

LESSONS LEARNED FROM FOUR YEARS IN A JOINT POSITION IN MATHEMATICS AND MATHEMATICS EDUCATION

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Abstract: In fall 2000, I started in a joint position in the Departments of Mathematics and Teacher Education at the University of Southern Maine (USM), as part of an NSF funded CETP grant “Maine Mathematics and Science Teaching Excellence Collaborative” (MMSTEC). This position was created to serve as a “bridge” between two colleges at USM, the College of Education and the College of Arts and Sciences, and one important aspect of my job is to improve 7-12 mathematics education offerings at USM and in southern Maine more generally. A major success has been the development and reintroduction an undergraduate mathematics teacher certification program at USM. Unfortunately, however, this position has been plagued with many difficulties and troubles. Some of these are perhaps due to the particular make-up of USM, and some are due more generally to the nature of a joint position spanning colleges. This paper briefly outlines my experience in a joint position and my understanding of the nature of the problems.

The Beginnings of a Joint Position.

With the awarding of a National Science Foundation Collaboratives for Excellence in Teacher Preparation (CETP) grant to the Maine Mathematics and Science Alliance and three universities in the University of Maine System, I was hired into a new joint position at the University of Southern Maine (USM). This position was funded for five years by the CETP grant “Maine Mathematics and Science Teaching Excellence Collaborative” (MMSTEC) [1] and administrators at USM agreed to fund the position after the cessation of this grant.

In design, the joint position would span two departments and two colleges, the Department of Mathematics and Statistics (Math) in the College of Arts and Sciences (CAS) and the Department of Teacher Education (TED) in the College of Education and Human Development (CEHD). For the duration of the grant, the workload was designed to be divided evenly between the colleges with my teaching one course in Mathematics each semester (25% of load), one course in Education each semester, (25% of load), service to the MMSTEC grant (25% of load, one course teaching reduction), and research (25% of load). One of the main goals for the position was to serve as a bridge between the two colleges, to improve the communication gap between mathematics faculty and education faculty.

To set the context for a discussion of my joint position, it is wise to outline past and

present mathematics education programs and initiatives at USM. With such understanding, a reader may more fairly evaluate my commentary on the challenges presented by a joint position.

A Short History of Mathematics Education at USM.

The University of Southern Maine is a young university, formed by the joining of Gorham State College (GSC) and the University of Maine Portland (UMP) in 1970. The name changed officially to USM in 1978. In 1988 a third campus, Lewiston-Auburn College, was added.

Geography – three separate campuses – has played a crucial role in USM’s development. The College of Education resides on the Gorham campus, and the College of Arts and Sciences resides primarily on the Portland campus, forty minutes away. While the faculties were merged by the stroke of a pen to form USM, a tension developed between the two campuses because of their different missions: GSC’s focus had been teacher training, while UMP was a regional university with increasing research ambitions. Currently, the Mathematics Department has its main administrative base in Portland, while the College of Education remains in Gorham.

Throughout the seventies and eighties, faculty members from the newly combined Department of Mathematics and Statistics were active in training mathematics teachers. The undergraduate certification program was fairly traditional, with a mathematics major, education course work, and student teaching leading to a B.A. in Mathematics and certification to teach 7–12 public school in Maine.

The mathematics educators at USM were very committed and high profile; they organized and led teacher training workshops and activities all over the state of Maine. Most of these faculty members were trained in mathematics education and had formerly worked at the teachers college GSC. There was a lively and thriving undergraduate mathematics education program at USM. In addition to secondary education, several faculty members had expertise and were very active in K–8 mathematics education. (By law, certification in Maine is K–8 or 7–12.) In 1987, a K–8 mathematics educator joined the Department of Teacher Education.

At some point during the late 1980s the undergraduate secondary mathematics certification program was eliminated from the College of Arts and Sciences, though I do not fully understand the circumstances that led to this. Shortly after, the College of Education created a fifth-year professional program, Extended Teacher Education Program (ETEP). ETEP is an extensive post-baccalaureate one year certification program. Students participate in a year-long internship, while they complete rigorous course requirements during evening classes. The internship is one of the great drawing points of the ETEP program; pre-service teachers are in the classroom full time all year long. The ETEP program works closely with partner schools and public school educators. Graduates of ETEP may return

to USM the following year to earn a Masters of Teaching and Learning by completing 13 additional credits.

