At the end of my third year as a tenure-track professor at Lewis University, I believe I have met many of the criteria of a good faculty member. Below I have provided a self-evaluation of my progress in the areas of teaching, scholarship, and service.

Mission as an Educator
I am extremely fortunate. I grew up with parents who loved me and loved math, hopefully in that order. I remember working on homework with my dad, an electrical engineer, and how excited he was to discuss the cool and interesting aspects of calculus with me. At the time, I was more focused on “getting the right answer”, but my dad was the first one to show me the beauty and creativity that is mathematics. I also have had many amazing, enthusiastic math teachers throughout my years in school who have inspired me to do what they do. Their approach to teaching mathematics made their classes interesting, challenging, and fun by using activities rather than didactic lecturing. My favorite teacher in high school would say, “we are in school to learn to think creatively and logically”, and as I progress in my career as a mathematics educator, I have adopted his mantra. Learning to think creatively and logically is more than a grade, it is a life skill that will help students be successful in whatever they choose to be in the future, from engineer to economist! This is my mission as a teacher, to enable my students to process the world around them in a creative and logical manner. I believe this mission is closely aligned with Lewis’ Lasallian mission especially regarding the pursuit of lifelong learning skills through creative and critical interactions. I also think that, as educators, we need to question how our methods affect student attitudes toward mathematics. Specifically, I want my teaching to instill a growth-mindset of learning [2]. That is, I want to emphasize that learning is not based on the amount of intelligence possessed by a student, but that understanding can be developed through effort and motivation. These goals as an educator have shaped how I teach, how I serve, and how I approach research.

Teaching Effectiveness
To achieve this mission, I intentionally facilitate a learning environment in my classes in which my students are motivated to think about topics both critically and creatively. Often this comes from interesting and challenging mathematical problems, but it also comes from fostering an active, caring learning environment. Teaching creativity through mathematics takes a little, well, creativity and I am always on the hunt for innovative ideas to improve my teaching. I have worked hard to develop my craft and have pursued and participated in professional development opportunities including the 2016 Inquiry-Based-Learning Workshop, the PKAL STEM Leadership Institute, and several Project NExT1 and Mathematical Association of America teaching workshops.

Active Learning:
One effective method I have developed to make my classrooms more active and challenging is my ICE (In-Class-Exercise) sheets. I use some form of ICE sheets in every one of my classes because I believe in order to learn mathematics students must do mathematics. Often students do not know whether they understand a concept until they try it. When students work on ICE sheets (ideally in groups), I walk around encouraging and helping them one on one. Usually problems on the ICE sheets are interesting and challenging, requiring some level of creativity to solve them. Often the activity will go a step further by asking the students to apply a concept to a new situation, solve a problem multiple ways, or anticipate what we are going to learn that day. For example, before learning to integrate by substitution in Calculus I, students look at less sophisticated integration techniques like polynomial expansion and trigonometric properties. We discuss the shortcomings of these techniques and the need for more robust approaches; one of which is integration by substitution. In my Real Analysis course, I often have ICE sheets that take a theorem we just learned and tweak the language or requirements of the theorem. The students

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1 New Experiences in Teaching, a professional development program for recent Ph.D.’s. in the mathematical sciences
then must come up with examples which disprove the new statement. This allows students to discover why each part of the theorem is vital for the statement to be true. The power of the ICE sheets is that in addition to promoting active learning, collaboration, and critical thinking skills, they are an excellent tool for training students in creative problem solving.

Another effective method I use to facilitate student discussion and active participation is “Voting Questions.” In my Calculus III and Applied Linear Algebra courses I use clicker questions from MathQUEST\(^2\) or create my own to help students check their understanding in a safe setting. Most of the time I pick questions that are slightly more conceptual or demonstrate a common misconception about the topic we are discussing in class. My goal with these questions is to challenge the students and help them learn from their mistakes in a fun way. Other times, I include several simple questions that will lead students to understanding the theory or motivation for a mathematical concept. For example, one of the ways I introduce eigenvalues and eigenvectors in linear algebra is by having students work on solving simple dynamical systems progressing through the clicker questions until they discover the eigenvector property. Students can then see the usefulness of eigenvectors in a very practical way.

