

Editorial

Is Online Technology the Hope in Uncertain Times for Higher Education?

Anthony G. Picciano

Hunter College and Graduate Center, City University of New York, New York, NY 10017, USA;
apiccian@hunter.cuny.edu

Significant technological challenges are affecting societies across the world and online technology continues to assume a pivotal place in all organizations: commercial and non-commercial, governmental and non-governmental, and all forms of education. The reasons for this are threefold. First, the normal evolution of digital technology is highly competitive. Well-resourced global corporations such as Google, Amazon, Microsoft, Facebook, Baidu, Alibaba, and Tencent are investing billions of dollars in advanced technology such as AI and are continually developing new hardware and software products and services. These corporations are fully aware of their commanding positions and are committed to expanding and enhancing the role of technology in people's lives. Second, the world is still feeling the impact of the COVID-19 pandemic, which pushed organizations toward greater reliance on online technology to keep their operations afloat. During the pandemic, higher education developed almost total dependency on online technology to safely deliver services to its students. Third, in 2022, the introduction of generative artificial intelligence (i.e., ChatGPT) forced society, including our education institutions, to determine how to integrate AI into its operations. All organizations are now dealing with AI-related critical issues, including rapidly changing job functions and employee displacement. The same is true in higher education, as colleges and universities continue to migrate to online technology to support instruction, academic services, and administrative efficiency.

Even before the onset of the pandemic in 2020 and the emergence of AI in 2023, higher education had already begun to shift to a more online environment, with some observers predicting significant upheaval. Joseph Aoun, President of Northeastern University and author of *Robot Proof, Higher Education in the Age of Artificial Intelligence*, acknowledged colleges and universities as among the fullest expressions of human culture ever evolved and perhaps the most effective institutions for intellectual advancement ever developed, but he went on to caution that if they fail to respond creatively and deliberately to the technological challenges that they face, "they will wither into irrelevance" [1].

Drew Faust, former President of Harvard University, in a message to the World Economic Forum, in 2015, described the following three major forces that will shape the future of higher education:

- The influence of technology;
- The changing shape of knowledge;
- The attempt to define the value of education.

She went on to extol the facilities that digital technology and communications will provide for teaching, learning, and research. She foresaw great benefits in technology's ability to reach masses of students around the globe and to easily utilize large databases for scaling up and assessment purposes. However, she also cautioned the following:

"So much of what humanity has achieved has been sparked and sustained by the research and teaching that take place every day at colleges and universities, sites of curiosity and creativity that nurture some of the finest aspirations of individuals and, in turn, improve their lives—and their livelihoods. As the landscape continues to change, we must be careful



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to protect the ideals at the heart of higher education, ideals that serve us all well as we work together to improve the world" [2].

In March 2024, I was on a panel entitled, "Navigating Generative AI in Higher Education: Implications for Pedagogy, Research, and Collective Bargaining", during which I presented my views on how AI has entered societies across the world and immediately forced higher education to consider a myriad of pedagogical, policy, and ethical issues. Building on a foundation of nanotechnology and quantum computing, AI was combining with massive cloud computing, robotics, and biosensing/synthetic biology to evolve into a general man-machine interface model (see Figure 1), in which technology is infused in everything mankind does. These technologies are already visible, but in another decade they will mature, integrate, and realize their greatest impact.

