Reflections from the Classroom

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Overview

For a long time, being considered an excellent teacher has been an asset for a KU faculty member. Unlike some research universities, KU has maintained an identity as a place in which excellence in teaching is a good feature of a faculty member, not something that might detract from one's standing as a professor. The present set of essays represent an evolution in that identity, the current state of a gradual change in what constitutes excellence in teaching and learning for KU in the 21st century. While that KU identity has centered for a long time on the sterling ability of our colleagues to synthesize research and ideas into a coherent oral narrative, a newer vision of teaching and learning has gradually emerged.

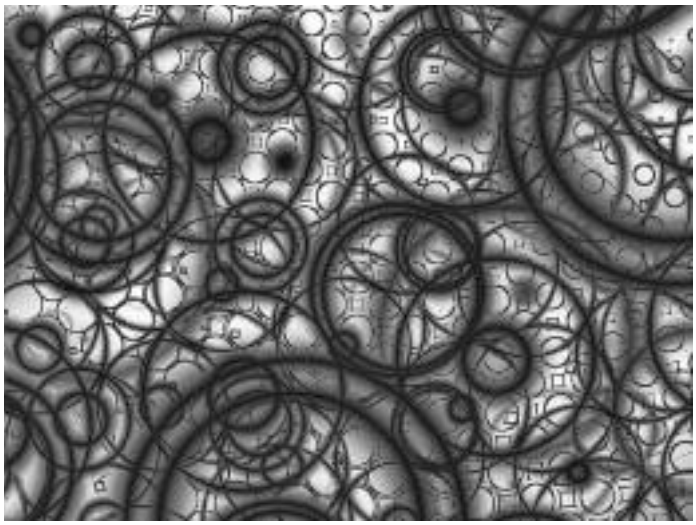
In addition to the foundation of knowledge that is essential to a deep understanding in any field of study, faculty members also expect students to be able to think about that knowledge, place it in a larger context of intellectual life, and use the ideas and knowledge in forms and in contexts that were not explicitly taught. And year in and year out a portion of KU undergraduate students have shown those extended layers of learning as a result of hearing our syntheses of the research and thinking in our fields, but that portion has been fairly small. While a case can be made for the idea that top levels of understanding should only be expected among the top levels of students, there is another line of thought holding that it is not acceptable for a majority of students to miss out on the best benefits of education, especially in the introductory (and often larger) classes in our programs.

Being a research university, we have followed the best research in higher education practice, and there is a lot of discipline-based education research that points toward course designs that can produce a deeper understanding in a much larger proportion of our students. These student-centered methods typically shift the building of a knowledge base to activities outside of class time, reserving time in the presence of an expert leader for consideration of the more difficult tasks of interactive puzzling over challenging issues in a field and finding ways to use the knowledge in new and creative ways. When students can practice the harder aspects of understanding with peers and in a setting that includes comments and feedback from an instructor, more complete learning can be achieved and more students can reach a higher threshold of learning.

One enormous benefit of this shift in the use of time in and outside of class is the effect on downstream performance in other classes. Not only to do more students pass courses, but they are also better prepared for later courses that take advantage of the foundational knowledge and independent thinking skills that are developed through student-centered course designs. So we are helping a greater number of students achieve levels of intellectual understanding that we as faculty members very much want to see in student performance, while at the same time we are helping students stay in challenging academic programs and complete their studies with fewer setbacks and detours.

KU faculty members have been a leading part of this shift toward more student-centered teaching for a number of years. In both large and small classes, faculty members have used a range of methods to help students get more out of their reading and writing outside of class, using in-class time for interactive methods to enhance the construction of more flexible and richer understanding. This issue of *Reflections* honors that ongoing work and also directs our collective attention to how the next steps of this evolution in teaching are playing out at KU.

Dan Bernstein
CTE Director



Finding Common Points through C21

Emma Scioli
Classics

I joined C21, the Course Redesign Consortium, in fall 2013 when I was teaching a large lecture class and a hybrid version of that course, both for the first time. Meeting with the group provided a unique opportunity to speak with other faculty members and hear what they were doing to tinker with the familiar paradigms for their large lecture courses.

