

Accent on problem-solving, team-based learning, personal initiative, integrative thinking

One New Curriculum, Many Heightened Expectations

John DeLeon

So what was the big idea when the College of Pharmacy launched a revised, reordered, and reshaped curriculum in the fall of 2010?

A better question might be “what were the *big ideas*?”, because there were several. One was to comply with the American Council for Pharmaceutical Education’s (ACPE’s) revised standards for accreditation. That necessity provoked a prolonged self-assessment by faculty and administrators that revealed some fundamental weaknesses.

Case in point: The old curriculum was front-loaded with basic science and drug knowledge courses, taught in the familiar lecture format. It was an invitation for students to practice the equally familiar “binge and purge” approach to passing those courses. Faculty did not feel that students were held accountable enough for previously learned material, as evidenced by inconsistent performance on their Advanced Pharmaceutical Practice Experiences as P-4s.

This did not go unnoticed by faculty, particularly clinical faculty, who often had

these same PharmD students in their practice settings during P-4 clinical rotations.

“During P-4 rotations, preceptors would discuss material they knew they, personally, had lectured on, and the students’ recall came up short,” says **Bruce Mueller**, PharmD, associate dean for academic affairs and professor of pharmacy.

Clinical Associate Professor of Pharmacy **Tami Remington**, PharmD, was one faculty member who had personally experienced this knowledge short-circuit in her practice setting at Turner Geriatric Clinic. Her experiences prompted her to become involved in the curriculum revision process.

“Our students were smart, but not necessarily savvy,” she says. “A significant number found it difficult to integrate into clinical environments. They weren’t able to consistently articulate recommendations and then defend their rationale for making those recommendations. They lacked the people skills necessary to counsel patients. We wanted improvements in all those areas.”

In one sense, then, the changes that have been made — rearranging the order in which various skills are taught, consolidating courses, and creating new courses and new course sequences — were the result of working back from the desired end.

And that desired end, reflected in preceptor evaluations of U-M PharmD students, became the Holy Grail: graduates who are adept team players, critical thinkers, and lifelong learners — in short, professionals whose training has prepared them for careers today, and for years to come.

“We wanted our PharmD students to get more value out of their education,” says Remington. “We kept pumping more and more information into them, because we felt they needed to know everything. In the process, we were shortchanging the practical aspects of integrating this knowledge, communicating it, applying it.”

Science and drug knowledge courses were moved to the P-2 and P-3 years, and new courses in communications and service learning became mandatory for P-1s. A five-course sequence was created,

beginning with a self-care course in the second P-1 semester, employing an active learning pedagogy that expects students to prepare on their own for classes focused on team-based problem-solving. Medicinal chemistry and pharmacology, previously taught separately (and sometimes confusingly) by College of Pharmacy and Medical School faculty, were merged. Offerings were added in evidence-based medicine and ethics, and their clinical applications. (See the sidebar “The Long Reach of Ethical Thinking” on page 7.)

“Some of the material was rolled out as new courses, some of the changes consisted of reordering current content, and, perhaps most significantly, the revised curriculum required a whole new approach to teaching,” says Mueller. “We pretty much replaced the ‘sage on the stage’ model of teaching with active learning pedagogy.”

Team-Based Learning (TBL), the new approach to teaching that’s used in the therapeutic problem-solving sequence, is the centerpiece of the new curriculum. Instead of listening to the sage and watching his or her PowerPoint presentation, students begin class every day with a quiz on their homework assignment. Then the teams they’re assigned to do the same quiz collectively, after which they are given a case related to the assignment. The role of the instructor is to facilitate students’ efforts to come up with the best strategy for a treatment plan.

“Students have to come to class prepared because they know their contribution to the team is so important and their teammates are counting on them,” Mueller says. “As professionals, our students soon will be working in teams to deliver health care. We want to make sure they have the skills to do that.”

Remington was initially unsure if she had the skills to teach using TBL methods, even though she led the subcommittee that proposed TBL to the curriculum committee.

“At first, actually implementing TBL felt like jumping off a cliff,” laughs Remington. “That said, we thought this was a very good balance of self-directed learning for students plus active learning in the presence of an expert.”

One other benefit of TBL is that it can be well executed in a single section for 100-150 students — well above the College’s individual class size.

