

Generative artificial intelligence at the service of education: rethinking university governance In the era of digital transformation

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Abstract— The integration of generative artificial intelligence (GAI) into higher education represents a major shift in the traditional dynamics of education, university governance, and the relationship between teachers, students, and knowledge. Capable of autonomously producing textual, visual, or multimedia content, GAI is transforming learning methods, assessment processes, and the design of educational pathways. By promoting personalisation, intelligent tutoring, and the co-creation of resources, it acts as an unprecedented lever for pedagogical innovation. This transformation also stimulates students' entrepreneurial spirit and redefines the role of teachers towards personalised support. However, it raises ethical issues such as the digital divide, algorithmic bias, privacy protection, and technological dependence. This study examines how the adoption of GAI is transforming teaching practices, fostering student entrepreneurship, and shaping governance models in Moroccan higher education. A quantitative survey was conducted among students and teachers and analysed using exploratory factor analysis and multiple regression to test a conceptual model integrating pedagogical innovation, university governance, and student entrepreneurship.

Keywords —Generative Artificial Intelligence, Higher Education, University Governance, Pedagogical Innovation, Student Entrepreneurship.

I. INTRODUCTION

The rapid advancement of Generative Artificial Intelligence technologies, such as ChatGPT, DALL·E, and Gemini, has profoundly transformed higher education paradigms. These models enable both students and educators to autonomously generate textual, visual, and multimedia content, thereby reshaping learning processes, evaluation methods, and governance models within universities. In Morocco, the integration of GAI emerges as both an opportunity and a challenge: it enhances pedagogical innovation and student entrepreneurship while simultaneously raising ethical concerns about digital divides, algorithmic bias, and technological dependency. This study investigates how GAI impacts pedagogical practices, promotes entrepreneurial competencies, and influences university governance within the Moroccan higher education landscape.

The study pursues three primary objectives: (1) to analyze the influence of GAI on pedagogical practices in Moroccan universities; (2) to evaluate the role of GAI in fostering students' entrepreneurial mindset; and (3) to explore the implications of GAI for university governance, particularly regarding ethics, transparency, and strategic decision-making. To achieve these aims, the researchers conducted a quantitative study among students and faculty members, using statistical analyses including exploratory factor analysis and multiple regression.

II. LITERATURE REVIEW

GAI is profoundly transforming educational practices and challenging the foundations of university governance. Recent research converges on several sub-themes that shed light on its potential, limitations, and strategic implications.

A. *Personalisation of learning and student autonomy*

GAI enables educational pathways to be finely tailored to individual needs, enhancing student autonomy and engagement. Holmes et al. [1] highlight its role in personalising content, while Wang et al. [7] emphasise real-time adaptive learning. Luckin [2] considers AI as a cognitive partner, capable of stimulating critical thinking and creativity. These developments call on institutions to rethink their teaching methods to incorporate more flexible, learner-centred models.

B. *Formative assessment and intelligent feedback*

IAG facilitates continuous assessment through systems capable of generating immediate, contextualised feedback. Roll and Wylie [3] show that these tools improve the quality of formative assessment. Heffernan and Heffernan [18] study intelligent tutoring systems, which adjust pedagogical recommendations based on the learner's profile. These transformations require a review of assessment policies and academic quality criteria.

C. *Development of cross-disciplinary skills and academic entrepreneurship*

IAG promotes the acquisition of 21st-century skills such as collaboration, problem solving, and critical thinking. Redecker [8] emphasises its role in developing these skills, while Zhang et al. [4] demonstrate its usefulness in modelling entrepreneurial projects, scenario simulation, and rapid prototyping. These uses reinforce the idea of an innovative university focused on action and creativity.

D. *Transformation of the teaching role*

Teachers are becoming facilitators and technology mediators rather than simply transmitters of knowledge. N. Selwyn [6] discusses this redefinition of the role, and Gauthier [29] emphasises the need to train teachers in the critical use of AI. Aoun [11] proposes a humanistic approach focused on human skills. These changes require an overhaul of continuing education and professional development policies.

