

Teaching Statement

Sandra Spiroff

A teacher affects eternity; he can never tell where his influence stops.

- Henry B. Adams

I have been involved in education and its impact on the surrounding community my entire career. Moreover, my experience in the classroom includes working with students from every range of the spectrum, from those who struggle in the traditional academic setting to those who excel in any course. The former group includes underrepresented minority college students who have chosen non-traditional classes, as well as high school students more than one year behind their academic peers, while the latter group includes initiates to the prestigious national honor society Phi Beta Kappa and precocious high school teens who voluntarily devote weekday afternoons to extracurricular mathematics.

I have also had the pleasure of working with graduate students and advanced undergraduates. I have conducted undergraduate research with junior and senior mathematics majors at the University of Utah and Seattle University. In addition, this past summer at the University of Nebraska-Lincoln, I developed and team taught a course for incoming graduate students. The class was based on a research paper published in the journal *Communications in Algebra* and required a unique approach to teaching an Algebra course. At the University of Utah, I mentored the students working under my post-doctoral advisor, answering questions about mathematical material, graduate school, and employment. I also administered a Master's Oral Exam and a Ph.D. Final Exam.

However, most of a mathematician's teaching experience is gained from interacting with the average undergraduate population. Therefore, I am addressing my teaching philosophy to this demographic. Of course, the themes discussed color my interactions with the above mentioned more advanced students, and come into play where applicable.

Every job is a self-portrait of the person who did it. Autograph your work with excellence.

-Anonymous

The first theme of my teaching philosophy is *variety of teaching methods*. It is my goal to present material in a way that is interesting and approachable to the students, while preparing them for future classes or jobs that require mathematics/mathematical thinking. To this end, I employ several different teaching styles in the classroom in order to add variety to my instruction. For example, while at the University of Illinois at Urbana-Champaign, I taught in the Calculus & Mathematica, Active Learning, and Merit Workshop sequences. (See www-cm.math.uiuc.edu, www.math.uiuc.edu/Bourbaki/Teaching/ActiveLearning.pdf, and www.math.uiuc.edu/MeritWorkshop, respectively.) The first type of course relies heavily on computer-based instruction, while the Active Learning classes regularly employ graphing calculators. All three make extensive use of small-group learning, but the Merit Workshop is characterized by its large minority population, specifically recruited for these classes. Although I am no longer engaged in teaching these specific courses, I continue to employ various aspects of them in my current classes to keep the students' interest and attention. Moreover, beyond Mathematica, I make additional use of computers in my classes. For example, each course has a website where students can access important information regarding

the class, and if applicable, a WeBWorK component. Another example is the use of Maple to create, or have the students create, graphs of functions which are presented to the class for identification and discussion. Finally, my teaching is characterized by the use of fun demonstrations and unique approaches to the material. The students find these entertaining and enlightening. Some examples include an experiment of Newton's Law of Cooling, a discussion of critical points during a movie of a roller-coaster ride, and a painting exercise to illustrate the geometry of the inverse of a function. Besides communicating my enthusiasm for the course content and the class as a whole, the occasional and random use of these in my presentations keeps the students interested in what is occurring in class.

Tell me and I'll forget. Show me, and I may not remember. Involve me, and I'll understand.

-Native American Saying

The second theme of my teaching philosophy is class participation, which I believe is directly related, in a positive manner, to the first theme. More specifically, since the atmosphere in the classroom is often one of discovery and experimentation, students are more willing to engage in discussion. When in front of any class I urge students to interact with me concerning the material being presented, but I usually like participation to be voluntary. Because I see the classroom experience as a two-way street between teacher and student, as well as a cooperative effort among students, whenever possible I have individuals demonstrate mathematics at the chalkboard. In addition, since I do not ask for perfection or even a completed solution, students are willing to come forward to make an attempt or to provide a first step in a multi-layered problem. This fosters a positive atmosphere in the classroom, for I am viewed not as the mathematical opponent, but as the calculus coach with the class as my team. Moreover, it demonstrates to students the problem-solving process, with which many struggle, and allows them to see how a classmate is approaching a problem. Finally, at many opportunities, I circulate around the room asking and answering questions, keeping everyone involved. If all else fails, silence is an effective tool in achieving class participation. Given a thirty-second pause after a question posed by the teacher, at least one student will be compelled to offer a suggestion.

They may forget what you said but they will never forget how you made them feel.

