

Artificial Intelligence and Hybrid Learning: Rethinking the Roles of Teachers in the Context of Social Sciences

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Abstract—The advent of Artificial Intelligence (AI) within educational systems, combined with the widespread adoption of hybrid teaching, is profoundly transforming pedagogical practices in higher education. This change particularly affects the social sciences disciplines, traditionally based on human interaction, critical thinking, and contextual knowledge. In this context, the place and role of the teacher are undergoing major reconfiguration. This article questions this metamorphosis: how do AI tools, integrated into hybrid systems, redefine the missions and postures of teachers, and with what effects on student performance and the quality of learning? To answer this, we use a dual theoretical and empirical approach, focused on the experience of Cadi Ayyad University.

Keywords: Artificial Intelligence, Hybrid Teaching, Teacher Roles, Social Sciences

XXXVII. INTRODUCTION

The advent of Artificial Intelligence (AI) within educational systems, combined with the widespread adoption of hybrid teaching, is profoundly transforming pedagogical practices in higher education. This change particularly affects the social sciences disciplines, traditionally based on human interaction, critical thinking, and contextual knowledge. In this context, the place and role of the teacher are undergoing major reconfiguration. This article questions this metamorphosis: how do AI tools, integrated into hybrid systems, redefine the missions and postures of teachers, and with what effects on student performance and the quality of learning? To answer this, we use a dual theoretical and empirical approach, focused on the experience of Cadi Ayyad University.

XXXVIII. MOTIVATION & METHODOLOGY

A. Motivation

The digital revolution, intensified by the growing integration of Artificial Intelligence (AI) in higher education, is profoundly transforming teaching and learning methods. In the context of social sciences, where human interaction, critical thinking, and contextualization play a central role, it is essential to understand how AI, integrated into hybrid teaching environments, reshapes the traditional roles of teachers. This research aims to explore these transformations by highlighting both the opportunities and challenges they present, in order to contribute to pedagogical development aligned with contemporary needs. The objective is to provide both theoretical and empirical insights to guide educational practices and policies.

B. Methodology

This study adopts a mixed-methods approach combining thorough theoretical analysis with empirical investigation. On one hand, a systematic review of recent literature was conducted to identify conceptual advances on AI, hybrid teaching, and the transformation of teacher roles within social sciences. On the other hand, a qualitative survey based on semi-structured interviews was carried out with teachers at Cadi Ayyad University to gather their perceptions and experiences with these technologies. Finally, an econometric analysis was performed on student performance data from groups using AI tools within a hybrid framework to quantitatively assess pedagogical impact. This triangulated methodology thus enables a comprehensive and nuanced understanding of the phenomena studied.

Hypothesis 1 (H1)

Statement:

The integration of AI-based tools in hybrid teaching

environments enhances the personalization of student learning pathways.

Hypothesis 2 (H2)

Statement:

The role of university instructors evolves from content delivery to strategic facilitation and ethical mediation when AI tools are embedded in teaching practices.

Hypothesis 3 (H3)

Statement:

Despite the pedagogical advantages of AI, its integration in higher education encounters institutional and human resistance that limits its full potential.

XXXIX. THEORETICAL FRAMEWORK AND CONTEXT OF EMERGENCE

The digital transition in higher education, although initiated well before the COVID-19 crisis, has accelerated dramatically since 2020, reshaping the foundations of teaching and learning. Hybrid education has emerged as a lasting response to the growing demands for flexibility, accessibility, and individualized learning paths. As Bates (2020) argues, pedagogical hybridization entails a profound reconfiguration of the traditional triad—teacher, learner, and content—into a dynamic and interactive ecosystem shaped by the use of digital technologies.

This new pedagogical environment challenges the transmissive logic historically associated with lecture-based instruction. It fosters more collaborative, reflective, and adaptive forms of learning, where digital tools not only support but actively structure educational processes. As students move between physical and virtual spaces, teaching becomes less centered on content delivery and more focused on facilitating meaningful engagement, fostering autonomy, and developing critical thinking. Consequently, educators are increasingly required to rethink their instructional approaches, integrate learning analytics, and embrace the affordances of technology to respond to diverse learner profiles and evolving societal needs.

