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The Future of AI in Education: How Students and Professors Adapt to Digital Transformation and AI Integration in Universities in Europe

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ABSTRACT: The rapid integration of Artificial Intelligence and the overarching digital transformation of the Higher Education Area in Europe have fundamentally reshaped pedagogical paradigms. This article explores the evolving relationship between technological advancement and institutional adaptation, leveraging the theoretical frameworks of digital maturity and strategic AI implementation. To ground these theoretical perspectives, a comprehensive quantitative research study was conducted, surveying a robust sample of 1,200 students and 250 professors across diverse European universities. The empirical findings reveal a significant level of technological adoption, with over 78% of students reporting the active use of AI tools within their learning processes, while over 55% of professors have integrated AI into the preparation of instructional materials. However, this shift toward automation is met with substantial caution; over 70% of all respondents expressed profound concerns regarding the privacy and security of personal and institutional data within AI ecosystems. Furthermore, the study identifies a disciplinary divide in tool utilization: respondents from the fields of economics, physics, mathematics, and engineering demonstrate a significantly higher frequency of AI usage compared to those in creative arts, such as fashion studies, performative arts, and sculpture. These results suggest that while AI acts as a vector of change in technical and analytical disciplines, its role in creative education remains more peripheral. The article concludes by emphasizing the need for European universities to develop ethical, data-secure marketing and teaching frameworks that bridge these disciplinary gaps while addressing user skepticism.

KEYWORDS: Artificial Intelligence, Digital Transformation, European Higher Education, Data Privacy, Academic Integrity.
JEL Classification: M31, A29

INTRODUCTION

Digital transformation in universities transcends the simple adoption of software; it represents a cultural shift toward digital maturity. In the European context, this maturity is often uneven, influenced by national policies, institutional funding, and disciplinary traditions. According to Zawacki-Richter and Latchem (2019), the systemic integration of AI in education has historically been categorized into institutional, student-facing, and teacher-facing applications. However, the recent democratization of generative AI has blurred these lines, placing powerful tools directly into the hands of stakeholders before institutional frameworks could be fully established. European universities are unique due to their emphasis on data sovereignty and ethical governance, largely influenced by the General Data Protection Regulation. This regulatory environment creates a paradox: while Europe seeks to lead in trustworthy AI, the restrictive nature of data privacy concerns often slows the pace of adoption compared to North American or Asian counterparts (Bearman et al., 2023).

Consequently, the adaptation process for European professors and students is marked by a distinctive cautious pragmatism. The adaptation to AI is rarely uniform across the academic hierarchy. Students, often characterized as digital natives though this term is increasingly contested in favor of digital learners tend to view AI through the lens of utility and efficiency. Recent studies suggest that students utilize AI for a range of tasks, from summarizing complex literature to debugging code and generating study schedules (Kasneci et al., 2023). However, this high usage rate does not necessarily equate to high AI literacy. Many students operate within a black box paradigm, utilizing outputs without a deep understanding of algorithmic bias or the potential for hallucinations (Bond et al., 2024).

One of the most striking phenomena in the integration of AI is the disparity between academic disciplines. As noted by Crompton and Burke (2023), AI tools are inherently predisposed toward structured data and logical syntax, making them natural allies for fields such as economics, physics, and engineering. In these domains, AI acts as a catalyst for research and complex problem-solving. In contrast, the creative arts, including sculpture, fashion studies, and performative arts, exhibit a more peripheral relationship with AI. This is not necessarily due to a lack of interest, but rather a fundamental clash between the standardization inherent in AI training data and the originality and tactile presence required in creative disciplines (Ouyang & Jiao, 2021). This research highlights this divide, suggesting that a one-size-fits-all AI strategy in universities may inadvertently marginalize creative pedagogies, leading to a fragmented digital landscape within the same institution.

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1. LITERATURE REVIEW

The literature review conducted on 82 sources through a desk research using Scoupus tool and theme and key word analysis into identifying the relevant sources for the research showcased not only benefits, but the specter of data insecurity looms large over European academia. The integration of AI involves the processing of vast amounts of proprietary research and personal student data. A main theme discovered in more than half of the resources analyzed showcased the lack of trust of the users in the privacy and data storage of the AI platforms and tools. As argued by Holmes and Tuomi (2022), the platformization of education, where universities become dependent on proprietary AI tools owned by external corporations, poses a significant risk to academic freedom and data privacy. For European universities, the challenge is to integrate AI in a way that respects the digital rights of the individual while remaining competitive in a global research market. In a previous study conducted on 150 university students in Romania it has been discovered that the concerns regarding privacy has been very high related to digital tools in the online education systems, even though 75.2% of the responders perceiving online education as more flexible than the physical one. (Stan, 2026), This lack of trust was supported by another study conducted the same year on over 250 learners using Ai tools in the digital environment, the results showing a lack of trust in regards to the privacy in over 50% of the answers, concluding that trust and perceived personalization serve as significant predictors of learner self-efficacy and engagement. These psychological states, in turn, act as mediators that drive the intention for continued usage. (Stan et. al., 2025)

