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A Posthuman Perspective on Entrepreneurial Competence Development for Vocational College Students

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Abstract

Traditional entrepreneurship education often privileges human-centered agency and cognitive mastery, overlooking the entanglements of digital technologies, environments, and sociotechnical systems. The objective of this research is to investigate a posthuman perspective on entrepreneurial competence development for vocational college students. Conducted at a vocational college, the study implemented an eight-week extracurricular entrepreneurship course designed in accordance with posthumanist educational principles. The research involved 30 student participants and 5 expert consultants, using a mixed-methods approach that included pre- and post-intervention tests, surveys, interviews, reflective journals, and artifact analysis. Quantitative data were analyzed using paired samples t-tests, while qualitative data underwent thematic coding guided by concepts of relationality and intra-action. Results indicated significant gains in students' entrepreneurial knowledge, practical skills, and attitudes, attributed not to isolated learning but to hybrid engagements with peers, mentors, technologies, and learning environments. These findings suggest that posthumanist pedagogies foster adaptive, co-creative, and context-sensitive entrepreneurial capacities. The study recommends further integration of hybrid experiential learning environments and proposes expanded research across varied cultural contexts to evaluate the broader applicability of posthuman educational models.

Keywords: Posthumanism, Entrepreneurial Competence, Vocational Education, Distributed Agency, Hybrid Learning Environments.

Introduction

The integration of digital technologies, artificial intelligence, and networked systems has significantly impacted the way individuals, institutions, and societies operate. Entrepreneurial competence is no longer solely human-centered, but must consider the distributed nature of agency across human and non-human assemblages. Traditional entrepreneurship education in vocational colleges has emphasized human-centered learning models, but these models are rooted in an anthropocentric worldview that isolates human agency from broader material and technological forces (Dedeoğlu & Zampaki, 2023; Kyrö, 2018; Lavrentyeva et al., 2019; Rasdiana et al., 2025). Posthumanist thought calls for a re-evaluation of educational practices, focusing on how entrepreneurial capacities are nurtured.

Despite significant advances in vocational entrepreneurship programs, there remains a persistent gap between theoretical knowledge and practical, situated action in real-world contexts. Entrepreneurial education often struggles to prepare students for the complexities of contemporary entrepreneurial ecosystems, which are shaped not only by human decisions but

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also by algorithms, infrastructures, environmental contingencies, and sociotechnical networks (Amjad et al., 2020; Clark et al., 2021; Sitaridis & Kitsios, 2024). The problem lies in the prevailing pedagogical assumption that entrepreneurship is a matter of individual mastery over a static environment, rather than a dynamic process of co-evolving with diverse human and non-human actors. This shortfall becomes particularly visible in vocational colleges, where students are expected to transition quickly into practice-oriented professions yet often lack the adaptive, relational sensibilities required in an interconnected economy. Recognizing this challenge, the research addresses the urgent need to rethink entrepreneurial competence as an emergent, materially embedded, and relational phenomenon, moving beyond the limitations of conventional human-centered models (Bernadó & Bratzke, 2024; Kimura & Nakajima, 2024).

The objective of this research is to investigate a posthuman perspective on entrepreneurial competence development for vocational college students. Specifically, it seeks to explore how decentering the human subject and embracing distributed agency can inform and transform educational practices aimed at fostering entrepreneurial capacities. Drawing on posthumanist theories from scholars such as Rosi Braidotti and Karen Barad, the study proposes an educational approach that views learning as an intra-action between students, technologies, environments, and sociocultural contexts. Through the design and implementation of an extracurricular entrepreneurship course grounded in posthumanist principles, the research examines how students' knowledge, skills, and attitudes evolve when they engage with entrepreneurial realities as entangled actors rather than isolated agents (Arend, 2019; Lemaire et al., 2023; McMullen et al., 2021). In doing so, the study addresses the research question: How can a posthuman perspective inform and transform the development of entrepreneurial competence among vocational college students in contemporary educational contexts?"

