

Students' Experiences of Generative AI in Higher Education: Understanding Digital Inequalities Through a Sociomaterial Lens

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Abstract

The integration of artificial intelligence (AI) in education has been widely discussed in recent years, with many studies emphasizing its potential to enhance learning efficiency and transform traditional educational practices. The emergence of generative AI (GenAI) systems such as ChatGPT, Claude, and Gemini has further accelerated these conversations, highlighting both the promise and the disruption such technologies bring to higher education. However, much of this discussion remains technology-driven, focusing primarily on what AI can do to improve learning rather than how students actually experience and appropriate these tools in their daily study practices. This short paper addresses this gap by examining how GenAI engagement is shaped by uneven conditions of participation across institutional contexts. Drawing on sociomaterial perspectives and postdigital critiques of “digital divide” thinking, the study frames GenAI-related inequality not as a simple access gap, but as emerging through entanglements of tools, infrastructures, institutional norms, and social support. Little empirical work has examined how differences in tool availability, guidance, and institutional arrangements shape students' ability to engage meaningfully with GenAI, beyond individual “literacy” or willingness to use it. By comparing students' experiences across university types, this paper shows how GenAI-related inequalities are enacted through everyday practices, including access pathways, support networks, and local norms around legitimate use.

This short paper reports findings from an ongoing study of students' day-to-day digital practices across two different types of universities in China. Drawing on sociomaterial perspectives, it treats students' engagement with GenAI not as an isolated or purely cognitive activity, but as shaped through dynamic interactions among both human and non-human actors. Using qualitative interview data from students at a highly ranked university and a less prestigious university in East China, the paper examines how access conditions, forms of guidance, and institutional cultures shape engagement with AI tools. The findings show that students' engagement with GenAI is assembled through different networks of resources and constraints. In the elite university, wider tool availability, stronger infrastructural support, and more established peer and institutional guidance enable more sustained and strategic use of GenAI for academic work. In the less prestigious university, constrained access pathways, limited guidance, and greater uncertainty about legitimate use restrict how confidently and effectively students can incorporate GenAI into study routines. These contrasts demonstrate how GenAI-related inequalities are produced through everyday participation conditions rather than access alone. The paper contributes to networked learning research by highlighting how AI-enabled learning is shaped by relational infrastructures of support, governance, and legitimacy, and it points to the need for institutional arrangements that foster equitable, well-guided GenAI engagement across diverse higher education contexts.

Keywords

Artificial Intelligence, Higher Education, Digital Inequality, Postdigital Divide, Sociomateriality, Student Experience

Introduction: Rethinking Digital Inequality in the Age of GenAI

The rapid emergence of GenAI in recent years has sparked widespread global interest in its impact on education systems. Driven by large language models, GenAI has significantly impacted how individuals learn and how institutions operate (Bond et al., 2024). However, this growing integration has also raised a number of significant concerns within the education sector, particularly in higher education regarding academic integrity, the reliability of AI-generated content, and broader ethical issues such as data privacy, copyright, and algorithmic bias (Lee, et al. 2024). Educators also worry that over-reliance on these tools may undermine critical human skills, such as

writing, while institutions often lack the training and policies needed to respond effectively (Giannakos et al., 2025). In response to the emerging challenges posed by generative AI, international organisations such as the United Nations and the World Bank have released a series of reports and policy guidelines outlining its implications for education (e.g., Miao et al., 2021; UNDP, 2025). While many of these reports emphasise the transformative potential of AI to personalise learning, improve efficiency, and expand access to quality education, there is also growing concern about the impact of AI on equity and inclusion in education, particularly regarding who is able to access and benefit from these developments (Varsik & Vosberg, 2024). Such concerns are often discussed through the concept of the digital divide.