_Growth-Mindset and Mastery-Based Testing_

Thinking creatively is challenging. Thinking creatively in a math class is very challenging! Therefore, it is important for me to facilitate a caring learning environment. Many students come into a mathematics class with a fixed mindset of learning or math anxiety. These students either believe they are not “good at math” or think if they struggle in a math class that they cannot do it. One of my goals as an educator is to demonstrate to them that anyone can learn and succeed in mathematics, it just takes time and practice. On the first day of class, I have students complete information cards and one of the questions on it is “What is one of your hobbies and how did you become good at it?” I collect the answers from the class and use them to demonstrate that in order to become good at something, we need to spend time and practice. I have yet to see someone say they were just naturally good at their hobby.

Students fear making mistakes, so the learning environment I want to create should be one which allows students to view mistakes as a learning opportunity. Students often struggle through their ICE sheets which is why it is vital that they feel supported throughout the process so that they do not lose confidence and shut down their own learning. Although they may not know it, when I use clicker questions, I am trying to make them more comfortable with being unsure about their answers since I only see the total votes from the class. Furthermore, when using clicker questions, I find them most effective if I incorporate the simple, but powerful “Think-Pair-Share” teaching strategy. Students can work on the problem themselves and vote. I then ask them to check with their neighbor. This is a simple way to make students collaborate and not feel isolated if they are not sure about a concept. They are not alone!

I believe that as educators, we need to question how our methods affect student attitudes. If we want students to learn from their mistakes and counteract a fixed-mindset of learning, perhaps we should look at what we incentivize in the classroom. One way that I, along with ten other math professors from Project NExT, are attempting to counteract math anxiety, poor STEM retention, and a fixed-mindset of learning is through using and researching a new assessment model called “mastery-based testing” (MBT). This method strives to increase complete understanding of concepts through a growth-mindset approach to learning. MBT allows students to change how they approach mistakes by giving them early feedback and enabling them to retest concepts. Research has shown that mistakes are important opportunities for learning and growth, but students often interpret mistakes as indicators of their lack of ability [3]. MBT reduces the cost for mistakes in assessments which allows

\(^2\)http://mathquest.carroll.edu/
students to learn and re-evaluate concepts. Furthermore, students are incentivized to keep working on concepts until they can show mastery, thus supporting a growth-mindset towards learning. Students who work hard and learn from their mistakes are then able to persevere through the material. I use this method of assessment in most of my classes and have found that students usually like it and prefer it to traditional testing. I have also noticed that it tends to enable hardworking B students to earn A’s since they may just learn material at a different pace.

Fostering Community in the Classroom

I strive to create a comfortable, friendly, active environment to encourage creative thinking. I keep my classes structured but informal so my students feel confident asking questions and participating. I create my own lecture notes for my classes to help us all stay on track and let students feel organized. I believe in active learning, but also that guided discussion interwoven with activities can be a very effective method of teaching. Circulating around the students during the class activities allows me to get to know my students individually and collectively. Students see that I care about them since I make a point to learn their names and majors. This sets a tone of accountability and my students work harder for me knowing I have a personal expectation of them. I also use “Feedback Days” which give students a chance to fill out anonymous feedback for me. This allows students an opportunity to safely tell me something they may not feel comfortable telling me in person. I also try to let my students know me as a person. For example, student quickly find out that I am obsessed with my two cats, Eva and Archer, and I create homework problems which feature them. Usually these Eva and Archer questions require the students to debate methods the cats use to solve math problems. This gives students a fun environment to develop deeper conceptual learning by making them go beyond procedural knowledge. Creating a personal learning environment helps our class become a tight knit group who supports each other and feels a sense of community.

Current Progress and Future Goals in Teaching

During my three years of teaching at Lewis, I have taught seven different courses and conducted five different independent studies. I have experienced a lot of success in my teaching and most of my courses evaluation scores are above 4. After averaging each overall score from every course, I have taught (including independent studies), I average a 4.4. In the next three years, I want to continue to hone my skills as a teacher. In particular, I want to continue to find better ways to incorporate active and inquiry-based learning techniques into my classroom while balancing content coverage. This is a tough line to walk since I believe active learning techniques help students engage better with the material and continue through their STEM major, but I also think students need to engage in an appropriate amount of material for each course. Additionally, I want to continue to revise my teaching materials and methods to keep the classroom challenging but fun and continue to better incorporate applications. For example, in my applied linear algebra course, I use radiography and diffusion labs to help provide motivation for concepts, and I hope to continue to revise and create similar activities. In short, I don’t want to become complacent with my teaching. In his Lilly Conference presentation, “Gone Fish’n: How Bass Fishing Can Enhance Your Classroom Teaching,” Professor Jay Rozema talked about how teaching is a lot like fishing. He told us not to “fish/teach memories” even though it is tempting and easy for a fisherman/teacher to fish/teach in the same old ways and places. As teachers, we must continue to seek new methods to find and catch our “fish” and I plan to keep transforming myself into a better educator.