This investigation holds significance not only for the field of entrepreneurship education but also for broader educational and theoretical discussions in the posthumanities. By applying a posthuman framework to vocational entrepreneurship education, the study contributes to emerging discourses that seek to reimagine learning as relational, distributed, and materially situated. It offers practical insights into how curricula, pedagogy, and assessment can be restructured to better prepare students for the fluid, unpredictable, and more-than-human realities they will encounter in the entrepreneurial world (Ceder, 2018; Cnossen et al., 2024; Herman, 2016; Melin & Gaddefors, 2023). Moreover, it challenges educators to reconsider the ethical and political dimensions of competence development in an era where technologies and ecosystems are active participants in shaping human futures. This research situates entrepreneurial education within a larger epistemological and ontological shift, pointing toward more inclusive, adaptive, and future-oriented models of learning.

Literature Review

This literature review examines key themes around entrepreneurial competence in vocational education, the foundations of posthumanism in educational thought, the intersections of posthumanism and entrepreneurship, and a reimagining of entrepreneurial competence itself as a distributed, relational process. In doing so, it builds a conceptual foundation for investigating how a posthuman perspective can inform and transform vocational entrepreneurship education.

Entrepreneurial Competence in Vocational Education

Entrepreneurial competence has long been conceptualized as an individual's capacity to identify opportunities, take calculated risks, innovate, and lead initiatives toward creating value.

Vocational education systems around the world have embedded entrepreneurship modules into their curricula with the goal of preparing students for increasingly competitive and volatile labor markets. The prevailing approaches emphasize human agency, personal initiative, self-efficacy, and rational decision-making as critical components of entrepreneurial success. However, these skill-centered models remain rooted in humanist assumptions that prioritize the independent subject while often neglecting the complex socio-technical systems, material infrastructures, and environmental contingencies that actively shape entrepreneurial realities (Ferreras-Garcia et al., 2021; Nikitina et al., 2020; Perić et al, 2020; Venesaar et al., 2021). As the context of entrepreneurship evolves alongside digitalization, automation, and global interconnectedness, vocational education's narrow focus on human-centric competence demands critical reconsideration.

Posthumanism and Education

Posthumanism arises as a critical response to traditional humanist thought, destabilizing the notion of the human as a distinct, sovereign agent at the center of knowledge production and social change. Posthumanist thinkers emphasize that humans are entangled with technologies, ecological systems, and material environments, forming dynamic assemblages that co-constitute agency and learning. In educational contexts, this paradigm shift encourages a move away from viewing learning as a purely cognitive, individual achievement toward understanding it as a distributed, relational, and materially situated phenomenon. Knowledge, from a posthuman perspective, is not a static object to be acquired but an emergent property of interactions between students, tools, environments, and discourses (Braidotti, 2017; Howard & Küpers, 2022; Janković, 2024; Liu et al., 2025; Morales & Zarabadi, 2024; Yan et al., 2025). This reconfiguration invites educators to design learning environments that acknowledge the agency of non-human actors—ranging from digital platforms to natural forces—and to support students in navigating these complex entanglements creatively and ethically.

Posthumanism and Entrepreneurship

When applied to entrepreneurship, posthumanist thought challenges the myth of the lone entrepreneur who, through personal brilliance and effort alone, creates disruptive innovations. Instead, entrepreneurship is understood as an emergent outcome of interrelations among human agents, technological artifacts, regulatory frameworks, market structures, and cultural narratives. Entrepreneurial agency is thus distributed across a network of actors, including algorithms, communication technologies, financial infrastructures, and even environmental conditions. Success in entrepreneurship no longer hinges solely on personal ingenuity or resilience but also on the capacity to perceive and respond to opportunities within these dynamic assemblages. Viewing entrepreneurship through a posthuman lens reveals it as an ecological practice that unfolds through relational, often unpredictable, interactions rather than isolated decision-making (Dy, 2022; Elia et al., 2020; Nambisan, 2017; Reed, 2022); Thomas, 2021). This perspective demands a radical reorientation in how entrepreneurial competence is conceptualized and cultivated, especially within educational frameworks designed to prepare students for future economies.