It never seemed like there was enough time in our meetings. If time had permitted, we could easily have stayed longer, talking about our pedagogy and ideas for improvement. It was a great way to hear how faculty members from other disciplines deal with similar concerns regarding the assessment and evaluation of learning, and meet those who have an interest in changing the dynamics of the large lecture course. C21 gave us a set time to focus on these issues—time that we might not have carved out. Otherwise we are all thinking of these things on our own, separate from one another, and rarely would have had time to really discuss them.

The format for our meetings was simple yet engaging. For each meeting, either Andrea Greenhoot or Judy Eddy sent out short readings that pertained to the topic of discussion for a given day; this was very helpful in building my library on pedagogical issues at a time when I was also trying to understand the theories and research behind reinventing the model for the large lecture course. I did not join C21 with something particular in mind that I wanted to improve for my course. The course, in fact, was still evolving while the Consortium was taking place. Thus, my interest and involvement in C21 was focused on future iterations of the course. For this reason, certain ideas that emerged in our discussions were particularly helpful as I planned ahead.

Classics 148, Introduction to Greek and Roman Mythology, has in the past enrolled 400-450 stu-

dents when we only have one section available. However, in fall 2013 enrollment in the large lecture section was down to 190, mainly because we had a number of online sections, as well as a couple sections taught by GTAs. I will be teaching the class again in fall 2014, also to a group of about 200, and I may be doing a hybrid version of the course, as well. One advantage of the reduced enrollment in the large lecture course is that I can more reasonably manage discussion and possibly group work during class time. A central goal for my future course is to set up out-of-class assignments for students that are relevant, engaging, and comparable to the kind of preparation I expect them to do for exams. In thinking about this goal, it was helpful to hear fellow members of C21 put forth ideas regarding how to use Blackboard to do more than test reading comprehension with multiple-choice questions/answers.

I don't use a textbook in my class, and textbooks often come with very sophisticated online resources that are designed to help with reading comprehension and then generate complex forms of assessment. Since I use primary sources in my class, I realize that I'm trying to get at the larger picture through a different path. There is a lot of flexibility without a textbook in the course, but it also presents more of a challenge to make sure that the course's organizational principles are really clear.

Integral to clarifying the organizational principles for students is class discussion. Setting up discussion in large lecture classes can be a challenge. I gathered from my colleagues in the sciences at C21 that their large group discussions focus on problem solving, where students communicate their answers via clickers. They can then build a lesson around the results from students. That, however, is harder to do in the type of class that I teach, where I'm trying vigorously to steer students away from thinking, "Here are the facts I need to know to answer these questions." I continually emphasize that in the humanities there are many ways to look at many issues, and that I am giving them tools to approach course material from different angles. To further underscore this lesson, I am considering incorporating, on a regular basis (once every five classes or so), very focused discussion questions (set up ahead of time via Blackboard) that allow students to explore several approaches to the assigned material. They can then prepare for and subsequently share their responses in class for an allotted 15 minutes, sometimes individually, sometimes in groups. This is also a way that can allow for people who might not be comfortable with spontaneous participation in a large group to know in advance that they can contribute at this time with ideas they have formulated before class.

It is undeniable that there is a pedagogical shift taking place in education right now toward online courses, hybrid courses, and flipped courses; C21 is the best place to tune into the latest thinking about this shift. In many fundamental ways, the ideas being put forth for flipping classes (i.e., placing an emphasis upon learning and preparing material outside of class and using in-class time for discussion of the material and deeper exploration of its meaning rather than straight lecture) is nothing new for humanities professors. For those faculty members in the humanities who are considering joining: don't be apprehensive that most members of C21 belong to the sciences and the social sciences. There are enough common points on a pedagogical level which make these discussions valuable beyond our specific disciplines. I have found it helpful and encouraging to get out of my own department and see what colleagues in other departments are doing. C21 a place to find support and engage with faculty members who are like-minded in their interest in revitalizing and reconstructing their courses. ◆

