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Towards the integration of Artificial Intelligence in entrepreneurial education: An Exploratory study at Hassan II University

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Abstract

Could entrepreneurship be taught using artificial intelligence? The teaching of entrepreneurship is a subject that is still gaining ground in the academic and scientific field, given that the nature of the discipline is very specific and requires a certain approach to its teaching. This study explores teachers' perceptions of AI integration into entrepreneurship education and its implications for their pedagogical role at Hassan II University in Casablanca. An exploratory qualitative approach draws on ten semi-structured interviews, conducted face-to-face and remotely, and a manual thematic analysis. The findings reveal openness towards AI alongside concerns about information reliability, unequal access and guidance for its use. Anticipated applications include project development, simulations and personalised support, while teachers emphasise their responsibility for guiding learning. The study distinguishes the perceived usefulness of AI tools from the conditions under which they become pedagogically relevant. Practical implications include combining teacher development, equitable access to resources and adapted assessment practices. These findings illuminate participants' perceptions and expectations without establishing the effects of AI on students' entrepreneurial competencies.

Keywords: Teaching Entrepreneurship, Artificial Intelligence, Active Approach, Innovation, role of teachers.
JEL classification : L26
Type du papier : Empirical Research

Résumé

Peut-on enseigner l'entrepreneuriat à l'aide de l'intelligence artificielle ? L'enseignement de l'entrepreneuriat est un sujet qui prend encore de l'ampleur dans le champ académique et scientifique, vu que la nature de la discipline est très spécifique et exige une certaine démarche à son enseignement. Cette recherche vise à comprendre les perceptions des enseignants concernant l'intégration de l'IA dans l'enseignement entrepreneurial et ses implications pour leur rôle pédagogique à l'Université Hassan II de Casablanca. Une étude qualitative exploratoire repose sur dix entretiens semi-directifs, réalisés en présentiel et à distance, et sur une analyse thématique manuelle.Les résultats montrent une ouverture à l'IA, accompagnée de réserves concernant la fiabilité des informations, les inégalités d'accès et l'encadrement des usages. Les applications envisagées concernent notamment les projets, les simulations et l'accompagnement personnalisé, tandis que les enseignants soulignent leur responsabilité dans la conduite des apprentissages. L'étude distingue ainsi l'utilité perçue des outils des conditions de leur pertinence pédagogique. Elle suggère d'articuler formation des enseignants, accès équitable aux ressources et adaptation de l'évaluation. Ces résultats éclairent les perceptions et les attentes des participants, sans établir les effets de l'IA sur les compétences entrepreneuriales.

Mots-clés : Enseignement de l'entrepreneuriat, Intelligence Artificielle, Approche active, Innovation, Rôle des enseignants.
JEL classification : L26
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1. Introduction

Entrepreneurship education has generated sustained interest in the relationship between teaching methods, learning experiences and entrepreneurial outcomes. Beyond transmitting knowledge about business creation, it raises questions about how students learn to explore opportunities, develop ideas and make decisions in uncertain situations. Active pedagogies address these questions by involving learners in projects, practical activities and reflection on their experiences (Fayolle & Verzat, 2009). However, the effects of entrepreneurship education cannot be considered independently of the pedagogical approaches employed. In their systematic review of 159 studies, Nabi et al. (2017) highlight the insufficient description of teaching practices and the predominance of short-term, subjective outcome measures. These observations underline the importance of examining how educational activities are designed and implemented, rather than assuming that all forms of entrepreneurship teaching produce comparable outcomes.

The development of artificial intelligence introduces further questions into this pedagogical debate. In particular, generative AI can support the production of educational content, feedback and personalised learning activities, while raising concerns about information reliability, academic integrity and students' critical engagement (Kasneci et al., 2023; Michel-Villarreal et al., 2023). Within entrepreneurship education, Bell and Bell (2023) discuss how these technologies may influence pedagogy, teaching practices and assessment. Their contribution draws attention to the need to prepare students for entrepreneurial contexts in which AI tools are increasingly available. Nevertheless, access to these tools does not establish their educational value in a particular course. Their relevance needs to be considered in relation to the learning objectives, the activities undertaken by students and the guidance provided by teachers. For entrepreneurship educators, this includes examining whether AI supports students' own reasoning or encourages them to delegate substantial parts of their work.

Experiential learning offers a theoretical perspective for examining this relationship. Kolb (1984) places experience and its transformation at the centre of learning, providing a basis for considering the relationship between practical engagement and reflection. In entrepreneurship education, the pedagogical literature has increasingly addressed how learners engage with experience and practice, rather than focusing exclusively on whether entrepreneurship can be taught (Hägg & Gabrielsson, 2020). From this perspective, AI-supported activities merit examination in terms of the learning processes they encourage. Generating a project proposal, for instance, is not equivalent to explaining its assumptions, questioning its feasibility or defending the choices it contains. This distinction directs attention towards the teacher's role in designing tasks, encouraging reflection and assessing students' understanding. It also provides a pedagogical basis for investigating teachers' views of AI integration.

A complementary perspective concerns the acceptance of technology. Davis's (1989) technology acceptance model identifies perceived usefulness and perceived ease of use as central concepts for understanding users' acceptance of information systems. These concepts are relevant to examining the benefits and difficulties teachers associate with AI. More recently, Kong et al. (2024) investigated generative AI acceptance among primary and secondary school teachers in Hong Kong, extending the model to include self-efficacy and subjective norm. Although their educational setting differs from university entrepreneurship teaching, their study illustrates the importance of considering teachers' attitudes, confidence and social environment when examining technology adoption. Together, experiential learning and technology acceptance provide complementary perspectives: the former concerns the educational processes that AI might support, while the latter helps interpret teachers'

willingness and perceived capacity to incorporate it. These perspectives are used here to inform interpretation, rather than to test a causal model.