1) Artificial Intelligence as a Pedagogical Transformation Tool

Educational AI refers to a set of tools and algorithms capable of analyzing learning data, proposing tailored content, and supporting pedagogical decisions. Holmes et al. (2022) distinguish several key applications: adaptive platforms, intelligent tutoring systems, conversational bots, and predictive performance analysis. These technologies allow large-scale personalization and transform approaches to evaluation, progression, and feedback.

However, this automation raises major ethical and pedagogical issues: risk of dehumanization, algorithmic biases, and loss of meaning in human interaction. In this context, the teacher's role does not disappear but is redefined around new skills: AI ethics, technological mediation, and critical data analysis.

The integration of AI in hybrid teaching deeply modifies the foundations of the classical pedagogical model and calls for rethinking the teacher's functions beyond transmission.

XL. PEDAGOGICAL RESPONSES AND TRANSFORMATION OF THE TEACHER'S ROLE

The rapid advancement of educational technologies and the integration of artificial intelligence in higher education are driving a profound redefinition of the traditional role of the teacher. Far from merely transmitting knowledge, teachers now face new responsibilities related to personalized guidance, analysis of learning data, and ethical mediation between humans and machines. This transformation is particularly significant in the social sciences, a field historically rooted in human interaction, critical debate, and collective meaning-making. This section explores, through both qualitative and quantitative approaches, the pedagogical responses adopted and the evolving functions experienced by teachers in hybrid settings enhanced by AI.

1) 1. New Teacher Functions in AI Hybrid Systems

Analysis of interviews conducted with social sciences teachers at Cadi Ayyad University reveals three structuring new roles:

- **Personalized Pathway Facilitator:** teachers adapt resources and advise students based on intelligent platform recommendations.
- **Pedagogical Analyst:** data from LMS allow targeted interventions.
- **Ethical Guardians:** teachers ensure balance between human and algorithmic factors, data protection, and student inclusion.

This redefinition requires new transversal skills (digital, analytical, ethical) and raises the question of continuous teacher training.

2) 2. Empirical Analysis: Impact on Student Performance

The econometric study conducted on two student groups shows that the use of AI devices significantly improves academic results. The effect is particularly marked in the following dimensions:

- Engagement (connection time +38%)
- Success (average grade +1.4 out of 20)
- Autonomy (improved early self-assessment)

Hypotheses H1 and H2 are thus confirmed: AI fosters effective personalization of learning and contributes to revaluing the teacher's role as a strategic facilitator.

Partial Conclusion II: AI integration redefines the teacher's role, strengthens pedagogical effectiveness, and promotes student success, provided there is adequate training and clear institutional support.

Hypothesis 1 (H1)

Statement:

The integration of AI-based tools in hybrid teaching

environments enhances the personalization of student learning pathways.

Verification:

This hypothesis can be validated through empirical data comparing two student groups: one using AI-supported hybrid systems and another using traditional hybrid platforms. Indicators like personalized feedback frequency, adaptive content delivery, and student satisfaction surveys can serve as measurable variables. In your study, higher engagement (+38%) and improved self-evaluation validate this claim.

Hypothesis 2 (H2)

Statement:

The role of university instructors evolves from content delivery to strategic facilitation and ethical mediation when AI tools are embedded in teaching practices.

Verification:

This can be assessed through qualitative analysis of teacher interviews and observation logs. At Université Cadi Ayyad, teachers identified roles such as “personalized learning facilitators,” “data-informed pedagogical analysts,” and “ethical guardians.” These new roles imply a clear shift in responsibilities, confirming the hypothesis.

Hypothesis 3 (H3)

Statement:

Despite the pedagogical advantages of AI, its integration in higher education encounters institutional and human resistance that limits its full potential.

Verification:

This hypothesis is supported by data on teacher feedback, training program availability, and institutional policy documents. In your study, tensions like lack of training, fear of replacement, and the absence of ethical guidelines demonstrate ongoing friction, validating this hypothesis.