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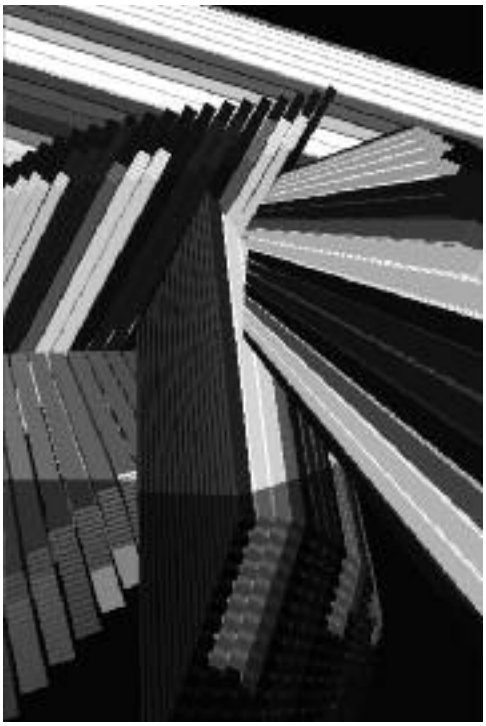

Rethinking Teaching a Large Introductory Biology Course

Mark Mort
Ecology & Evolutionary Biology

Principles of Organismal Biology is the second course in a two-course sequence (BIOL 150/152) that is required for most biology majors at the University of Kansas. In addition to majors, many students from other disciplines elect to take BIOL 152 to fulfill their laboratory science requirement. It is a four-credit, lecture-lab course that includes content in evolutionary principles, biodiversity, organismal physiology, and ecology. The course enrolls 400-475 students during the spring semester. More recently, it was offered in the fall semester (2013) with an enrollment of 91 students. A team of two instructors teaches the course, and currently there is a pool of six instructors who rotate through Biology 152 or its Honors equivalent.

Biology 152 was first taught in 1998. Over time the course evolved, especially to include new technologies (e.g., Blackboard, clickers), but the basic format has remained the same—a traditional lecture course. Much class time was spent delivering PowerPoint-based lectures, with limited peer-peer and/or instructor-student interaction. Course instructors agreed that integrating active learning and promoting more interactions within the class (students and instructors) would help enhance student learning. However, the time required to rethink the structure and develop activities prevented much progress until a few years ago.

I was granted modified instructional duties (MID) by CLAS in spring 2012, which provided me with time to focus on updating our approach to the course. During the semester, I organized a series of meetings with the faculty teaching BIOL 152 as well as faculty teaching downstream courses for which BIOL 152 is a prerequisite. These meetings allowed the BIOL 152 teaching team to share ideas, discuss what worked well or not so well, and think about how the course could be made more active and interactive. The meetings also helped us identify the skills students needed when they entered downstream courses, such as increased exposure to critical thinking and the scientific method, higher scientific literacy, and familiarity with interpreting graphs and data. It was also noted that an important outcome of an introductory biology course was to show students what biologists do and why they do it, yet little to no time was spent on this topic.

During my MID semester, I also participated in a multi-week course redesign workshop at the

Center for Teaching Excellence. This forum provided an opportunity to share ideas and receive feedback from a small group of peers who were thinking a lot about how to engage students in novel ways. Most changes now implemented in BIOL 152 were shared with, and improved by, the workshop participants and organizers. The transformation of BIOL 152 is clearly a work in progress, but here I will highlight some of the more significant changes made to the course. I will then provide my impression of how these changes enhanced the course and will share initial feedback from students and colleagues.

Course changes

Syllabus revision—As instructors, determining how various concepts presented in a series of textbook chapters are related is obvious to us; however, based on the results of in-class quizzes and short answer essays on exams, it became clear that some students were unable to make connections between chapters and determine how the ideas presented throughout the course were cumulative and interrelated. To reduce this tendency of students to "silo" information, we erected four broad learning themes (i.e., evolution, organismal diversity, structure and physiology, and ecology) and organized the textbook chapters under this framework. During the first class meeting for each learning theme, the students are provided with a set of learning goals (in class and via Blackboard) and a road map of how we will proceed through the material. Clicker-driven formative assessment questions are scattered throughout the learning theme introduction, with questions specifically designed to highlight common misconceptions.

