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## Classroom 4.0

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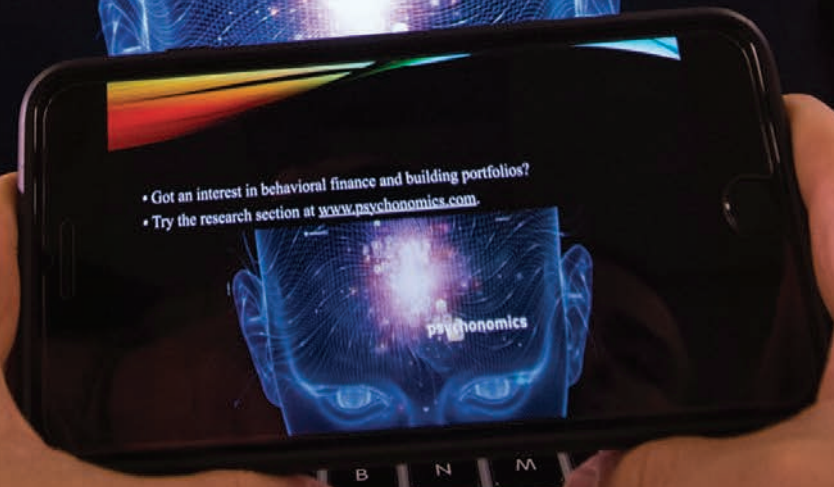
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# Classroom 4.0

**Artificial intelligence, once the stuff of futuristic books and films, is finding its way onto college campuses. How is American higher education adapting to the digital age?**

One-on-one, personalized education is the hallmark of Linfield College – small classes, attentive faculty and even the ability for students to shape their own majors and minors. The tailored style is why students (especially first-generation students) graduate from Linfield at higher rates than at larger schools, why nearly all students participate in extracurricular activities, why students have individual relationships with faculty mentors.

A different kind of personalization is at the heart of technological changes looming in higher education. After being essentially unchanged since the concept of colleges and universities surfaced a millennium ago, industry experts say higher education is on the cusp of a new chapter.

“Universities have not changed for centuries, but they’re going to have to if they want to survive,” says Joseph Qualls, chief executive of RenderMatrix Inc., which works with defense companies, entertainment companies and others researching ways to use artificial intelligence (AI). Qualls believes that in a world accustomed to personalization, classes in which a group of students gather to listen to a lecturer may not be effective for much longer.

“It’s time,” Qualls says, “to rethink how education works.”

A former clinical assistant professor and researcher at the

University of Idaho’s college of engineering, Qualls believes AI – where machines learn by recognizing patterns, classifying data and adjusting to mistakes – has the potential to revolutionize learning. He points to Siri, chatbots and autonomous cars as ways AI-based systems are becoming more common in day-to-day life.

Already, schools use crowdsourcing programs that allow students to interact electronically with classmates and professors in virtual classrooms, a supplement to face-to-face class time. At Linfield, Blackboard, a learning management system, enables professors and students to post homework assignments, watch videos and collaborate on class conversations.

Beyond Linfield, AI-based software is also used to evaluate the skills and interests of students, then customize a course that makes the most of their potential. Students learn at their own pace, instead of the pace of the class.

“AI can monitor student work and detect that 50 students made the same mistake,” Qualls explains. “We can learn from that. We can anticipate the mistakes students will make and steer them in a different direction.”

Qualls predicts that one day students will interact with an AI system that will provide a unique educational path for each person.

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– *Joseph Qualls, chief executive, RenderMatrix Inc.*

Imagine an art student sketching a building, her electronic pencil moving across her tablet. As the drawing develops, she receives messages about architecture, the type of brick she’s chosen, vegetation and water necessities. She’s acquiring information specific to her work as she goes along. It’s an overly simple example, but suggests ways in which an entire curriculum can be built around learning outcomes – that technology helps students achieve without being on a pre-determined course list.

Alex Freeman, senior director at The New Media Consortium, analyzes trends in education and agrees AI will be increasingly important on college campuses of the future.

“We’re seeing the cutting edge of it now, but within 10 years deeper-learning approaches will be very important,” he says. “These will drive higher education for decades to come.”

Freeman says trends include flipped classrooms, currently being used at Linfield, where students watch a presentation before coming to class, then use class time itself for hands-on or collaborative instruction. He notes the classic “sage on a stage” model, with a professor lecturing to a class, is transitioning to a “guide on the side,” where students work independently and professors offer advice.

Adaptive courseware – applying algorithms like those used by Netflix and Amazon – is also becoming more common. It pinpoints areas where individual students will be likely to succeed, and then helps teachers shape the most effective ways for students to learn, based on data from thousands of others.

“With a textbook there are the same five questions at the back of the book for everyone, regardless of their level,” Freeman says. “With AI, the five questions at the back become personalized based

on how the student responds. How many questions should a student have? That depends on the student.”

Laura Brener, Linfield’s Online and Continuing Education (OCE) director, says these days the same digital tools used in online education are increasingly being implemented in traditional classrooms, too.

“We’re preparing students to live and work in a digital age and our education should reflect that, both in online and face-to-face classes,” she says.

Whatever the details turn out to be, the transition ahead will no doubt be unsettling for many in higher education. But the digital shift fits hand-in-glove with Linfield’s commitment to agile education, says Susan Agre-Kippenhan, vice president for Academic Affairs and dean of faculty. Professors are already continually adapting curriculum to present relevant material to students, she says. That’s a process that will continue, even if it is in new and different ways.

“Linfield faculty care passionately – not just about teaching, but about teaching and learning,” she said. “Even our most effective lecturers make use of a range of teaching tools to engage students.”

Among those tools are computer-simulated scenarios, hand-held electronic polling devices that produce immediate data for the class to see and cloud-based software or databases that allow students to work simultaneously on problems.

“These tools give faculty and students more information about learning and open up time for robust discussion, collaboration and hands-on work that ignites learning,” Agre-Kippenhan says.

The same, she predicts, will be said for whatever digital changes come next.

– Laura Davis and Scott Bernard Nelson '94