Rethinking Entrepreneurial Competence

A posthuman reimagining of entrepreneurial competence moves beyond discrete skill sets toward cultivating students' capacities for relational thinking, adaptability, and affective attunement to their socio-material environments. Entrepreneurial competence, from this vantage

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point, involves the ability to navigate assemblages of opportunity, uncertainty, technology, and affective forces rather than simply applying learned skills in predictable contexts. It emphasizes openness to emergent possibilities, responsiveness to non-human actors, and ethical engagement with the broader ecosystems in which entrepreneurship takes place. Rather than training students to master fixed competencies, a posthuman approach advocates for developing their ability to co-create with diverse actors, to innovate within entangled systems, and to recognize entrepreneurship as a process of continual becoming rather than a linear trajectory toward success (Barnes et al., 2018; Bernadó, 2024; Ghafar, 2020; Willemsen et al., 2021). This reframing not only aligns with contemporary realities but also offers a transformative vision for vocational education seeking to prepare students for complex, unpredictable futures.

Materials and Methods

This study employed a qualitative research and development (R&D) methodology, aligned with posthumanist and new materialist approaches. By designing, implementing, and analyzing an extracurricular entrepreneurship course at a vocational college, this research aimed not only to study educational outcomes but to enact a new, relational model of entrepreneurial learning in practice (Kazakeviciute et al., 2016; Malekipour et al., 2018; Park & Kim, 2022; Wahidmurni et al., 2019; Yohana, 2020). The following sections detail the research design, participants, course intervention, data collection methods, and data analysis strategies.

Research Design

Rather than treating entrepreneurship competence as a static set of skills to be transmitted, the study emphasized dynamic co-creation processes among students, technologies, environments, and knowledge systems. The research unfolded across three phases: initial needs assessment and conceptual design, course implementation over eight weeks, and post-intervention evaluation. This flexible design allowed for continuous adaptation, respecting the unpredictable and emergent nature of learning within posthuman assemblages, as shown in Table 1.

Phase	Focus	Methods
Phase 1	Needs assessment and course	Literature review, consultation with
	conceptualization	education experts
Phase 2	Course intervention implementation	Active teaching sessions, hybrid
		environments
Phase 3	Post-intervention evaluation	Surveys, interviews, artifact collection

Table 1. Research Design and Steps

Participants

The study involved 30 student participants from a vocational college. These students volunteered to engage in the extracurricular entrepreneurship program, representing diverse professional backgrounds and entrepreneurial interests. 5 educators and entrepreneurship experts were also invited as consultants during the course development and evaluation phases. Their role was to contribute specialized knowledge, advise on course structure, and provide feedback on the posthuman learning processes in action, as shown in Table 2.

Group	Role in Research
30 Vocational College Students	Learners participating in the course intervention
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5 Educators and Experts	Advisors for course design and evaluators of outcomes

Table 2. Participants

Course Intervention

The core of the study was an eight-week extracurricular course explicitly designed to foster entrepreneurial competence through posthumanist educational strategies. The course emphasized the relational co-production of knowledge by encouraging collaborative entrepreneurial projects, integrating digital simulation platforms, and situating learning in hybrid material spaces, including both physical innovation hubs and online networks. Special attention was paid to facilitating student reflections on the entanglement of human and non-human factors within entrepreneurial processes, such as the roles of digital technologies, market algorithms, and ecological systems, as shown in Table 3.

Course Design	Examples of Implementation	
Relational learning	Team-based entrepreneurial challenges	
Technological integration	Use of digital business simulation software	
Hybrid material environments	Collaboration in incubators and online spaces	
Reflection on entanglement	Structured ing on technology-human interactions	

Table 3. Course Intervention

Data Collection

Multiple forms of data were gathered to capture the complex, layered impacts of the posthumanist course intervention. Quantitative data included pre- and post-intervention knowledge tests and skill assessments to measure students' conceptual and operational understanding of entrepreneurship. Surveys measuring entrepreneurial attitudes were also administered before and after the course. Qualitative data were collected through semi-structured interviews with student participants, reflective journals maintained throughout the course, and analysis of project artifacts produced during group activities.