Pre-lecture preparation—A common challenge we face teaching large lecture courses is that the heterogeneity of background experience and preparation makes it very difficult to design lectures and in-class activities that engage students, who range from those with restricted prior knowledge of the material to the highest performing students. We are currently using Blackboard to help students prepare for class. They are not given copies of the slides before or after lecture, but instead they are provided with chapter outlines and lecture guides to help them focus their reading and preparation on key concepts. Many students that I have spoken with during and after the course felt that the reason we withheld slides was to increase attendance. In fact, lecture attendance was consistently higher in the redesigned course. However, the actual motivation was to discourage students from falling into the trap of memorizing slides right before an exam. Students are also given weekly pre-lecture quizzes that can be taken multiple times from Friday afternoons until before class, on Mondays at noon. These quizzes comprise basic knowledge questions (i.e., Bloom's first or second levels) and are used to reinforce basic concepts and terminology.

In-class learning and group activities—It was never my goal to fully "flip" Biology 152, but instead to provide students with resources to come to class more prepared to engage in a discussion of the focal material. Thus, class time consists of various activities, including some traditional lecturing, punctuated with formative clicker questions and frequent peer group learning activities. The latter have included short think-pair-share exercises, small group discussion followed by polling or students sharing opinions, and class demonstrations. Students were assigned to lecture groups at the start of the semester. At the beginning of class, each group retrieves its answer folder and sits together in the lecture room. This not only expedites group work but also allows the instructor flexibility to use impromptu assessments that respond to the dynamic nature of an active classroom.

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Scientific literacy and undergraduate research—Two additional mechanisms were introduced to respond to colleagues' comments that students would be well served by being introduced to scientific research (i.e., what a biologist does, scientific method, etc.) and basic data interpretation. Several researchers in the Department of Ecology and Evolutionary Biology agreed to record short research podcasts that are shared periodically at the start of class. These podcasts introduce students to exciting emerging research directions and highlight undergraduate research opportunities at KU. We are continuing to grow our podcast library and will expand it to include research shorts from related departments (e.g., geology, chemistry, mathematics). We also have a continuing dialogue about research opportunities for undergraduates using our class Blackboard site and materials developed and shared with us by the Center for Undergraduate Research. In addition, each learning theme culminates with an in-class discussion of a peer-reviewed scientific paper. Working in their groups, students answer questions that guide their reading and encourage creative thinking about future research directions based on the research article. Both instructors and two lecture GTAs move around the room during the discussion to facilitate participation.

Post-lecture reinforcement—Two post-lecture activities were implemented to provide opportunities for students to review material at their own pace and as frequently as they wish. First, a series of voice-over Power-Point podcasts were produced and distributed via Blackboard, highlighting some of the main concepts covered in class. Second, self-assessment quizzes were created for each chapter. These quizzes are made available about one week after the chapter material is covered and comprise five to ten questions, worth up to one extra-credit point. Self-assessment quizzes remained active throughout the semester for students to continue to review and reinforce course material.

Reflecting on transforming BIOL 152

As noted, the redesign of Principles of Organismal Biology is a work in progress, and we are in the process of gathering and analyzing data related to student learning gains and performance compared to previous semesters. Pre- and post-course surveys have been developed and deployed for BIOL 152 and Genetics (BIOL 350), the next course in the majors sequence. Survey results should provide useful information on the retention of material from BIOL 152 to BIOL 350, as well as measure the progress of students in meeting the learning goals of each course. Even before our analyses are complete, however, several observations and outcomes of the redesign effort are worth noting.

One of the most common concerns I have heard from colleagues working on course redesign is that students, when asked to engage in course material in new and varied ways, tend to push back or opt to enroll in other sections that are taught in a traditional manner. I did experience some student push back during spring 2013. The biggest complaint, however, was not that the students were being asked to do more on their own time, but rather that they wanted to have copies of the lecture slides. To address this issue, I spent some class time discussing why lectures slides were not going to be distributed, and reinforced that reviewing the outlines to prepare for lecture was a better approach. Many students accepted this and adapted; however, "you really need to give us the PowerPoint slides" was a common comment on my course evaluations. In coming semesters, and as others adopt some of the approaches presented here, student concerns about having direct copies of lecture-based resources should fade.

Compared to previous semesters, lecture attendance during spring 2013 was excellent and was high even on days when attendance had been sparse in the past. Another striking observation was that many students were engaging in the material in a more sophisticated manner than previous semesters, which allowed for productive discussions within and between the lecture groups. Because of this, I introduced more group activities than I had originally anticipated, and the feedback from students indicated that they

found the peer discussion, followed by sharing of opinions, to be useful.