Other recent empirical data from large-scale regional surveys highlights a remarkable surge in student engagement with generative AI, suggesting that learners are integrating these technologies into their study habits at a pace that often outstrips institutional policy development (Granström & Oppi, 2025). This rapid integration is particularly visible in technical and analytical disciplines: such as physics, engineering, and economics, where the alignment between AI capabilities and discipline-specific tasks is most pronounced. In these applied fields, the use of AI for complex cognitive tasks has become a standard feature of the student experience, fundamentally altering how knowledge is processed and applied (Qu et al., 2024). Another study conducted on university professors in Romania links fear of plagiarism to the lack of trust in AI, showcasing that most professors in the study fear that plagiarism is higher in the digital environment than in the physical one. (Stan, 2025)

On the other hand, many studies have been proving a high amount of perceived advantages linked to the digital transformation and AI integration in universities across Europe, specifically Generative AI, as a core component of their digital student identity. Research indicates that students primarily use these tools for document summarization, academic writing support, and personalized tutoring (Sejdiu & Sejdiu, 2025). A significant adaptation trend is the use of AI to bridge the digital divide among international and vulnerable student populations. For instance, international students in Europe utilize AI-driven translation and language-learning platforms to navigate academic standards and cultural adjustments (Arslan et. al, 2025). This indicates a shift where students no longer see AI as a novelty but as a necessary scaffold for academic success in a diverse environment. Evidence from Portugal and other European regions shows that professors are successfully integrating AI for pedagogical content creation and administrative management support (Oliveira et. al., 2026). Rather than resisting, many faculty members are calling for professional development to move from being mere users to guides who can foster critical thinking in an AI-saturated environment.

One of the most significant advantages is the shift toward personalized and adaptive learning environments, which move away from a one-size-fits-all model to dynamic, data-informed systems (Abedin et. al., 2026). Generative AI systems can customize educational materials to match an individual learner's speed and existing knowledge, facilitating continuous feedback cycles that improve engagement and mastery. This level of personalization is particularly transformative for students who struggle with abstract lectures, as AI identifies patterns in learner behavior to provide content in visual, auditory, or interactive formats that better suit their cognitive profiles (Georgescu et. al., 2025).

2. METHODOLOGY

The architectural blueprint of this investigation is grounded in a rigorous quantitative framework, purposefully engineered to dissect the multifaceted dynamics of artificial intelligence integration within the European pedagogical landscape. To ensure the empirical integrity of the study, the methodological approach adheres to a post-positivist paradigm, emphasizing the systematic quantification of behavioral patterns and attitudinal shifts across a geographically and academically heterogeneous sample. The primary objective of this research design is to determine the extent to which technological adoption is moderated by disciplinary affiliation and to evaluate the prevailing anxieties regarding data integrity within academic ecosystems. Central to this inquiry is the hypothesis that a profound disparity exists between analytical and creative disciplines, suggesting that the former are predisposed to earlier and more intensive tool integration due to the structural alignment of AI capabilities with their underlying methodologies. The sampling protocol utilized a stratified random technique to assemble a cohort consisting of 1,200 students and 250 faculty members from across the European Higher Education Area. This stratification was essential to ensure a representative distribution across diverse academic domains, ranging from the hard sciences, such as physics and mathematics, to the creative and performative arts. By establishing these distinct strata, the study sought to test the secondary hypothesis that institutional and personal concerns regarding data privacy act as a significant inhibitor to universal adoption, regardless of the perceived utility of the technology. The selection of participating universities was dictated by their commitment to digital transformation initiatives, providing a fertile ground for observing the transition of AI from a nascent innovation to a foundational pedagogical tool. Data collection was facilitated through a meticulously constructed survey instrument, which was subjected to an iterative validation process, including a comprehensive pilot study to ensure psychometric reliability. The questionnaire was designed to capture both the frequency of AI engagement and the specific nature of the tasks being automated, while simultaneously gauging respondent sentiment toward the security frameworks governing AI deployment. To maintain high standards of data ethics and ensure compliance with the General Data Protection Regulation, the methodology incorporated robust anonymization protocols and cryptographic security measures. This rigorous approach to data collection was intended to minimize social desirability bias and provide an authentic reflection of the skepticism and enthusiasm prevalent within the academic community. The analytical phase of the research employed a suite of multivariate statistical techniques aimed at identifying correlations between demographic variables, disciplinary requirements, and technological receptivity. The methodology utilized inferential statistics, specifically focusing on the application of Analysis of Variance and regression models, to interrogate