In practice, TBL is actually easier than being the sage on the stage, Remington adds. Whereas the lecture format is akin to performance art — requiring a faculty member to stand in front of class with attractive slides, mix-

she says. “The accent is on solving problems rather than passively absorbing information. We’ve also noticed an improvement in students’ communication skills because they are required to articulate a solution.”



“The accent is on solving problems rather than passively absorbing information.” — Nancy Mason

ing entertainment with information — faculty play a supporting role with TBL.

“We are facilitators in the classroom,” Remington explains. “The biggest challenge comes in designing the problems that teams will have to solve. We have to create learning environments that bridge basic knowledge and significant, real-life clinical problems.”

The best team challenges are those that are difficult enough to pull the new learners up a few steps, but not so hard that students can’t make the connection between the knowledge they acquired during self-study and what is needed to solve the problem.

Nancy Mason, PharmD, associate dean for student services and clinical professor of pharmacy, succinctly summarizes the impact of this approach. “It’s making our students think like clinicians much earlier in their education than before,”

Communication was part of previous PharmD curricula, but it didn’t hold center stage as it does now, from initial coursework to the end of the P-4 year.

The working assumption was that if you were intelligent and you knew your subject matter, you could communicate it, Remington explains. That assumption didn’t necessarily hold water.

“Like every other skill, the more you practice communicating, the less self-conscious you are, and the easier it becomes,” she says.

If teaching in a TBL environment was a challenge for faculty, it was at least as daunting for the students, who now had to deal with daily homework and daily quizzes, on top of spending twice as much time in class. It seemed like too much, and they said so.

“Students pointed out to us — correctly — that the workload assigned outside of class was excessive,” Mueller remarks.

Changing that dynamic required students and faculty to work through some conflicting expectations, and to do it collaboratively and constructively. That, in itself, was a learning experience for everyone involved.

“Speaking as an educator, you don’t want to dumb down your class, but you also don’t want to run students into the ground by requiring so much that they burn out,” says **Gundy Sweet**, PharmD, clinical professor of pharmacy and director of curriculum assessment.

What is the sweet spot where high expectations exactly balance the volume of doable work? “You don’t know until you start doing it,” Sweet confides.

The upshot was that the academic model was changed to limit how much homework faculty could assign. The College is still tweaking the system, Mason says, but aside from the big issue of work overload, all other adjustments have been minor.

“The feedback from students, now, is that things are much, much better,” she adds.

“You’re put in the position of a clinician trying to solve the case. That really revolutionizes the learning experience.” — Adam Loyson

Making adjustments based on student input is no surprise, given that student concerns with the old curriculum helped shape the new one. The semester of self-care that begins the therapeutic problem-solving sequence is one example. Students learn early about the over-the-counter drugs that are often the answer when a patient comes to a pharmacy, asking for help.

“That content used to be scattered throughout our therapeutic sequence, so it tended to be de-emphasized through diffusion,” says Mason, “The self-care course was entirely reconfigured to reflect what students were telling us over and over again: that they didn’t feel as knowledgeable as they would like to be in the OTC area.”

Another example is merging what had been separate courses in medicinal chemistry, taught by pharmacy faculty, and pharmacology, taught by medical school faculty, into a three-course sequence in *Principles of Drug Action*, taught collaboratively.

“Historically, pharmacology was one of the sequences rated lowest by our students,” says Mueller. “Now medicinal chemistry and pharmacology professors are in the room at the same time, teaching about the same topic, so there’s no conflict. Pharmacology has vaulted from one of our lowest-rated courses to one of our highest-rated.”

George Garcia, PhD, professor of medicinal chemistry and department chair, found the new arrangement to be educational for him as well as the students. “Speaking only for myself, I’ve learned a lot working with these pharmacology professors,” he says. “There’s much more to the material than I appreciated. I think the course really gives the students a good perspective not just on the medicinal

chemistry, but also the larger view of how drugs work on the body’s biological systems. When you think of medications as chemicals, pharmacology and medicinal chemistry cover the soup to nuts of drug action.”

Like his colleagues in other areas, Garcia has found that the rewards accruing from fresh approaches outweigh the challenges. “We spend a lot more time collaborating with our pharmacology colleagues on how best to integrate and present the material,” he explains. “It’s more labor-intensive, but the upshot is that we’re doing a better job. It’s more rewarding for everyone, students and faculty.”

Better integrated content, creatively sequenced courses, innovative pedagogy, instruction in spheres that were previously scattered or ignored — it all adds up to more frequent, and frequently monitored, doses of learning.

