

Hyped or Transformational? AI in Higher Education

¿Hipnotizada o transformadora? La IA en la enseñanza superior

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Abstract

This paper explores the difference between the transformation idea and the reality of how colleges and universities leverage technologies for teaching, learning and assessment. We seek to understand why a structural and operational transformation of these institutions rarely happens and offer an understanding of the structural, operational, financial, and political constraints that prevent transformation but encourage continuous improvement. More specifically, we suggest that AI will not deliver on its promise to finally “solve” the so-called “two sigma” problem, which arises from the work of Bloom (1984), who showed that students taught through tutoring performed better by two standard deviations than those taught in a traditional classroom.

Keywords: artificial intelligence, AI, artificial intelligence in education, AIED, higher education, transformation.

Resumen

Este documento explora la diferencia entre la idea de transformación y la realidad de cómo las facultades y universidades aprovechan las tecnologías para la enseñanza, el aprendizaje y la evaluación. Tratamos de entender por qué rara vez se produce una transformación estructural y operativa de estas instituciones y ofrecemos una comprensión de las limitaciones estructurales, operativas, financieras y políticas que impiden la transformación, pero fomentan la mejora continua. Más concretamente, sugerimos que la IA no cumplirá su promesa de «resolver» por fin el llamado problema de las «dos sigmas», que se deriva del trabajo de Bloom (1984), quien demostró que los estudiantes a los que se enseñaba mediante tutoría obtenían mejores resultados en dos desviaciones estándar que los que recibían enseñanza en un aula tradicional.

Palabras clave: inteligencia artificial, IA, inteligencia artificial en la educación, AIED, enseñanza superior, transformación.

Sal Khan, has suggested that artificial intelligence (AI) will have a profound impact on the future of education. As founder of the Khan Academy and pioneer of video and chatbot-based learning, Khan has a vested and fiduciary interest in saying so. In his book (Khan, 2024), he suggests that “we’re at the cusp of using AI for probably the biggest positive transformation that education has ever seen. The way we’re going to do that is by giving every student on the planet an artificially intelligent, but amazing, personal tutor.”

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He is not alone. Others have suggested that a major transformation fuelled by AI and educational technology is now clearly on the horizon. This is even though this narrative began in the 1920s with early teaching machines and has so far failed to materialize (Watters, 2019,2021) and repeated attempts to revive the idea (Christensen et al., 2008) prove hollow.

This paper explores the difference between the transformation idea and the reality of how colleges and universities leverage technologies for teaching, learning and assessment. We seek to understand why a structural and operational transformation of these institutions rarely happens and offer an understanding of the structural, operational, financial, and political constraints that prevent transformation but encourage continuous improvement. More specifically, we suggest that AI will not deliver on its promise to finally “solve” the so-called “two sigma” problem, which arises from the work of Bloom (1984), who showed that students taught through tutoring performed better by two standard deviations than those taught in a traditional classroom.

Opportunities that AI brings into education

Not only in various industries but also within education, AI offers significant opportunities for performance and productivity improvement (Mollick & Mollick, 2024; Khan, 2024). Along with recent developments and innovations with each new release of a generative AI model like ChatGPT5 or Claude 3 Sonnet, the promise that AI brings to education expands and new applications become apparent. Many benefits are already apparent, including serving as a 24x7 assistant with providing round-the-clock support, answering questions, dialogue-based tutoring, and gathering, analyzing, and summarizing data from various sources only in seconds (Miao et al., 2021). AI also enables multi-language learning with instant translation. Moreover, AI enriches learning environments through multiple types of learning materials such as multimedia and simulations (Ghnemat et al., 2022; Holmes & Tuomi, 2022; Murgatroyd, 2024a). AI is seen by some to have the potential to revolutionize higher education (HE) with personalized learning and feedback (George, & Wooden, 2023). AI functions as a kind of intelligent tutoring system providing computer-based step-by-step tutorials to learners (Holmes & Tuomi, 2022; Miao et al., 2021), providing automatic feedback, formative assessment, alternative approaches, and guidance. It can identify at-risk students and provide early interventions for them to support their learning journey (George, & Wooden, 2023). For educators, AI brings an efficient and effective way of in-classroom monitoring and automating summative evaluation. AI can help educators to easily create various forms of instructional materials and smart curation. There is a great deal of potential for education in the effective deployment of AI in colleges and universities (Murgatroyd, 2024b).