The literature therefore provides reasons to examine both the pedagogical implications of AI and the perspectives of those expected to integrate it. Bell and Bell (2023) address these implications in entrepreneurship education, whereas Kong et al. (2024) examine teacher acceptance in a different educational context. These contributions do not establish how entrepreneurship teachers at Hassan II University understand the opportunities, constraints and responsibilities associated with AI. This study addresses that contextual question through teachers' accounts of their practices and expectations. Its focus is on how they interpret potential applications, distinguish benefits from concerns and envisage changes in their professional role. Attention is also given to training and institutional support, since responsible integration involves questions of competence, guidance and academic integrity (Kasneci et al., 2023; Michel-Villarreal et al., 2023).

Accordingly, this article explores teachers' perceptions of AI integration into entrepreneurship education at Hassan II University in Casablanca, Morocco. Two research questions guide the investigation: How do teachers perceive the integration of AI into entrepreneurship education? How do they envisage its implications for their role and teaching practices? An exploratory qualitative approach was adopted, based on semi-structured interviews with ten teachers and a manual thematic analysis. The study contributes a contextual account of the relationship between teachers' attitudes towards AI, their pedagogical expectations and the conditions they consider necessary for its use. Its practical contribution is to identify considerations for teacher development and institutional support grounded in participants' accounts. The study examines perceptions and reported experiences; it does not measure the effects of AI on students' entrepreneurial competencies.

The article first reviews the literature on entrepreneurship education, active pedagogies and artificial intelligence, and develops the theoretical perspectives relevant to the research questions. It then presents the research methodology, followed by the findings and their discussion. The conclusion summarises the contributions, practical implications and limitations, and identifies directions for future research.

2. Literature review

2.1. Teaching entrepreneurship: History and trends

2.1.1. Overview of the history of entrepreneurship education

Teaching entrepreneurship is a topic of debate among researchers in the field, which has given rise to two opposing schools of thought: First school: Entrepreneurship can't be taught, it's innate, and courses can't produce entrepreneurs. It's not a systematic matter.(Boutillier &Uzunidis,1999; Danvers, 2003)[1]. Second trend: Entrepreneurship is a teachable scientific discipline; aptitudes change, skills are forged and culture takes root at a gradual pace, as a result of the training provided in entrepreneurship, (Fayolle et Gailly, 2008; Fiet, 2001;Henry et al., 2005; Kuratko, 2005; Martin et al., 2013; Moumni et al., 2021). In his book Innovation and Entrepreneurship, Drucker (1986) states that: "*Entrepreneurship is not a science, nor an art, it is a practice*" (p.9). This means that entrepreneurship is a field to be cultivated through confrontation with the business world, and that it is through real-life situations that an individual can develop entrepreneurial skills, building up their own knowledge of the entrepreneurial process through their own experience. Research has progressively shifted from asking whether entrepreneurship can be taught towards examining how entrepreneurial learning occurs through experience and pedagogical practice (Hägg & Gabrielsson, 2020).

[1]*As cited in Moumni et al. (2021, p.291)*

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Entrepreneurship was first taught at the Harvard School of Business in 1947, and it was from this time onwards that entrepreneurship teaching began to grow in scope from year to year on an international scale (Carrier, 2009).The teaching of entrepreneurship has emerged as much as a miracle solution to the problem of unemployment, especially for young graduates, from whom the majority of countries suffer. The aim of this initiative is twofold: to make students aware of entrepreneurship as a career possibility (the entrepreneurial profession), and to train students in the technical and managerial skills needed to develop their entrepreneurial abilities. These objectives call for different assessment criteria: raising awareness of entrepreneurship as a career option should be distinguished from developing entrepreneurial competencies, which requires attention to the learning activities provided and the specific outcomes assessed (Nabi et al., 2017).

Today, entrepreneurship courses are widespread in all public and private establishments, nationally and internationally, and across a range of study specialties, yet teaching pedagogy is still a moot point. Conventional approaches to entrepreneurship teaching include lectures, business plan development and case studies (Carrier, 2009). Their contribution to learning depends on how they are implemented and combined with opportunities for student participation. When activities focus primarily on reproducing information, they may provide limited opportunities for students to exercise creativity, make decisions and reflect on their experience (Fayolle &Verzat, 2009; Nabi et al., 2017).

When teaching centres primarily on transmitting knowledge, students may have fewer opportunities to exercise autonomy and apply entrepreneurial concepts. Active pedagogies extend the teacher's role to facilitating activities, guiding reflection and providing feedback (Fayolle &Verzat, 2009). Hence the need to rethink pedagogy and move towards an active approach.Digital technologies offer additional ways to support entrepreneurial learning, but their educational contribution varies. Hammoda's (2024) review of 26 empirical studies reports generally positive findings for games and simulations, while results concerning online learning and MOOCs are more mixed. Mensah et al. (2024) complement this perspective by examining students' acceptance and use of e-learning in entrepreneurship education. For generative AI, Bell and Bell (2023) highlight implications for teaching practices and assessment. Together, these studies suggest that digital integration requires attention to learning objectives, users' acceptance and pedagogical design.