E. *University governance and strategic decision-making*

AGI offers decision-making tools for resource management, academic planning, and predictive analysis. Brynjolfsson and McAfee [5] analyse its impact on strategic governance. Miao et al. [30] propose ethical and participatory governance frameworks, and the OECD [20] recommends regulation based on transparency and inclusion. These perspectives call for enhanced, agile, and data-driven university governance.

F. *Ethical regulation and digital justice*

The use of AI raises major issues related to algorithmic bias, data protection and equitable access. Floridi [9] and Binns [10] warn of these risks, while Selwyn [12] criticises unregulated technological enthusiasm. Williamson and Eynon [13] analyse the tensions between automation and humanisation. These challenges require robust ethical frameworks and responsible governance.

G. *Educational reforms and hybrid models*

AI is part of a dynamic transformation of learning environments. Kozma [14] links technological innovation to educational reform. Siemens [15] introduces the theory of connectivism, which values networks and information flows. Anderson [16] and Bates [17] explore hybrid environments and new forms of educational design. These approaches invite institutions to rethink their curricula and teaching methods.

H. *Institutional policies and international frameworks*

Institutions such as Jisc [25] and UNESCO [26] offer guidelines for the ethical and strategic integration of AI into education. Chen et al. [21] and Zawacki-Richter et al. [22] studied the integration of AI into LMS systems

and distance learning. These international frameworks provide benchmarks for developing consistent and contextualised institutional policies.

I. Inclusion, accessibility, and social justice

Bi [19] proposes an inclusive vision of educational AI, while Eynon [23] examines digital inequalities in algorithmic environments. Kalloo et al. [33] explore the use of mobile AI in developing countries. These works highlight the importance of equitable governance that is sensitive to local contexts.

J. Political imaginaries and socio-technical tensions

Finally, Perrotta [32] analyses political representations of educational AI. Veletsianos [31], Castañeda et al. [33], and Ferguson et al. [34] discuss the tensions between automation, humanisation, and learning data analysis. These reflections call for university governance that articulates technological innovation and human values.

Based on the theoretical foundations identified in the literature [1] and [5], our study proposes a conceptual model examining the relationships between the use of GAI, the development of entrepreneurial skills, and the adoption of anticipatory academic management practices among higher education students.

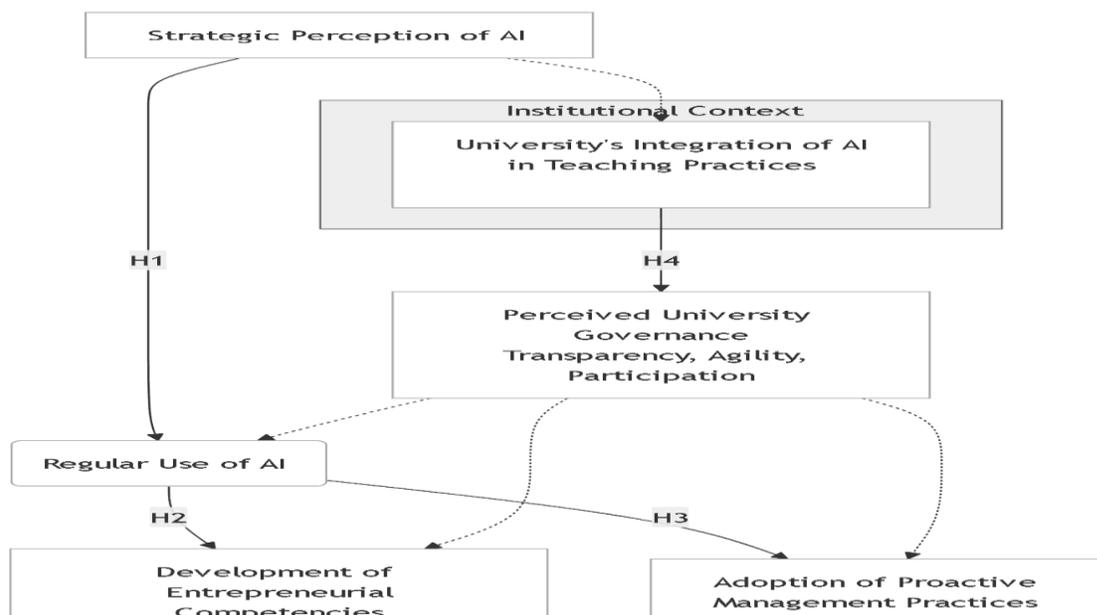
The hypotheses of our research are formulated as follows:

- H1: Students with a strategic perception of GAI are more likely to integrate it into their academic and professional projects.
- H2: Regular use of GAI is positively associated with the development of cognitive and entrepreneurial skills in students.
- H3: GAI promotes the adoption of planning and forecasting practices in academic contexts.
- H4: The integration of GAI into teaching practices influences students' perceptions of university governance, particularly in terms of transparency, agility, and participation.

These hypotheses structure the empirical analysis and aim to test the validity of the proposed conceptual model.

The conceptual framework of our research is illustrated in Figure 1 below, which provides a visual representation of the main relationships between the latent variables.

Figure 1. Conceptual model of the impact of AI integration on university governance and student entrepreneurial competencies



Source: Authors, 2025

III. METHODOLOGY

The research employed a quantitative design involving students and faculty from six Moroccan higher education institutions, both public and private. A stratified random sampling ensured regional and institutional representativeness. Data were collected using a 28-item questionnaire encompassing four dimensions: (1) GAI usage, (2) entrepreneurial competencies, (3) anticipatory academic management, and (4) perception of university governance. Responses were measured on a five-point Likert scale. Statistical analyses were conducted with SPSS and SmartPLS to test four hypotheses (H1–H4) linking GAI usage to pedagogical innovation, entrepreneurship, and governance.

TABLE I. IMPACT OF GENERATIVE AI ON STUDENT ENTREPRENEURSHIP

Indicators	Percentage
Encouragement to develop a project	72,3 %
Confidence to launch a business	65,5 %
Generation of innovative ideas	81,3 %
Visual prototyping support	56,3 %
Market analysis facilitation	55 %

Source: Authors, 2025

TABLE II. PERCEIVED PEDAGOGICAL IMPACT OF GAI

Indicators	Percentage
Evolution of teaching methods	40,5 %
Improved comprehension and application	68,8 %

Source: Authors, 2025

TABLE III. STRATEGIC PERCEPTION OF GAI

Indicators	Percentage
Viewed as autonomous technology	54,6 %
Considered a technological revolution	45,7 %
Received entrepreneurship training:	52,1 %

Source: Authors, 2025

IV. RESULTS AND ANALYSIS

The empirical findings validate all four hypotheses. GAI usage significantly contributes to the development of entrepreneurial skills ($\beta = 0.62$, $p < 0.001$), supports anticipatory academic management ($\beta = 0.54$, $p < 0.001$), and positively influences students' perceptions of university governance ($\beta = 0.59$, $p < 0.001$). The coefficient of determination ($R^2 = 0.68$) indicates that 68% of governance variance is explained by the model. Furthermore, reliability indices (Cronbach's $\alpha > 0.80$) confirm internal consistency across constructs. However, only 11.5% of respondents reported the existence of institutional frameworks regulating GAI usage, highlighting the absence of governance mechanisms and ethical oversight.

V. DISCUSSION

The results underscore GAI's transformative role as both a pedagogical and governance catalyst. It enhances cognitive engagement and creative capacity among students while promoting project-based learning and entrepreneurial simulation. GAI's capacity for adaptive learning and data-driven feedback supports predictive management and strategic planning. Yet, the study also reveals institutional fragility—limited ethical frameworks, digital inequality, and uneven adoption across regions. This duality suggests that while GAI strengthens innovation, it simultaneously amplifies existing systemic disparities.

VI. CONCLUSION AND IMPLICATIONS

This study concludes that Generative AI constitutes a structural driver of pedagogical innovation and governance transformation in Moroccan higher education. It fosters creativity, autonomy, and inclusion, but requires institutional support to mitigate ethical risks and digital divides. Universities should implement AI ethics committees, establish clear regulatory frameworks, and provide continuous training for faculty. Students should be guided to strategically integrate GAI into research and entrepreneurial projects. Future research should explore disciplinary variations and the implications of GAI for participatory governance and digital sovereignty in Global South contexts.

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