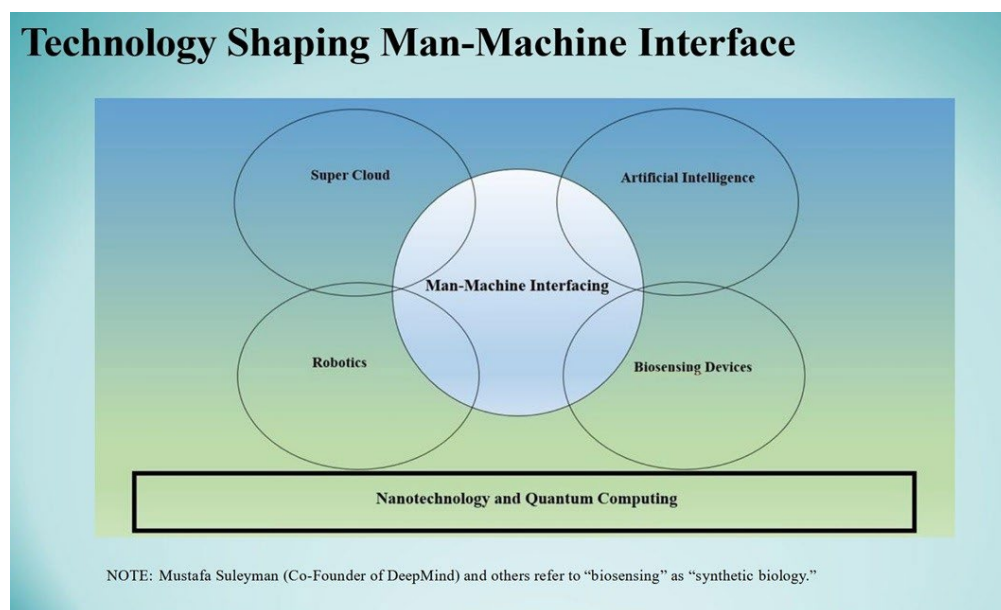


Figure 1. The evolving man-machine interface model [3].

The critical questions I raised in my discussion asked how educators will address and adapt to these new technologies.

In some cases, faculties may have to adjust to a tutor role, rather than develop their own content or pedagogical practices. There will be many more off-the-shelf courses developed at other colleges, universities, or commercial suppliers. While disruptive in some advanced societies, these practices could also lead to significant cost savings and expansion of higher-education opportunities in economically poorer countries. This will further accelerate a trend that commenced more than a decade ago.

Faculty researchers, especially those engaged in large-scale projects that involve multiple partners in the academy and in private industry, will work increasingly with AI algorithms. The lead researchers may not be people but the algorithms themselves.

Printed books and other library holdings have already moved rapidly to all-electronic access, with AI facilitating faster searches for materials and delivering them within seconds on mobile devices.

Teaching assistants, academic advisers, and counselors will see their roles simplified to offering assistance to students with personal needs and situations where the human side of advisement is most important. All advisement regarding course requirements, majors, and careers will be supplanted by AI applications.

Significant changes will occur in administrative and organization functions, where services will be consolidated, utilizing fully online cloud applications for admissions, registration, financial aid, bursaring, and purchasing. It is likely that large public university systems will be further centralized and merged, reducing the need for many administrative operations at the local campus level.

Many current educators may feel a loss of purpose as their expertise is overshadowed by AI software, while younger generations of educators will take their places, accept the new order, and work within it to make it successful. But the period of transition will be tense and perhaps difficult. Educators will be forced to accept technology as a primary partner in the education enterprise, as will their counterparts in the private industry [4]. The concept that technology changes, improves, and enhances is not the issue, but how people change in response to technology is. This will be education's challenge over the next decade and beyond. The timely and important questions raised and the issues explored in this volume can help us prepare for the uncertainty that rapidly advancing technology will bring to our world, specifically to our colleges and universities.

I thank *Education Sciences* for giving me the opportunity to edit a volume on such a critical topic. In particular, I thank the editorial staff, especially Sylvie Yang, who provided valuable and prompt assistance throughout the publication process. Most importantly, I thank the authors who contributed their research to this volume. Their work provides valuable insights for all interested in the future of higher education. Their perspectives are based on the study of issues across institutions in different parts of the world. They have examined a variety of topics, including data analytics, student evaluations, generative artificial intelligence, and MOOCs, to name a few, and employed a wide variety of research methods—both quantitative and qualitative. The sample sizes in these papers were varied, ranging from three case studies to a review of over two million responses collected on a student database. Detailed below are brief abstracts describing the ten submissions that were accepted for inclusion.

The Contributions

In “Developing a Next-Generation Model for Massive Digital Learning”, Chris Dede and William Lidwell describe the development of massively open online courses (MOOCs) and their role, providing foundational models for remote learning during the COVID-19 pandemic and its aftermath. They concluded that insights from these models offer the opportunity for student engagement at scale, taking advantage of the strengths of online instruction, such as collapsing time, bridging space, personalizing via rich data-streams, using AI-based instructional assistants and learning partners, delivering content and experience across universities, and sustaining online learning communities after formal instruction ends. Furthermore, they posit that these advances can enable next-generation massive digital hybrid learning, a means to achieve the aspirational vision of universal global access to higher education.

Lucas Kohnke and Andrew Jarvis conducted a study of English-medium instruction (EMI) in Hong Kong when in-person classes were suspended due to COVID-19. The results showed that students faced particular challenges with reading and study skills (especially self-motivation), as well as vocabulary range, which affected more than one skill. Corroborating existing research, students with less secondary school EMI experience reported greater challenges. The authors' conclusion was that as online technology continues to deliver content in tertiary education, EAP courses must be closely aligned with the necessary language and study skills of students in these digital EMI environments.