2.1.2 Active pedagogy: Trends in entrepreneurship education

Active pedagogy is a new form of entrepreneurship teaching based on the Learning by Doing approach, which represents a renovation of the entrepreneurship teaching system. Here, the roles are reversed, with learning focused much more on the student, while the teacher intervenes only to advise or hint at the right path. This recent approach is being called upon to help students develop entrepreneurial skills, i.e. identifying a business opportunity, reinforcing critical and reflective thinking, proposing innovative solutions, developing coping skills in the face of complex or newly encountered situations, etc. (Fayolle &Verzat, 2009). Mastery of these skills will help students to come up with innovative project ideas and, above all, become alert to striking business opportunities.

Active pedagogy can be mobilized in a number of ways: project-based pedagogy, situation-problem, inverted pedagogy or flipped classes, games and simulations and the case method. Each of these methods has its own specific features, which must be properly managed if they are to achieve their intended purpose. Creativity and resilience also deserve explicit attention. Project activities can invite students to develop and compare alternative ideas, while simulations and project revisions can provide opportunities to respond to setbacks and reconsider decisions. These are pedagogical objectives rather than automatic outcomes. The EntreComp framework provides relevant competency benchmarks through creativity,

motivation and perseverance, coping with uncertainty, and learning through experience (Bacigalupo et al., 2016).

In the following table, we will present each method in a concise manner. The choice of method should reflect the entrepreneurial competencies targeted: project work can provide opportunities to explore needs and develop ideas, while cases and simulations can encourage decision-making under uncertainty. These connections represent pedagogical objectives rather than guaranteed outcomes; their achievement depends on how activities and assessment are designed (Fayolle &Verzat, 2009; Nabi et al., 2017).

Table 1: Active methods for teaching entrepreneurship

Active Methods	*Definitions*	*Targeted skills*
Project-based teaching	This method is based on teamwork focused on solving a complex problem for an entrepreneurial project. This method often takes the form of drawing up a business plan(Honig, 2004).	Analysis, collaborative work, critical thinking, management.
Problem situation	According to Guilbert & Ouellet (2008), problem-based learning is defined as*"a complex problem-solving process in which participants in teams work together to search for information and solve a real or realistic problem proposed in order to develop problem-solving skills and learn content at the same time".* (Cited by Aatif &Malainine, 2022).	Reflection, Communication, Autonomy and Problem Solving.
Flipped teaching	Flipped pedagogy or flipped classrooms is an active approach that involves make classroom sessions more dynamic through practical activities (debates, prototype design, simulations, etc.). Outside the classroom, students are encouraged to consult their theory lessons and video clips to help them assimilate the content of the curriculum(Slaoui, 2021).	Action Learning, Reflection, Collaboration.
Games and Simulations	Real-life simulations or serious games are an interesting way of learning about entrepreneurship. Students are confronted with practical cases similar to the problems of the professional world, in which they are expected to make strategic decisions in order to run a successful SME. (Carrier, 2009).	Resilience, dealing with the unexpected, coping with failure, decision-making, emotional management.
Case method	The case method, or trial-and-error learning, is an entrepreneurial teaching modality inspired by the military. It involves directing students to work on cases from the professional world, directing them to propose action plans. (Quoted by Aatif &Malainine, 2022).	Identification of obstacles, search for appropriate solutions, Adaptation.

Source: Authors

These active methods provide a basis for examining how AI might support entrepreneurial learning. AI-generated scenarios, feedback and alternative project proposals can be incorporated into activities that require students to compare options and justify decisions (Bell & Bell, 2023). Their educational value depends on maintaining students' critical engagement and the teacher's guidance, rather than treating generated outputs as completed learning tasks (Kasneci et al., 2023).

2.1.3 Teaching entrepreneurship and artificial intelligence: what potential?

Artificial intelligence has a long history, with important milestones including Alan Turing's work in 1950 and the Dartmouth summer research project organised in 1956 (Turing, 1950; McCarthy et al., 1955; Lemsieh &Abarar, 2024).This technology is rapidly spreading across a range of fields, but education and teaching have been given particular attention, especially through increased exploitation of its digital tool known as Chat GPT. This tool is a digital chatbot that provides instant answers on a variety of human-related topics.

Chat GPT remains the most famous digital tool among others, in artificial intelligence, it presents several advantages to its users which are as follows: Writing essays, Preparing content for oral presentations, Searching for bibliographic references, Doing some academic

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work, Suggesting great ideas for projects, etc. (Rosario Michel-Villarreal, 2023). In entrepreneurship education, potential AI applications include supporting project development and generating scenarios through which students can examine alternative business decisions (Bell & Bell, 2023). Broader educational research also identifies uses for formative feedback, question answering and personalised guidance (Lo, 2023; Kasneci et al., 2023). These applications require safeguards concerning information accuracy, academic integrity and students' responsibility for their work (Michel-Villarreal et al., 2023). AI should therefore be considered a resource integrated into pedagogical activities, whose educational value depends on how teachers design and supervise its use. Simulation, feedback and personalisation are not exclusive to generative AI. Its distinctive contribution lies in producing and revising content through natural-language interaction, allowing learners to request alternative scenarios, explanations or project proposals. These capabilities can support iterative exploration, but generated responses require critical examination because plausible content may contain inaccuracies (Bell & Bell, 2023; Kasneci et al., 2023; Lo, 2023).

