TEACHING STATEMENT

MATTHEW J. LAFFERTY

In 2010 and 2011, I was fortunate to be selected as an NSF GK-12 fellow at the University of Arizona. The aim of the Arizona program, known as G-TEAMS (Graduate Students and Teachers Engaging in Mathematical Sciences), was to get graduate students into K-12 classrooms in order to develop innovative, rigorous, and applicable material that could be used in K-12 mathematics courses. This experience had a profound impact on my teaching, and in this statement I would like to reflect on what I consider to be the foundations of my teaching philosophy and how these have been molded by my G-TEAMS experience.

At the time I applied for my first G-TEAMS fellowship I would have described myself as an excellent teacher. I saw the fellowship as an unique opportunity to use my teaching skills to get K-12 math students interested in and excited about math, but never as an opportunity to improve these skills. However, being able to observe many different middle school and high school math classes and interact with the students forced me to question my own effectiveness as a teacher. Many of the students I talked to viewed mathematics as a foreign language of arbitrary formulas, definitions and theorems. To them, math class was nothing more than a torturous exercise in memorization. Unfortunately, the lectures rarely did anything to dissuade them of this. I saw many caring, devoted, and hard working instructors give dry, unengaging lectures in which true understanding of the material was often sacrificed for easy to apply formulas and witty mnemonics. Worst of all, I realized that I was one of these instructors.

I began to rethink how I structured my lessons. Specifically, I wanted my lectures to be more engaging and interesting, while at the same time making sure that my focus was on the student's understanding of the underlying mathematics. I found that one of the best ways to accomplish the latter is to always try to introduce new mathematics by building on past material. Doing so not only helps the students to understand and remember the new material, it may also help them better understand the material on which it is built. For example, in my seventh grade class at St. Michael's Parish Day School, we were covering quadratic equations and needed to discuss multiplication of linear polynomials. While this is nothing more than the distributive property, many instructors (and textbooks for that matter) would only hint at this before introducing the infamous acronym FOIL. By instead focusing on the role of the distributive property, my students were able to come away with a deeper and more complete understanding of the material. In fact, by the end of the class, they were excited by the realization that they could use what they had just learned to determine the product of arbitrary polynomials, not just linear ones.

A renewed focus on student understanding alone would not have much impact if I was not able to keep my students interested and engaged. While I have always made great efforts to keep my lectures interesting, over time I had gotten into the habit of simply talking at the students for the entire class. To make sure that my students are engaging with what we were learning, I began employing the "I do, we do, you do" strategy. After introducing a concept I illustrate this concept by going through several examples. I then have the class walk through an example with me, and finally, I give them an example to work through on their own. Not

only does this keep students engaged with the class, it also helps them to discover points of confusion before we move on to other topics.

In addition to keeping the students involved throughout the class, I also want to keep my lectures fun and interesting. In fact, coming up with ways of doing this is one of my favorite parts of teaching. For example, in a lecture on theoretical and experimental probability I began by recalling the Monty Hall problem: You are on a game show and given the choice of three doors. Behind one door is a pile of cash, and behind the others, goats. After you make your pick, the host opens one of the two remaining doors to reveal a goat. You are then given the option of switching doors. Should you switch? After giving the students plenty of time to think about their answer, we derived the theoretical probability of getting the pile of cash by switching doors. The students were surprised and fascinated by the counterintuitive answer. I then brought out an interactive presentation I had created that allowed students to play the Monty Hall game in order to determine the experimental probability. Their excitement grew as they saw the experimental probability getting closer and closer to the theoretical probability. Much like relating new mathematics to past material, these memorable examples both help students to understand the material as well as remember it. I have no doubt that if I ran into a student from this class tomorrow they would be able to tell me the difference between experimental and theoretical probability.

Beyond lectures and lessons, my G-TEAMS experience also revealed that I could be doing a better job of answering student questions. Prior to G-TEAMS, my answers were often mini-lessons in which I would give a clear and detailed explanation of how to solve a problem from start to finish. While the students would leave happy that their question had been answered, they were not leaving with a better understanding of the material. I realized that I need to guide students to the solution, not carry them there. My answers now invariably begin with some form of the statement, "Walk me through what you tried and show me where you are getting stuck". From there I allow the student to lead me to each successive point by asking guiding questions. While some students are resistant to this more involved approach, I have been amazed at how often it has allowed students to resolve their own confusion. Not only does this lead to greater understanding of the material, it also breeds confidence.

Finally, I want to mention the one aspect of my teaching that has remained constant throughout my graduate career; the attitude I bring to the classroom. Before any definitions or theorems are given, I know that the attitude I bring to the classroom will lay the foundation for success or failure. I firmly believe that the attitude of the instructor will be reflected in the students. In every class I teach, I make a conscious effort to be friendly and polite to the students, to treat them with respect, and to make sure that they know that I genuinely care about their understanding of the material. I do this in order to foster a supportive learning environment, where students are not afraid to ask questions, make mistakes, and otherwise actively engage in the class.