For poliEdTech entrepreneurs, they regard higher education as a very large public sector industry worth around \$1.5 trillion worldwide. The sector spends less than 4% of its budget (app.\$75-100 billion) on technology hardware and software. EdTech developers and vendors want to move this spending to nearer 7 or 8%. Most of them have convinced themselves that education is ready for an AI transformation, providing individualized learning, adaptive assessment, and personal support for learners. More online and hybrid learning, more data-driven instruction, more formative assessment, and less reliance on precarious instructors which in turn come up with the idea of automating teacher tasks (Selwyn, 2019; Sperling et al., 2022) is anticipated to ‘transform’ education. Between 2015 and 2023 a total of \$75.5 billion in venture capital has been invested in EdTech, mainly in China, US, India and Europe¹.

Challenges that AI posits to education

Within higher education eco-systems, the impact of recent developments in AI is unquestionably dramatic. As reported in a recent study (Lee et al., 2024), educators are encountering new challenges, such as the inability to depend on existing assessment strategies and uncertainty about how to develop new, reliable assessment methods. Students have always cheated, but AI enables to do so quickly and efficiently. Some institutions and faculty are using AI developments to engage students in both critical assessment, ethics and appropriate use of technologies to support learning. Some others insist on banning it (Lee et al., 2024).

What has become apparent as AI emerged following the pandemic is that institutions are hindered by slow, cumbersome, and overly “political” corporate governance and a lack of courageous leadership (Murgatroyd, 2024b). Many educators feel an urgent requirement for training, professional development, and ongoing support, but they are encountering difficulty securing the needed support level (Lee et al., 2024). Having firsthand experience and understanding technical challenges, risks, possibilities, and potential use cases can cause difficulty in terms of policies and accessibility, which in turn leads to tensions and uncertainty (Holmes & Tuomi, 2022). Faculty and support staff workloads and the pressure to “perform” are getting in the way of the time needed to play, explore, and experiment as each new iteration of generative AI brings new possibilities for teaching and learning. AI is moving much faster than our institutions can adapt.

The lack of connection between AI developers and experts in learning sciences is another major barrier to change and transformation (Zawacki-Richter et al., 2024). AI applications are developed largely by computer scientists and data engineers rather than educators. This is why most AI applications focus predominantly on content presentation and testing for understanding - a very behaviourist mode of learning (i.e., present-remember-test-feedback) is at the heart of many AI applications (Bates, et al., 2020). In such a digitized era where equity, diversity, and inclusion matter, a more engaging constructivist and connectivist approaches to education is needed if we are to fully leverage AI for teaching and learning (Noguera, 2022), especially in higher education. Given the complexity of learning higher intellectual skills, critical thinking, problem-solving, creativity, teamwork and effective communication are much needed for the acquisition, construction and communication of knowledge. To enable these forms of learning, it is essential to strengthen the connection between developers and educators (Lynch, 2017). Otherwise, AI will merely explore new and more efficient ways of poor teaching while perpetuating erroneous ideas about teaching and learning (Bates et al., 2020).

Why an AI Transformation Will Not Happen in Higher Education

On the “revolutionary potential” and transformative power of artificial intelligence in education, many of the developer and venture capital champions of the “big change is inevitable” claim are largely grounded in conjecture, speculation, misunderstanding of education, hype and optimism (Nemorin, 2021; cited in Miao et al., 2021). AI transformation within higher education is unlikely to occur in the next decade, though over time, it will impact all components of the higher education system. Continuous improvement using AI is more likely to occur.

The first and most important reason behind the slow pace of change in higher education, which AI developers and vendors need to understand, is that they misunderstand the purpose of learning. Learning in higher education refers to exploring, creating, and using knowledge in a specific situation by engaging socially, emotionally, and cognitively through the demanding work of critical inquiry in a learning community (Garrison, et al., 2003). It is not an automated,

“banking activity” (Biesta, 2017; Freire, 1973; Murgatroyd, 2024a); but rather is a collective engagement guided and influenced by teachers who serve as a catalyst for liberation and reimagination in that process as being a creative talent. A lack of understanding of what educators do in society results in an exaggerated expectation of AI as a transformative tool (Jean-Louis, 2021). There is a distinct gap between the reality and expectations of AI in HE.

A ‘one-size-fits-all’ approach in education is impossible for any learning technology. Defining educational problems as simpler than in reality and standardizing a technology deployment strategy as if responding to the needs of all learners and their instructors is clearly an overhype. It does not fit with the reality and challenges of college and university classrooms. Underestimating the complexity and nuances of educational problems, outcomes, solutions, and challenges leads to more harm than good. Education challenges are complex, “wicked problems,” not as easy and simple to respond to as many AI developers anticipate. Although reaching a consensus is challenging when the future of a learning community and education eco-system, rather than just individuals, is at stake, there is a need for genuine, open dialogue and engagement of students, teachers and policy makers for the next stage of development of AI for education. AI is not a panacea in education, despite being showing potential and promise. There is also a need to understand that educational systems are at different stages of development. Education is culturally located, local and different. Literature or history courses are different in New York, Lagos, Caracas, and Bangladesh. No one size fits all.