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3 After averaging each overall score from every course, I have taught (including independent studies), I average a 4.4.

4 Research has found positive learning gains and attitudinal changes in classrooms that implemented active learning, especially for women and lower-achieving students [1].
Research and Scholarly Activity
As a math teacher, I have a huge responsibility in shaping STEM education. All of the sciences need mathematical training, and calculus is often seen as the “gatekeeper” for STEM majors. Unfortunately, many students, especially females and minority students, suffer from math anxiety or lack sufficient background in pre-calculus [4]. This is a problem I want to help solve. Helping to improve STEM retention is especially close to my heart. One way I believe I can help is through exploring alternate teaching and assessment methods and involving undergraduate students in research.

Mastery-Based Testing SoTL Project
As I mentioned in my teaching section, I and others from my Project NExT cohort are trying a new method of assessment in our courses. We are also conducting research on this method to determine its effectiveness and impact on students. For the past 3 years, we have been collecting data from our students through anonymous evaluations and surveys about their thoughts on assessment and the testing process. The main goals for this project include, but are not limited to:

1) Assessing the extent to which students felt they mastered major concepts of the course, examined and reflected on past material, and felt test anxiety.
2) Evaluating whether mastery-based testing influences a student’s mindset on learning, improves the learning of concepts, and reduces test anxiety.

We are currently finishing up a paper summarizing our initial results from this study and hope to publish it in a mathematics education journal within the year. We also manage a blog, mbtmath.wordpress.com, in which we share tips and resources to help people implement this method of assessment.

In addition to this group research, I also conduct Scholarship of Teaching and Learning research comparing MBT to traditional assessment in my Calculus II courses. I am currently analyzing the data I have collected from two years of Calculus II courses and am working on disseminating and publishing my results. Over the past three years, I have presented my preliminary findings at six different regional and national conference including The Original Lilly Conference, the Joint Mathematics Meetings, MathFest, and regional MAA section conferences. I plan to continue this research and have recently commenced another 2-year project in collaboration with Dr. Alyssa Armstrong of Wittenberg University.

Undergraduate Research
When I was an undergraduate, I really benefited from the opportunity to research with my professors, and one of my goals as a faculty member is to provide research opportunities for my students. I am a geometric group theorist by training and unfortunately this research is not the best suited topic for undergraduate students – especially sophomores and juniors. My goal has been to transition from geometric group theory to something more appropriate for undergraduate research. So far, I have worked with eight students on mini-research projects and independent studies involving math education, applied linear algebra, statistics, and data analytics. Most of these projects are conducted through independent studies or SURE, and three of these students have gone on to present their research at national conferences.

One of my goals for the next few years is to continue to improve my ability to facilitate and lead undergraduate research. To aid me with this, I have applied for and been accepted into two different programs, the PIC (Preparation for Industrial Careers) Math Workshop on Data Analytics and the American Institute of

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5 http://maa.org/pic-math
6 http://www.maa.org/node/837521
Mathematics Research Experiences for Undergraduate Faculty\textsuperscript{7}. Both workshops are designed to help undergraduate faculty better engage in research that is accessible to undergraduates.

\textbf{Service}

In my three years at Lewis, I have enjoyed many opportunities to serve my department, college, and community.

\textit{Departmental Service}

I proved early on that I am a contributing member of our department who is willing to lend a helping hand when needed. Within two months of my first year at Lewis, Professor Juraco fell ill and we needed someone to pick up her Fundamentals of Advanced Mathematics class. I took over her class even though it put me at five different preps in my first semester of teaching. Since then, I have served the teaching needs of my department and have taught an overload every semester except one. I also designed and taught two new courses (Senior Seminar and Applied Linear Algebra) and regularly assist during SOAR advising and Campus Visit Days.

In my three years at Lewis, I have worked hard to revitalize the math side of our department and have received a lot of excellent support and freedom to do so from my chair. Within my first year, I created daily math study tables where students can get free math tutoring near the CaMS department, and created promotional and informational material to help guide our students through the Lewis Math Major. As Director of Mathematics, I have also initiated curriculum and assessment changes along with helping the other math faculty construct a Strategic Plan for the math side of our department. I was awarded a Discovery Grant that allowed me to revamp our Senior Seminar course and create a new bi-annual event called Math Bash which helps students learn about the mathematics program and job opportunities in the mathematical sciences. As the faculty sponsor for the Lewis Math Club, I work closely with the club’s officers to help them run events like the annual Math Careers Panel, Pi-Day, Meet an Actuary, Math Bash, canned food drives, poker nights, and more. I have also taken over 30 majors to local conferences and ACCA events.