While I would still describe myself as an excellent teacher, it would not be for the reasons I would have cited in the past. Rather, the most important lesson that I've learned from my experience with G-TEAMS is that what makes a great teacher is having the humility and willingness to adapt the way you teach in order to meet the needs of your students.

STUDENT EVALUATIONS

COLLEGE ALGEBRA (MATH 112) - SPRING 2009

University of Arizona
35 students, 14 respondents

	Mean
What is your overall rating of this instructor's teaching effectiveness? *almost always effective* (5) – *almost never effective* (1)	4.6
How much do you feel you have learned in this course? *an exceptional amount* (5) – *almost nothing* (1)	4.3
What is your overall rating of this course? *one of the best* (5) – *one of the worst* (1)	4.2
Rate the usefulness of the outside assignments (homework, papers, reports, and special projects, etc.) in helping you learn. *almost always useful* (5) – *almost never useful* (1)	4.5
Rate the usefulness of the in-class activities (lectures, discussions, etc.) in this course in helping you learn. *almost always useful* (5) – *almost never useful* (1)	4.6
I was treated with respect in this class. *strongly agree* (5) – *strongly disagree* (1)	5
What is your rating of this instructor compared with other instructors you have had? *one of the most effective* (5) – *one of the least effective* (1)	4.4
Of the total hours you spent on this class, how many were valuable in advancing your education? *almost all valuable* (5) – *almost none valuable* (1)	4.5
The materials used in this course (text, readings, websites, etc.) are. *almost always useful* (5) – *almost never useful* (1)	4.6
The difficulty level of the course is. *extremely difficult* (5) – *extremely easy* (1)	3.9

PRECALCULUS (MATH 120R) - SPRING 2010

University of Arizona
33 students, 18 respondents

	Mean
What is your overall rating of this instructor's teaching effectiveness? *almost always effective* (5) – *almost never effective* (1)	4.6
How much do you feel you have learned in this course? *an exceptional amount* (5) – *almost nothing* (1)	3.9
What is your overall rating of this course? *one of the best* (5) – *one of the worst* (1)	3.8
Rate the usefulness of the outside assignments (homework, papers, reports, and special projects, etc.) in helping you learn. *almost always useful* (5) – *almost never useful* (1)	4.2
Rate the usefulness of the in-class activities (lectures, discussions, etc.) in this course in helping you learn. *almost always useful* (5) – *almost never useful* (1)	4.4
I was treated with respect in this class. *strongly agree* (5) – *strongly disagree* (1)	4.8
What is your rating of this instructor compared with other instructors you have had? *one of the most effective* (5) – *one of the least effective* (1)	4.2
Of the total hours you spent on this class, how many were valuable in advancing your education? *almost all valuable* (5) – *almost none valuable* (1)	4.1
The materials used in this course (text, readings, websites, etc.) are. *almost always useful* (5) – *almost never useful* (1)	4.2
The difficulty level of the course is. *extremely difficult* (5) – *extremely easy* (1)	3.6

CALCULUS (MGR., LIFE, AND SOC. SCIENCES) (MATH 1930) - SPRING 2013

University of Nebraska at Omaha

43 students, 24 respondents

5 - *strongly agree / very good*
4 — *agree / good*
3 — *neutral / average*
2 — *disagree / poor*
1 — *strongly disagree / very poor*

LEARNING	Mean
I found this course intellectually challenging and stimulating.	4.4
I learned something I consider valuable.	4.1
My interest in the subject increased as a consequence of this course.	3.6
I learned and understood the subject materials of this course.	4.2

ENTHUSIASM	Mean
The instructor was enthusiastic about teaching this course.	4.5
Instructor was dynamic and energetic in conducting the course.	4.5
Instructor enhanced presentations with the use of humor.	4.4
Instructor's style of presentation held my interest during class.	4.5

ORGANIZATION	Mean
Instructor's explanations were clear.	4.4
Instructor's materials were well prepared and carefully explained.	4.4
Proposed objectives agreed with those actually taught so I knew where the course was going.	4.4
The instructor's presentation of material facilitated taking notes.	4.5

GROUP INTERACTION	Mean
Students were encouraged to participate in class discussions.	4.5
Students were invited to share their ideas and knowledge.	4.5
Students were encouraged to ask questions and were given meaningful answers	4.6
Students were encouraged to express their own ideas and/or question the instructor.	4.4

(Continued)

INDIVIDUAL RAPPORT	Mean
Instructor was friendly towards individual students.	4.8
Instructor made students feel welcome in seeking help/advice in or outside of class.	4.8
Instructor had a genuine interest in individual students.	4.7
Instructor was adequately accessible to students during office hours or after class.	4.8

