

***Third-Year Candidate Statement  
on Teaching Research and Service  
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I will focus on my scholarly activities during my initial three years, attempting to provide a picture of how my teaching, research, and service activities are interwoven and build on each other. With respect to my research, I provide a context and some background to illustrate how the major publications build on each other and have begun to have impact in mathematics education. I include plans for future work, with optimism that the coming three years will see a continued gain in prominence of the work that I have begun at Texas A&M.

**Teaching**

My goal is to model effective teaching behaviors that reflect current research. I strive to simultaneously provide the most challenging activities, framed by high expectations and multiple assessments that attend to individual needs and abilities. The idea of a single academic standard is both unrealistic and contrary to our expectations for teachers in the K-12 classroom. If we expect that our graduates will be able to both teach in diverse settings and assess individuals as they progress through various learning experiences, then I believe that I should also attend to providing individualized experiences with customized expectations designed to challenge students to reach their potentials. As an example of my attempt to model best practices for mathematics education, I rely heavily on student selected problem-based learning activities. As an exemplar of my commitment to research based teaching, I have co-authored a publication with one undergraduate student my first year. My graduate students nominated me for college level teaching recognition the second year. Their nomination resulted in my being asked to conduct a brown bag lunch presentation to the College of Education faculty entitled *Promoting Reflective Thinking: A Teaching Prerequisite*. Following the article and the graduate teaching recognition in each of my first two years, the TAMU Center for Teaching Excellence named me as the Montague Scholar recipient representing the College of Education during my third year. Finally, I co-authored a paper pertaining to the statistical teaching and learning issues of middle grade students with colleagues and a graduate student.

**Research**

My research agenda is anchored in thorough statistical preparation. As a reflection of my preparation and my interests, I believe that it is important that mathematics educators should be in the forefront of the call to include sophisticated quantitative research methodologies and analyses. Advances and innovations in the conduct and reporting of quantitative research studies often fail to find their way to applied researchers. It is clear given the increased emphasis by federal education policy on quantitative research methods fluency, a high level of competence in these methods is essential to assume a leadership role in mathematics education research. Qualitative research provides rich descriptions and fosters the development of theory, while quantitative analyses promise the ability to measure and provide support for generalization. My ultimate goal is to become adept at qualitative and quantitative methods that will allow me to generate new theory and rigorously test that theory across various samples.

## ***Progress Toward My Research Agenda***

The decisions I have made about journals in which to publish are connected to my goals of becoming adept with substantive methodological techniques and bringing that expertise to the mathematics education community. I have made a conscious decision to publish in high impact journals because I wish to reach mathematics education researchers. Currently, I have three listings in the social science citation index for an average of .789 impact factor with a total of eight citations by other researchers. Overall, I have a .26 impact factor not counting two *in press* articles that will contribute positively to my impact rating. I compare favorably to other assistant professors (.21) at top ten universities based on our benchmarking results. Overall, I have a comparable ratio of SSCI to non-SSCI rated journals of .33 as compared to assistant professors at top ten institutions (.30).

To provide a context for the reviewer of my work and to develop a sense for how my research will continue to evolve, I have selected six articles that outline my progress toward national recognition as a mathematics education researcher. Initially, I published an article dealing with commonality analysis of the van Hiele construct of sixth grade students. Commonality analysis identifies the common and unique variance contribution of each variable to the model. I followed this publication with a second article that used a meta-analytic method termed reliability generalization, a method which was postulated by Vacha-Haase in 1998. The importance of being cognizant of the reliability of the data in hand is essential because all analyses are attenuated by the same factors that govern the obtained reliability. Additionally, these same factors influence the obtained effect size. This article demonstrated my ability to apply a relatively new methodology to meta-analytically review the historically reported reliability of data for the *Mathematics Anxiety Rating Scale*, a commonly used instrument in mathematics education. This article led an inquiry into the coverage of null hypothesis significance testing (NHST), effect sizes, and confidence intervals in statistics methods textbooks that are commonly used in courses for applied researchers such as mathematics education PhD students. While reliability generalization was a new technique, effect sizes and confidence intervals are historically well established but seldom effectively used in reporting results, even in highly-rated journals. This study found that while effect size and confidence intervals are gaining page space in statistical design textbooks, they are still eclipsed by coverage of NHST. Therefore, if applied researchers get the majority of their training in their graduate programs, it is likely that they enter the professorate with inadequate training beyond NHST. With the publication of this article, I was ready to explore how editorial board members of some of the most prestigious general education oriented journals viewed NHST, effect sizes, and confidence intervals.

I view the manuscript *Exploring the Impact of the New APA 5<sup>th</sup> Edition Publication Manual on the Preferences of Journal Board Members* as my initial attempt to bring general issues of statistics reform to mathematics education. The research for this paper brought me into contact with mathematics educators who serve on the editorial boards of the *American Educational Research Journal*, *Educational Researcher*, *Journal of Counseling Development*, and *Journal of Educational Psychology*. The presentation of this paper at the 2003 AERA conference resulted in 32 advance requests for the paper and a packed room at the conference. This led to my initial successful entry into mathematics education that married methodological issues to

research reporting in the premier journal for mathematics education, *Journal for Research in Mathematics Education* (JRME).

I elucidate my position in the recently accepted article *Statistical Significance, Effect Size Reporting, and Confidence Intervals: Best Reporting Strategies* that reaches mathematics education researchers and mathematics teacher educators. I believe that this manuscript demonstrates my growth as a researcher and establishes a foundation for the next stage of my research agenda.

### ***The Next Three Years and Beyond***

I plan to continue exploring interesting analytic methods while advocating for quantitative research reform in mathematics education. I plan to embark on a methodical exploration of mathematics cognitive development in elementary and middle school students with regard to social issues and mathematics teacher preparation. I see many avenues in which to pursue my interests namely the need to continue the exploration of theory development supplemented by quantitative studies. I will continue to submit my work to high-quality journals referenced by the social science citation index while increasing my presence in the most highly regarded journals for mathematics educators. I plan to continue my trajectory, advancing my scholarly pursuits and maintaining our national competitiveness with top ten public universities.

I plan to investigate the social issues related to individual differences in mathematics achievement when the common factors generally associated with school failure are present. While the at-risk population is relatively large, the proportion of high mathematics achievers within that population is relatively small. Qualitative techniques can provide insights into the resiliency process and contribute to the development of new theoretical concepts. These insights will provide for additional lenses through which we view learners. These theoretical concepts may lead to explicit interventions applicable to at-risk populations who under perform mathematically. It is this population that could be used in quantitative theory testing. However, to achieve this goal, I will need to continue to pursue insights into complex and emergent quantitative analyses while delving deeper into situated learning theory, student enactments of mathematical learning, and the role of representations in mathematics concept development.

### **Service**

While my service is more than one would expect from an assistant professor, given that I am one of two mathematics education faculty, it is incumbent on me to assume a larger responsibility than would normally be expected of an assistant professor. I have selected activities that are closely aligned with my research and teaching goals (e.g., see vita). I chair my department committee for the *Educational Research Exchange* and each year, I support students and colleagues university-wide through my work with *Student Research Week*.

In service to my field, I reviewed for several journals (17 manuscripts), national and regional conferences (63 proposals), and as a guest reviewer for *Psychological Reports: Perceptual and Motor Skills*. While service and leadership to the field are distinct, I plan to grow into leadership roles as my research agenda and professional career continues to evolve.