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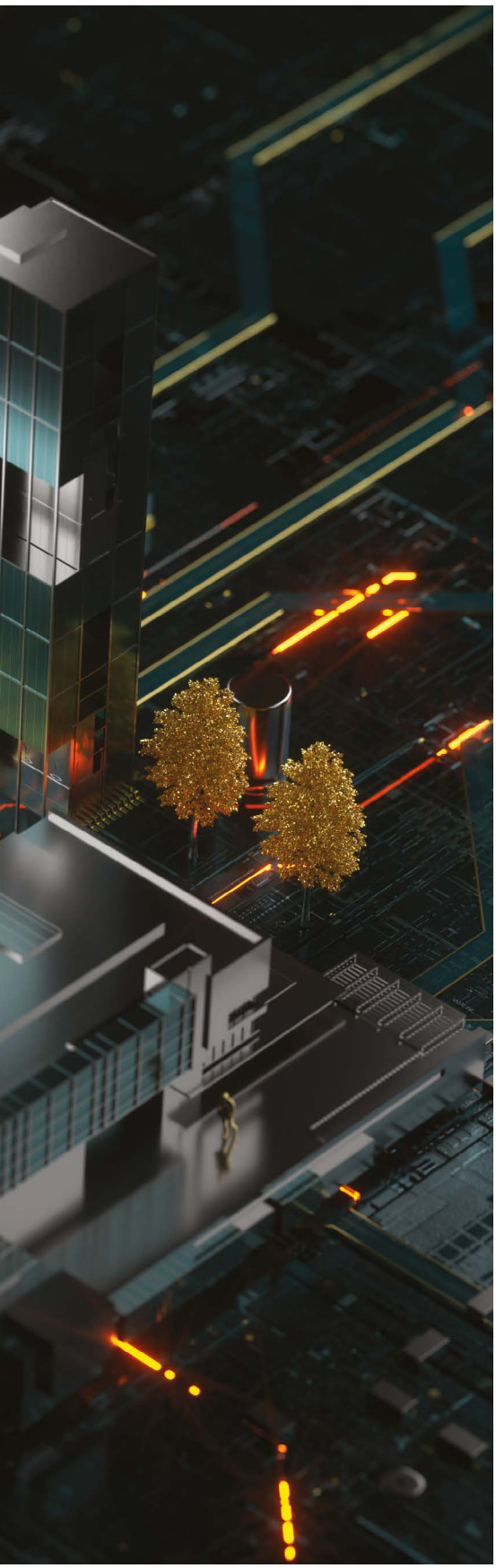

Degree of change

From lectures by avatars to entire qualifications, AI is coming for higher education. **By Jackson Ryan**

Pan Hui has already been replaced by artificial intelligence — and he did the replacing himself. In 2023, one of his students mentioned that they were a little bored seeing the same professor every lesson and might enjoy being taught by some different faces. This gave Hui an idea: why not use generative AI and an avatar to teach the students instead.

"I wanted to see whether the students would accept avatar teachers in the classroom and how they respond to this technology," he says.

Like many researchers and educators, Hui, a computer scientist at the Hong Kong University of Science and Technology (Guangzhou) in China, views AI as a tool with potentially transformative power in education. So, over ten weeks in early 2024, postgraduate students were taught a course by various digital avatars. They could ask questions of the avatar and an underlying large language model (LLM) provided real-time responses, syncing facial animations to the answers. Hui and colleagues collected data on the students' experience via surveys and interviews. Members of his class reported that certain human-like avatars, such as one that looked like Albert Einstein, felt more trustworthy than cartoonish avatars[1].

Hui's experiment provides clues to the approach that an 'AI-first' higher-education provider might take in the classroom. AI has already had a seismic impact on higher education as existing universities race to integrate a suite of tools and LLMs into administration, curriculum design, teaching and assessment — and at the same time grapple with students' use of LLMs. The struggles faced by universities so far, both ethical and pedagogical, arise from the rapid deployment of AI tools into higher-education systems that were not equipped to handle them.

But what if new universities were built with AI as a core tool? From admissions that can be handled by AI agents directing prospective students towards particular courses, to personalized tutoring and lesson plans based on individual learning needs and progress, there is an opportunity to completely rethink how a university works as an educational institution.

