

## *Teaching Statement*

**Sandra Spiroff**

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, in addition to 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. To be specific, I have mentored the students working under my post-doctoral advisor, answering questions about mathematical material, graduate school, and employment. I have also administered a Master's Oral Exam and a Ph.D. Final Exam. In addition, I am engaged in research with a fifth year college senior who possesses a strong mathematical background and future. Our joint project stems from a result of my doctoral thesis.

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.

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](http://www-cm.math.uiuc.edu), [www.math.uiuc.edu/Bourbaki/Teaching/ActiveLearning.pdf](http://www.math.uiuc.edu/Bourbaki/Teaching/ActiveLearning.pdf), and [www.math.uiuc.edu/MeritWorkshop](http://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. Another example is my use of Maple to create graphs of functions which I present to the students 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.

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.

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 semester. For more formal feedback from students in the course, I use the structured university evaluations at the end of the semester.

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. 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.

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. 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**

### **High School Educational Experience:**

#### Normandy School District, St. Louis

- Helped develop 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](http://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

### **University Educational Experience:**

#### Saint Louis University, St. Louis

- Taught Intermediate Algebra and Business Calculus

#### University of Illinois at Champaign-Urbana

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

University of Utah, Salt Lake City

- Guided an independent study student in an REU program (Research Experience for Undergraduates) under the VIGRE grant (Vertical Integration of Research and Education)
- Taught Business Algebra, Business Calculus, Calculus I, Abstract Algebra (Spring 2006)

**Computer Experience:** Maple, Mathematica, Singular, Macaulay 2, C program