Traditionally, the concept of the digital divide has been framed through a “binary of haves and have-nots,” primarily focusing on unequal access to physical hardware and internet connectivity (Rogers, 2001). This first-level divide was later expanded by van Dijk (2012), who argued that the divide is multi-layered, moving from material access to skills access and ultimately to usage access which is the ability to turn technology into meaningful social or educational capital. Building on this multi-layered framing, scholars have further extended the trajectory through the idea of a third-level digital divide, which shifts attention from access and competence to unequal benefits, including educational, economic, and civic outcomes, and highlights how digital participation often amplifies existing social inequalities (van Deursen & Helsper, 2015). More recently, this linear view of digital divide has been criticised for its deterministic and technology-centred assumptions. Critics argue that framing the divide as a “gap to be closed” treats technology as a neutral tool that exists outside of the user’s social reality. Engen and McGarr (2025) challenge these traditional models, noting that they often ignore the relational nature of technology. They argue that digital exclusion is not just about a lack of skills or tools but is deeply embedded in the social and institutional structures that dictate how and why technology is used. In this view, even when students possess the same skills, their ability to benefit from technology is mediated by their socio-economic position and the material stability of their daily lives. This critique leads to the emergence of the postdigital divide. As Knox (2019) argues, the term “postdigital” is less about a period “after” the digital than a critical stance that unsettles digital dualism and the assumption that technologies sit outside social life. From this perspective, the digital is already embedded in, and constitutive of, everyday practices and institutions, making it difficult to separate “the digital” from “the social” in any straightforward way (Knox, 2019). Building on these postdigital critiques, there remains limited empirical work that examines how GenAI-related inequalities are enacted in students’ everyday study practices across contrasting institutional contexts. Responding to calls to move beyond techno-solutionist framings of the digital divide and to examine how divides are produced through digital society (Engen and McGarr, 2025), this paper adopts a sociomaterial lens and provides qualitative evidence of how students’ GenAI practices are enabled and constrained by local configurations of tool access, guidance, infrastructures, and norms of legitimate use.

Conceptual Framework: From Access to Everyday Sociomaterial Conditions

Recent discussions of GenAI in higher education increasingly recognise that unequal engagement is emerging alongside rapid adoption. Much existing work frames this inequality through differences in access to tools and infrastructure and through variations in digital or AI literacy (Bassi & Pagallo, 2025; Hammerschmidt et al., 2025; Lutz, 2024). While these approaches are valuable, they risk promoting techno-solutionist narratives, where digital inequality is treated as a gap to be closed through provision or upskilling. Postdigital approaches challenge digital dualism and the assumption that technologies sit outside social life. Engen and McGarr’s (2025) account of the postdigital divide provides a useful starting point by shifting attention away from narrow access-gap framings towards the broader arrangements through which divides are produced within digital society. Following this logic, GenAI-related inequality is approached here as an uneven condition of everyday practice, asking who can engage meaningfully with GenAI, and how institutional arrangements, infrastructures, and social support shape that engagement. To capture students’ lived experiences and the dynamics through which GenAI engagement is enabled and constrained, this study adopts a sociomaterial lens. This perspective traces its roots to the work of Orlikowski (2007), who argues that the social and material are constitutively entangled in everyday practice. In the field of education, sociomateriality has been extensively developed by scholars such as Fenwick et al. (2011), who argue that learning and teaching do not happen solely within the human mind but are performed through the shifting relations between human actors and material objects. Drawing on this framework, Gourlay and Oliver (2013) argue for a move “beyond the social”, conceptualizing digital literacies not as internal cognitive skills but as situated, sociomaterial practices. More recently, Gourlay (2021) has emphasised that student engagement is a

“distributed” phenomenon, emerging through entanglements of human and nonhuman actors. By adopting this lens, the study avoids treating GenAI as a standalone tool, instead focusing on how its use is produced through the complex assemblages of digital platforms, institutional arrangements, and the everyday material realities of student life.