Such 'AI-first' universities might find it easier to integrate technology, because they would include AI systems as the foundation of everything they do, suggests Helen Crompton, executive director of the Research Institute for Digital Innovation in Learning at Old Dominion University in Norfolk, Virginia.

For some higher-education observers, however, there is both opportunity and concern. Anthony Kaziboni, a sociologist at the University of Johannesburg in South Africa, says he is worried that if the companies behind AI systems are too involved in reshaping education, it would cause problems because their motivations "are not rooted in pedagogy, but profit".

AI's personal touch

Early adopters of putting AI at the core of school education might provide a blueprint for how AI-first universities could take shape. Alpha School, headquartered in Austin, Texas, and with an expanding network of private campuses across the United States, has students working for just two hours a day with its personalized AI system that it says tailors to pupils' "strengths, weaknesses and interests". Students spend the rest of their day dedicated to "life skills, passion projects and co-curricular activities", with some human oversight by "guides", rather than teachers.

Tuition costs vary, but *The New York Times* reports US$40,000 per year in Austin and NBC Bay Area news website reports US$75,000 in San Francisco. The model provides a template that AI-first universities might implement: focus on personalizing the education experience — even starting before students decide which course to take — while humans mentor and support their learning.

Crompton says that falling enrolments have seen university programmes in many developed countries contract or disappear entirely in the past decade. Between 2012 and 2022 in the United States, there was a fall in the proportion of 18- to 24-year-olds moving into higher education from 41% to 39%. AI might be a survival strategy for universities and colleges, helping to streamline the admissions process by giving them near-instant recommendations for courses that align with their interests. A prospective student could talk to an AI agent and within seconds receive direction to a

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degree. "They immediately feel like they've been heard, where in the older systems they weren't," says Crompton.

This kind of system is already being offered by some providers. Maestro, an accredited AI-first institution in Austin (formerly known as Peloton College), bills itself as "the #1 AI-native university offering free world-class education". It offers qualifications in areas such as web development, cybersecurity and AI software engineering. If you land on Maestro's homepage, you'll be greeted by a chatbot that guides you to one of its programmes, which are entirely taught by an "AI tutor". Maestro took in its first student cohort in September and currently offers only a small selection of skills-based Associate of Applied Science (AAS) courses, although its website suggests that BSc, BA and MBAs degrees will be available soon.

There is evidence that AI-driven personalization of the curriculum might enhance the learning process, too. For instance, one study by researchers at the Massachusetts Institute of Technology Media Lab in Cambridge, involving 272 participants, demonstrated that personalization positively affected motivation to learn (although it did not affect the performance of students)[2]. Another study[3], not yet peer-reviewed, explored how real-time, AI-generated summaries of a writer's work helped to initiate self-reviewing and editing, finding that authors who used the tool would often incorporate elements of the AI's feedback. Such an AI could provide instant, individualized assistance that is impossible for a teacher or tutor to provide, strengthening students' essays or academic manuscripts.

Some initiatives have already seen teachers and students use generative AI tools for tasks such as role-playing scenarios they might encounter in business or enabling conversations with historic and literary figures to unpack concepts and ideas. Crompton says you could "have debates with AI", such as discussing perceptions of women in society during the mid-1800s with an AI chatbot based on the novelist Emily Brontë.

"AI tools are being driven by big tech companies that have expertise in coding, rather than education. That's the part that makes me uneasy."

Beatriz Bordadágua, an astrophysics doctoral student at the Heidelberg Institute for Theoretical Studies in Germany, sees some advantages of AI and personalization in universities. She thinks AI could speed up the pace of learning, noting that conventional universities have not necessarily evolved their methods of teaching as information technologies have developed. "Now, information is obtained quickly and tailored to your needs in short bursts, whereas traditional universities still have two-hour lectures with hundreds of students. These methods work, of course, but are they the most effective way of teaching?" she asks.

Hui says this kind of personalization might also be helpful from a teacher's perspective. "We know that all students have different progress when learning," he says. "As one person, it's difficult for me to adopt the right pace for teaching." Through his experiments with digital avatars, he found that students wanted authenticity and lecturers that would adapt to individual styles. That puts the human educators in a curatorial position, overseeing a suite of personalized tools, including AI agents and LLMs that help to create lesson plans, tutor students or help with assessments. "The human would still play a very important role," he says.

