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In this issue, you will find the first in a series of three articles devoted to profiling a few of the University's faculty members who were asked to address the topic, "*Innovative Methods of Teaching.*"

How I Flipped my Classroom and Fell in Love with Teaching Again



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The Traditional Classroom

When I walked into my first course as a newly minted Assistant Professor in 1981, I did so fully prepared to deliver my first lecture. As with generations of college professors before, I received no formal training in the art and science of teaching. Yet I came armed with some 5 years of experience in graduate school, instructing undergraduate laboratories and leading recitation and discussion sessions. I knew that ascending to the professoriate meant teaching primarily by lecturing. I would organize the material, wrap it up into a good story, and hold the floor the entire period – stopping only to ask or be asked the occasional question. Why did I lecture? It was tradition!

Lecturing grew to dominate the classroom experience of Western-education for several reasons. In the early days of university instruction (think medieval Europe) books were expensive and rare. The professor often possessed the only copy of a book and his lecture generally meant sharing the knowledge of the text by reading passages to the students. This tradition was also certainly informed by the format of the church sermon. The lecture

method persisted despite new technologies that made books widely available during the industrial age. Indeed, lecturing suited well the industrialization of university education that characterized the 19th and 20th Centuries. One professor could easily address 100 students in lecture hall, and with amplification, 500 or more.

In my traditional lecture-driven and passive classroom, all of the students took notes and the better ones would do the assigned readings. Come test time, the students would show what they knew by answering questions that I wrote – demonstrating how much of my interpretation of the material that they learned, or perhaps simply memorized for the examination.

Parallel to my traditional classroom lectures, I taught hands-on laboratories that fully engaged the students physically and mentally. The students executed experiments, collected and analyzed data, and assembled reports with references to the literature. Unlike my lectures, my labs used active learning.

The laboratory portion of my courses was always more work but more fun for both the students and me. It was not that I was a lousy lecturer – quite the contrary. What I finally figured out was that lecturing is a lousy way to teach! Sometime around the year 2000, I attended workshops at the HU Faculty Institute that introduced the concept of the learner-centered classroom. A few years later, my young colleague, Dr. Deidre Gibson (whom I had recruited to the faculty and who is now my department chair) attended an off-campus workshop for geoscience educators. I saw her apply the learner-centered techniques from that experience in her classroom and I was sold.

Turning Tradition on its Head

Stepping away from the lectern in favor of learner-centered approaches requires rethinking how one approaches the educational endeavor. Before reading about my method, consider if you could embrace the following caveats:

1. Education is more about learning how to ask good and appropriate questions of the material than it is about memorizing sets of facts or specific narratives.
2. The classroom experience is not about you, it is about the students.
3. The validity of information is not dependent upon having it come from your lips.
4. Students should be required to obtain and do the required reading prior to coming to class.
5. You may hold students responsible for material they are required to read even if you did not cover it in class.
6. The voices of students rather than yours should dominate the classroom.
7. Learning happens best in a circle, with students looking at each other rather than focusing only on the professor or projected image on a screen.
8. You are responsible for ensuring that all students participate fully and that no student either dominates or withdraws from the process.
9. Learner-centered approaches are less orderly than lectures so you are responsible for building structure in the course in other ways.

10. Technology should empower students to learn and be effective peer-teachers.
11. Technology should empower you to make better use of the precious time you share with the students.
12. It is important for students to take ownership of their educational experience.
13. Students should understand that they play a critical role in the learning community of the classroom and that their presence facilitates the process – when absent they and the rest of the community lose out.

My Method

I developed this method through experimentation in several different courses that encompassed the full range of academic levels: Introduction to Environmental Science (MES 130), Marine Biology (MES 400), Gateways to Renewable and Sustainable Energy (MES 290), Eating for a Healthy You and a Sustainable World (HON 290, co taught with Dr. Michelle Pen-Marshall) and General Ecology (MES 430). I found the method equally useful for all course levels. Note that the lower level courses included students from a wide variety of majors.