-Anonymous

The last theme of my teaching philosophy is feedback, which I view as falling into two categories, namely student-to-teacher and teacher-to-student. Both of these have formal and informal components. One example of informal student-to-teacher communication is the short written comments about the class which I request from students within the first few weeks of the semester. This is very casual and anonymous and allows me to assess my teaching and make the necessary adjustments or explanations at that time. Asking for feedback in this way helps my relations with students because they are pleased that I care about their opinion of the class and my teaching thus far in the term. For more formal feedback from students in the course, I use the university evaluations at the end of the term.

The teacher-to-student communications also occur formally and informally. One example of informal feedback is the verbal communication in the classroom mentioned above. Because of the relaxed atmosphere in class, many students are more willing to speak up, thereby providing me with the opportunity to clear up their questions and concerns and to make suggestions, which benefits everyone in attendance. In terms of formal teacher-to-student assessment, I believe in providing frequent, equitable, written feedback to my students. This takes the form of regular homework, quizzes, and tests, all of which are graded and returned to students in a timely fashion. At the University of Utah and Seattle University, I used the WeBWorK homework system, which received much positive feedback from those in my classes. Students have described my courses as “tough, but fair” and I am pleased with this description. They must work hard to earn an A, but it is also clear that everyone has an equal opportunity to achieve this, or any, grade.

I am still learning.

-Michelangelo

In summary, there are many complexities and dynamics in the classroom that make effective teaching a challenge for any instructor, but I believe that by remaining true to my three main themes, I create a successful atmosphere in my mathematics courses. Moreover, as with the WeBWorK system, I update my instructional methods and ideas when I learn of new ways which can benefit my students. Because I have received much positive and appreciative feedback from students over the years, I am confident that I have achieved the correct “mathematical formula” for my classrooms.

Teaching Vita

Sandra Spiroff

Graduate Educational Experience:

University of Nebraska-Lincoln

- Developed and team taught an algebra course in the IMMERSE program
- Mentored pre-graduate students

University of Utah, Salt Lake City

- Mentored graduate students concerning mathematical content, graduate school, and employment
- Presented four talks in the Mini Course “Classical Problems in Commutative Algebra”: *Cohen-Macaulay Rings, Injective Modules and Gorenstein Rings, Auslander-Buchsbaum Formula, Chow Groups*
- Participated in the Graduate Colloquium, presenting the talk “The Divisor Class Group of a Noetherian Normal Domain” to graduate students and faculty
- Organized, and presented in, the Commutative Algebra Seminar

University Educational Experience:

Seattle University, Seattle

- Developed and implemented undergraduate research projects
- Implemented and maintained the WeBWorK computer homework program
- Taught Calculus II and Abstract Algebra II

University of Illinois at Champaign-Urbana

- Won the Mathematics Teaching Award
- Employed alternative teaching strategies in the *Calculus & Mathematica*, Active Learning, and Merit Workshop sequences; www-cm.math.uiuc.edu, www.math.uiuc.edu/Bourbaki/Teaching/ActiveLearning.pdf, and www.math.uiuc.edu/MeritWorkshop, respectively
- Taught Business, Intermediate, and College Algebras, Calculus I & II

University of Utah, Salt Lake City

- Received highest ranking as Calculus instructor Spring 2004
- Guided an independent study student in an REU program (Research Experience for Undergraduates) under the VIGRE grant (Vertical Integration of Research and Education)
- Presented the talk “Unique Factorization” in the Undergraduate Colloquium
- Used the WeBWorK computer homework program
- Taught Business Algebra, Business Calculus, Calculus I, Abstract Algebra

High School Educational Experience:

Normandy School District, St. Louis

- Co-developed an alternative education program designed for students at least one year behind their academic peers
- Interned during summers within the community, for example (1) in the Diversity Department of the USPS in the City of St. Louis, and (2) in the Human Resources Department of the Regal Riverfront Hotel
- Taught Algebra I & II, Basic Math, Geometry, Math Analysis, and Calculus

University of Illinois at Champaign-Urbana

- Served as Research Assistant on a collaborative project between Danville High School and the education and mathematics departments of the University of Illinois to improve teacher preparation; see www.ed.uiuc.edu/meter

University of Utah, Salt Lake City

- Participated in Science Day, presenting the talk “Unique Factorization and the Roll of the Dice” to prospective college freshmen and their families
- Gave several presentations in the Math Circle program, engaging Utah high school students with strong mathematical interests and abilities in advanced topics

Computer Experience: C, Macaulay 2, Maple, Mathematica, WeBWorK