Chat GPT is expanding into new, more sophisticated versions of chatbots.In fact, this digital tool raises concernsfor teaching and assessment, especially when it is a programmed intelligent machine that writes high-quality content in a very limited time on behalf of the human student.

On the one hand, this hampers student learning in terms of the progression of writing skills, analysis and criticism of the text generated. On the other hand, for teachers, student assessment would become a more complex mission to accomplish. These concerns are particularly relevant when assessment relies primarily on written outputs that AI can generate. A polished business plan may not, by itself, demonstrate a student's understanding of the assumptions and decisions it contains. Oral explanations, successive project drafts and reflection on the use of AI can help teachers examine the learning process alongside the final product (Bell & Bell, 2023; Lo, 2023). The challenge is therefore to preserve students' intellectual responsibility while establishing clear expectations regarding acceptable AI assistance and acknowledgement of its use (Michel-Villarreal et al., 2023). Empirical research in business schools provides a more specific perspective. In a mixed-method study involving 107 postgraduate business students in the United Kingdom, Essien et al. (2024) found that the most substantial improvements associated with AI text generators occurred at the lower levels of Bloom's taxonomy. They also identified concerns about reliability, accuracy and ethics. In a separate exploratory study involving 70 students at a US business college, Sun and Deng (2025) found that the cognitive demands of students' ChatGPT prompts were related to those of the prompts supplied by their instructor. These findings highlight the importance of teacher guidance and task design when integrating AI into business education. Today, artificial intelligence is a digital power that is imposing itself on society, and its emergence is influencing the way people live and in particular the academic and economic environment (university and the economy). The teaching of entrepreneurship needs to mobilize active pedagogy even more within universities, if it is to achieve the desired objectives (to bring out entrepreneurs and/or prepare competent profiles). So, it is a timely opportunity to include artificial intelligence tools and exploit them as much as a means inserted into the active approach to entrepreneurship education (Michel-Villarreal et al, 2023). However, its formal integration calls for an exploration of teachers' perception and vision of this perspective.

2.1.4. Theoretical perspectives on AI integration in entrepreneurship education

Experiential learning theory provides a foundation for examining the relationship between active pedagogies and entrepreneurial learning. Kolb (1984) describes learning through the interaction of concrete experience, reflective observation, abstract conceptualisation and active experimentation. This perspective gives learning by doing a meaning that extends

beyond participation in practical activities: learners must also reflect on their experience, relate it to concepts and use the resulting understanding to guide further action. In entrepreneurship education, developing a project can therefore become a learning opportunity when students examine their assumptions, interpret feedback and revise their decisions. This understanding is consistent with the emphasis on experience and practice identified in the development of entrepreneurial pedagogy research (Hägg & Gabrielsson, 2020).

The teacher plays an important role in supporting these connections between action and reflection. Within the present study, the teacher's mediating role refers to organising learning situations, questioning students' reasoning and helping them relate their experience to entrepreneurial concepts. Applied to AI-supported activities, this perspective suggests that generating a business idea or project document cannot, by itself, demonstrate learning. Students also need opportunities to evaluate proposals, explain their choices and reconsider their initial assumptions. Experiential learning thus informs the second research question by directing attention to how teachers envisage guiding students' engagement with AI-generated material while preserving their responsibility for the learning process.

This pedagogical perspective can be further specified through frameworks developed for entrepreneurship education. Fayolle and Gailly (2008) connect educational sciences with the design of entrepreneurship teaching, encouraging explicit consideration of educational objectives and their relationship with teaching and evaluation. Neck and Greene (2011) complement this approach by presenting entrepreneurship as a method that students can practise through learning activities. Together, these contributions provide a basis for examining whether AI applications are consistent with the competencies targeted in a course. For this study, their relevance lies in distinguishing assistance with producing an output from opportunities to practise entrepreneurial reasoning. They inform the second research question by helping interpret teachers' expectations concerning project development, decision-making and the organisation of practical learning activities.

Understanding the integration of AI also requires attention to how teachers perceive the technology. Davis's (1989) technology acceptance model identifies perceived usefulness and perceived ease of use as central concepts in the acceptance of information systems. These concepts offer a perspective on the benefits teachers associate with AI and the effort they anticipate in using it. Research by Kong et al. (2024), conducted among primary and secondary school teachers, extends the examination of generative AI acceptance to self-efficacy and subjective norms. Although this educational setting differs from university entrepreneurship teaching, it provides a relevant comparison for considering perceived capability and social influences. These concepts inform the first research question by supporting interpretation of accounts concerning usefulness, confidence and pressure to adapt. They are used as interpretive resources rather than as variables measured through a standardised acceptance scale.

Acceptance alone, however, does not explain how teachers incorporate a tool into their teaching. The technological pedagogical content knowledge framework emphasises the interaction between subject knowledge, pedagogical knowledge and technological knowledge (Mishra & Koehler, 2006). Its relevance here is that technical familiarity must be considered alongside the teacher's understanding of entrepreneurship and of how students learn. Applied to AI integration, the framework invites examination of how teachers select activities, assess generated content and adapt their guidance to learning objectives. It therefore complements the second research question by framing the evolution of the teacher's role in terms of professional judgement and the coordination of different forms of knowledge.

