MAA/Tensor Foundation/MUW Math Camp

Bonnie L. Oppenheimer, Ph.D.
Assistant Professor
Division of Science and Mathematics
Mississippi University for Women
boppen@muw.edu
(662) 329-7239

Abstract: Mississippi University for Women received a $5000 MAA/Tensor Foundation grant to hold a summer residential Math Camp in 2000. The structure of the camp, faculty and staff, activities, and the statistical results from the pre- and posttest are given. Changes for the next camp are discussed.

Mathematics is a beautiful and valuable subject, but girls are often deterred from the many benefits of mathematics by societal pressures and the lack of sufficient training. The Mathematical Association of America in conjunction with the Tensor Foundation offers grants up to $5000 to support mathematical activities for women. We proposed to bring 20 rising high school freshmen girls onto the campus of Mississippi University for Women (MUW, or the W) for a week to encourage these girls to stay in college-preparatory mathematics courses.

Founded in 1884 as the first public college for women in America and admitting men since 1982, Mississippi University for Women currently is ranked the number one regional public liberal arts college in the South by U.S. News and World Report. This is the third consecutive year that the university has received this ranking and the sixth consecutive year that the university has been in the top 10 among its peers for academic reputation and campus diversity.

Located on 104 acres in the heart of residential Columbus, Mississippi, 24 of The W's more than 60 buildings are listed on the National Register of Historic Places. As high-tech as it is historic, The W features a fiberoptic backbone that links every residence room, classroom and office to the Internet, interactive videoconference classrooms, state-of-the-art computing facilities and a satellite uplink.

Quality education for women has been implicit in the W's mission since its inception. We find that many girls have limited their involvement in mathematics by choosing to take fewer and lower level mathematics courses than boys do while in high school. The W already hosts a Sonia Kovalevsky Day, where we bring high school girls onto campus for a day of mathematical activities. We proposed a similar opportunity for younger students, bringing them on campus for a more extensive time to demonstrate the beauty, utility, and fun in mathematics. We wanted the students to finish the week with two thoughts: 1) Mathematics is truly fun! and 2) I should take as much mathematics as I can in high school.

Notification of the $5000 award was made March 24, 2000. All the Math Camp instructors had already committed to the project at that point. Dr. Bonnie Oppenheimer, Assistant Professor of Mathematics in the Division of Science and Mathematics at Mississippi University for Women, was the project director, having had worked with the Mississippi State University (MSU) math camps as a mathematical consultant and presenter. Dr. Jane Wenstrom, the Clare Boothe Luce Professor in the Division of Science and Mathematics at Mississippi University for Women, runs our Sonia Kovalevsky Day. Dr. Dorothy Kerzel is an Assistant Professor of Mathematics in the Division of Science and Mathematics at Mississippi University for Women. She has presented on probability and statistics at various teaching-oriented conferences, and has presented workshops at MUW's annual Sonia Kovalevsky High School Mathematics Day. Dr. Wenstrom and Dr. Kerzel wrote material for and taught at a week-long enhancement program for in-service middle school teachers as part of an Eisenhower grant. Dr. LeRoy Wenstrom,

mathematics teacher at the Mississippi School for Mathematics and Science, has helped with several of our Sonia Kovalevsky Days. He also helps run professional development workshops for in-service middle and high school teachers. Carol Wright, National Board Certified mathematics teacher at Weir Attendance Center, worked at the MSU math camps with Bonnie. Carol maintains an intensive presentation schedule while continuing to teach high school mathematics.

The award letter asked us to check that a program for girls only would be allowed on our campus. Although it seemed obvious that MUW would be the perfect place for such a camp, there did seem to be some legal concern. When we finally were allowed to send out the publicity and application forms, the publicity mentioned that the camp was for 20 girls, but the application form had both male and female boxes that could be checked. No boys applied, fortunately.

Information was sent to public middle schools via the statewide fax line. Private schools in the area were contacted directly. The W's Public Affairs department contacted the local newspapers. We had five phone calls from Jackson the day the information ran in the *Clarion Ledger*.

Since the W runs Governor's School, we borrowed their information packets for their participants, and revamped them for Math Camp. (For example, we could take out all the information about male/female visitation hours in the residence halls.) Successful applicants were sent an acceptance letter, a publicity form to be sent directly to their local newspaper, campus map, insurance coverage form, off-campus activities form, T-shirt order form, discipline statement, and general information about being on campus. When these participants arrived, they were given a research permission form to sign, and their room assignments and phone numbers. All forms were checked for missing signatures. Unsuccessful applicants were called and given their position on the waiting list. Three people on the waiting list were called by the end of the first evening, and attended camp the rest of the week.

We didn't stop borrowing from the Governor's School at just their forms. Since Math Camp was going to run the week before Governor's School started, we called the counselors who had gone through their application and interview process, and hired two of them to be Math Camp counselors. We couldn't have been happier with this decision. Jennifer Meriwether and Rebecca Rogers were in charge of all activity times, discipline outside the classroom, and meals. Although Carol Wright did stay in the residence hall also, the counselors were in charge of lights out and wake up calls. They did an excellent job for us.