\textit{College and University Service}

In addition to serving my department, I am also very active in service at the college and university level. In my first year, I was elected onto the Educational Policy Committee and recently I was elected to the Graduate Council. I also serve on the Gender Equity Committee, the Library Advisory Board, The Noyce Scholarship Steering Committee, and the CAS Assessment Committee. I have been on three search committees -two in math (chairing one) and one librarian search. Recently, President Livingston appointed me to serve on the Title IX Task Force. For the past three years, I have also volunteered for the Lasallian Scholarship Interview Program and judged posters for Celebration of Scholarship.

\textit{Community Service}

Beyond Lewis University, I have also engaged in service to our local community. I have led Girls’ Create with Technology sessions, served as one of the NCWIT\textsuperscript{8} Member Representatives for Lewis University, and helped Dr. Howard plan and run events through this NCWIT grant. Specifically, I initiated a Lewis Scholarship for NCWIT Aspiration Winners and helped organize the NCWIT Aspirations in Computing Award Ceremony hosted at Lewis University. For two years, I helped Dr. Kozak with her C.A.T.S program. As part of this initiative, we taught basic programming skills to female students at St. Mary Immaculate Catholic Elementary. I have also served the local community by running local math camps at IMSA and Lewis. We were able to run the Lewis Math Camp for free thanks to a PPG grant that Jared Taylor helped me secure. During this camp, I along with

\textsuperscript{7} \url{http://reuf.aimath.org/}

\textsuperscript{8} National Center for Women and Information Technology \url{https://www.ncwit.org/}
Lewis STEM majors and a colleague of mine from University of St. Francis, taught students graph theory and 3D printing methods. At the end of the week, students created their own games and 3D printed their own game pieces using what they learned during the week.

Math Teachers’ Circles
One of the service initiatives I find most fulfilling has been my work with local teachers. Last year, I created the Southwest Chicago Math Teachers’ Circle\(^9\). This Math Circle provides the opportunity for 5\(^{\text{th}}\) - 12\(^{\text{th}}\) grade math teachers and local college professors to collaborate on developing and refining the problem-solving skills of local teachers and students. This community of learners provides math instructors a supportive network to discuss mathematical and pedagogical issues that arise in the classroom and gives teachers support and resources to initiate more student-centered, inquiry-based pedagogies in their classrooms. I have also found that this math circle helps teachers rekindle their enjoyment of solving interesting and challenging math problems in a supportive group environment. To get this program started, I recruited teachers from St. Xavier University, Trinity Christian College, University of St. Francis, College of DuPage, St. Bede the Venerable Elementary School, and Taft Elementary to help serve on our leadership team. We secured both a Seed Grant to start the circle and a Workshop Grant to run a 3-day Immersion Workshop. This circle has provided me with a way to reach local teachers and collaborate with other ACCA professors who serve on our leadership team. We usually have 15-20 participants at our monthly meetings and rotate the location between Lewis University, St. Xavier University, and Trinity Christian College. I believe this work is very much in line with Lewis’ Lasallian mission of association and has been very rewarding for me, the leaders, and the participants.

Service to the Greater Mathematical Community
As a mathematician, I also have a duty to serve the mathematical community. I regularly judge the Undergraduate Poster Sessions at both the Joint Mathematics Meetings and the Young Mathematicians Conference. I am a reviewer for the mathematical publication \textit{PRIMUS}, and have organized both a paper session and panel session at national math conferences. I also run graduate student workshops on job preparation at both the ACMS\(^10\) bi-annual conference and the Indiana MAA Section meetings. I also created the ACMS Graduate Student Mentoring Network and currently serve as a mentor.

Conclusion
Lewis has provided me with many opportunities to make an impact and grow in confidence and leadership, and I have enjoyed my first three years here very much. Being able to be a part of so many students’ lives and to impact them like my best teachers did for me is exciting and invigorating. I look forward to many more years to come, and hope that my accomplishments and contributions will continue to make me a valued member of the Lewis faculty community.

References

\(^9\) \url{https://southwestchicagomathcircle.wordpress.com/}
\(^10\) Association of Christians in the Mathematical Sciences