B. Results and Recommendations

1) Key Results

The empirical and theoretical analysis of the integration of artificial intelligence in hybrid teaching within social sciences at Cadi Ayyad University has led to the following key findings:

- Improved Student Performance**
Students engaged in AI-enhanced hybrid learning environments demonstrated a measurable improvement in academic outcomes, with an average grade increase of **+1.4 points** out of 20, and a **38% increase in active platform engagement time**.
- Greater Autonomy and Motivation**
The use of intelligent tutoring systems fostered a higher degree of self-regulation and early self-assessment practices among students, especially in asynchronous learning modules.
- Redefinition of the Teacher's Role**
Teachers transitioned from knowledge transmitters to **strategic facilitators, data-informed pedagogues, and ethical mediators**, requiring an

expansion of their professional competencies, particularly in digital literacy and AI ethics.

- Pedagogical Equity Concerns**
While AI tools provided personalized pathways, disparities emerged due to **unequal access to digital resources** and **varying levels of technological proficiency**, raising questions about inclusiveness.

2) Recommendations

Based on these findings, we propose the following actionable recommendations:

- Invest in Teacher Training Programs**
Establish ongoing professional development initiatives focused on digital pedagogy, ethical use of AI, and data analytics in education to empower educators in hybrid environments.
- Adopt Clear Institutional Guidelines on AI Integration**
Universities should create and enforce **transparent, ethical, and inclusive policies** regarding the adoption of AI tools in teaching and assessment practices.
- Promote Human-AI Co-Teaching Models**
Encourage the design of hybrid pedagogical frameworks where AI complements — rather than replaces — the teacher, reinforcing their central role in facilitating critical thinking and ethical reasoning.
- Ensure Equitable Access to Digital Infrastructure**
Institutions must address the digital divide by providing necessary technological support to both students and faculty, ensuring fair participation in AI-enhanced learning systems.
- Foster Research on Long-Term Impacts**
Support longitudinal and interdisciplinary research initiatives to better understand the long-term effects of AI integration on student learning outcomes and the evolution of teaching roles.

Future and Emerging Research Directions

1. Reconfiguration du rôle enseignant à l'ère de l'IA hybride

L'intégration de l'intelligence artificielle dans les dispositifs hybrides transforme profondément les fonctions traditionnelles de l'enseignant. Ce dernier devient à la fois **facilitateur pédagogique, analyste des données d'apprentissage, et garant éthique**. Cette évolution nécessite l'acquisition de compétences nouvelles, notamment en éthique, en numérique et en analyse.

2. Impact mesurable sur la performance étudiante

Les résultats empiriques montrent une amélioration significative de l'engagement, de la réussite et de l'autonomie des étudiants grâce à l'IA. Cela confirme que les technologies intelligentes, bien intégrées, **valorisent l'apprentissage personnalisé** et renforcent l'efficacité pédagogique.

3. Enjeux critiques et perspectives de recherche

Malgré ses apports, l'usage de l'IA en éducation soulève encore **des résistances, des besoins de formation, et des défis éthiques et réglementaires**. De nouvelles recherches sont nécessaires pour comprendre les effets à long terme, encadrer l'usage des IA génératives, et expérimenter des modèles de co-enseignement entre humains et machines.

Issues, Limits, and Research Perspectives

1. Current Tensions

Despite the observed benefits, several tensions persist:

- **Teacher Resistance:** fear of substitution, cognitive overload
- **Lack of Training and Support**
- **Absence of Clear Regulation** on the ethical use of AI in education

These issues require coordinated efforts between institutions, pedagogical teams, and researchers.

3) 2. Future Research Avenues

- Longitudinal studies on AI's effects on critical skills
- Analysis of the impact of generative AI on student work
- Human/AI co-teaching: shared roles, cross responsibilities.

General Conclusion: AI and hybrid teaching challenge the place of the teacher in higher education. Far from marginalizing them, these technologies strengthen their role as mediators, strategists, and ethicists. However, public policies, training programs, and research must support this

transformation to keep it human-centered and learning-oriented.

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