We had very good attendance from several of the schools with minority populations, and the camp was 80% minority. B. L. Moor Attendance Center in Oktibbeha County sent seven students. Both Armstrong Middle School (Starkville) and Oak Hill Academy (West Point) sent three students. B. F. Liddell Middle School (Noxubee) sent two students. We had one student each from South Lamar School in Millport, Alabama, Lee Middle School (Columbus), Murrah High School (Jackson), Whitten Middle School (Jackson), and Crystal Springs Middle School.

Parents and the camp participants could arrive on campus on Sunday, June 4, anytime after noon. At 4:00 p.m., we introduced the Math Camp staff to the parents, and went over the pickup

procedures at the end of the week. Parents could stay for supper with their daughter. Afterwards, we split the girls into their groups, had them pick their group names for the week (Hott Girlz and Tigerettes), design the Math Camp T-shirt, and make their name posters. This last proved to be the best thing we did for the girls. A name poster had the girl's name vertically down the side of the poster, and each girl had to find words to describe herself that began with each letter of her name, which were then written horizontally on the poster. Once created, the posters were hung on the front of the lab tables we were using. From the front of the room, we could see the names on these name posters and know where each girl was sitting. Every time one of the Math Camp participants impressed us, we put a sticker on her name poster. (We had lots of stickers for each Camp instructor.) The girls worked hard for these stickers!

We ran two rooms of ten girls each throughout the week. Each group did the same activities, just in a different order. The sole exception to this was the pretest and posttest, which everyone did at the same time. The classroom activities included enlarging a picture, making a computer quilt, designing a building using Maple, doing an algebra relay, using geoboards, examining a solar system model, using algebra tiles, building with zomes, making tessellations, measuring and estimating, learning about graphing calculators, making tetrahedron kites, using tangrams, doing games and puzzles, learning about codes, working with matrices on graphing calculators, and examining patterns. Each group took a field trip to MSU's Engineering Research Center, to see the Virtual Reality Lab (the Cave). In addition, the W had a Concert on the Green during that week, and the Math Camp girls line danced for hours to the live music.

On Friday, parents could come onto campus to eat lunch with their daughters. Time was allowed for packing up rooms and cars, and then an Awards Ceremony was held. The girls were given their name posters with all the stickers on them, as well as the computer quilts, tessellations, and kites. Awards were presented from each of the other classroom activities; the counselors gave out awards as well. We made sure all participants received at least one award.

When the pretest and posttest scores were examined using a matched pairs t-test, the posttest scores were statistically significantly higher than the pretest scores. ($n = 20$; $\bar{d} = 6.025$; s.d. = 3.02; $t_{calc} = 8.92$; $t(\alpha = .05, \text{d.f.} = 19) = 1.729$.) The attitudinal surveys showed no significant differences. ($n = 20$; $\bar{d} = 0$; s.d. = 1.54; $t_{calc} = 0$, and $t(\alpha = .05, \text{d.f.} = 19) = 1.729$.) Contact will be maintained with the students and/or their school counselors to track the mathematics courses chosen by the girls attending Math Camp throughout their high school careers. Right now, two of the participants are in Prealgebra, 16 are in Algebra I and one is in Geometry. We have lost contact with one camper.

There were many surprising facts we encountered as we tried to put the Math Camp together for the first time. We were unaware that we needed to carry insurance on the campers, or that we needed to hire our own lifeguard even if we had the pool reserved. A multitude of reports from the W's Financial Affairs office will follow the principal investigator for at least two years. One parent lied about his daughter's mathematical training. (This is the camper who no longer attends the school on her application forms.) A registered letter to the parents requesting the name of the current school has had no effect.

Now that we have experience doing summer residential camps, there are a few things that we will do differently this coming summer. We will change the mathematical focus to geometry, and invite both girls and boys. There will be no grade restriction on this camp; students must only meet the requirement that Algebra I has been completed, and Geometry will be the fall mathematics course. The counselors suggested a later bedtime, and less time to eat. My colleagues suggested that the Camp Director not also be a Camp Instructor. Waiting for the grant notification was harrowing. We announced this year's camp with a tuition of $350, with a possibility of scholarships if the grant is awarded.

To avoid some of the problems from those who did not meet the camp guidelines last year, we will add a recommendation form to be completed by the school principal about likely behavior at camp; a form to be filled out by a mathematics teacher stating that the student has passed or is likely to pass Algebra I; and a form from a school counselor that the applicant will take Geometry during the next school year.

All things considered, Math Camp was easy to put together. We wouldn't be considering doing another summer residential camp if the first hadn't been such a success. We recommend that more colleges and universities in the LA/MS Section try their own version of Math Camp. Pick a topic for which your campus can have fun creating activities, apply for some grant support, and try it!