In the summer of 2003, I began my first of six summers as a counselor at Many Point Scout Camp, a Boy Scout camp in northern Minnesota. At Many Point, I had my first experiences in teaching: knot tying, swimming, fire-building, and scores of other outdoor activities. I quickly learned that in order to foster student learning, my instruction needed to actively engage the students and make their practice of the skills the central feature of each lesson. As a Graduate Teaching Assistant at the University of Nebraska–Lincoln, I have been the sole instructor of several classes, including *College Algebra and Trigonometry*, *Calculus III*, and *Contemporary Mathematics*. I have also worked with in-service middle-level teachers and with students preparing to begin graduate study in mathematics. In each of these endeavors, I continue to make active participation the foundation for student learning in my classroom.

This semester, I am teaching *College Algebra and Trigonometry*. In my classroom, you will find students gathered around tables, and you will see me crouched next to a group encouraging the discussion of practice problems. On the board you will see remnants of a brief presentation to introduce the content and skills for the day. You will hear me respond to questions “Is this right?” and “How do I do this one?” with answers “Let’s check. How does your answer compare with your neighbor’s?” and “I am happy to help. Tell me about what you have done so far.” You will see students explaining solutions and strategies to each other in small groups, while pairs of students sketch solutions on the board.

I am sensitive to the fact that many students experience anxiety about mathematics. Combined with anxiety about public speaking, the pressure of presenting a problem at the board can be overwhelming. I seek to ease my students’ anxiety about (presenting) mathematics by creating opportunities for students to present and discuss solutions in low-risk environments with their peers, and this is my motivation behind recommending that a volunteer sketch a solution on the board with a buddy. I present this suggestion to the volunteer under the guise that the buddy can hold the notebook. While the pair works, other students are busy at the tables, with their attention diverted from the (potentially nervous) pair at the board. I consistently observe pairs communicating about the mathematics and presentation of an exercise while at the board, and they confidently return to their table after completing the task. These two small adjustments (with a buddy and without scrutiny from their peers) allow the pair to present their group’s solution in a more comfortable environment. I complete this exercise in low-risk class discussion by asking the group to select a representative to stand (again with a buddy) and explain the solution to the class.

A particularly memorable example of student involvement in my classroom took place in *Contemporary Mathematics*, a terminal sophomore-level course which covers statistics, voting theory, fair divisions, and graph theory. During a brief unit on the Monty Hall problem, I introduced the rules of the game (three doors, two goats, one car, and the choice to switch or stay) and posed the question of whether it is better to switch or stay. I asked students to “think, pair, share” their responses. Bringing the class together for a large-group discussion, responses were mixed, with most students predictably inclined to stay. To identify the better strategy, each small group of students played 15 iterations of the game. Half of the groups were instructed to use the “stay” strategy, and the remaining half the “switch” strategy. The “stay” groups reported their findings first, and were pleased to have found the car 5 or 6 out of the 15 times. When the “switch” groups shared their results, in which they consistently found the car 10 or more times, the remarkable difference in the successes of the strategies

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was evident in the data. Moreover, this activity helped the students arrive at the conclusion that is better to “switch” and provided a framework for students to construct their own explanations of the conclusion.

In summer 2014, I assisted with the NebraskaMath/Math in the Middle course *Number Theory and Cryptology for Middle Level Teachers*, a week-long course for in-service middle-level (grades 5-8) teachers. I helped present the background necessary to introduce the RSA encoding scheme, including a proof of Fermat’s little theorem. I presented a combinatorial proof based on the idea of counting necklaces. This strategy served to highlight the general principle of the proof while also utilizing tools which were appropriate for the audience. After my experience working with in-service middle-level teachers, I am excited to work with future mathematics educators.

I incorporate the use of technology into my classroom to support active student participation. In *Contemporary Mathematics*, I used the classroom response system Socrative during the lesson that introduced voting theory. The Socrative system allowed students to participate in a mock vote using smart-phones, tablets, and laptop computers. I complemented this activity with a discussion of how the upcoming voting systems will use the votes to select winners. In this same lesson, I used Socrative to complete an Exit Quiz. Each student indicated how well he or she understood of the day’s material and shared something he or she learned. After class, I reviewed the responses, which informed my design of subsequent lessons on the topic.

