



Going the Distance

Real-time Internet Course from
Arizona to Jordan

By Susan McGinley

Tucson, Arizona and Irbid, Jordan lie 10 time zones apart at 32 degrees latitude. Jordan's climate zones resemble those in desert Arizona, where the drier areas in particular have problems with crops damaged from salt buildup in soils. Irrigation is a particular challenge.

Research and teaching conducted at the University of Arizona in Tucson and the Jordan University of Science and Technology (JUST) in Irbid offer applied approaches to similar agricultural and environmental problems.

By collaborating internationally and sharing solutions, faculty and students at both universities can make a difference in how quickly new methods and technologies

are adopted in their own areas and also in other parts of the world. Real-time Internet classes speed this process by eliminating travel, housing, visas, international tuition and other requirements that take time and cost money.

That was the aim of a real-time Internet civil engineering course offered between the UA and JUST from October 2006 to January 2007. A first for both institutions, 18 students in Jordan participated in a class transmitted live from Tucson as they sat in their classroom in Irbid.

"This is the first experience in a Jordanian university in full long-distance learning," says Ziad Al-Ghazawi, associate professor of civil and environmental engineering at JUST. "It attracted a fantastic mix of students from backgrounds in agriculture, chemical, civil and environmental engineering. This multidisciplinary course was offered by JUST's Civil Engineering graduate program. We received a letter from the head of the Royal Scientific Society congratulating us on this course."

Thanks to technical expertise and equipment available in both locations, the graduate course "Irrigation Management of Reclaimed Water" (with a special focus on salinity) was transmitted from the UA to JUST through a free broadband connection that provided a high-quality feed. Three monitors in each location enabled faculty and students to see and talk to one another as if they were in the same room. Other system components included two cameras, a laptop, an ELMO for projecting images, and a transmission bridge.

The class format included live lectures from Al-Ghazawi in Jordan, and from Pete Waller, associate professor, and Muluneh Yitayew, professor, both in the UA Department of Agricultural and Biosystems Engineering, teaching in Tucson. Faculty uploaded lab notes, pictures and video clips of the

lab and field excursions and other course information on the course Web site.

"I actually thought it was easier to teach this way," Waller says. "Once I learned how to operate the controls, I could decide as I went along whether to put my face up on a monitor, draw images on the ELMO projector or run a PowerPoint. The technology is so cutting-edge, it feels like you're there in Jordan with the class."

The course was part of the Sustainable Development of Drylands in Asia & the Middle East Project, funded under a cooperative agreement with the U.S. Agency for International Development and the International Arid Lands Consortium (IALC). This project supports the sustainable development, management and restoration of arid and semiarid lands in Afghanistan, Pakistan, Jordan, India and Yemen. The IALC is headquartered at the UA Office of Arid Lands Studies (OALS) in Tucson.

"This has been a wonderful team effort," says Robert Freitas, IALC project director. "Backup and government facilitation came through our primary partner, the Badia Research and Development Center, Higher Council of Science and Technology, government of Jordan. We had permission from the Jordan University of Science and Technology administration and president." Al-Ghazawi and Akrum Tamimi, visiting assistant professor of arid lands studies from the UA, worked with the JUST administration to establish the class.

"We had excellent cooperation also between the two technical teams at the UA and JUST that enabled us to use Internet real-time conferencing capabilities," Freitas says.

In Tucson, the technical aspect of the course was handled by Dave Bogner, coordinator of video/media communications, and Ed Carpenter, program director of the multimedia and video unit, part of Educational Communications and Technologies (ECAT) in the UA College of Agriculture and Life Sciences. In Jordan, Amer Eliwi, communications and network supervisor of the JUST Computer and Information Center, managed the technical aspects of the course.

"We used a two-way, audio-video over-the-Internet technology," Bogner says. "It was broadcast out of a regular distance learning studio here on campus in ECAT. We did set up a backup system where we tied a bunch of telephone lines together to get the backup if we needed it. There were a few glitches with audio problems—only two days out of the whole semester—but on the whole it went better than expected."

The time difference required a few adjustments. Most of the time the one-and-a-half-hour course sessions began at 5:00 p.m. Jordan time, which meant the Tucson team started their broadcast at 7:00 a.m., except during Ramadan, the Muslim holy month dedicated to fasting. During those weeks

the Tucson team began at 5:00 a.m. to enable the Jordanian faculty and students to end the session early enough to travel home to break their fast.