“The students who came before us say they wouldn’t study until the week before exams and then cram it all in,” says **Patrick Spoutz**, a P-4 and, thus, a member of the first class that started with the new curriculum. “That’s not how things happen in my class. Repeated testing forces us to stay on top of the material. Team-based learning is what makes the new curriculum what it is.”

Despite the early bumps in the road, Spoutz and his classmates seemed genuinely pleased with the improved fit between their present studies and future paths.

“Whenever we’ve had lectures based on the old curriculum, it always feels like something’s missing at the end,” says P-4 **Adam Loyson**. “We’re so used to this dynamic learning style where we’re expected to familiarize ourselves with the subject beforehand. Once you get to class, rather than just hearing about the material and seeing it on a PowerPoint slide, now you’re actually in the driver’s seat. You’re put in the position of a clinician trying to solve the case. That really revolutionizes the learning experience.”

P-4 **Rachel Lebovic** agrees with Spoutz and Loyson. “Team-based learning really defines the new curriculum,” she offers. “I also think one of the biggest improvements is the order in which we learn the material, such as having the self-care course early.”

Now, PharmD students can intelligently discuss over-the-counter products even after the first year, which is especially helpful for students who have their *Introductory Pharmaceutical Practice Experience* (IPPE) in the community setting.

“We’re engaging in practice as a pharmacist even after the first year,” says Lebovic.

To reinforce the idea that there's more to being a health care professional than social status and a hefty paycheck, the new curriculum not only mandates a service learning experience but puts it in the first year.

"There's an emphasis on community engagement that wasn't there before," says Mason. "In the service learning course, students are assigned to work in health-related agencies for medically underserved people in our local area, mainly as volunteer patient advocates."

If they have not worked with this patient population before, and most students haven't, they get acquainted with people who lack access to health care and who struggle financially. "These are people our students will encounter in their community, and we want them to understand their patients' struggles and to offer informed advice."

Among other things, that means knowing what resources are available and where, so they can be a referral source for people who need housing or food. "Pharmacies are a first-line health agency," Mason adds. "People walk into their pharmacies seeking medical advice more than anywhere else."

Staying one step ahead of the curve is a never-ending process in pharmacy education states **Barry Bleske**, PharmD, an associate professor of pharmacy who chaired the curriculum revision committee.

"In a very short time we did a good job of evaluating our old curriculum, identifying weaknesses, and developing a new curriculum," he remarks. "Defects have been eliminated. Higher education is all about change, which means you are constantly confronted with compelling issues. Progress comes in ensuring that they aren't the same issues you thought you'd resolved."

Bleske originally saw his curriculum committee role as a call to duty. But the deeper he got into the curriculum, the more he enjoyed it. As with any good scientist, evidence informed his opinions.



"The biggest challenge of any curriculum is to see what's coming down the road." — Barry Bleske

"We were committed to make results tangible and to measure outcomes," Bleske says. "Faculty came together to create content, shape that content into courses, and make sure that the courses were working as envisioned. We got constant feedback from students — mostly positive. Time will tell with TBL, but I believe it's a positive step on many levels. Teamwork is here to stay."

For Bleske, the whole process evoked memories of being in graduate school in the 1980s. The PharmD was still relatively fresh and new, he recalls, and things that are routine today were cutting edge at the time.

"It was reassuring to know that I can still get excited about the value of change and still have the energy to advance it. The biggest challenge of any curriculum is to see what's coming down the road, and to have your curriculum doing it now."

The real proof of the changed curriculum comes this year, as the first cohort of PharmD students schooled in the new curriculum completes their P-4 rotations.

Early reports from the students are encouraging. "I was worried that I was missing some of the content that used to be in the old curriculum," states Lebovic, now in the thick of her P-4 year. "But so far I've found that I'm incredibly well prepared, and I can always look up the content I don't know. The skills I have gained are definitely helping me to succeed."

Spoutz is similarly impressed. "I haven't been blindsided by huge gaps; no nasty surprises," he says. "In topic discussions with my preceptors, I feel like I'm able to hold my own."

From a faculty perspective, Remington found herself more than holding her own in a TBL environment, her initial apprehension notwithstanding.

"You give students a problem and then you circulate to make sure they're working on the problem and not talking about the football game," she smiles. "It's exciting. Class is loud. Class is very loud. At first, it feels like a loss of control, but you soon come to realize it's the sounds of learning."