Data Analysis

A mixed-methods analytical approach was employed. Thematic coding, guided by posthumanist concepts of distributed agency, relationality, and material-discursive practices, was used to analyze qualitative data from interviews, journals, and project artifacts. Coding sought to surface how students perceived their engagements with technologies, environments, and each other in their entrepreneurial learning journeys. Meanwhile, quantitative data from knowledge tests, skill assessments, and attitude surveys were statistically analyzed using paired samples t-tests to determine whether significant changes occurred pre- and post-intervention.

Results

This study investigates how a posthuman perspective can reshape the development of entrepreneurial competence among vocational college students through the design and implementation of extracurricular entrepreneurship education. The findings are presented in three major sections.

1686 A Posthuman Perspective on Entrepreneurial Competence Basic Information Analysis of Entrepreneurship Education in Vocational Colleges

Theoretical and Conceptual Foundations

The rationale for developing extracurricular entrepreneurship courses is grounded in multiple educational theories. Taylor's curriculum development theory emphasizes systematic, objective-centered course design, focusing on aligning learning objectives with evaluation strategies. This approach offers a scaffolded framework for course implementation that accounts for learners' needs—a critical consideration for vocational students with diverse professional trajectories.

Complementing Taylor's model, constructivism theory underscores active, experiential learning through "assimilation-adaptation," a useful lens for designing learning environments that mirror real-world entrepreneurial scenarios. These scenarios are embedded with digital platforms, collaborative practices, and adaptive feedback systems—elements that mirror the posthuman ontology of interconnected learning ecosystems.

Furthermore, social learning theory situates entrepreneurial development within networks of interaction, imitation, and feedback—elements that mirror the posthuman concept of distributed agency, where learning outcomes are emergent from student-mentor-technology interactions rather than individual cognition alone.

Figure 1, captures the multi-layered design of the extracurricular course structure, integrating objectives, content, activities, and evaluation methods within a dynamic pedagogical cycle. These components, as shown, work synergistically to reflect both human and non-human agency in shaping entrepreneurial competence.



Figure 1. Entrepreneurship Extracurricular Course Design

Teacher Perspectives on Existing and Extracurricular Curriculum

Interviews with instructors reveal that vocational entrepreneurship education often suffers from theoretical saturation and practical deficiency. Teachers noted that current classroom-based

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courses lack tangible engagement with entrepreneurial processes. As one educator expressed, "Although students have learned a lot of entrepreneurial knowledge, they do not know how to deal with real problems." This gap suggests a need for material-discursive practices—a posthuman construct where practice, space, and narrative co-shape knowledge—that are absent in traditional pedagogy.

Teachers endorsed extracurricular education as a corrective approach that would allow students to engage in entrepreneurial incubators, simulations, and team projects—activities aligning with posthuman emphasis on assemblage learning. They also emphasized the integration of soft skills (e.g., communication, collaboration), which emerge relationally in co-performative environments rather than as fixed attributes.

Student Demand and Learning Preferences

A comprehensive survey (n=500) revealed high demand for practical, experience-based entrepreneurial learning. Table 4 illustrates students' interest levels.

Response	Frequency	Percentage
Very interested	317	63.4%
Some interest	134	26.8%
No interest	49	9.8%

Table 4. Student Interest in Entrepreneurship

A striking 82.2% of students reported that although they had learned foundational entrepreneurship theories, they could not implement them in practice. Similarly, over 90% identified major barriers such as lack of funding, team partners, and guidance on risk management.