Another way to assess whether the redesign efforts helped student performance is to compare the DFW rates with past iterations of the course (Table 1), and the rates for the redesigned BIOL 152 (2013) were considerably lower than previous semesters.

Table 1. BIOL 152 total enrollment and DFW rates 2008–2013.

Semester	Enrolled	D	F	W
2008	413	53 (12.8%)	23 (5.5%)	19 (4.6%)
2009	408	34 (8.3%)	5 (1.2%)	15 (3.6%)
2010	461	53 (11.4%)	23 (4.9%)	25 (5.4%)
2011	451	46 (10.1%)	30 (6.7%)	30 (6.7%)
2012	396	46 (11.6%)	21 (5.3%)	36 (9.0%)
2013	**473**	**10 (2.1%)**	**14 (2.9%)**	**11 (2.3%)**

As mentioned earlier, we are in the midst of analyzing data on learning gains. We also plan to gather two to three years of data on exam performance before running comparative analyses, which will give us a clearer picture of student achievement in the redesigned course. Our preliminary results indicate that spring 2013 exams were equally rigorous to previous semesters. Watch for more information about student performance in BIOL 152 in CTE's newsletter next fall.

Student impressions—A post-course survey administered by the Center for Online and Distance Learning (CODL) was conducted, which provided feedback on what students found helpful and what did not work well. Most students thought the increased use of Blackboard improved their performance in the class, and ~70% of the respondents indicated that additional online content would have been helpful (Table 2). Regarding the web-enhancement of the course, two students commented:

"At first I thought the web stuff was over the top, but by the end of the semester I really appreciated all the work the instructors put into helping us understand the material through out-of-class resources."

"Web content for this semester helped a lot and kept me updated on everything I needed, considering I commute to class."

The scientific paper discussions received the most varied responses. This result was not at all surprising, since asking students to share their opinions with 400+ of

Table 2. Responses to post-course survey of BIOL 152; results are reported as percent of the 159 respondents completing the online survey.

	Strongly agree	Somewhat agree	Somewhat disagree	Strongly disagree
Compared to other courses at KU, the BIOL 152 Blackboard website was easy to navigate and improved my performance in the course.	**46.6%**	29.1%	13.5%	8.1%
I would have liked to see even more content, such as podcasts or videos, on Blackboard.	**39.7%**	31.5%	13.7%	5.5%
The pre-lecture quizzes required me to read in advance of lecture and helped me learn better.	20.9%	**53.4%**	15.5%	8.1%
The Chapter Self-Assessments were helpful for reviewing the lecture material.	**81.1%**	14.2%	3.4%	0.0%
The scientific paper discussions helped me to obtain a grasp of how science is conducted.	15.0%	25.9%	23.1%	**30.6%**

their peers can create discomfort. However, 40% of the class indicated that the activity was at least somewhat useful. Therefore, the activity was modified based on student comments, and during the current semester students will again be asked to read and discuss four papers during lecture.

It will come as no surprise that redesigning a course, especially one as large as BIOL 152, requires a lot of time and energy. Participation in the CTE workshop was important in this effort, because it created a time each week when I was able focus on the course and share ideas with some of the most talented instructors at KU. Transforming the course into its current, highly web-enhanced format required a significant investment of time and would not have been possible without the support of Julie Loats and her staff at CODL. I would strongly recommend meeting with the staff at both CTE and CODL as the first step for any instructors considering redesigning or flipping their courses. ◆

Redesigning the Redesign

Phil Baringer
Physics & Astronomy

I've survived the experience of redesigning a large-lecture introductory course, and I'm on to the next step—thinking about what I should do differently when I teach this course next time. In this essay I'll briefly describe the redesign process that I went through, and I'll share a couple of the questions I am currently pondering.

The course in question here is PHSX 211, the first semester of an introductory general physics sequence that is taken primarily by engineering, earth science, and physical science majors. In fall 2013, Michael Murray and I taught separate sections of the course, but we worked closely on the redesign and had common exams and homework assignments. Each section had around 150 students in a large auditorium setting. We put lecture videos on Blackboard for students to view before class and reserved class time for group problem solving. Undergraduate teaching assistants (UTAs) were used in class to assist groups, with a ratio of about one UTA per 50 students.

