Statement of Teaching Philosophy

Having taught for over 30 years, I possess a teaching *history* as well as a teaching *philosophy*. I actually wrote my teaching history first, which has been omitted for brevity (but can be accessed at http://myweb.lmu.edu/jdewar/), and from which I distilled the following statement of my teaching philosophy.

My role as a teacher is simply this: to encourage learning.

I find it particularly satisfying to observe that the university's mission statement contains a similar phrase. Of course, as with all statements of mission or philosophy, "the devil is in the details." And when the discipline is mathematics, one has to admit that some students would sooner engage the devil than the discipline. Here are some of the details of how I encourage learning.

I approach students as people

All people have talents, interests, needs, anxieties, and competing demands for their time, and students are no exception. When I began teaching, students were not that much younger than I was. Understanding them and connecting with them was easy. Over my teaching career, students have typically viewed me as a faculty member who was approachable and concerned about them. However, eight years ago, my understanding of students changed profoundly, when my oldest entered college, and again five years later, when my youngest started college (which happened to be during the fall of 2001 and 9/11 occurred). Awareness of the complex moods, motivations, and prior experiences of my own children gave me a new lens through which to view my students. I surreptitiously take roll the first day of class by asking them to "Tell me your name, major and something you did last summer or over break." I encourage networking by offering to help them share emails, phones and instant messaging monikers if they so choose. In certain classes I ask for an email containing a math "autobiography," their reasons for taking the course, and their expectations from it. If a student has a problem, I try to help them get to the source of it. I listen to my students. Examples of listening and responding to students' needs span my teaching career. I'll mention two. In 1976 I began organizing a yearly Career Night for Women Math Majors because the sophomore women math majors were very concerned about what career opportunities mathematics could provide them. These were so popular and informative, that within a few years we opened them to all math majors. This event continued through most of the 1980's and was finally replaced in the 1990's by the career speakers who spoke in conjunction with the (then) new MATH 190/191 Workshop Course sequence for freshman math majors that I co-developed (see comments on course and curriculum development, page 2). More recently, during the LACTE grant (see comments on grants, page 3) I conducted a focus group with future K-12 math and science teachers, asking what would help them reach their goal of a successful teaching career. They said: "Connect us with role model teachers for math and science." The result was the creation of the Meet the Teachers Roundtable event, now in its 8th year, where our future teachers participate in exemplary hands-on math and science lessons, learn how to present these lessons, and make appointments to visit the classrooms of the role model teachers.

I project enthusiasm and possess a passion for the discipline

I do love mathematics. I especially enjoy the "aha! Experience" when I finally see the path to a solution of a difficult problem. I want my students to share that joy and to learn

to appreciate the beauty of an "elegant" solution. I want my students to understand that mathematics is not just about numbers; rather, it is *the search for and the study of patterns*. I also want students to know that math impacts their daily lives in a profound way. So I discuss how mathematics is involved in their every use of the Internet, each credit card purchase, or any medical test. Finally, students are expected not just to generate a correct answer, but also to explain the reasoning behind their answer.

I do my best to apply what is known about learning mathematics in my classroom

I subscribe to the constructivist theory of learning that knowledge is constructed by connecting new ideas to old. I champion mistakes for what they are - real learning opportunities. In the mathematics classroom, a wrong answer is almost always the right answer for some other question. I listen carefully to what students say, analyzing what the misconception is at the root of the error, and then help them connect their answer to the "right question." My classroom is a safe place to make mistakes. I strive to actively engage all students in my classroom, through think-pair-share or consult with your neighbor or quick write activities. Concepts are illustrated in various ways with hands-on materials, if possible. I use a variety of means, including writing prompts and portfolios, to promote my students' metacognitive thinking and self-reflection on their learning. I model desired outcomes and strive to clarify my expectations. In courses that involve mathematical proofs (especially in MATH 248 Introduction to Methods of Proof), students have the opportunity to re-write proofs until they meet an acceptable standard of excellence. I am convinced of the value in letting students know clearly what a teacher expects them to do. I provide specific learning objectives, rubrics for grading major assignments, portfolios or papers (yes, students do write papers in certain of my math courses), and, at times, sample tests.