Because Jordan's language of higher education is English, there wasn't a language barrier, although the students had to accustom themselves to the nuances and accents of the presenters in Tucson.

"In the beginning there were a lot of fears," wrote Maha Abu-mwais, a JUST civil engineering student. "The big fear was to attend the lectures while the teacher is not with you in the same room or in the same country. That means no office hours to meet your teacher if you have any questions. The second fear was whether the performance of the high-tech instruments (Internet connection, microphones, audio and video) would work correctly through the lecture time. I decided to go through with this experiment as a challenge... as a good chance to communicate with other universities outside Jordan to know other ways of lecturing and thinking."

Abu-mwais and other students noted that their concerns subsided as the class continued, and they were grateful for



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Distance course content focused on irrigation management to conserve water and reduce salt buildup in the soil—issues of concern in both the Middle East and the American Southwest. Pictured at right, reclaimed water is used to irrigate landscaped traffic medians along Farouk Shrer, a boulevard in the resort city of Aqaba in southern Jordan. Aqaba's natural arid landscape is remarkably similar to southern Arizona's.

the email communications (in place of office hours) and class discussions with Waller and Yitayew that clarified what was going on.

"The students were really sharp, motivated and capable," Waller says. "I was very impressed as I graded their papers." Student tests and papers actually were sent by email or FedEx from Jordan to Tucson for grading and then returned, a practice Waller admits he would change (except for grading exams in Tucson) for subsequent courses because it would be cheaper and more appropriate to hire someone to grade the papers in Jordan according to Jordanian grading standards.

Although the course was initially offered in a point-to-point format, Freitas hopes to expand the effort to include more classes in a variety of locations and formats. Possibilities include transmitting from one location to many at the same time, and transmitting courses bi-directionally, where students would be in session in the studio in Tucson and in the classroom in Jordan at the same time.

"We'd like to transmit from Tucson to multiple locations in Jordan, eventually," Freitas says. "Students from Amman who are agency personnel of Jordan are attending, but it's quite a drive for them. I hope this course is a model for many other departments to try.

"Eventually we'd like to put together a program, not just a course, based on the strengths here at the UA, especially in water," Freitas adds. "We hope to have a water-based distance program, starting at the graduate level where the students are more highly motivated to work through technical requirements and to understand the material."

Overall, not only did the distance format save time and money, it also was easier and safer for students and professors to remain in their own countries, and cultural differences were lessened. There were other advantages as well.

"The most important benefit I had through this program is that you can have the most updated courses while you are staying in your country and

without needing to change anything in the university system, with less cost comparing of opening new sections hiring new professors and so on," wrote Maysoun Zoubi, an engineer working at Jordan Ministry of Water and Irrigation in the Government Performance Monitoring and Evaluation department. She suggested future Internet courses on water pricing in agriculture, crop patterns, water forecasting, and using reclaimed water for industrial purposes.

Laith Al-Waked, an agronomist working in the Jordan Water Authority wrote, "This course allowed us to compare our experiences, personally and Jordan-wide, with the external world, which is a very good way to see our achievements, our knowledge...in comparison with others. I wish that we could have another course on the practical methods of planting new crops in Jordan—those that will accept wastewater irrigation, cash crops, with low crop water requirements, and how to shift from high crop water requirements to low crop water requirements with the same economic benefits."

Collaborative efforts work both ways. Jordanian professors have much to offer students in Tucson, should the opportunity arise to teach the course in both directions.

"The university programs in Tucson and Jordan are different, but our goals are the same: to preserve the environment and to use water resources as best we can," Waller says.

"It shows in a concrete manner how you can bridge some of the gulfs that have opened up between various cultures. We're doing it using science and education, with modern technology. If we can deliver this to Jordan, we can deliver it anywhere." ♦

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CALS MULTIMEDIA/VIDEO UNIT



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The multimedia/video unit responsible for broadcasting the real-time distance course from Tucson to Jordan has a fully-equipped studio located on the first floor of the Forbes building on the University of Arizona campus. The resource is available within the College of Agriculture and Life Sciences.

"The technology is getting more useable for the Internet" says Ed Carpenter, program director. "For the Jordan course we had a routine connection with a better backup system than usual, with technical assistance, support, consultation and facilitators."

In addition to this course, the ECAT multimedia and video unit also provides and runs courses for other departments and faculty in CALS, according to Carpenter. These have included courses broadcast to Yuma as part of the Agricultural Technology Management program offered there. The studio is also used for seminars, meetings and two-way distance applications such as interviews for extension job searches that are also Web cast.

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