Despite increasing promise and potential shown with each new release of a generative AI model or application, AI remains overhyped and underused. A platform adopted in January 2024 become outdated in March due to the rapid pace of AI development and refinement. For example, the power of ChatGPT4o was, within three weeks, surpassed by Claude 3 Sonnet. Consequently, many institutions avoid the risk of failure by making such a significant investment in training and deployment, especially since there is limited funding available for innovation and risk-taking (Bates et al., 2020; Wheeler, 2019; Murgatroyd, 2024b). Colleges, and universities generally need to be convinced that new technologies can enhance learning outcomes and learner experience in significant and sustainable ways. Most technologies do not. This is why the education sector tends to remain highly conservative when new technologies emerge (Bates et al., 2020; Watters, 2021).

AI also poses ethical concerns. Problems of academic integrity, cheating, faculty dishonesty in academic writing, and issues about bias, equity, and inclusion have also led to resistance by faculty and administrators. These issues slow AI-driven change and transformation in education, leading to a more gradual, considered and measured pace of change. Higher education institutions have to implement precautionary policies and practices to respond to these issues since fundamental human rights and data privacy issues are at the heart of these ethical concerns. This has also slowed and inhibited the deployment and use of AI (Berendt, Littlejohn & Blakemore, 2020). In addition, nation-level laws, regulation and policies are being developed that will require certain conditions of transparency and protection to be implemented, which is also causing caution in the institutional deployment of AI.

Many of the established EdTech companies have been selling the same basic proposition about what technology can do since the 1920s and have yet to deliver (Cuban, 1986; Watters, 2019; 2021). They are selling the idea that “education is broken” and that they can now fix it using AI. In this, they are mistaken. The following table compares and contrasts the EdTech “value proposition” with the reality of the situation in education as we understand it.

Table1. The EdTech Value Proposition to “Fix” Broken Education versus Reality

Education is Broken – Technology Can Fix It	Educational Institutions Are Complex and Their Challenges Complex: No Quick Fixes
<ul style="list-style-type: none"> • Define the problem as simple and offer a standardized solution (e.g. No Child Left Behind, tutoring beats classroom teaching). • The problem is a global one, not just local. A fix in New York will work in Bangladesh or Turkey. • So as to gain control of the situation, we need to make increased use of data and analytics and chatbots. • By imposing targets and deadlines we can push the system to respond – we also need to intervene with more technology and new leadership if targets are not met. • Standardize the strategy and responses to all challenges - one size fits all. 	<ul style="list-style-type: none"> • Educational outcomes and “performance” are “wicked problems” not simple ones. • Both the problem and the solution are local, not global, and need to be owned locally. • So as to make progress, all need to understand the past, present, and future and the way in which outcomes are shaped by factors outside the institution (inequality, poverty, precarity, food poverty, homelessness). • There needs to be a recognition that no one size fits all and that consensus is difficult when what is at stake is the future of the community, not just individuals. • What is needed is robust, evidence-informed decision-making and risk-taking. • This all requires agile and adaptive leadership.

Over the long one-hundred-year history of EdTech, the value proposition has remained largely the same, but the tools used to suggest a “Solution and fix” keep changing (Watters, 2019, 2021). The challenges within higher education have become more complex, volatile, uncertain, and brittle, made worse by the continued underfunding of higher education around the world.

Educators need to pay attention to the potential of AI, rather focus on the negatives (Bates et al., 2020; Murgatroyd, 2024b). Beginning from Vygotsky’s empirical work on the role of tools in human cognition in which he asserted that technology can augment human thinking (Tuomi, 2022), there is a need to systematically explore the potential and opportunities AI affords to shift teaching, learning and assessment to a more twenty-first century approach. AI can help, but the key is that it supplements and supports the work of compassionate and effective teachers. As individuals interact with tools, they engage in a process of cognitive transformation, where these tools become integral to their thinking processes. That means it expands their capacity for problem-solving and conceptual understanding beyond what is achievable through unaided cognition. This perspective underscores the profound influence of technology on human intellectual development, influencing how we perceive, learn, and innovate in our increasingly complex world. Considering the role of technology in enhancing our cognition as described by Vygotsky, leaders can leverage technology for robust, evidence-informed decision-making.

AI can also enhance leaders' capacity in higher education since it can provide calculated risk assessment tools and evidence-informed strategies for fostering continuous adaptation,

agility, and improvement in decision-making processes. As colleges and universities seek to become more agile, these tools will be vital to the work they need to do.