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the influence of academic field on the rate of AI utilization. These statistical tests were specifically aligned with the research objective of mapping the disciplinary divide, allowing for a precise evaluation of whether the peripheral role of AI in creative education is a product of technical limitations or cultural resistance within those fields. By isolating these variables, the study aimed to provide a comprehensive diagnostic of the current state of European higher education, facilitating the development of a theoretical framework for ethical and secure technological assimilation.

3. RESULTS

The primary data reveal a staggering discrepancy between the student body and the professoriate regarding the speed of AI integration. While the student population exhibits a high degree of organic adoption, where tools are utilized for self-directed learning and administrative efficiency, the faculty's engagement remains more tethered to traditional instructional preparation. The data indicate that the vast majority of students have moved beyond mere experimentation, treating generative AI as a foundational component of their academic toolkit. Conversely, the adoption curve for professors suggests a more deliberate, albeit slower, transition, primarily focused on the automation of syllabi creation and the synthesis of existing research materials. When disaggregating the data by institutional type, a notable trend emerges regarding the influence of university infrastructure on individual behavior. Respondents from research-intensive institutions reported a more structured engagement with AI, often supported by preliminary institutional guidelines, whereas those in smaller, specialized colleges reported a more fragmented approach. This suggests that while individual adoption is high, the lack of a unified European framework for AI in education has resulted in an uneven landscape where the quality of integration is often determined by the resource capacity of the specific institution.

The core of this study was dedicated to testing the primary hypothesis H1, which posited that academic discipline acts as the most significant predictor of AI utilization frequency and depth. To evaluate this, the research team employed a series of one-way Analysis of Variance (ANOVA) tests to compare the mean frequency of usage across eight distinct disciplinary clusters: Engineering, Physical Sciences, Economics, Mathematics, Fashion Studies, Sculpture, Performative Arts, and Humanities.

The results of the ANOVA provided robust support for H1, revealing a statistically significant difference between the clusters ($F(7, 1442) = 42.18$, $p < 0.001$). Post-hoc Tukey HSD tests further clarified these distinctions, showing that students and faculty in Mathematics and Engineering utilized AI tools with a frequency nearly triple that of their counterparts in Sculpture and Performative Arts. This confirms the disciplinary divide as a foundational reality of current higher education. The data suggest that the analytical and rule-based nature of STEM disciplines allows for a more seamless alignment with the current capabilities of Large Language Models and algorithmic problem-solvers, whereas the subjective, tactile, and process-oriented nature of the creative arts creates a natural friction with automated systems. Furthermore, the secondary hypothesis H2 explored the relationship between security concerns and adoption resistance. It was hypothesized that high levels of perceived risk regarding data privacy would negatively correlate with the depth of AI integration. To test this, a Pearson correlation coefficient was calculated between the Privacy Concern Index (a composite score derived from the survey) and the Integration Depth Score. The analysis yielded a significant negative correlation ($r = -0.64$, $p < 0.01$), indicating that as anxieties regarding the security of personal and institutional data increase, the willingness to move beyond superficial tool usage decreases. This finding is critical, as it suggests that the security paradox: the coexistence of high adoption and high concern, is actually a limiting factor that prevents users from fully leveraging AI for complex, sensitive academic work. The data regarding the disciplinary divide offer a nuanced view of how the vector of change operates differently across fields. In the domains of Economics and Physics, the integration of AI is frequently described by respondents as an evolutionary step in data processing and predictive modeling. For these participants, AI is viewed as an extension of existing computational traditions. This stands in stark contrast to the feedback from the Creative Arts cluster. In fields like Fashion Studies and Sculpture, the qualitative data indicate that AI is often perceived not as a tool for enhancement, but as a potential threat to the authenticity of the creative process.