I have been and continue to be heavily involved in course and curriculum development

Early in my career I became interested in the problems of math anxiety and math avoidance. I developed a one-day workshop "Counteracting Math Anxiety" that was offered through Continuing Education. The foundations of this workshop continue to influence my teaching today, especially when teaching courses for future elementary teachers or for non-majors. Closely related research interests into the under-representation of women in math-related fields led to the development in 1979 of a math/science core course entitled: Mathematics: Contributions by Women, originally numbered as ST (Scientific Thought) 206 and cross-listed as Women's Studies WS 221. Due to changes in LMU's core, this course has evolved into MATH 398 Women and Mathematics that directly addresses the needs of future teachers. The course combines a study of the lives and mathematical work of 9 women mathematicians from Hypatia of Alexandria to Emmy Noether of modern times with an examination of gender equity issues in mathematics education and participation. It has always included a significant amount of mathematics at the appropriate level. Students typically enter the course unable to name a single woman mathematician. They exit with a significant increase in knowledge of women's contributions to mathematics and of the factors that will encourage school-aged girls (and boys) in their studies of mathematics. They are also better able to articulate what the discipline of mathematics entails.

Another major course development project was undertaken in 1991 with two colleagues, Dr. Thomas Zachariah and Dr. Suzanne Larson. We developed a two-semester sequence for freshman mathematics majors to improve the retention rate and to enhance the education of our majors. The courses have four components: (1) Problem Solving, (2) Mathematical Writing, Verbal Communication and Study Skills, (3)

Mathematical Culture, and (4) Mathematical Careers and People. This course incorporates many relatively new pedagogical innovations, builds a community of learners, makes students more adept problem solvers, increases students' confidence in their ability to solve problems, and improves their mathematical writing and communication skills. To aid in institutionalizing this course the project team developed course materials and resources including a student manual and an instructor's course manual in print and on disk for this two-semester workshop-course. MATH 190/191 has been assessed in a number of ways both quantitative and qualitative using pre- and post-tests on problem solving, student surveys of attitudes, knowledge of potential careers, ability to name mathematicians, and end-of-course surveys. Most significantly, the dropout rate for students taking both semesters of the course during 1992-2000 was one-half of the dropout rate for LMU math majors during the preceding five years.

<u>My grant work dovetails with my teaching/advising</u>

In 1995 LMU joined 9 other universities to form the Los Angeles Collaborative for Teacher Excellence (LACTE), a 6-year $5.5 million dollar project funded by the National Science Foundation to improve K-12 math/science teacher preparation. One legacy of LACTE at LMU is an increase in Liberal Studies majors concentrating in mathematics (and science), paid internship opportunities at the California Science Center, and new math (and science) courses for these students. The math department now boasts more than a dozen future elementary teachers concentrating in mathematics (up from zero before LACTE). I frequently advise these students, as well as our math majors headed to secondary teaching, about courses, conferences to attend, and scholarships.

<u>My research informs my teaching</u>

My recent experience as a 2003-4 Carnegie Scholar has given me additional insights into mathematical learning. My colleague, Dr. Curt Bennett, and I have adapted and expanded R. Shavelson's typology of scientific knowledge to create a new typology of mathematical knowledge that contains 6 cognitive dimensions and 2 affective dimensions of mathematical learning. Across these 8 dimensions we applied P. Alexander's Model of Domain Learning, a classroom-based theory of expertise, to create a Mathematical Knowledge Expertise Grid that provides a useful framework for analyzing and thinking about my teaching and my students' learning.

<u>I show my students how mathematics provides lessons for approaching life</u>

In virtually all my classes, I find the opportunity to say: "Problem solving is what you do when you don't know what to do, because if you did know what to do, it wouldn't be a problem, it would be an exercise." Useful heuristics to approach problems include: *Understand a problem before you tackle it! Gather data and look for patterns. Test hypotheses. Break a complicated problem down into smaller more manageable pieces. Have you done something like this before? If one approach isn't working, try another approach. Monitor yourself: What exactly are you doing? Why? Suppose you did manage to accomplish that, how would it help you?* These exhortations apply both to solving mathematical problems and to real-life problems of all sorts. One former student of mine based his philosophy of life paper for his philosophy course on the problem solving strategies discussed in my course. I know this because he later shared the paper with me. That student's paper is one of my treasures.

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