Alyse C. Hachey, Claire Wladis, and Katherine M. Conway examined a sample of 780 students who dropped out of fully online and face-to-face courses in a large university system in the Northeast U.S. The results indicated that there were distinct differences in the patterns of reasons given by online and face-to-face students. Although the perceived quality of the instructor/instruction was deemed important to student persistence in both modalities, it seemed to be of greater importance when learning face-to-face. Furthermore, issues related to time were found to be more prominent reasons for the loss of online learners. The findings from this study shed new light on the reasons for online attrition, with implications for online policy and course design in a post-pandemic era.

Andrés F. Mena-Guacas, Jesús A. Meza-Morales, Esther Fernández, and Eloy López-Meneses studied the relationship between digital competencies and collaboration attitudes among 1316 higher education students in ten Spanish universities. Their analysis indicated

that students who perceived themselves as more competent in using digital tools tended to have a slightly higher disposition to collaborate with their professors in virtual environments. Some competencies are more closely associated with collaboration than others. The results of this study underscore the importance of students acquiring strong digital skills to thrive in an increasingly digitized educational and work environment.

Charles Dziuban, Patsy Moskal, Annette Reiner, Adysen Cohen, and Christina Carasas examined student perceptions of instruction based on a total of 2,171,565 observations for all courses offered each semester from fall 2017 to fall 2022 at the University of Central Florida. The results indicated that 68% of students responded identically to each of the protocol's nine Likert scale items, essentially straight lining their rating of instruction and casting doubt on the validity of their engagement with the process. Student responses reflecting a variety of university demographics were also presented. The authors discuss the potential influences of students' reactions and present a possible model for effective teaching and evaluation. Their model provides a critical commentary on the evolving learning landscape. They conclude that by harnessing the power of data analytics, fostering open communication, and embracing ongoing assessment, instructors can create exemplary teaching experiences that empower students to reach their full potential.

Charles R. Graham, Ganbat Danaa, Tserenchimed Purevsuren, Adriana Martínez, Cinthia Bittencourt Spricigo, Barbara Maria Camilotti, and Tserenkhand Batsukh conducted international case studies examining universities in Colombia, Brazil, and Mongolia that were at different stages along the path of a digital pedagogical transformation. This article tells each story, including (1) what is driving the local need to engage in digital transformation, (2) what the major challenges and barriers are to achieving a transformation, and (3) what efforts are being made to help each university move along the path towards adoption and change. Three major themes emerged from the case studies: (1) the role of local policy in shaping digital transformation, (2) the importance of developing human capacity with technology, and (3) the potential for digital transformation to bring hope.

Julia Lynn Parra and Suparna Chatterjee examined critical issues related to social media and generative artificial intelligence. Using a combination of a current review of the literature and qualitative collaborative autoethnographic research, the authors took a step back and engaged in critical conversations about what we have learned from our uses of social media for learning in our online courses, with a focus on (1) the intentional uses of social media, (2) the challenges and concerning issues of social media tools, and (3) exploring the implications of artificial intelligence. Centering on the Special Issue's theme of "hope", the authors navigate these educational and technological landscapes and attempt to answer the question, "where do we go from here?"

Gregory C. Weaver, Paige L. McDonald, Gordon S. Louie, and Taylor C. Woodman examined the future for international virtual exchanges (IVEs) in higher education in the post-COVID-19 era. The authors systematically analyzed the literature published since the start of the COVID-19 pandemic, exploring methods, models, and the outcomes of IVE in higher education. This research was conducted according to the "Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews" (PRISMA-Scr) guidelines. Their findings demonstrate the potential for IVE to be scaled across higher education to promote the knowledge and skills required by a global ecology.

Catherine Manley conducted an action research study that focused on 37 institutional stakeholders who evaluated the potential of prescriptive analytics to project student outcomes in different simulated worlds. The goal of these prescriptions was to make recommendations to students about tutoring and to faculty about beneficial course redesign points. The study's analysis focused on the alignment of resources, processes, and values for feasible institutionalization of such analytics, highlighting institutional core values. She concluded that in the post-pandemic mix of online and on-campus learning under increasingly constrained resources, educational leaders should explore the potential competitive advantage of leveraging data from online technologies for greater student success.

In the concluding article, Alfred Essa examined a possible future for post-secondary education in the age of AI. The consensus view among economists is that AI is a general-purpose technology (GPT) similar to the steam engine, electricity, and the Internet. As GPT AI evolves, it holds the promise of fundamentally redefining the educational landscape, influencing not only current practices in institutional management and pedagogy but also shaping future trends in learning, evaluation, and accreditation. He also comments on possible cost–value equations that are evolving to support workforce development and lifelong learning.

I agree with Essa’s assessment that advancing technology will not only be the hope for higher education but integral to its very essence.

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