KAIST doesn’t wait for change in Korea, pioneers ‘Education 3.0’

by Michael B. Horn

As South Korea struggles to escape the downsides of centuries of a Confucian emphasis on rote learning while retaining the positives from that Confucian legacy, at least a couple institutions in the country aren’t waiting for permission to move forward.

KAIST, the Korean Advanced Institute of Science and Technology, a top public research university located 150 km south of Seoul in the city of Daejeon, is trying not only to spark innovation in research and the creation of new products, services, and companies, but also in how it educates.

In my meetings with several on the campus—including the president of KAIST, Steve Kang; Tae-Eog Lee, a professor and the director of the Center for Excellence in Learning and Teaching at KAIST; and Woontack Woo, a professor in the KAIST Graduate School of Culture Technology with a specialty in ubiquitous virtual reality, I heard about a range of initiatives designed to bring KAIST to the forefront of innovation in a variety of fields, including the move beyond mass education to mass-customized education through blended learning, or what KAIST calls Education 3.0.

From left to right, KAIST President Steve Kang, Michael B. Horn, Tae-Eog Lee.

In our meeting, Woo spoke about how the Graduate School of Culture Technology represents a relatively unique experiment in Korean education to harness the talents and perspectives of students and faculty with diverse backgrounds and perspectives to produce breakthrough innovations. With half of the graduate students coming
from the humanities—with degrees in areas like art, design, and literature—and the other half from engineering backgrounds, Woo described the school as akin to the MIT Media Lab.

Although the environment is exciting, it also presents a daunting educational challenge. For certain subjects, students need a similar level of background knowledge to access the topic, but because students have such diverse educational backgrounds, they have widely different understandings of the material. The need for customization is huge as a result. Woo is ultimately trying to leverage his background in creating smart environments combined with user information from smart phones and wearable devices to truly personalize individuals’ experiences—and by extension, their learning opportunities.

That is not the only conversation going on at KAIST, however, to personalize learning. Several years earlier, KAIST’s previous president, Nam Pyo Suh, who has been a professor at MIT for decades and was head of MIT’s department of mechanical engineering at MIT for 10 years, began pushing the notion of utilizing online learning onto KAIST’s faculty to end the use of lecturing in the classroom.

Although Woo said many faculty members did not like the idea because of traditional notions of the role of teachers, when Suh appointed Lee as the director of the Center for Excellence in Learning and Teaching, together they evolved the vision and struck a more bottoms-up approach to introducing what they call Education 3.0.

Education 3.0 bears many of the hallmarks of flipped classrooms and is a form of blended learning. Lectures move online—which handles students’ need for personalization—and, as one of Lee’s presentations states, “What in a class? Anything but lecturing!” Class time moves away from PowerPoint, blackboards, and whiteboards and is instead devoted to interactive and applied learning—questions and answers, review and summary, quizzes, interactive problem solving, discussion, project-based learning, and labs. The goal is to overcome students’ habits for rote-based learning, which were honed through mass education, and improve their creativity, synthesizing skills, communication, teamwork, and leadership while still having them master the necessary knowledge.

According to Lee, moving to Education 3.0 elevates the role of the teacher and will require more teachers, but he agreed with Woo that many faculty members were worried and did not like the top-down approach to implementing online learning. So he and Suh took a new bottoms-up approach to recruit a coalition of the willing who wanted to give the methodology a try.

Students were hungry for something different, too. A survey in a basic compulsory lecture course revealed that only 10 percent of students felt lecturing was helpful for their study; over 60 percent cited solving quizzes and textbooks—a finding similar to the pattern that many have observed students deploy when using Khan Academy.

In a trial run with four classes in 2012, the results were positive. Student exam scores in the Education 3.0 classes were generally much higher than students taking the same exam in the conventional lecture class. Not only that, but students rated the experience as preferable. The original objective was not to improve the exam grade, but instead to bolster students’ skills in creativity, leadership, and so forth. These attributes are hard to measure, Lee said, but the sense on campus is that there is improvement in these areas because of the active and applied learning that is taking place.

Seeing the early positive results, more professors have begun opting to offer Education 3.0 classes. The majority of professors report that student understanding is improved, and 95 percent want to continue teaching in this new format. As a result, even more professors are now signing up. The goal, Lee said, is to offer 30 percent of all classes in this way by 2018. This year they expect that 120 classes—out of roughly 2,400 total in a year—will be
offered in the Education 3.0 format.

Kang is supportive of the move to Education 3.0 as well, which bodes well. In his mind, basic knowledge served Korea well in its tremendous economic growth over the previous several decades. But having played the disruptive game once, to continue to grow, it will now take entrepreneurship and creativity. Its test-centric culture hurts it in trying to achieve this goal, he said, which is why it is so important that KAIST does its part in reversing this trend.

KAIST isn’t the only major university pushing forward to utilize online and blended learning to move from mass education to student-centered, personalized learning—or mass-customized education. At a meeting I had at Korea University in Seoul with the director of its Center for Teaching and Learning, Professor Hiwhoa Moon, I heard about the Center’s efforts to combine online and offline learning through flipping the classroom. Established in 2004, also in the room were the center’s previous director, Professor Hikyoung Lee, and a graduate student who is doing research on the efficacy of flipped classrooms.

The group at Korea University, including employees from Apple, Intermajor, and KBS. Photo by Tracy Kim Horn

The research has been positive. Although unable to track student outcomes, in a perception survey, 80 percent of students said they learned more in the flipped classroom than in the traditional one. Students reported that they were more engaged with the content because they had studied before the classroom to prepare their questions and digest the material.

With this result in hand, after years of using its own learning management system (LMS) to support its online learning work, just two weeks ago Korea University signed an agreement to use the revamped Blackboard LMS and take its work to the next level. Although the faculty is still highly skeptical of the flipped approach, Moon said, he suspects that slowly they may adopt aspects of the methodology as they see it work. And he has bigger plans in store, as the Center is beginning to build learning and research maps down to the course and concept level to allow students to engage with topics in a variety of ways.

Thanks to these groups at KAIST and Korea University that are dedicated to innovating how they educate, there are some bright signs for the future of education in the Korean landscape.
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