills for STEM/STEAM graduates in the solar-energy sector [11], identify a continuing shortage of skilled labor even though the sector is expanding. The bottleneck is not simply the number of graduates, but whether they have industry-ready specialist competencies that combine academic, industrial, and entrepreneurial knowledge. Their suggestion to embed specialist skills modules into curricula is also useful for AIGC education. Programs should not teach AI only in a general way; they need to place AIGC use in concrete employment and entrepreneurship contexts.

Instead, they should put AIGC workflows into specific employment and entrepreneurship contexts. Bikar et al. also show, in the Malaysian post-COVID context, that upskilling, reskilling, gig-economy initiatives, and entrepreneurship programs are helpful for graduate employability. AIGC may make the boundary between employee and entrepreneur less clear by supporting micro-freelancing and individual entrepreneurship [12].

4. How AIGC Reshapes the Competency Profile: Thematic Synthesis

Across these studies, several changes in competence are especially related to graduate development in the AIGC era.

4.1 From Content Production to Judgment, Curation, and Value-Alignment

When AIGC can produce serviceable first drafts of text, code, images, and business materials, the value of graduate work shifts from output volume to evaluation, synthesis, and ethical calibration. This does not make production irrelevant, but it changes where professional judgment is most visible. The distinction resembles the difference between innovation and entrepreneurship: innovation concerns the creation of novel solutions, whereas entrepreneurship concerns the mobilization of resources to capture value [2]. In AIGC-mediated work, prompting an LLM may initiate an innovation process, but judging the output, aligning it with stakeholder needs, and turning it into a credible employability or venture narrative remain distinctively entrepreneurial tasks.

4.2 Hybrid Competence: Human–AI Collaborative Workflow Literacy

Several studies suggest that future work is not only about people operating machines, but more about the efficiency of human-AI cooperation. Lans et al. point out that interdisciplinary cooperation and systems thinking are core elements for the sustainable development of an entrepreneurial project [4]. Secundo et al. show that if a project helps a person expand social networks, gain deeper career observation, and improve self-management, then the project can support personal and professional growth [13]. From this perspective, the most valuable graduates may be those who can connect what they have learned across disciplines and fields with AI tools.

4.3 Entrepreneurial Intention under Conditions of Heightened Uncertainty

AIGC also increases the uncertainty that Lee and Jung connect with weaker career adaptability. n entrepreneurial mindset can help buffer uncertainty [7], especially when students gain confidence through exposure, feedback, and repeated practice. Such training is useful not only for starting a business, but also for finding one's position in a changing labor market. Zlatanovic et al. further show that entrepreneurship education works better when it is connected with national innovation systems [2]. This point becomes more relevant when AIGC gradually becomes part of these systems.

5. Persistent Gaps and Challenges

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5.1 The "Domain-Generic" Trap

At present, many entrepreneurship education programs have an obvious weakness: they are too formulaic and rigid. Students are often asked to write business plans and make roadshow presentations. What matters more in these tasks is whether the form looks complete, rather than whether the project is really based on demand. For a graduate student, being able to write a complete business plan does not mean having real entrepreneurial ability. Amalu et al. show that employers prefer compound talents, and different industries have different requirements. Therefore, education should not stay at the level of a general template [11].

This problem is especially common today. It is easy to use AIGC to generate a business plan that looks complete, and even several versions can be produced in a short time. However, whether the project can really be implemented, whether there is real demand, and whether there is a market still require students to make their own judgments. Future training should not only ask students to learn a standard model essay. It should guide them to use AIGC tools to judge, organize, and develop their own ideas.

5.2 Assessment and Integrity Lag

Traditional assessment methods are also facing a major challenge. In the past, assessment often focused on the final papers, assignments, or project outputs submitted by students. Now, with the development of AIGC tools, we can no longer simply judge whether students have really mastered the content or how much they have actually participated.

Therefore, assessment in the AIGC era should not focus mainly on preventing students from using tools. It should pay more attention to how much students improve during the process of using AI tools. Compared with only checking the final text, process materials may better reflect students' real abilities, such as multiple drafts, prompt records, oral defense, reflection logs, and project explanations. These materials can help teachers judge whether students only passively accepted AIGC outputs or whether they selected, judged, and recreated them. From this perspective, AIGC not only brings new academic integrity risks, but also reminds universities to rethink the assessment system itself.

5.3 Inadequate Competence-Inventory Coverage

These frameworks are still mainly based on traditional entrepreneurship education and employability training. They do not explain the new abilities required in the AIGC era very clearly. For example, how students should ask effective questions to AIGC, how they should judge which tasks can be given to AI and which parts must be checked by themselves, how they should understand ethical risks in AI-generated content, and how they should coordinate several AI tools to complete a task are not fully covered in existing frameworks.

This limitation is quite important. Curriculum design and assessment first need to answer one question: when AIGC participates in learning and work, what abilities should students actually have? If this point is not clear, universities will find it hard to decide what to teach and how to teach it. They will also find it hard to evaluate whether students have really mastered AIGC-related competence.

6. Towards an AIGC-Driven Cultivation Mechanism

Drawing these findings together, this review proposes a preliminary framework for an AIGC-driven cultivation mechanism built around four pillars.

Pillar 1: Competence redefinition. Graduate students need a hybrid competence set that combines foundational digital and AIGC literacy, domain-specific technical and entrepreneurial knowledge, meta-competencies such as learning agility, self-regulation, and adaptability, and ethical-integrity judgment. This pillar extends the validated frameworks of Ploum et al. and Lans et al. by making AIGC-specific dimensions explicit [4,5].

Pillar 2: Pedagogical redesign. Cultivation should move from information delivery toward generative co-construction. AIGC should be embedded in action-based formats such as hackathons, service-learning, and incubators, not as a shortcut, but as a means of supporting iteration, reflection, and situated problem solving. This design logic is consistent with action-based education [14] and open-innovation teaching [6].

Pillar 3: Assessment transformation. Assessment should become more process-oriented and transparent. Possible methods include prompt-log and rationale portfolios, oral defense of AI-assisted work, comparative tasks in which

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students' critique and improve AIGC outputs, and peer-evaluation rubrics that reward the quality of hybrid human-AI collaboration.

Pillar 4: Institutional ecosystem redesign. AIGC cultivation should not be limited to one course. It also needs cross-disciplinary AIGC labs, real projects with industry, faculty training, and fair access policies. Following Houssou et al., Castro et al., and Zlatanovic et al., this kind of institutional support may make AIGC-related training more stable and more useful for employability [2,15,16].

7. Conclusion and Future Research Agenda

The above review of related studies shows that the influence of AIGC on graduate employability and entrepreneurship competence cannot simply be understood as the addition of a new tool. The main change is that the focus of student ability may have shifted. In the past, more attention was often paid to whether students could write a document, complete a plan, or produce a project output according to requirements. After AIGC becomes involved, these outputs themselves become easier to generate. What needs more attention is whether students have their own judgment, whether they can see if AIGC-generated content is reasonable, and whether they can use it in specific professional tasks.

This issue is also clear in entrepreneurship education. In the past, many entrepreneurship courses asked students to write business plans or give project presentations. Future research directions should focus more on how, in the process of cultivating students, we can enhance students' professional knowledge literacy and interdisciplinary integration abilities, and consider how to integrate AIGC usage skills into the entire cultivation process. Given that students enter the job market on an annual basis, we need a longer-term perspective and cycle, incorporating AIGC usage skills into employment capability assessments. In the process of entrepreneurship, I have observed that AIGC does not play a decisive role in the success or failure of a project, but it can play a positive role to a certain extent, all of which we cannot ignore.

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