I provide a syllabus that details all of the student expectations and explains how the course runs. The students are required to sign a contract that says they read the syllabus and that they will keep active their HU Pipeline email and Blackboard accounts. The elements of the method are:

1. The students are required to complete the assigned readings for the day prior to coming to class. They are to bring with them six written questions. The first two questions are based upon the previous classes' material. The next four questions are drawn from the new readings for the day. On the first day of class the students do an exercise that teaches them how to read a passage and develop higher level questions. I instruct the students to avoid definitions and simple facts, and to instead focus on higher level of cognition (application, evaluation, compare and contrast, etc.).
2. Each day begins with a quiz. I use the class roster to call on five different students to state their quiz question – recall this is based on the previous classes' material. All the students are required to write an answer for each question. Next we grade the quiz. I use the roster to call on a new student and ask them how they answered the first question. We discuss that answer to determine if it is acceptable and compare it to alternatives from other students. This process is repeated until all five questions are graded. The students do self-grading in this exercise. A few students may try to cheat the system and award themselves unearned credit. This is not hard to detect and typically those students end up doing poorly in all the other aspects of the course. I try to build an environment based upon trust and valuing integrity.

3. Next, a student will give a 7 – 10 minute PowerPoint presentation on a topic they previously selected from a list that is included in their syllabus. These topics complement the readings for the course. The point is not to have students teach from the readings, but to present on issues related to the primary material. All students are required to write two questions to ask the presenter. I use the roster to select three or four students to ask their question. I may also ask questions of the presenter, and curious students often raise their hands to continue the discussion. On some days there are additional student presentations as explained below.
4. I devote the remaining class time to the new material for the day. As with the quiz, I will use the roster to select a student to ask a question and another student to answer it. These questions typically stimulate additional discussion. At the end of class the students turn in their graded quizzes and written questions. They earn up to 5 points for the quiz and 5 more points for bringing all of the required 6 questions. Occasionally I will call on a student to provide a question for the quiz or discussion and that student will confess to coming to class unprepared. This is where eyeglasses are useful. For I will dip my head, look over my glasses and ask her or him if this will happen again? I remind them of the contract they signed and that they are responsible for pulling their weight in the learning community. This is very uncomfortable for the student and the attendant mortification is generally sufficient to prevent a reoccurrence.
5. I use several kinds of additional learner-centered activities to supplement the regular class program. In Environmental Science, I require the students to choose a “personal sustainability action” that they will do for the semester. I provide a list of suggested activities, but encourage them to suggest others. They commit to do things like take shorter showers, unplug electronics, recycle, ride a bike, etc. The students report to the class on their activities as well as writing papers on what they did and why it was important. I also require students in Environmental Science to bring to class “Enviro-Events” three times over the semester. These are 1 or 2 minute presentations of something of environmental consequence appearing in the news. These presentations are typically also accompanied by some discussion. In my advanced courses I also require the students to complete a service-learning project related to the course and to write about it.
6. I use a mid-term and final examination as two of the evaluators of student achievement. However, in keeping with the learner-centered theme, I require the students to generate the questions for each exam. The students are instructed to NOT indicate a correct answer. The students receive points for posting questions in a discussion group in Blackboard. I provide specific instructions on the number and kind of questions required, and the readings or chapters to be covered. Again I emphasize developing higher level cognition questions. I compile all the submitted questions and email that file to the entire class. This file

typically contains some 300 questions. I try to select questions from each student to use on the examination. The exam consists of about 50 questions, including several essays. Of course, the quality of the submitted questions is variable and I have to edit and modify as needed. Often the students will avoid submitting questions on some of the more difficult topics and I have to generate those. I use BlackBoard to administer the examinations. The students take the exam outside of the classroom on their own. I tell them they are allowed to use the readings or any other published source (including online sources) to help them answer the questions, but they are not allowed to obtain aid from any person. The students that fail to adequately prepare for the exam typically can't finish the test in the allotted time.