More recent developments of AI-enabled counselling and mental health supports show that, carefully positioned and deployed, AI can promote well-being of students, teachers, and other educational stakeholders by leveraging their character strengths and predicting their levels of happiness (Bittencourt et al., 2023). Educators will drive continuous improvement, not EdTech vendors. They will do so by deploying AI for use, which will make their lives easier while producing improved student outcomes.

AI may lower the costs of instructional materials, space, administrative tasks and assessment. The most significant costs at all levels of education are people costs: teachers, student support, and management. A part of the “transformation narrative” is that some of these people can be replaced by artificial intelligence – something already happening in other sectors, such as technology companies, financial and insurance institutions, engineering, architecture, law and accounting (Susskind, 2020). The number of management and administrative positions will be reduced as AI apps gradually replace these functions. The teaching process, however, is intensely human - intensely based on empathy, compassion, engagement, and involvement in a way that goes beyond the reductionist notions of teaching and learning (Biesta, 2013,2017). AI could and is enabling teachers to focus more on students’ engagement and learning at a higher and deeper level, which in turn leads to increased productivity and, potentially, improved learning outcomes. The increase in productivity comes from using AI as a co-intelligent partner with teachers to improve teaching, not from replacing humans with machines (Diamandis & Kotler, 2020; Mollick, 2024). AI does not threaten teachers but rather supports them as a teaching assistant or learning agency for students (Bates et al., 2020; Chiu et al., 2023; Chiu, 2024). Developing this form of AI relationship will take time. There are no “quick fixes.”

What is Currently Happening and What Will Happen Next

Numerous creative, imaginative, effective, and successful implementations of AI in HE are already becoming evident, and new use cases for AI are emerging (Mollick & Mollick, 2024). AI has been embraced as a cross-interdisciplinary idea in the curriculum and has already emerged in some universities’ programs, including the University of California, San Diego, the University of Washington, and the University of California, Berkeley (Southworth, 2023). AI has been incorporated in some university courses, such as Harvard, Massachusetts Institute of Technology, Wharton and Carnegie Mellon already centering courses around the ethics and implications of AI (Southworth, 2023). Stanford University launched a new Institute for Human Centered Artificial Intelligence. Northwestern University has focused on curriculum availability in specific majors such as computer science, electrical and computer engineering while the University of Florida started more advanced initiatives infusing AI across the curriculum regardless of discipline to create an AI-ready workforce. Similar initiatives can be found in different HE institutions around the world and their activities will gradually inform the work of all.

Incorporating AI to enhance multidisciplinary programs and courses is also beginning to happen (Chiu, 2024). More progress has emerged in K12 education than in the skilled trades, college, or university education. For instance, Korea, Japan, and Hong Kong have each aimed to incorporate AI into school curricula, whereas China is doing the same both in primary and secondary schools. Another example is from Singapore which developed specific AI education programs both for teachers and students through testing before system-wide deployment. To sum up, the initiatives that are occurring in higher education lag K-12 developments.

Higher education institutions need to be prepared to help students be future-ready for employment in emerging fields of work, almost all of which will require AI use (Chiu, 2024;

Susskind, 2020). To achieve this, they will need to develop AI literacy and digital fluency as well as new relevant competencies of evidence assessment and AI ethics into the curriculum. Every student should leave college or university with a high level of skill and experience in using AI tools as a co-intelligent partner in their learning (Mollick, 2024). This, in turn, requires higher education institutions to adopt innovative teaching pedagogies and assessment techniques and also build interdisciplinary programs very soon. They need to follow the developments and fulfill the needs and necessities of the fourth industrial revolution to boost student preparedness for the next-generation workforce.

As is always the case with innovative developments, spectacular failures are likely to occur. The question is: will schools, colleges, and universities learn from failure and use the failure as a basis for “leap-frogging to the future”, or will the failure inhibit innovation (Murgatroyd, 2023)?

To sum up, as we see more effective, innovative, and successful AI-assisted and AI-enabled implementations in universities and colleges, change will occur gradually. Despite the venture capital push and the vendor claims about AI having the power to “revolutionize” and “transform” education, it will not happen - at least not in the next decade. Despite the promises, increasing demand, and over \$150 billion in EdTech investment since 2000, we should not expect AI to be a magic wand. Instead, AI technologies should be recognized as ‘far from perfect, but improving’ (Miao et al., 2021, p. 11).

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End Notes

ⁱ See <https://www.holoniq.com/notes/edtech-vc-collapse-at-580m-for-q1-not-even-an-ai-tailwind-could-hold-up-the-10-year-low> for detailed analysis of EdTech investments.