Students expressed strong preferences for hybrid learning modalities combining lectures, case analysis, simulations, and mentorship. Table 5 summarizes preferred course formats:

Activity	Selected by Students (%)
Case analysis	92.2%
Team discussion	92.0%
Guest lectures	83.8%
Sand-table simulations	79.8%
Field visits	77.8%

Table 5. Preferred Learning Activities in Extracurricular Courses

These findings echo posthumanist emphasis on the entanglement of material, technological, and human factors in learning environments. Students were not merely requesting information, but interactive, co-created experiences where non-human actors (digital tools, case media, simulation software) play a formative role.

1688 A Posthuman Perspective on Entrepreneurial Competence Development and Validation of the Extracurricular Course

Multilevel Course Design

The course design was executed across five domains: top-level architecture, objectives, content, activities, and evaluation, with each domain mapped to theoretical frameworks and tailored to students' posthuman learning trajectories.

Top-Level Design: The course was organized to move from knowledge acquisition to material engagement and networked learning (see Figure 1).

Objective Design: Learning goals were structured into three tiers:

- Knowledge Objectives: Mastery of entrepreneurial plan writing and business model frameworks.

- Skill Objectives: Practical performance in project simulation, business pitch design, and investor engagement.

- Attitude Objectives: Cultivation of entrepreneurial identity, risk navigation, and adaptive mindset.

Content Design: The course includes three modules: business plan writing, roadshow skills, and project pitching. Each module integrates case-based teaching, peer feedback, and real-time scenario simulations.

Teaching Activities: Drawing from task-based and experiential learning theories, the course included:

- Business plan writing + critique workshops
- Simulated investor roadshows

- Peer-reviewed project exhibitions are explicitly framed by posthuman constructs. Students engage with platforms, avatars, and technologies that shape their entrepreneurial self-concept.

Expert Evaluation of Course Consistency

Five experts assessed the course across four criteria: objective clarity, content richness, activity design, and evaluation rigor. The findings are summarized in Table 6.

Item	Mean Score	Standard Deviation	Rating
Objective	3.0	1.41	Medium
Content	4.8	0.45	Best
Activity	5.0	0.00	Best
Evaluation	3.8	0.45	Good

Table 6. Expert Evaluation Results

The activity dimension received perfect consensus (SD = 0.00), reflecting the perceived strength of simulation-based and collaborative practice. These activities align with the posthuman emphasis on intra-action—the performative emergence of learning through entangled relations between people, technologies, and systems.

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Empirical Impact of the Course on Entrepreneurial Competence

To measure the impact of the course, pre- and post-intervention tests were administered in knowledge, practical skills, and entrepreneurial attitudes to a group of 30 students.

Knowledge Gains

Students' written test scores improved significantly, as shown in Table 7.

Test	Mean Score	SD	t	р
Pre-test	54.53	4.59		
Post-test	70.67	4.62	15.58	< 0.001

Table 7. Knowledge Test Comparison

The increase reflects more than just rote learning. Through a posthuman lens, it shows expanded epistemic agency—students became capable of using hybrid tools (e.g., simulations, digital roadmaps) to articulate and apply complex entrepreneurial knowledge in action.

Skills Development

Both business plan and roadshow scores showed statistically significant improvement, as shown in Table 8 and 9.

Test	Mean Score	SD	Т	р
Pre-test	29.9	3.14	10.12	<0.001
Post-test	42.8	7.39	10.12	<0.001

Table 8. Business Plan Skill Improvement

Test	Mean Score	SD	Т	р
Pre-test	16.8	2.91	15 20	<0.001
Post-test	27.2	2.91	15.50	<0.001

Table 9. Roadshow Skill Improvement

These gains suggest that entrepreneurial competence is not merely internal but performed through socio-material assemblages. Students increasingly recognized how design, storytelling, digital tools, and team collaboration affect entrepreneurial performance.

Attitudinal Shifts

Students' entrepreneurial attitudes also shifted substantially, indicating a reorientation toward risk, innovation, and co-agency, as shown in Table 10.