Ethical and equity considerations cut across these pedagogical and technological perspectives. UNESCO's AI competency framework for teachers combines a human-centred mindset with AI ethics, technological understanding, pedagogy and professional learning (Miao

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&Cukurova, 2024). It offers a reference for examining responsibilities concerning privacy, human agency and equitable participation in AI-supported education. In relation to the first research question, it helps interpret concerns about unequal access and responsible use. In relation to the second, it directs attention to teachers' guidance and the institutional conditions needed to support their work. Taken together, these theoretical and professional frameworks connect teachers' perceptions with pedagogical purposes and ethical responsibilities. They guide the interpretation of participants' accounts without implying that the present exploratory study tests their causal relationships or establishes the effects of AI on entrepreneurial learning.

3. Research methodology

This study explores how entrepreneurship teachers at Hassan II University in Casablanca perceive the integration of artificial intelligence into entrepreneurship education. More specifically, it examines the uses they envisage for these tools in their teaching practices and how they understand their role in supporting students' learning. To address these questions, the research adopts an exploratory qualitative approach based on semi-structured interviews with ten entrepreneurship teachers.An interview guide was developed to address the research questions. It was first reviewed by a professor specialising in entrepreneurship, whose recommendations informed an initial revision. The revised guide was then reviewed by two entrepreneurship teachers to further refine its content before data collection. The exploratory study was conducted at Hassan II University, for the following reasons:

- Access to participants: accessibility of entrepreneurship teachers within the university facilitated data collection.
- Novelty of the subject: In-depth exploration of this emerging topic with Hassan II University teachers.
- Contextual relevance: the university brings together several institutions offering entrepreneurship courses, allowing the study to explore teachers' perspectives across different teaching settings within a common institutional context.The university also provides an institutional setting in which entrepreneurship education is supported by dedicated student services. Its Pôle Insertion & Entrepreneuriat, established in 2019, supports students and graduates through entrepreneurship-related training and assistance with project development, including activities associated with SALEEM and the National Student-Entrepreneur Status (Université Hassan II de Casablanca, n.d.). These arrangements make the university a relevant setting for exploring teachers' perspectives on entrepreneurship education and its pedagogical development. Their presence does not, however, imply that AI tools are already systematically integrated into teaching.

Interviews with teachers were conducted remotely and face-to-face over a fixed period of 30 min to 45 min. The table below shows the distribution of entrepreneurship teachers by Hassan II University establishment.

Table 2: Breakdown of teaching staff by institution at Hassan II University

Participant code	Institution	Position and subjects taught	Teaching experience (years)	Interview mode	Interview duration (minutes)
I1	UH2C Faculty of Sciences Ben M'Sik	Lecturer-researcher Biological sciences and Director of the Entrepreneurship Center	20	Face-to-face	35
I2	UH2C Faculty of Sciences Ben M'Sik	Lecturer-researcherBiological sciences	25	Videoconference	40

I3	UH2C FSJES Aïn Chock	Lecturer-researcher Entrepreneurship	15	Face-to-face	30
I4	UH2C FSJES Aïn Chock	Lecturer-researcher Project management	20	Videoconference	45
I5	UH2C ESTC	Lecturer-researcher Management / Project management	25	Face-to-face	38
I6	UH2C FSJES Aïn Chock	Lecturer-researcherEntrepreneurship	15	Videoconference	32
I7	UH2C FSJES Aïn Sebaâ	Lecturer-researcherProject management	20	Face-to-face	42
I8	UH2C FSJES Aïn Sebaâ	Lecturer-researcherProject management	25	Face-to-face	36
I9	UH2C FSJES Mohammedia	Lecturer-researcherEntrepreneurship	15	Videoconference	30
I10	UH2C FSJES Mohammedia	Lecturer-researcherEntrepreneurship	20	Face-to-face	44

Source: Prepared by the authors.

Participants included teachers involved in management, entrepreneurship and project management courses, as well as the director of a university entrepreneurship centre. The sample also included a lecturer-researcher teaching entrepreneurship to science students. These profiles provided perspectives from different disciplinary backgrounds and teaching responsibilities. The sample comprised four women and six men. Participants expressed different attitudes towards AI, ranging from support to reservations, while some emphasised the need to adapt to its growing presence in education. Familiarity with AI was not assessed systematically through a separate question.

We chose to work with non-probability sampling based on the snowball method. The interviews were conducted with entrepreneurship professors in two ways: face-to-face and remote via videoconferencing,to discuss the integration of AI into entrepreneurship courses and receive their feedback. In fact, of the 10 interviews, six were conducted face-to-face and four remotely.The interview guide comprised 9 questions subdivided into 4 main themes, each of which deals with a particular aspect of the incorporation of AI into entrepreneurship teaching, as follows:

Perception of Artificial Intelligence in Education: This section identifies teachers' thoughts and attitudes to the idea of incorporating artificial intelligence into entrepreneurial education.

Pedagogical Approaches and Artificial Intelligence: This theme helps to understand how teachers use or envisage using artificial intelligence in entrepreneurship teaching and the benefits they associate with these uses.

The role of teachers in the integration of AI: This theme sheds light on teachers' perceptions of how artificial intelligence may change their role in entrepreneurship education.

Future perspectives on AI: This section explores perceived barriers, training needs and recommendations for integrating AI into entrepreneurship education. The four themes can be situated within complementary strands of literature. Teachers' perceptions of AI relate to perceived usefulness and perceived ease of use, which are central to technology acceptance research (Davis, 1989). The theme of teaching approaches connects the discussion of active pedagogies in entrepreneurship education (Fayolle &Verzat, 2009) with the potential implications of generative AI for learning activities and assessment (Bell & Bell, 2023). The changing role of teachers can also be examined in relation to the pedagogical guidance, critical judgement and human oversight required when using these tools (Kasneci et al., 2023). Finally, barriers, training needs and recommendations relate to concerns about academic integrity, institutional guidance and the responsible integration of generative AI into higher education (Michel-Villarreal et al., 2023).