Further Explanation

The above method requires providing the students with well-organized readings broken-up into sections of an appropriate size for each day. This is essential to the success of the flipped classroom. The traditional lecture method provides the students with a well-organized set of notes. My flipped-classroom does not. However, the better students often come to class with outlines they created from the readings.

In some classes, I use text books and am careful to specify the exact pages or chapters required for each class-meeting. In my green technology class, I created my own modules and posted them on Blackboard. In some classes, I will use videos or movies in the same way as required readings. For example, in the food class I teach with Dr. Penn-Marshall, we have the students view the films "Food Inc." and "Super Size Me" and to develop questions for discussion from those.

I also use other types of learner-centered assignments not mentioned above. Again in the food class, we require the students to create a three-day photographic food diary. The students photograph everything they put in their mouths over a 3-day period. They then present this to the class in the form of a collage for each day using PowerPoint. They also run their dietary selections through the USDA MyPlate program to produce a report on the nutritional content of what they ate.

I actually do some lecturing in my classes. For a few complex topics, the students benefit from my giving a mini-lecture of 10 minutes or so to clarify important points. I also have a few favorite stories to tell regarding some topics. These range from my experiences doing research in the Arctic, to how I advised my 1970's college roommates on ecological principals to maximize their marijuana crop growing under lights in the closet. And I will sometimes spend a few minutes talking about an important event in the news that relates to the class topic. Short videos often help with that. While my standard classroom program provides the predictability that students crave, it is also good to break-up things with a variety of short activities every so often.

I also use email and post materials on Blackboard to alert students to relevant recent articles and short videos that come to my attention. Students do need frequent reminders to check their HU email often, as social media is the primary means of communication for many of them.

I find the flipped-classroom to be more stimulating and fun to teach than the traditional lecture format. The students sometimes generate excellent questions that force me to rethink closely held notions. They provide a fresh set of eyes to view the material and may bring new perspectives to the topic. The flipped-classroom facilitates the development of a learning community.

Using instructor-regulated discussion ensures that introverted students get as much floor time as the enthusiastic extroverts. I repeatedly see how shy students learn to gain confidence and become more comfortable with speaking in class. The method also allows me to get to know and understand the students much better than I ever did in the professor-centered classroom.

The essence of the flipped-classroom is that time is devoted to having students exploring, thinking about, and communicating the material. Rather than using (in my view wasting) class time to present basic material easily garnered by reading, the flipped-classroom focuses on mastery of the concepts and developing an internal language for deeper thought.

The physical classroom setting is important for facilitating my learner-centered approach. The traditional classroom is structured so that the students can easily see the professor and *not* their fellow classmates. Lecture halls with fixed seats are the worst in this regard. Better are classrooms with movable desks that facilitate rearrangement in a circle. My favorite venue on campus is the Marine Science conference room. Students sit around the boardroom style table that enables free discussion as well as viewing projected material for presentations.

The Russian revolutionary V.I. Lenin once remarked that, “Quantity has its own quality.” Translated to the educational setting and the revolution in teaching: the number of students matters. I have used my method with as many as 35 students in a class. I think that is the effective upper-limit. Beyond that, it I suspect it would be difficult to maintain a cohesive learning community that regularly engaged each student several times a class. I prefer sections in the size range of 15 -20 for my method. There are other learner-centered techniques for use in the larger classroom.

Summary

The flipped-classroom builds a learning community where students take ownership of their education. Instructor regulated discussion ensures equity of participation. Precious class time is devoted to deeper understanding of and communicating about the material. Professors and students put more into and get more out of the process than the traditional lecture-driven approach. My method is just one of many different approaches that facilitate learner-centered instruction. I encourage colleagues to consider my approach as well as others, and to feel free to experiment with their own ideas. There is no one best way to teach. We should celebrate the diversity of the faculty including the variety of ways of instruction they offer. So if you feel that the traditional lecture style works best for you and your students, that is perfectly valid. However, I do encourage even the most ardent traditional lecturers to at least try a few learner-centered techniques to enliven their classrooms. Times change, students change, and our disciplines change; so let’s all be willing to grow in the way we teach.