I began thinking about the course redesign about a year earlier. Through CTE and the C21 Consortium, I got ideas and encouragement. In spring 2013, I taught a small Honors version of this course to 20 students. During that semester CODL staff very patiently taught me how to make videos and post them on Blackboard. I made two types of videos—narrated PowerPoint lectures and example problem videos. The narrated lecture videos were each around 15 minutes. Example problem videos varied from five to 15 minutes, depending on the complexity of the problem. That first semester I managed to post a little more than one of each type of video per week. In the fall I had the same frequency of lecture videos, but I made one example problem video per class session (three per week). The other part of the course preparation was finding good problems to give students in class. This proved to be easier than I thought, as there is a lot of material out there to choose from. Next time I teach the course, I expect the process of revising in-class problems to be similar to what I normally go through to update and improve lecture materials.

I agree with what many others have said—flipping a course the first time is an enormous amount of work. It felt like I started spinning dozens of plates on the first day of class, and then had to frantically run around keeping those plates spinning until the last day of class. Happily I got through the semester with only a few of those plates falling and breaking. (And this was with another instructor sharing the load, and having taught the course many times before, and having started preparing a year ahead.) Preparing online materials for a flipped course is a very safe and controlled undertaking; the in-class

part, though, is more like trying to prepare for improv comedy. The student-centered nature of the class time made it much more fun, however, and having the support of the UTA's helped keep the classroom energy level high. The best guidance I can offer for the in-class part comes from Ms. Frizzle of *Magic School Bus* fame: "Take chances, make mistakes, get messy."

One of the things I like about the flipped format is that it makes the student's responsibility for learning quite explicit. With the traditional lecture format, the instructor and student can pretend that somehow skills and information are pouring into the student's head and that they will be retained. This really kind of does work for a small fraction of introductory students, but we want to reach a larger number. When we tried to engage students in active learning during class time, some understood the point and embraced it, but others balked and thought we were not doing our job. Even though we showed them the studies and explained the rationale, a significant fraction of freshmen and sophomores in this class didn't buy into it. They would sit around in class waiting for others to answer questions. They would Google the homework problems rather than engage with them. They would ignore the videos and the textbook. And of course they would fare poorly on the exams as a result.

One question I have for next time is, should I stop bribing students to come to class? Students got points for attending class, and so they did, overwhelmingly. That doesn't mean they were engaged when they came. Back when I was teaching in the lecture-plus-clicker-question format, I decided to stop giving attendance points, and this led to a much better in-class experience for me and for the students who did come. Somehow the dead weight of disengaged and disinterested students in the large lecture hall stifled the students who did want to be there. Chris Fischer is teaching a flipped PHSX 211 course this term, and he isn't giving attendance points. He studied the results of a midterm exam and found dramatically higher scores for students who did come to class compared to those who didn't. Of course, this may be measuring a correlation between class attendance and the overall level of student engagement, or it may be showing value added by the in-class group problem solving, or most likely it may be showing some combination of the two. The instructor should give students the best possible guidance on how to learn material, and the best possible opportunities to do so. But the instructor can't force a student to take advantage of those opportunities. As always, I will describe the path to success in my syllabus and in class. But in order to persuade them to follow that path, do I really need to lay out brownie points along the way that students can collect like candy treats? Do I better serve the engaged students by doing less pandering to the disengaged ones? (This latter question also bears on how to slant the in-class improv routines.)

One of the things I like about the flipped format is that it makes the student's responsibility for learning quite explicit.

Another question I am wrestling with is the relationship of the textbook to the other course materials. In my syllabus (and in class), I always state that students should read the relevant sections

of the textbook before coming to class. In the days before flipping, I would design my lectures to underscore key points of the textbook and use clicker questions to gauge student's understanding of the material. The in-class lectures have turned into the narrated PowerPoint videos on Blackboard. My approach to the videos, like my approach to the lectures, was to offer highlights of the chapter. I had one student confess to me that he wasn't watching my online videos because they were redundant with the textbook (which he was actually reading). I told him I highly approved of his choice. This got me thinking that perhaps I should just post a chapter reading guide rather than those lecture videos, thereby making it even more explicit that the students are supposed to read that text for which they paid so much money. I believe the example problem videos I post add value for the students beyond the text, because they can see my thinking process as I work through a problem. Perhaps some shorter, more focused PowerPoint videos on particular topics within chapters would work better than the whole-chapter-based ones.