Test	Mean Score	SD	Т	р
Pre-test	2.6	0.6	10.2	<0.001
Post-test	4.2	0.3	12.5	<0.001

Table 10. Entrepreneurial Att	titude Scores
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Posthuman analysis views this shifts not as individual growth but as becoming-entrepreneurial a process shaped by interactions with mentors, peers, technologies, and evaluative processes.

The results highlight that extracurricular entrepreneurship education designed through a posthuman lens significantly enhances students' knowledge, skills, and attitudes. More importantly, it reconstructs entrepreneurial competence as an emergent, distributed phenomenon—co-produced through technologies, relational learning, and hybrid environments. By embracing the fluid boundaries between human and non-human actors, vocational colleges can cultivate not only entrepreneurial readiness but also the adaptive, co-creative competencies necessary for 21st-century economic and social challenges.

Discussion and Conclusion

This study contributes to a growing body of scholarship that reimagines education in the context of posthumanist thought by investigating how entrepreneurial competence can be developed through relational, technologically mediated, and materially embedded learning practices. The findings of this research strongly align with theoretical perspectives from Braidotti (2017), Barad (2007), and Ceder (2018), which suggest that learning is not solely a human cognitive process but an emergent phenomenon shaped through intra-action between humans and non-human actors. Through the design and implementation of an extracurricular entrepreneurship course, this study demonstrates that vocational students can develop more nuanced and adaptive forms of competence when placed in hybrid learning ecosystems that include digital platforms, collaborative environments, and reflective practices.

The results revealed significant improvements in students' entrepreneurial knowledge, practical skills, and attitudes. Importantly, these gains cannot be fully explained by traditional, anthropocentric pedagogical models. Instead, the students' development can be understood through the lens of distributed agency, where technologies, tools, environments, and human actors co-produce learning (Howard & Küpers, 2022; Janković, 2024). The dramatic improvement in roadshow and business plan performance, for example, underscores that competence was enacted not as isolated skill execution, but as co-performative expression shaped by digital simulations, peer feedback, and material conditions (McMullen et al., 2021; Bernadó, 2024). These findings reinforce the claim that entrepreneurial competence should be reframed not as an individual possession but as an evolving capacity enacted within entangled networks (Elia et al., 2020; Cnossen et al., 2024).

Furthermore, the high student demand for experiential and hybrid learning aligns with posthumanist educational frameworks that reject the banking model of education (Freire, 1970) and instead call for situated, embodied, and affectively engaged learning environments. Students preferred learning activities—such as sand-table simulations, team discussions, and real-time project exhibitions—reflect a desire for participatory, co-constructed learning. These preferences affirm the posthuman critique of static, transmission-based pedagogies (Braidotti, 2017) and advocate for pedagogical models that embrace dynamism, unpredictability, and sociomaterial co-agency.

From a broader perspective, this research supports the notion that vocational education must evolve in response to the complex realities of contemporary entrepreneurial ecosystems. The increasing role of automation, platform capitalism, and ecological disruption demands educational models that cultivate affective adaptability, ethical awareness, and systemic thinking

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(Dy, 2022; Rasdiana et al., 2025). This study responds to that call by providing empirical evidence and practical design strategies for posthuman entrepreneurship education.

Despite these contributions, several limitations remain. The relatively small sample size (n=30) restricts generalizability, and the specific cultural and institutional context may shape how posthuman practices are received. Future research should employ longitudinal and comparative designs across varied geographic and disciplinary contexts. It is also necessary to explore deeper ethical implications of delegating educational agency to algorithms, data infrastructures, and digital simulations (Kimura & Nakajima, 2024).

In conclusion, this research offers a compelling model for vocational education that embraces the posthuman condition—one in which students learn not in isolation but as part of vibrant assemblages of human and non-human actors. By decentering the autonomous human subject and embracing distributed learning, vocational entrepreneurship education can better prepare students for uncertain futures. This paradigm shift represents not merely a theoretical provocation but a pedagogical necessity in the age of digital and ecological entanglement.

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