Research Design

The study employs a qualitative comparative case study design informed by the principles of the horizontal comparison (Bartlett & Vavrus, 2016). This approach enables the analysis of students’ digital practices across two contrasting institutional contexts: one elite and one non-elite university in China. The comparative design reflects the study’s aim to explore how students’ day-to-day digital practices unfold within distinct institutional environments. By examining cases situated at different positions within China’s higher education landscape, the analysis identifies both commonalities and variations in how students engage with digital technologies in their learning, communication, and daily routines, thereby revealing how digital inequalities manifest in practice. The horizontal case study approach extends this comparative logic by tracing digital practices, such as navigating online platforms, managing classes, working with AI, or participating in virtual communities, across different settings. Rather than treating each university as a bounded unit, this approach follows practices, materials, and relations as they move through and are shaped by different sociomaterial configurations. Institutional type provides a meaningful context that structures access to resources and expectations, however, the analysis does not assume a fixed hierarchy. Instead, it explores how each setting gives rise to particular sociomaterial arrangements that condition students’ digital engagement. Data collection integrates multiple qualitative methods, including online observations, visual methods, semi-structured interviews, and institutional document analysis. Together, these methods provide a triangulated and context-sensitive account of digital practices. The research design is also underpinned by reflexivity and ethical awareness, recognising the researcher’s positionality within the cultural and institutional contexts of the study and ensuring participants’ privacy and data security throughout the research process.

Preliminary Findings

This short paper reports a focused analysis from an ongoing research project. Drawing on thematic analysis of the wider dataset, it presents one particularly informative pattern concerning how students describe the uptake of GenAI within everyday study, and how this differs across institutional contexts. The initial data for this study was collected in the summer of 2024 through a series of interviews and visual methods conducted across two universities in East China. Through the thematic analysis of the interview data, GenAI emerged as an important theme in students’ accounts of their everyday digital practices, especially in the highly ranked elite university. Overall, the findings indicate that engagement with AI is not a universal or transferable skill but an emergent sociomaterial practice shaped by the specific configuration of resources, infrastructures, and institutional cultures within different university contexts. Finding shows that at the non-elite university, over half of the participants reported having no prior experience with generative AI tools. Among those who had used them, engagement tended to be limited to relatively informal or recreational purposes, such as generating beautified images, experimenting with AI image creators, or consulting chatbots to brainstorm ideas or locate quick answers. A smaller number of students mentioned using AI for basic academic tasks, including translation and text summarisation. Several participants noted that they shared premium accounts with peers in their dormitories as a cost-saving strategy, reflecting both financial constraints and the role of peer networks in mediating digital access. In contrast, students at the elite university demonstrated more diverse, confident, and critical forms of engagement. They reported using generative AI tools for academic and professional purposes, including essay editing, coding, presentation design, and research idea generation. Many expressed an awareness of both the potential and limitations of these tools, acknowledging instances of inaccuracy or “hallucination” and the need for human verification. From a sociomaterial perspective, these differences indicate that students’ GenAI engagement is shaped through entanglements of people, tools, and local arrangements rather than through individual choice alone. At the elite university, students are positioned within a rich sociomaterial network that includes access to premium AI tools, and institutional cultures that legitimise experimentation and critique. These material and discursive resources collectively enable more agentic and reflexive forms of digital practice. By contrast, students at the non-elite university operate within more constrained configurations shaped by financial pressures, uneven prior exposure, and limited institutional guidance. Here, access is often mediated through informal peer sharing of

accounts, which supports basic or occasional use but also narrows the scope and stability of engagement, making sustained and confident use harder to maintain.

In conclusion, this short paper offers empirical insights into students' experiences of GenAI in higher education by examining how digital practices are enacted in everyday study through a sociomaterial lens. Contributing to debates on postdigital inequality, it moves beyond access-based or literacy-based accounts to show how unequal engagement emerges through the everyday sociomaterial arrangements. The findings indicate that students' experiences with GenAI are shaped through uneven configurations of tool access, institutional guidance, support, and norms. These configurations do not simply determine whether students use GenAI, but shape the scope, confidence, and sustainability of their practices, and the extent to which GenAI can be translated into educational value. Given the limited word count of this short paper, it is not possible to elaborate all dimensions of these configurations in detail. What is important, however, is the analytic implication: digital inequalities are not best understood as fixed gaps in access or competence, but as outcomes of how everyday practices are organised and made legitimate within particular institutional settings. A postdigital, sociomaterial research agenda therefore calls for more fine-grained accounts of students' day-to-day practices, tracing how GenAI and other digital tools become entangled with material and institutional arrangements. Attending to these entanglements would enable networked learning research to specify where inequalities are assembled and stabilised within learning networks and, crucially, to identify which institutional arrangements are most consequential for enabling equitable and legitimate ways of learning with digital technologies.

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