The course redesign experience is intense and exhausting, but it is also revitalizing. I look forward to teaching this course again and getting it closer to "right." I also look forward to more conversations with the C21 group. I'll take new ideas and encouragement any time I can get them. ◆

Course Transformation: A Student's Perspective

Blair Schneider
Geology

Educational reform has always been a genuine passion for me. As a PhD student, I have found avenues to pursue it along with my science education, including working as a graduate teaching assistant when I completed my master's degree at KU, serving as a GK-12 fellow and working with UKanTeach courses for two years, and staying actively involved in several clubs and organizations where we go out and teach geology and science to the public, namely students in elementary and middle schools. I was hired as a graduate assistant for the Center for Teaching Excellence in fall 2013, where I assist with the C21 Consortium and help with course transformation for faculty participating in the group. When I came into this position, I felt very confident that I was way ahead of the game because of my prior experience. What I found out very quickly is that I'm not.

Course transformation, particularly flipping a classroom, was completely unfamiliar to me. And to be honest, it's because I have very rarely experienced it in my eight years as a college student. The few classes I do remember that resembled some aspects of a transformed course were during my undergraduate program. Since beginning work with the C21 Consortium, I cannot fully express how disappointed I am that I never was provided the opportunity to learn this way.

Course transformation is simple—you make better use of your class time. By taking lectures, facts, and simple calculations out of the classroom and helping students learn those on their own before class, instructors have time to work on challenging problems that we know students struggle with, do demonstrations in class, or show examples of real-world applications to the material being learned. I feel confident that if I had had the opportunity to learn this way in my more difficult science courses, I would have been more successful in them. I spent so much time trying to pass the classes that I didn't retain much information when I left. I felt burnt out and never wanted to deal with that type of science again. I've since mastered material from those courses, but only because I had to apply them to the research I am doing now.

One lesson I want to expand on from working with C21 is the misconception that students retain information by taking tests or by reading a chapter in a book, but that just isn't true. The courses that I remember the most, that I really took something away from,

were the courses that actually applied the material I was learning. I took away a lot of information from my stratigraphy course, for example, because the last month of the class was spent going out to a site and mapping a mile long section of outcrop. It was a hard, grueling project, but everything I remember from that class is from that project; I don't remember a single exam question. I realize now that this is probably one of the reasons why geology appealed to me so much as a science—we spend so much time on field trips applying the material we talk about in class. This isn't to say that courses should not have exams; exams are an important way for faculty members to assess what students are learning. But the expectation that students doing well on an exam means that they will remember that material later on simply isn't accurate; there must be more applying, analyzing, evaluating, and creating for retention to occur.

I am so grateful to have the opportunity to be involved with the C21 Consortium, especially at this point in my career as a PhD student. I have learned so much in just a short few months, and I have had the chance to meet and work with some fantastic faculty members who have become role models for my future career. Most importantly, I have the advantage now of knowing how classes I teach in the future should be structured, and how to promote learning and retention for my students. It is an experience that few students get while in school, and I plan on continuing to promote course transformation long after I graduate. ◆

From the Frontlines to the Mainstream

Andrea Follmer Greenhoot
CTE/Psychology

KU has been a testing ground for innovative teaching for many years. A number of KU faculty members, including those featured in this volume of *Reflections*, have been early adopters of the student-centered teaching methods that are at the core of "flipped," "hybrid," and "blended" courses. All of these teaching models involve shifting the delivery of information to out-of-class time, often with the help of technology, so that in-class time can be spent on high-impact activities (e.g., group problem solving, writing, and collaboration) that produce deeper and more transferable learning than lecture and note-taking. For many of us, this type of teaching is novel; we learned to teach in a culture that emphasized the role of the instructor as a deliverer of information and the student as the receiver. Shifting these roles in our classes, particularly in large classes, requires real faculty time and energy, some of our most precious commodities in a large public research university. Despite the high value placed on teaching at KU, widespread attainment of this new form of excellence is not a simple and straightforward matter.