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After conducting semi-structured interviews with the teachers, we began transcribing the responses collected from them, and carried out a thematic analysis to draw conclusions regarding the perception of the insertion of artificial intelligence into entrepreneurial teaching as a pedagogical innovation. The analysis was conducted manually. Responses were examined within each interview and compared across interviews using an analytical matrix organised by themes and subthemes. Similar ideas were grouped together to identify recurring views, while differences between teachers' perspectives were also considered. For example, references to costs, equipment and infrastructure were grouped under barriers to AI integration, whereas statements about technical training and ethical awareness were classified as training needs.The analysis was initially organised around the four themes of the interview guide. Within each theme, similar ideas expressed by participants were grouped into more specific categories. This procedure combined a deductive organisation based on predefined themes with an inductive identification of categories within the responses.The response material was reread and compared with the analytical matrix to check that the groupings reflected the views expressed by participants. This review also considered differences between responses, alongside recurring ideas.

4. Results and Discussion

4.1. Analysis of Findings

In this section, we will present the results of the study, highlighting the trends and observations gathered in relation to each theme.

Perception of artificial intelligence*:* Several Entrepreneurship teachers express a positive perception of the idea of integrating artificial intelligence into entrepreneurship education. This favorable attitude is due to the several advantages that these artificial intelligence tools present, namely: Time savings, the ability to run business simulations, personalize student learning according to their level of performance, content creation also a transformation of teaching approaches. Although teachers are positive about this new technology, they insist that it must be used to best effect. A professor of entrepreneurship has a different view from the other teachers, challenging the notion of fear of Artificial Intelligence by declaring: "*L'IA a des points positifs et des points négatifs. L'IA a accéléré à une allure très vite, il va très vite. Tout le monde ne suit pas l'intelligence artificielle. J'ai peur de l'IA, je crains qu'elle crée des disparités entre les gens, je crains que l'IA ne favorise que les élites tout en désavantageant ceux qui ont plus de difficultés à s'adapter et à utiliser ces outils sophistiqués. Il faut tout d'abord comprendre, les processus et les étapes de l'usage de l'IA* ".

The responses reveal favourable attitudes towards AI alongside reservations about its use. These positions are not necessarily contradictory: teachers may recognise potential benefits while questioning the conditions under which these tools should be integrated into teaching.AI appears to be the calculator of the day, AI gives me as much pleasure as a teacher to try out more complicated things, AI is perhaps a catalyst in our lives, AI is revolutionizing our lives. The incorporation of AI is a responsibility shared by all actors in the academic ecosystem. These advanced answers illustrate the acceptability of AI, except that its integration must be applied responsibly and ethically.

«*Je suis à 1 000% pour l'IA, pour les raisons suivantes et je m'explique : C'est un outil qui va favoriser la performance. Elle s'agit d'une révolution scientifique comme la calculette qui a vu le jour. À condition, l'utilisateur doit être le pilote et il faut éviter du copier-coller intégral. »*

AI initiatives are hardly emerging in our Moroccan context. According to my discussions with professors, Artificial Intelligence initiatives at Hassan II University's public institutions are very limited, and are confined to digital and Artificial Intelligence training courses at the

Ben'Msik Faculty of Science and the National Student Entrepreneur Program. On the other hand, private schools and universities such as HEM, ISCAE and UM6P do exist. Taken together, these accounts suggest that favourable perceptions of AI do not imply unconditional acceptance. Teachers associate its usefulness with time savings and pedagogical possibilities, while also expressing concerns about unequal access and the need for guidance. Perceived usefulness, a central concept in technology acceptance research (Davis, 1989), therefore provides only one perspective on these responses. Acceptance also appears conditional on support for responsible and equitable use.

Pedagogical approaches and AI*:* When it comes to teaching entrepreneurship, every teacher strives to energize his or her course to stimulate the entrepreneurial spirit in his or her students. Faculty teachers rely on the classic method that they explain the entrepreneurship course, illustrate it with case studies of successful entrepreneurs and ask their students to set up a business model to foster their learning.

For teachers in schools with limited access, they turn to integrative approaches such as: Project-based approach, learning by doing approach through simulation games, workshops and case studies. There's even a professor at ESTC who integrates artificial intelligence tools with her students during her course to encourage interaction and exchange with her learners.

Having given an overview of the most widespread teaching methods in entrepreneurship, we now present concrete examples of the transformation of entrepreneurial pedagogy through the use of artificial intelligence.

Artificial Intelligence-based tools enable simulation activities to be carried out much more quickly and immersively, making it easier for students to test the potential of a product or service in a fictitious market and adapt it later. Artificial intelligence can also generate personalized quizzes for teachers, based on the student's level, course chapter and background. This leads to ongoing assessments and checks on how well students have assimilated the course, especially for teachers with a fairly large number of learners. Thanks to these sophisticated tools, teachers will be able to ensure student engagement through interactive and entertaining activities.