While ETEP has been very successful in general, its inception together with the end of undergraduate certification, apparently facilitated a growing rift between the Department of Mathematics and Statistics in the College of Arts and Sciences and the College of Education. The number of mathematics majors dropped precipitously. Several of the graduate courses of ETEP (including the Secondary Mathematics Methods course) were non-print, meaning they did not appear in a published course schedule and were not open to non-ETEP students. As a result, undergraduate students and uncertified in-service teachers had no way to become certified mathematics teachers at USM, except through ETEP enrollment. While one can certainly see value in both approaches to teacher education (undergraduate and graduate), unfortunately, a philosophical divide developed to mirror the physical one.

In addition, throughout all this, severe antagonisms arose between various faculty members. Many talented individuals lost respect for other talented individuals, and the valuable contributions particular individuals could make to education or mathematics or mathematics education were lost since communication lines broke down. Many of those who cared deeply about teacher training became demoralized by the situation, as conversation stopped.

Contemporaneously, events beyond the university changed the landscape of mathematics education. Significantly, a severe national shortage of qualified mathematics teachers grew more critical. Unfortunately, the ETEP enrollment of secondary mathematics teachers, which has never been high, remained very low – usually only one or two students a year. USM was not producing the number of secondary mathematics teachers Maine needed. While unique features of USM have probably exacerbated these issues, my sense is that many universities face the same difficulties.

In September 2000, I started as Assistant Professor of Mathematics and Mathematics Education at the University of Southern Maine. As described above, my position was created by and funded for the first five years by the NSF Collaborative for Excellence in Teacher Preparation program. My training is in pure mathematics, but I have always been very interested and dedicated to education and teaching, having taught high school for two years before earning my Ph.D. The position is joint with the Department of Mathematics and Statistics in the College of Arts and Sciences and the Department of Teacher Education in the College of Education. My office is located in Portland with the Mathematics Department. The main duties, as outlined in the advertisement, were mathematics and secondary mathematics education. While my teaching duties are split equally between the two departments, my research is allowed to be in either field.

With the approval and help of the then Dean of the College of Education, I was able to sit in on the Secondary Mathematical Methods course my first semester, to learn specifics of certification and mathematics education training in Maine. I now teach the graduate ETEP Secondary Mathematics Methods course each fall. Originally, the methods instruction was

a two semester sequence, with the second semester focused on a lab which involved visits to area schools and comparative mathematics education studies. The second semester of secondary methods (mathematics as well as all other subjects) was eliminated after the academic year ending 2002 because of budget cuts and low enrollments of secondary ETEP students.

Since starting at USM, I have been working with members of the Department of Mathematics and the Department of Teacher Education to re-create an undergraduate secondary mathematics program at USM. The main goal of this program is to train qualified mathematics teachers in Maine, combining rigorous field experience like that involved in the ETEP internship with rigorous mathematics training. In developing such a program, we have been using suggestions from both the national mathematics and education communities. Specifically, we are following the guidelines of the Conference Board of Mathematical Sciences, whose lengthy study culminated in a book outlining suggested mathematics training for future teachers, *The Mathematical Education of Teachers* [2]. We are also working to incorporate the College of Education's professional development goals, including their twelve teaching standards and their close link with the southern Maine public school community.

The initial committee consisted of three members from Teacher Education, three members from Mathematics and Statistics, and me as Chair. Throughout academic year 2001 – 2002, we met often to work out details of the program. This was by no means an easy task, as philosophical differences exist between committee members. Members of the Department of Teacher Education wanted to use ETEP and their K-8 program as a model (cohort-based, intensive internship, candidacy phase, portfolio development, satisfactory demonstration of the twelve teaching outcomes) and members of the Department of Mathematics and Statistics wanted fewer required credit hours, a one-semester full-time internship, and more flexibility to accommodate USM's many transfer or continuing education/non-degree students. To summarize, the main points of contention were

- a full year internship (insisted on by the Department of Teacher Education)
- at most ten hours a week in the classroom during the first semester internship (insisted on by the Department of Mathematics and Statistics)
- a candidacy phase (insisted on by the Department of Teacher Education)
- extensive course work in Education and Mathematics (insisted on by both Departments).

In the end, we drafted a rigorous and demanding program that was accepted by both the College of Education and the College of Arts and Sciences in April 2002. The main outline of the four year program is: an initial two years of course work in education and mathematics, preparation for candidacy including documentation of achieving several teaching standards, application and admission to candidacy, internship phase, and graduation.

The program is truly joint in nature, with a joint faculty committee being selected each year to review applications for candidacy, advise pre-service teachers, and supervise internships. Melody Shank of the College of Education and I have worked out many details of the program. Copies of an outline of the secondary mathematics program and candidacy procedures are available on the web [3]. I hope that this program opens up opportunities for interested and dedicated individuals to become mathematics teachers in Maine. I view it as a constructive step toward expanding our state's pool of qualified mathematics teachers.