In addition to focusing on active participation to fuel student learning, my instruction also reflects the simultaneous roles of the students. All at once, each student is a learner of the specific subject matter of the course, a learner of mathematics, and a learner in general. In *College Algebra and Trigonometry*, where the majority of students are in their first semester at Nebraska, I highlight skills necessary to be successful students (of mathematics), such as effective note-taking and scheduling ahead of deadlines. For example, students are expected to complete weekly online homework assignments, where each assignment covers 3-4 sections. When presenting an example in class, I make note of the homework problems which are similar to this example, and encourage students to tackle the assignments in small pieces: “After today, you will have seen and practiced the material necessary to complete section X on homework assignment Y.”

I continue this strategy outside of class, where I further emphasize a development of problem-solving strategies. For example, I recently assisted a student in my *College Algebra and Trigonometry* class with review for an exam. We discussed steps for finding an equation for a linear function from a given pair of points. I complemented this discussion with the following question: On an exam, what clues will you use to conclude that you need to find the equation for a linear function? I feel that this kind of discussion helps foster students’ abilities to see mathematics as a source of inspiration for problem solving rather than a body of equations and formulas.

While teaching *Contemporary Mathematics*, I found that my lessons were not fully meeting my goal of focusing on student participation and practice. When administering quizzes, I would periodically ask for feedback to gauge students’ feelings about the course and material. In the first half of the semester, there were several comments with the following theme: Less lecture, more practice! I took these comments to heart and took more care to design my presentation of the material to allow for more practice. When transitioning from my
presentation of the material to group work, I emphasized that group work is a time to practice skills and develop mastery. My goal is to help students see that we practice the skills not because we know them, but rather so that we will know them. In a course evaluation at the end of the semester, a student commented on the change in style from the beginning of the semester, noting that “class was a lot better and helpful” after the change. The same student stated “This is the first math class where I have learned things I will actually use in my future.”

With the help of colleagues and mentors, I work to improve the quality of my teaching. Twice during my time at Nebraska I have utilized the Office of Graduate Studies’ mid-semester Teaching Analysis By Students (TABS) survey; in Spring 2014, a visit included a video recording of my teaching. I found the recording of my teaching to be an incredibly informative tool. I saw in this recording that I frequently spoke about my presentation on the board at the same time that the students were copying down the information from the board. Since viewing this recording, I have made consistent and conscious efforts to allow adequate time for students to write notes before I make verbal comments. I can’t reliably listen and write at the same time, and so I shouldn’t expect that my students can. Moreover, I work to present the material so that students’ notes serve as both a helpful guide in the early stages of practice and as an organized reference for later review.

I also seek to improve my teaching as I encounter new classroom environments. I have not yet had the opportunity to teach a traditional proof-based course like abstract algebra or analysis. These courses will provide new opportunities to reflect on my teaching as I interact with highly-motivated mathematics majors, and I welcome the challenge and the opportunity.

I strive to make my classrooms a welcome place for all students, and I believe that I am best able to meet the educational needs of my students when I better understand their diverse backgrounds. As a first-generation college student, I am sensitive to the fact that each of my students will enter the classroom with a unique set of experiences, and that these experiences will influence the way in which each student interacts with his or her peers and the course material. I make a dedicated effort to better understand these experiences. For example, at the start of the Fall 2014 semester, I invited each of my students to visit my office. In a short conversation with each student, I asked each student to tell me about his or her past experiences with mathematics, concerns about the course, and any other information which would help me to better serve as his or her instructor for the semester. These conversations were incredibly informative, and I believe that they set the tone for a successful semester to come.

I feel very fortunate to have taught a wide variety of courses at different levels and for groups of students with different backgrounds. One of the most touching student comments I have received came from a Calculus III student. The comment states in part “More students would find mathematics interesting and fun if taught by Mr. Lutz. As a math major I look forward to learning more from Mr. Lutz in the future.” This comment inspires me to continue in my efforts to improve my teaching as I strive to present mathematics in a welcoming and engaging way.