

Robert M. Capraro
Promotion and Tenure Candidate Statement
on Teaching, Research, and Service

This candidate statement focuses on my journey as an assistant professor of Mathematics Education in Teaching, Learning, and Culture at Texas A&M University. As I reflect on my journey to this pivotal point in my professional life, I feel that early K-12 classroom experiences with high need populations in multicultural Miami served me well. Three essential tenets emerged, as determinant to my successes with teaching, service, and inquiry and it is this creed that continues to govern my practices and beliefs in my current professorial role. First, high expectations for others and myself sends the personal message to each student that I believe in their abilities to be successful. Second, clearly stated outcome expectations encourage intrinsic motivation and allow control over each individual's potential to succeed. Finally, inquisitiveness through my actions and expectations model the need to understand why and how things happen, an absolute essential for both classroom teachers and educational researchers seeking solutions to 21st century problems.

Teaching

Teaching is the essential component through which both research and service prove meaningful. I invest heavily in the future of graduate students who aspire to teach and research at top-tier universities while supporting undergraduate students who will be the mathematics teacher leaders of tomorrow. This mentoring is time consuming and demanding but immensely rewarding. While having taught an overload three of the five years at A&M, I continue to influence undergraduate and graduate students alike. I serve as chair for seven doctoral students, graduated two, a member of five other committees, serve as chair of 12 master theses, graduated 10 and served on 13 others. All students I mentor present at research conferences including undergraduate students. These students have accumulated 23 solo local, regional, and national presentations and 21 have co-presented with me at national conferences. One undergraduate, six masters and three doctoral students have published their work in peer-reviewed journals and 4 of 5 of my doctoral students have manuscripts under review for publication in top-refereed journals. One graduate student was an invited speaker on effective mathematics pedagogy for secondary teachers in 2003 and 2004 and one earned a Fulbright Scholarship. In joint publications with students, as part of my mentoring process, my name appears last, indicating that students who publish with me understand the whole process from collecting data to making final editor-requested revisions. I have engaged in multiple collaborative projects with undergraduate and graduate students to meet college and departmental expectations for them to conduct research and publish with faculty. I do not coauthor publications with students who conduct research or develop manuscripts while enrolled in my classes even though I provide extensive mentoring and guidance. This is exemplified by the four graduate students who published without co-authorship as a result of research conducted as part of my course requirements (see vita).

I actively seek to continuously improve my teaching by participating in peer reviews of my teaching and reflecting on ways to improve student achievement, conveying material in a more approachable manner, and helping students deal with mathematics anxieties. I have participated in the Academy for Educator Development and the Center for Teaching Excellence at Texas A&M, as well as a departmental peer process involving faculty dyads who both conduct observations and are observed teaching. As a result of this process, I now include mathematically relevant magic to make some concepts more approachable to students, increase confidence, and build rapport.

Research

The decisions about publishing outlets are connected to my goals of becoming adept with substantive methodological techniques and bringing that expertise to the mathematics education community. I make a conscious decision to publish in high impact journals because I wish to reach researchers. Currently, I have five listings in the Social Science Citation Index with an impact factor of 3.822 and cited 28 times in top journals. The complete list of my 25 publications that includes 16 peer-

reviewed journal articles and 3 peer-reviewed contributions to edited volumes can be found on my vita. My research agenda is anchored in thorough educational research preparation. As a reflection of that preparation, my interests, and in light of federal legislation, I believe it is important for mathematics educators to be on the forefront to embrace sophisticated quantitative research methodologies, analyses, and quasi-experimental/experimental designs. The next step for my career is to secure federal funding. I eagerly await the decisions on two proposals submitted to federal agencies on which I am principal investigator.

My research interests are best described as fitted to a tetrahedron, four faces but any three vertices forming a solid foundation regardless of how the shape lands. The functional base, regardless of which face ends up on the bottom, is formed by some tripartite intersection of research, teaching, service, and practical application. Practical application is the process for helping students, teachers, and researchers make better sense of the issues related to mathematical learning and encouraging dialog. I am interested in the representational models that help middle grades students make sense of mathematics and how these representations function to facilitate broader and deeper mathematical understandings as students progress to increasingly more abstract mathematical ideas. This topic has been the focus of recently submitted funding proposals, presentations at national conferences, and the subject of several manuscripts. My most recent work centers on how randomly selected middle grade students from carefully selected school districts and how they interpret the representational notion of equivalence in early algebraic equations. While this investigation is in the early stages, its purpose is to build on notions previously reported by Denmark, Barco, and Voran's (1976) research and to examine the effects of those findings on mathematics pedagogy, student mathematics textbook content, and mathematics teacher preparation.