There is another USM program that involves mathematics education. The College of Education offers an intensive cohort-based undergraduate program for pre-service K–8 teachers, called Teachers of Elementary and Middle School (TEAMS). TEAMS students are required to take three math classes, two of which are designed solely with TEAMS students in mind. As seems to be the national norm, many people are unhappy with these courses. Members of the College of Education have complained about the quality of mathematics instructors for years, and members of the Mathematics and Statistics Department have argued that many students are not prepared and that the course is difficult to teach because of students' attitudes (disrespect and disinterest, not math phobia). It is difficult to assess the validity of these charges, since the more fundamental disagreement seems to be on the goals and design of the course. Last year a new joint committee of members of the Department of Teacher Education and Department of Mathematics and Statistics was formed to address these problems. After an initial heated meeting, the committee fell apart, further exacerbating this point of conflict. The Director of Teacher Education has since refused to meet with the Department of Mathematics and Statistics, citing irreconcilable differences. Though it might be easy for both sides to take solace in the fact that this conflict is common to many universities, obviously this does nothing to further the goal of improving teacher training. Addressing these courses remains a problem for the university.

Problems and Challenges of a Joint Position.

Several of the difficulties associated to my position at USM stem from USM's history and position as a comprehensive regional university serving southern Maine. Some of these problems, in my view, are unique to USM and probably do not apply more generally to joint positions. However, some of these concerns, while arising from the particulars of USM, are more general: a joint position at University X in departments Y and Z with faculty member A would have similar problems, a variation on the theme in a different key, with different instrumentation, different soloists.

In outlining the challenges of the job presented by the particular nature of USM, then, I hope that some lessons can be learned for those who in the future are contemplating designing joint positions.

It is difficult to underestimate the dual impact of geography and a cantankerous history of mathematics education at USM on my position. Informal and casual interactions – bumping into colleagues in the hallway, sharing a bag lunch – between faculty often create bonds that are important in building departmental dynamics. A complaint on the part of certain members of TED has been that they rarely see me, a consequence of an office miles away. In reality, the issue is much more complicated than office location, though this is a concrete manifestation of deeper problems.

My experience is that it has been necessary to overcome a good deal of trepidation, cautiousness, concern, (even suspicion?) on the part of CEHD members because my research degree and interests are in mathematics, and not in education. As recently as last fall when I arrived late to a TED department meeting, I was introduced as a “guest” by the Director of Teacher Education. While unintentional, slips like this communicate a hesitancy to view me as a full-fledged member of the the department. I was more immediately accepted into the Department of Mathematics, because, I believe, there was more appreciation and understanding of my Ph.D. training and research interests.

In addition, since my workload is officially divided into four categories and I interact with essentially entirely different groups of people for each of these areas (TED, Math, MM-STEAC, research), there have been many problems over the years with keeping my workload manageable.

In retrospect, it is clear to me that job duties and the particular needs of mathematics education at USM were not thought through thoroughly enough before I was hired. Indeed, the motivation for my position did not originate within my two departments with members of Teacher Education and Mathematics deciding how to improve mathematics education at USM. As a result, after I was hired it became clear to those paying attention exactly how great were the needs of mathematics education at USM, and the scope of job duties for which I was responsible expanded.

To illustrate a mutating job description and the potential for expanding workload, I relate a story from an annual review by my peer committee during October 2001, the beginning of my second year at USM. My peer committee and tenure and promotion guidelines at USM were established explicitly for me, since there was no precedent for a faculty member in two departments spanning colleges. The tenure and promotion guidelines are fairly typical though not too specific, requiring good teaching, research, and service. The composition of the peer committee is unique: three members from the Department of Mathematics and Statistics, three members from the College of Education (not necessarily the Department of Teacher Education), and the PI for the MMSTEAC grant Dick Stebbins (a chemist) as Chair.

Although the advertisement for my position mentioned work in secondary mathematics education and research in mathematics, two of the members of the peer committee (one in Educational Leadership and one in Special Education) recognized the pressing need for someone to direct the mathematics instruction of USM’s popular and well-populated K-

8 elementary education program. One of these Education faculty members in particular wanted me to start publishing in mathematics education too, to become a fully integrated member of CEHD during my probationary period. In a thoughtful and respectful letter to me, the Peer Committee, and the then Deans of CAS and CEHD, he requested to be removed from the Peer Committee if I were not to apply myself to K-8 mathematics education. In the end, when I argued that expanding my duties to encompass elementary mathematics education in addition to the development of a secondary mathematics education program (which was entirely new to me) and my mathematics duties was too great a spread and not in line with either my interests or expertise, this person resigned from the committee.