A potential application mentioned during the interviews was the use of to perform personality tests on students and offer them adaptive softskills with an entrepreneur's profile to immerse themselves in the posture of an entrepreneur. The interview material illustrates these expectations through proposals for quizzes adapted to students' understanding and simulated markets in which project ideas could be explored. These anticipated applications are consistent with discussions of personalised support in education and AI integration into entrepreneurship teaching (Kasneci et al., 2023; Bell & Bell, 2023). They should nevertheless be distinguished from evidence of their effectiveness, which was not assessed in this study.Their relevance to entrepreneurial competencies depends on the activities organised around them. Comparing alternative project ideas may provide opportunities for creativity, while examining simulated decisions and revising proposals after feedback may support reflection on uncertainty and setbacks. These possibilities concern pedagogical design; the interviews do not establish gains in creativity, resilience or decision-making. Likewise, suggestions concerning personality assessment represent participants' expectations rather than validated applications.

Teachers' roles in IA-Supported Entrepreneurship Education: The integration of artificial intelligence into general education will lead to a transformation in the role of the teacher, that is, the intelligent tools of artificial intelligence will help to make a teacher's work more interesting, they will enhance it further. For all teachers, artificial intelligence is not and never will be a threat to university professors; on the contrary, it's a facilitating tool that adds value to their work.

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We refer to this testimony from a professor who asserts that "*Je dis que le train ne dépasse pas les rails. L'IA ne va pas substituer un enseignant, mais l'IA va me permettre des choses que je ne faisais pas avant, par exemple : traduire le contenu en image, d'aller vers de différents niveaux de contenus, adapter mon cours aux différents niveaux d'acquisition et d'aptitudes de mes étudiants*". In spite of technological advances, humans still have a role to play in monitoring, controlling, catching up and, above all, encouraging the strongest and guiding the weakest.We'd have to be retrained, but there's one thing that will never replace the human being, and that's seeing the psychological side of things. In other words, it is the teacher who holds the power, with artificial intelligence intervening on his behalf to make his work more effective than before, rather than replacing it. Here, artificial intelligence is called upon to facilitate and enhance the work of teachers. These accounts emphasise teachers' continuing responsibility for guidance, interpretation and interpersonal support. This perspective can be related to UNESCO's AI competency framework for teachers, which combines a human-centred mindset, ethical responsibility, AI pedagogy and professional learning (Miao &Cukurova, 2024). The framework helps interpret the role described by participants as extending beyond technical assistance to include pedagogical judgement and attention to students' needs. Their statements about the irreplaceability of teachers express their professional views rather than a prediction established by this study.

These findings also suggest practical directions for assessment. Oral presentations could require students to explain and defend project decisions, while successive drafts and reflective accounts could document how their proposals developed. Authentic tasks involving field observations or customer enquiries could further connect assessment with students' own experience. Disclosure of AI assistance and comparison between written submissions and oral explanations could support academic integrity, alongside institutionally approved plagiarism checks. These are implications drawn from the findings and literature, rather than practices whose effectiveness was tested in this study (Bell & Bell, 2023; Lo, 2023).

Barriers and conditions for IA integration: Future prospects for the use of artificial intelligence are summarized in 3 main points: 1) Obstacles to the integration of artificial intelligence. 2) The types of training required for proper handling of artificial intelligence tools. 3) Recommendations for the use of artificial intelligence.

All teachers agree that the main obstacle to integrating artificial intelligence is the lack of financial resources, because this initiative requires an investment cost. This involves infrastructure to be prepared, equipment to be acquired and training to be given to teachers for proper support of 4.0 technology. Other obstacles mentioned are: unequal access to artificial intelligence for teachers and students, the problem of resistance to artificial intelligence, the problem of ethical use, the problem of cyber security and the risk of misinformation.

There are those who argue that technical training is essential for the effective use of advanced tools, and that this training should cover the following aspects: *Technology, Benchmarking on best practices in entrepreneurship*. Others argue that fundamental training should include the following elements: training in codes of ethics, so as to know how to use and manage data and avoid misuse of the database. "*Il me semble qu'on n'a pas besoin d'être former techniquement de l'interface, on a besoin d'être formé pour savoir utiliser la data et vérifier si la data est fiable*".

The entrepreneurship teachers' recommendations can be summed up in three fundamental aspects:

Promote equal opportunities: Firstly, make artificial intelligence an advantage for disabled students, that is invent intelligent tools adapted to their disabilities. Secondly, to democratize access to information through artificial intelligence.

Supporting users: Supporting teachers and students to better exploit artificial intelligence through simulations and experts in the field.

***Develop ethical practices**:* raise awareness of the use of artificial intelligence in an ethical spirit. "*Notre devoir à nous tous c'est notre responsabilité partagée, de mettre des limites, c'est de sensibiliser les gens, de donner l'exemple*".

In other words, the ethical use of AI calls for the principle of internalizing ethics in learners, by making available to them the laws and regulations in force to raise their awareness, train them and protect them against the abuses and harmful effects of intelligent systems. We must also try to awaken in them a critical spirit towards artificial intelligence products. AI is a resource that must be accessible to all students, without any social disparity, to guarantee the principle of equity for learners. The barriers can be organised into three levels of intervention, without assigning them a frequency-based ranking. Access to equipment and digital resources constitutes a practical condition for participation. Teacher development then concerns the ability to select appropriate tools, assess information and design learning activities. Institutional governance provides a cross-cutting framework for these uses through guidance on academic integrity, data protection and accessibility. These dimensions are interdependent: equipment alone does not ensure pedagogically appropriate or equitable use. The recommendations can be linked to concerns expressed in the interviews. The request to learn how to "verifier si la data est fiable" supports training in source verification and critical evaluation, alongside technical instruction. Similarly, the reference to a "shared responsability" supports a collective approach involving teachers, students and institutional decision-makers. Concerns about unequal access also justify attention to affordable resources and accessibility for students with disabilities.