Recognizing this state of affairs, this year the College of Liberal Arts and Sciences and the Provost's Office invested in a program to support and promote faculty members' efforts to transform large foundational courses. The program is based on a successful initiative at the University of Colorado and the University of British Columbia (the Carl Wieman Science Education Initiative). Specially-prepared postdoctoral teaching fellows are hired into departments for a three-year period. These fellows partner with faculty to redesign large courses around evidence-based teaching practices. In this first year, KU's program has supported 2.5 teaching fellows, which were awarded through a competitive application process to biology, geology, and geography. Our local version is considerably smaller than those at UBC or CU, but we did have several other things going for us when the program was launched in August 2013. First, there was already a small but critical mass of campus leaders in course redesign, many of whom had participated in one of CTE's faculty seminars on hybrid course transformation in 2012 or 2013. Second, resources were available through the Center for Online and Distance Learning to help faculty produce online materials and take advantage of a range of new interactive learning activities. Third, CTE had hired a documenting learning specialist to help faculty find ways to learn whether course

changes were improving learning.

To integrate these resources and broaden the impact of the teaching fellows, CTE organized a new intellectual community around course transformation: the 21st Century Course Redesign Consortium, or C21. C21 brings together the teaching fellows and department faculty members with whom they are collaborating, plus faculty leaders in course redesign, instructors implementing redesigned courses, course design and technology specialists, and graduate and undergraduate students, all of whom bring various knowledge, experiences, and perspectives to the course transformation process. Our goal was to expand the intellectual exchange and support for this work beyond the three natural science departments with fellows. In designing this learning community we drew on several well-established CTE programs. We adapted an approach from CTE's Faculty Seminar, which convenes a cohort of four to 10 faculty over a semester to work on course design. Similarly, C21 participants met monthly across the academic year to consider strategies, and to share and reflect on results of implementations. Adding course design and e-learning specialists was inspired by a successful project CTE developed a few years ago. The idea of including students in C21 came from a practice that Dan Bernstein used to improve his courses: invite students who have previously taken a course to collaborate on redesign and share insights into the student experience. Yet the scale of C21 is quite unlike anything we have done before. Membership has grown from 40 faculty, staff, and students to over 80, representing 20 different academic departments. Between 35 and 50 participants attended meetings.

Each C21 gathering took the form of a workshop organized around specific goals (e.g., "F2F vs. online: Choosing the best environments for specific learning activities," or "Did it work? Finding and evaluating evidence"). Readings were distributed before meetings, and materials were made available on a Blackboard site. A small number of graduate student assistants followed up with individual instructors after meetings to offer assistance in implementing ideas generated in the workshops.

The size and diversity of C21 made it a unique challenge, but these characteristics also appeared to yield some of the greatest benefits. As Emma Scioli points out in her essay, C21 conversations about teaching with colleagues from very different fields stimulated novel and valuable teaching ideas. Because C21 included faculty with varying levels of experience with redesign, instructors who were newly engaged in the work—like Emma—also had opportunities to learn from KU leaders in course redesign, like Phil Baringer and Mark Mort. As underscored by the title of Phil's essay, veterans have continued to adjust their courses, and C21 provided occasions for them to gather new ideas and reflect on their progress. Including students in C21 offered an "on the ground" perspective on plans for our courses. At the same time, as Blair Schneider emphasizes in her essay, participation in C21 was a valuable intellectual and professional development experience for the students.

The enthusiastic and sustained response to C21 is a testament to KU's identity as a research university where excellent teaching can thrive. Additional evidence comes from a summary of progress made to date: The teaching fellows have now collaborated with 25 faculty members in their departments to partially or fully transform 13 courses, and C21 participants have worked on the redesign of more than a dozen additional courses beyond those facilitated by the fellows. Based on the early success of the teaching fellows, the School of Engineering is hiring a fellow beginning AY2014-2015, and three more will be added to CLAS departments (physics, psychology, and film and media studies). As more courses are transformed, we will be able to look more closely at just how much transformation is needed to produce clear upgrades in student learning. We are poised for the design and implementation of transformed courses to move from the frontlines into the mainstream at KU. As we do, more of our students than ever will have the opportunity to develop high levels of understanding and intellectual skill. ◆