I have selected six articles that outline my progress toward national recognition as a mathematics education researcher. The article "Treatments of Effect Sizes and Statistical Significance Tests in Textbooks" was an inquiry into the coverage of null hypothesis significance testing (NHST), effect sizes, and confidence intervals in statistics methods textbooks commonly used in courses for applied researchers such as mathematics education PhD students. This study found that while effect size and confidence intervals are gaining page space, they are still eclipsed by coverage of NHST. Therefore, if applied researchers get the majority of their training only from their graduate programs, it is likely that they enter the professorate with inadequate training beyond NHST. That article was the springboard for "Statistical Significance, Effect Size Reporting", and "Confidence Intervals: Best Reporting Strategies" in *Journal for Research in Mathematics Education* (JRME). Recent JRME articles were reviewed and implications of changes to the *American Psychological Association's Style Guide* were discussed for their impact on mathematics education. This led to "Middle Grades: Misconceptions in Statistical Thinking" that epitomizes my interests in how students think about various representational models and what assumptions they make. As part of data collection for that article, I noticed an important language component that functioned as another form of representation. Inquiry into the influence of verbal/language representations resulted in "Are You Really Going to Read Us a Story? Learning Geometry Through Children's Mathematics Literature". The findings indicated that the influence of verbal/language representations, as conveyed through children's literature, impact student achievement by facilitating conceptual development that is both measurable and practically important. These publications were followed by other mathematics education related pieces as I endeavor to make substantive empirical contributions to investigating impacts of representational forms on student learning.

I continuously refine and improve my expertise in quantitative methodological and analytical strategies. I participated in mini-courses offered at Texas A&M University by Drs. Bruce Thompson and Victor Willson, *American Educational Research Association* (AERA), *Southwest Educational Research Association*, and *Northwestern University* (see vita).

Service

Although my service is more than one would expect from an assistant professor, I was one of two mathematics education faculty in the department, therefore, it was incumbent on me to assume a larger

responsibility than would normally be expected. I selected activities that were closely aligned with my research and teaching goals (see vita). I chaired the department committee for *Educational Research Exchange* (ERE) for each of my first three years and the college ERE committee my fourth year. I supported graduate students university-wide as a judge for *Student Research Week*. I served on numerous committees including faculty evaluation (3 times); hiring committees for department head, mathematics education (2 times), and science education; department head's advisory committee on faculty evaluation; and recently was appointed to the college PhD Research Education Task Force where, in part, I was charged with collecting data for this project through my web-based assessment instrument.

For service to the field, I am a reviewer for: several journals (46 manuscripts), national and regional conferences (45 proposals), and a guest reviewer for *Psychological Reports: Perceptual and Motor Skills*. I have grown into leadership roles at the national and regional levels. I am associate editor for *American Educational Research Journal* where I have handled 84 manuscripts, written 81 decision letters, and six reviewer commendations. I was selected to chair the 2005 *Outstanding Reviewer Recognition Reception* at the annual meeting for AERA sponsored journals. I conducted mentoring sessions at the last two annual meetings and my most recent mentee is now a published author. I was nominated for board positions of national organizations of School Science and Mathematics Association, Research Council for Mathematics Learning, and SIG-Research in Mathematics Education. I hold elected positions in the first two and newsletter editor for the Southwest Educational Research Association.

Teaching, Research and Service Summary

My goal was, and remains, to model effective teaching behaviors that reflect current research. I strive to simultaneously provide the most challenging activities, framed by high expectations and multiple authentic assessments that attend to individual needs and abilities. I was nominated by graduate students for college level teaching recognition my second year and received the Montague Scholar undergraduate teaching award in my third year. I co-authored numerous published works with undergraduate and graduate students and colleagues. I was awarded one extra-mural grant and several competitive system grants, of which three led to publications. I served on over 20 committees for the department, college, and university as well as a member of editorial teams responsible for bringing the *American Educational Research Journal* and *School Science and Mathematics Journal* to Texas A&M University.

The Coming Years

I plan to continue exploring interesting analytic methods while advocating for quantitative research reform in mathematics education. In addition, I plan to embark on a methodical exploration of mathematics learning in elementary and middle school students mediated by representational models controlling for social factors. I will continue to submit my work to high-quality journals and collaborate with students and colleagues. I plan to continue my trajectory, advancing my scholarly pursuits and improving our competitiveness with top ten public universities.

I was part of a team that recently brought *School Science and Mathematics Journal* to Texas A&M. With this successful bid, I will gain valuable experience dealing specifically with mathematics and science manuscripts. My intermediate plans are to: (a) complete a book proposal on representational affordances for problem solving, (b) propose a special issue highlighting factors related to representational forms and comorbidity of reading and mathematics disabilities, and (c) continue competing for extramural funding.

In the past I have enjoyed modest funding successes totaling \$111,893 to support my research. With high standards, I expect to earn funding on a large scale given my tenacity to pursue collaborations and partnerships. I expect that my pursuit of federal funding will be fruitful in the near future enabling me to embark on the initial steps of my long-range goal to better understand the nexus of mathematical representations and the mathematical resiliency of underrepresented populations. Foundationally, I have established my research credentials, demonstrated quantitative expertise, made progress toward mixed-methods proficiency, and explored representational forms and their relationship to mathematical achievement.