I have a tremendous amount of respect for this colleague's actions and believe he accurately assessed and was deeply concerned with the needs of USM K-8 teacher preparation program. The true problems lay in their being more work to be accomplished in mathematics education at USM than one new hire could attend to, lack of understanding and communication about the nature of the new position leading to changing expectations and job definition, and a fragmented workload with its 25% divisions.

A related and particularly pernicious problem for mathematics education at USM is lack of funds and lack of colleagues. As USM is involved in mathematics education at many levels and in myriad ways — training elementary teachers, training 7–12 teachers, supervising pre-service mathematics interns, maintaining a strong undergraduate and graduate Master's curriculum, re-creating an undergraduate secondary mathematics program, etc. — at this time there does not seem to be an adequate number of faculty in the College of Education and the College of Arts and Science with the focused expertise to successfully meet all the goals of serving the southern Maine mathematics public education needs. Searches for a faculty member in Mathematics Education have been canceled for financial reasons, despite interest in the Mathematics Department and the Teacher Education Department in interviewing additional qualified candidates.

Finally, the make-up of USM's administration during the last four years has complicated the attempt to break new ground in a joint position spanning colleges. There have been two Provosts, two interim Deans of Arts and Sciences, and two Deans of Education during my four years at USM.¹ This means that some individuals in the administration have at times been slow to respond or uncomprehending of the difficulties posed by this joint position, because of inexperience with the subtleties of managing such a novel position or lack of knowledge of intricacies of the delicate balance which recently united TED and Math after a stormy history. To further complicate matters, the new Dean of Education recently departed from the previous three Deans and the Peer Committee's consistent, positive, annual evaluation of my teaching, research, and service to mathematics education. In her letter of December 2003, she writes that my research, teaching, and service are fine and well documented by outside evaluators of research, student and peer evaluations of teaching,

¹As mentioned above, there has also been turnover in the Education members of the Peer committee.

and service accomplishments. After this, she then proceeds further in her evaluation and makes a complicated and seemingly contradictory argument that I do not reflect enough in writing on my teaching to be tenured as a teacher educator.

My conclusion after four years is that it would have been more appropriate to hire a senior person into such a joint position at USM. The many tensions that predate my acceptance of the job, the serious responsibilities of program design and patching relations, and the stress of trying to iron out wrinkles from changing evaluation criterion and job duties have made for more challenging work than I think it reasonable to expect from probationary faculty. I actually love challenges and have thoroughly enjoyed my teaching, research, and work in secondary mathematics education at USM. There is much to be proud of in terms of accomplishments in mathematics education at USM, particularly since progress often required delicate interpersonal skills and coming up with compromises to accommodate competing values and views. Nonetheless, after many a long day I have thought that I would have preferred a simpler setup, involving only the three pillars of pre-tenure evaluation: teaching, research, and service.

Reflections.

Many of the problems outlined above — unclear and expanding job expectations, geographical setup, differing goals of Colleges of Arts and Sciences and Education, stormy relations, changing administration — could arise at any institution implementing a joint position, though the particular incarnations outlined above may be peculiar to USM.

Of a more general nature, the problems of lack of understanding, respect for and sharing of common values are most likely inherent in any joint position spanning colleges. It seems essential for such a position to be successful that there be a working mechanism to address these tensions, if they happen to manifest themselves during a faculty member's career. Details of such a job description should be fully worked out in advance of hiring, with input primarily from the two departments that will house the joint hire. Monitoring of the progress and success of a joint hire should be regular and even, with doors left open to make changes if necessary.

In particular, tenure and promotion are a thorny issue. This is where the differing values of the two Colleges or Departments can clash, perhaps at the expense of the untenured faculty member. It seems difficult, if not impossible, to work out evaluation guidelines in advance that will suit all parties involved in the evaluation process. Of course, this may not even be necessary, if there is appreciation for a broad range of professional activity and an understanding of the different accomplishments various Colleges or Departments might value.

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Biographical Sketch.

Elizabeth Allman received her Ph.D. in Mathematics from UCLA in 1995. She has always been very interested in both mathematics and mathematics education. Her current research interests are in mathematical biology, and she relishes the opportunity to teach courses in mathematics and mathematics education. In recent years, she has particularly enjoyed the opportunity to work with pre-service high school teachers in Maine and learn more about the teacher certification process.

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