Personalization cost

There could be costs to personalizing higher education with AI, however. Crompton points out that graduates who are trained in AI-first universities, and therefore reliant on AI tools to learn, might then take this approach if they progress on to academic research during doctoral studies or beyond. "What happens if those people are using AI to guide them into decisions on what we should look at?" she asks.

Crompton calls this "cognitive steering" and points to a study[4] published in July, by researchers at the University of Washington in Seattle and Stanford University in California, that found politically partisan AI models could reshape people's political views in about 10 minutes, even if the users' beliefs were the opposite of those coded into the AI.

Similarly, she says there is a risk that students might incur a "pedagogical debt", where their reliance on AI in higher education means they haven't acquired the skills needed to solve problems or make decisions in the parts of society where AI has not been integrated.

Bordadágua points to disadvantages for students, too. Universities are not just teaching subjects to pupils, she says, but they are teaching skills, such as how to think critically. "It seems obvious to me that humans should teach other humans how to think, not computers," she says. "For example, teaching people that it is human to make mistakes, but that we should take accountability for them."

Personalization has another major disadvantage: efficient and effective tailoring to an individual requires collecting a lot of data on teachers and students and increases surveillance. Getting the balance right will be hard, Hui notes, and Crompton suggests the path requires a commitment to training both students and educators in digital literacy.

What else might educators, and students, lose in AI-first universities that transition away from person-to-person learning? Kaziboni cites research from Microsoft[5] that suggests an overconfidence in generative AI responses can make people less critical. He seems sceptical that an

DESIREE RIOS/THE NEW YORK TIMES/REDUX/EYEVINE

Students at a camp run by Alpha School in Austin, Texas, create arcade games using AI.

YAWEI ZHAO

Computer scientist Pan Hui presents an AI teacher to his class at the Hong Kong University of Science and Technology (Guangzhou) in China.

AI-first university could produce leaders or those who understand society. "A degree is not just a certificate," he says. "It's a marker of how and where you've been formed." This might create a divide between degrees from conventional institutions and those from AI-first universities. "I think degrees from AI-heavy institutions will be viewed with suspicion," Kaziboni says.

Big-tech university

Some researchers think placing AI at the forefront of higher education could jeopardize academic freedoms, as providers cede knowledge-sharing to big tech companies. It also risks further entrenching biases in generative AI and LLMs that mirror inequalities and prejudice in the real world.

Even so, major universities across the world have signed deals with generative AI providers such as OpenAI, creators of ChatGPT, to provide their LLM tools to faculty members, students and administrative staff. In February, OpenAI announced a collaboration with California State University in Sacramento that provided more than half a million students and staff with access to ChatGPT Edu, a version of its popular generative AI tool designed specifically for education providers. The University of New South Wales in Sydney, Australia, signed a similar deal in September, with its enterprise agreement giving staff access to 10,000 licences of the software. "AI tools are being driven by big-tech companies, which have expertise in code rather than education," says Kaziboni. "That's the part that makes me uneasy."

Although the pitfalls associated with jamming AI into any place of learning are apparent, there is a need to equip students with the skills they will require beyond the education system. "Given the attention that AI has received across so many sectors, and the adoption and integration of AI-based tools into the daily work of so many professions, it is arguably critical for universities to prepare graduates for the AI-driven world of work that they will enter," says Karin Verspoor, a computer scientist at RMIT University, Melbourne, Australia.

For Kaziboni, building a higher-education provider that leads with AI is looking at the problem from the wrong direction. "What's needed is not an AI-first university, but an education-first conversation about AI," he says.

He points to the vast disparities in the way that AI is being rolled out across institutions in South Africa, creating an imbalance in skills once students complete their studies. Education, he believes, is being reshaped by entities that are not rooted in pedagogy, so the tools are being rushed along. "What we don't yet have is an AI university that is truly intentional" in terms of its educational approach, he says. "One that says: this is our philosophy, this is our pedagogy, this is our ethical stance, and this is how AI fits into that vision. What we have instead is a rush. Everyone is hopping on the AI bandwagon and not wanting to be left behind."

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