Announcements

PKAL Summer Leadership Institute—Applications Due March 24

PKAL Summer Leadership Institute for STEM Faculty

Institute I: Pendle Hill, Wallingford, Pennsylvania, July 18–23, 2014

Institute II: Baca Campus of Colorado College, Crestone, Colorado, July 25–30, 2014

Applications due March 24, 2014

The **PKAL Summer Leadership Institute** is designed for both early- and mid-career STEM faculty engaged in leading projects aimed at transforming undergraduate STEM education in their classrooms, departments, and institutions. The Institute curriculum is grounded in a carefully coordinated blend of theory and practice related to the politics of institutional transformation, and aims to empower STEM faculty to act as agents of change in their home institutions and/or professional societies.

Personalized mentoring and professional coaching are cornerstones of the Institute experience. As such, a team of six to eight expert mentors works with participants throughout the Institute to shape a personal agenda for leadership and to guide participants in conceptualizing how they can implement institutional change action plans at their institutions.

Early- and mid-career STEM faculty are invited to apply for this Institute. There is no limit on the number of applicants from a single institution. However, because the Institute is designed for individual leadership growth and development, team applications are not appropriate.

All applications are due on March 24, 2014. Women, minorities, and persons with disabilities are strongly encouraged to apply. For more information on the Institute, **click here**.

To learn more about PKAL, please visit www.aacu.org/pkal, e-mail us at pkal@aacu.org, or call us at 202.884.7439.

A Network for Academic Renewal Conference

February 27–March 1, 2014

Portland, Oregon

Register by February 5 for reduced conference rates.

General Education and Assessment: Disruptions, Innovations, and Opportunities will examine how emerging disruptions in higher education are leading to positive opportunities for innovation in general education and assessment to improve the undergraduate experience for all students. The conference will feature innovations that go beyond a single program or campus, pedagogy or practice, and that show how tenure-track and contingent faculty, other educational professionals, community partners, and students are developing expanded paradigms for learning that matter for students, the workforce, and communities both local and global.

Featured Presentations Include:

From Disruption to Design: A General Education for 2030?

Randall Bass, Vice Provost for Education, Georgetown University; and Sybril Bennett, Associate Professor, Journalism, Belmont University

Examining Leadership Paradoxes: New Students and Faculty on Campus

Adrianna Kezar, Professor of Higher Education, Rossier School of Education, University of Southern California; and Robert T. Teranishi, Professor of Education, Morgan and Helen Chu Chair in Asian American Studies, University of California–Los Angeles

Leading Innovation and Institutional Transformation

Ellen Junn, Provost, San Jose State University; and Anny Morrobel-Sosa, Provost and Senior Vice President for Academic Affairs, City University of New York Herbert H. Lehman College

Evolving Identities of E-Portfolios

Bret Eynon, Assistant Dean for Teaching and Learning, La Guardia Community College/City University of New York

The Degree Qualifications Profile: Framing Learning Outcomes for General Education

Holiday Hart McKiernan, Chief of Staff and General Counsel, Lumina Foundation; and Paul Gaston, Trustees Professor of English, Kent State University

Reflection for Innovation

Terrel Rhodes, Vice President for Quality, Curriculum, Assessment, and Ashley Finley, Senior Director of Assessment and Research—both of AAC&U

In addition to a full roster of concurrent sessions and plenary presentations, AAC&U also offers practical Pre-Conference Workshops—three hours of active learning with some of higher education’s leading innovators in developing strategies, practices, and policies that lead to student success.

Learn more about this conference and register online.

For more information, please call 202.387.3760, or write to Siah Annand at network@aacu.org