At university level, possible responses include shared access to selected tools, practical training based on entrepreneurship courses and clear guidance for their use. At national level, coordination by the ministry responsible for higher education could support common principles and reduce disparities between institutions. Research funding bodies, including the CNRST, could be considered potential partners for evaluating pilot initiatives. These are proposed institutional responses to the needs identified, not existing commitments or programmes documented by this study.

4.2. Discussion and Implications

The findings provide two complementary answers to the research questions. Regarding teachers' perceptions, AI is associated with opportunities for supporting teaching, but its integration is also questioned in terms of accessibility, reliability and responsible use. Regarding the teacher's role, participants envisage technological assistance alongside continued responsibility for guiding and assessing learning. Considered together, these findings suggest that perceived usefulness and pedagogical legitimacy are distinct: teachers may recognise the capabilities of a tool while questioning whether its use serves the objectives of entrepreneurship education. This interpretation brings the technology acceptance perspective (Davis, 1989; Kong et al., 2024) into dialogue with frameworks concerned with educational objectives and learning processes (Fayolle &Gailly, 2008; Kolb, 1984).

The study extends the discussion of AI in entrepreneurship education by showing how these considerations are connected in teachers' accounts within a specific university setting. Bell and Bell (2023) identify potential changes in entrepreneurship pedagogy and assessment; the present findings provide a contextual account of how teachers envisage and qualify these possibilities. They also complement research examining student outcomes in business education. Essien et al. (2024) and Sun and Deng (2025) draw attention to cognitive demands and instructional guidance, whereas this study examines the perspectives of teachers expected to organise such learning situations. These different forms of evidence should remain distinct: anticipated benefits expressed in interviews cannot establish improvements in student competencies.

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A further interpretation concerns the relationship between individual willingness and institutional conditions. The coexistence of favourable views and reported constraints suggests that implementation cannot be understood solely as a matter of teachers accepting or rejecting AI. It also involves their perceived capacity to use it appropriately and the support available within their institutions. The practical implication is to assess readiness across these dimensions before extending AI-supported activities. For entrepreneurship courses, this means specifying the learning purpose of an application, the decisions that remain the student's responsibility and the evidence through which learning will be assessed. This provides a common rationale for the training, assessment and access recommendations developed in the preceding themes, without assuming that the proposed arrangements have already demonstrated their effectiveness.

5. Conclusion

The integration of artificial intelligence into the teaching of entrepreneurship is a topical subject that deserves particular attention. Before tackling this technological integration in teaching, we must first recall what artificial intelligence is. Artificial intelligence is a technological revolution in which machines and computer systems operate in a very similar way to the human brain, performing cognitive activities such as thinking, reacting, analyzing and solving problems. This digital revolution has invaded all fields, including education. For our case, we decided to carry out a qualitative study of entrepreneurship teachers to recognize their perceptions of the integration of this technological innovation, and to understand what change might be attributed to the implementation of artificial intelligence. In what follows, we will try to focus on the main findings.

The results of the study show that teachers are open to the idea of incorporating artificial intelligence, except that there needs to be an ethical approach to its use. From this observation, we can see that teachers have a positive attitude towards AI, and are aware of its advantages.

Artificial Intelligence can never replace the teacher, but this technology is involved in perfecting and improving the content of the teacher's work, so that students acquire real entrepreneurial skills. The human side is a strong point that is irreplaceable despite technological progress, and we quote the words of one teacher who asserts that "*il y a comme même une chose qui ne remplacera jamais l'être humain le fait d'avoir le côté psychologique, un professeur voit les larmes de quelqu'un qui bloque la machine ne voit pas*".

Here are teachers' recommendations for integrating artificial intelligence:

Make the tools of artificial intelligence available to students with disabilities, in order to generalize its benefits to a wide range of beneficiaries.

Teachers need to adapt to this emerging technology and make the best use of it in their work for efficient results.

The ethical use of artificial intelligence is a point on which both teachers and learners need to be made aware.

According to the two AI competency frameworks developed by UNESCO for both learners and professors. It turns out that a very important aspect of these standards is that of ethics and equality in the use of AI, in which teachers and students are the main players in its responsible mobilization: for teachers, they are required to choose AI tools that respect students' privacy, and learners' personal data must be protected against any misuse. Teachers are also expected to make their students aware of AI regulations against uses harmful to the environment and the social life of individuals. In addition, teachers are expected to teach their students to use AI tools responsibly, to stimulate the principle of agentivity in them. Indeed, learners are required to question the answers generated by AI, checking their reliability and trying to

develop a critical sense towards the results provided by this new technology. Another element to be discussed is that of inclusivity: all students must have equitable access to AI resources, despite discriminating criteria such as socio-professional category, ethnic and/or cultural origins, gender, student status (special needs student versus normal student).
Learners also play a crucial role in mobilizing AI. In fact, students need to be aware of the risks involved in using AI, and it's imperative that they use these rather sophisticated resources with caution, in a way that doesn't harm their social lives and those of others. Students have the right to access AI, to understand how it works and how it generates results, in order to respect the principles of transparency and explicability, as defined by UNESCO.

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