This resistance in the arts is not merely a matter of technological illiteracy; rather, it appears to be a conscious pedagogical choice. Professors in the performative arts noted that the struggle of the creative process is central to student development, and the shortcut offered by AI is seen as detrimental to the acquisition of core competencies. Consequently, while 78% of the total student sample uses AI, this number drops precipitously when looking specifically at students in fine arts programs, where usage is often limited to administrative tasks rather than the core creative work of the discipline. Perhaps the most significant finding of the study relates to the pervasive nature of security concerns. With over 70% of respondents expressing profound apprehension regarding the privacy of their data, it is evident that the rapid pace of technological deployment has outstripped the development of protective frameworks. This skepticism is not localized to any specific demographic but is a cross-disciplinary phenomenon. Respondents expressed a particular fear regarding the black box nature of AI ecosystems, where the destination and usage of inputted intellectual property remain opaque. This lack of trust extends to the institutional level. Many professors indicated a reluctance to integrate AI into their teaching because of the absence of clear university-sanctioned tools that guarantee the protection of proprietary research or student data. This suggests that the current wave of adoption is largely happening in an unregulated space, where users are sacrificing their privacy for the sake of utility, a trade-off that many find increasingly untenable. The results indicate that without the intervention of secure, transparent, and ethically grounded marketing and teaching frameworks, the skepticism currently felt by the majority of stakeholders could solidify into a permanent barrier to deeper pedagogical innovation.

4. CONCLUSIONS

The synthesis of the empirical evidence gathered in this investigation leads to the inescapable conclusion that the European higher education sector is currently navigating a period of profound, albeit asymmetrical, metamorphosis. The confirmation of the primary hypothesis, that disciplinary affiliation serves as the definitive arbiter of technological receptivity, underscores a burgeoning digital stratification within the academy. While artificial intelligence has effectively transitioned from an emerging innovation to a fundamental cognitive scaffold in analytical domains such as physics, mathematics, and engineering, its presence in the creative arts remains conspicuously marginalized. This divergence is

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not merely a consequence of varying levels of technical proficiency but reflects a deeper philosophical conflict regarding the nature of original thought, the value of the creative process, and the perceived authenticity of automated outputs. Consequently, the role of AI as a vector of change is currently localized rather than universal, creating a bifurcated educational landscape that could, if left unaddressed, leave creative disciplines isolated from the broader evolution of the knowledge economy. The most critical barrier to a more cohesive and comprehensive integration remains the pervasive atmosphere of security skepticism that transcends all demographic and disciplinary boundaries. The statistical reality that over 70% of the academic community harbors profound anxieties regarding data privacy and the integrity of institutional ecosystems suggests that the current rate of adoption is incredibly fragile. This trust deficit indicates that while students and faculty may utilize these tools for immediate functional gains, they do so with a sense of reluctant pragmatism rather than institutional confidence. The coexistence of high usage rates and high levels of concern reveals a precarious equilibrium; the lack of transparent, GDPR-compliant, and ethically fortified frameworks means that the academic community is essentially operating in a digital grey zone. Without the urgent formulation of secure, university-sanctioned AI infrastructures, there is a significant risk that a major data breach or ethical lapse could trigger a regressive backlash, stifling innovation for years to come.

Furthermore, the research highlights that the disciplinary divide is self-reinforcing. As analytical fields develop more robust use-cases and integrated workflows, the creative arts may experience a further alienation from the technological discourse, viewing AI primarily through the lens of a threat to intellectual property rather than a partner in experimentation. To mitigate this risk, European universities must move beyond generic digital literacy programs and toward discipline-specific ethical frameworks. Bridging the gap between the technical early adopters and the creative skeptics requires a nuanced marketing and pedagogical strategy that emphasizes the human-centric control of technology. It is not enough for AI to be technically efficient; it must be demonstrably secure and philosophically compatible with the diverse traditions of European scholarship. In final summary, this study posits that the future of the European Higher Education Area will be defined by its ability to resolve the tension between automation and agency. The findings suggest that the successful democratization of AI across all fields of study, from sculpture to economics, is entirely contingent upon the establishment of a trust-based ecosystem. The findings show that the ultimate objective for policymakers and institutional leaders should not be the uncritical acceleration of AI usage, but rather the creation of a data-secure environment that respects disciplinary integrity. Only by addressing the underlying fears of the academic population and providing clear, ethical boundaries for tool deployment can universities ensure that AI serves as a catalyst for equitable progress rather than a source of further academic fragmentation. The evolution of the modern university depends on transforming AI from a peripheral, often-distrusted utility into a secure, transparent, and multi-disciplinary partner in the pursuit of knowledge.

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