BREADTH	Mean
Instructor contrasted implications of various theories.	4.3
Instructor presented the background or origin of ideas/concepts developed in class.	4.3
Instructor presented points of view other than his/her own when appropriate.	4.4
Instructor adequately discussed current developments in the field.	4.1

ASSESSMENT & EVALUATION	Mean
Feedback on examinations/graded materials was available.	4.3
Methods of evaluating student work were fair and appropriate.	4.6
Examinations/graded materials tested course content as emphasized by the instructor.	4.7

ASSIGNMENTS	Mean
Required readings/texts were valuable.	4.3
Reading, homework, laboratories contributed to appreciation and understanding of the subject.	4.3

OVERALL	Mean
Compared with other courses I have taken at UNO, this course is.	4.1
Compared with other instructors I have had at UNO, this instructor is.	4.4

CALCULUS I (MATH 1950) - FALL 2013

University of Nebraska at Omaha

32 students, 14 respondents

5 - *strongly agree / very good*
4 — *agree / good*
3 — *neutral / average*
2 — *disagree / poor*
1 — *strongly disagree / very poor*

LEARNING	Mean
I found this course intellectually challenging and stimulating.	4.8
I learned something I consider valuable.	4.3
My interest in the subject increased as a consequence of this course.	3.8
I learned and understood the subject materials of this course.	4

ENTHUSIASM	Mean
The instructor was enthusiastic about teaching this course.	4.5
Instructor was dynamic and energetic in conducting the course.	4.3
Instructor enhanced presentations with the use of humor.	4.1
Instructor's style of presentation held my interest during class.	4.1

ORGANIZATION	Mean
Instructor's explanations were clear.	4
Instructor's materials were well prepared and carefully explained.	4.3
Proposed objectives agreed with those actually taught so I knew where the course was going.	4.8
The instructor's presentation of material facilitated taking notes.	4.4

GROUP INTERACTION	Mean
Students were encouraged to participate in class discussions.	4.4
Students were invited to share their ideas and knowledge.	4.3
Students were encouraged to ask questions and were given meaningful answers	4.6
Students were encouraged to express their own ideas and/or question the instructor.	4.5

(Continued)

INDIVIDUAL RAPPORT	Mean
Instructor was friendly towards individual students.	4.7
Instructor made students feel welcome in seeking help/advice in or outside of class.	4.8
Instructor had a genuine interest in individual students.	4.7
Instructor was adequately accessible to students during office hours or after class.	4.2

BREADTH	Mean
Instructor contrasted implications of various theories.	4.1
Instructor presented the background or origin of ideas/concepts developed in class.	4.1
Instructor presented points of view other than his/her own when appropriate.	4.2
Instructor adequately discussed current developments in the field.	3.8

ASSESSMENT & EVALUATION	Mean
Feedback on examinations/graded materials was available.	4.5
Methods of evaluating student work were fair and appropriate.	4.7
Examinations/graded materials tested course content as emphasized by the instructor.	4.8

ASSIGNMENTS	Mean
Required readings/texts were valuable.	4.2
Reading, homework, laboratories contributed to appreciation and understanding of the subject.	4.8

OVERALL	Mean
Compared with other courses I have taken at UNO, this course is.	4.2
Compared with other instructors I have had at UNO, this instructor is.	4.1

STUDENT COMMENTS

1. *"The instructor made himself available so we could come in and get help, also the pace of the class was good so I didn't feel overwhelmed and understood the material before moving on."*
2. *"(Matt) explains things well"*
3. *"Great teacher and thorough"*
4. *"Mr. Lafferty was always very helpful and easy to talk to!"*
5. *"I liked Matt a lot, he's a great teacher."*
6. *"Mr. Lafferty is one of the best instructors I have ever had because he takes the time to actually teach the material."*
7. *"He was able to keep my focused and interested."*
8. *"He helps really good and explains great."*
9. *"One of the most helpful teachers I've had at this university (UNO) so far as office hours and helping students to be sure we understand the homework and material."*
10. *"Mr. Lafferty really cared about students, enjoyed having him as a teacher."*
11. *"Mr. Lafferty was so nice and understanding."*
12. *"(He was) well prepared and tried to show the application as well as cut out unimportant material."*
13. *"I really enjoyed how he encouraged questions and never felt like they were stupid or a hassle."*
14. *"He is a very nice and helpful guy. Answers all questions and is very willing to help"*
15. *"How open to questions he was is crucial. He did a great job of helping when things were difficult, and got all the note(s) prepared well. He was also extremely dynamic, great professor."*
16. *"The instructor was always very helpful, and available to help. I felt I could ask him anything."*
17. *"The instructor was available by email, before classes and had long office hours which helped me come to a full understanding of the material."*
18. *"He was very insightful at presenting new material."*
19. *"It was well explained and he made sure we understood the material."*
20. *"(His) teaching style was great."*
21. *"The instructor carefully explained the material, always helped answer questions, and was always accessible to reach in person or over email to answer questions. Made the material easy to understand because he explained it so well."*