

Twenty Years Training Future Middle and High School Mathematics Teachers

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1. Introduction

There is an unspoken question in my head at the first day at beginning of each semester when I teach our entry-level credential course for hopeful future middle and high school mathematics teachers. As I scan the roomful of hopeful, smiling, expectant faces, and am about to begin the class, I think to myself: “So you think you want to be a high school mathematics teacher, uh?” My also unspoken answer is “OK, Im here to help you decide if this profession is for you, and if so, how to be the best possible teacher you can be.”

I then heartily welcome the newbies to the credential program and to this first course in the program: “EDSS 300M: Introduction to Teaching High School Mathematics.”¹

This is my twentieth year in the mathematics department at California State University, Long Beach as the Single Subject Student Teaching Coordinator; teaching two, sometimes one, EDSS 300M courses, and placing, on average, about fifty student teachers in the local school districts schools each year along with assigning university supervisors for each student teacher. To keep my finger on the pulse of the program I also supervise, on average, eight student teachers.

My experience: four years at Torch Middle School, thirty years teaching mathematics at Gahr High School in Cerritos, CA, chair of the department and district mathematics coordinator for a 15 of those years.

Put this all together and I think I have come to recognize the traits necessary to succeed as a teacher in the middle and high school mathematics classroom.

¹I shall refer to “high school mathematics” for short, but the program is geared to train middle and high school mathematics teachers. The single subject credential in mathematics allows its holder to teach mathematics in departmentalized classes grades K-12. Since grades K-6 are usually not deparmentalized, K-6 is usually the purview of multiple subject credentialed teachers.

2. First Days Of Class

After a general welcome and self-introduction of each student (I have each student memorize/internalize each of their classmates' names "from the get-go"), I begin with ten qualities and characteristics that a teacher should have to be successful (regardless of grade level and not necessarily order of importance):

- (1) Have a caring personality.
- (2) Memorize the student names quickly.
- (3) Be extremely (and I mean extremely!) organized.
- (4) Have a sound understanding of the fundamentals of mathematics.
- (5) Be familiar with pedagogy in general, and that of teaching mathematics specifically.
- (6) Break down large mathematics concepts and skills to incremental, connected pieces, in the manner of a spiraling curriculum.
- (7) Develop meaningful lessons that:
 - (a) are flexible (anticipatory),
 - (b) involve group activities,
 - (c) differentiate instruction, and
 - (d) are guided by continuous formative evaluation like checks for understanding.
- (8) Consistently enforce firm but fair classroom management.
- (9) Be a good listener; kids have a lot to tell you—and teach you.
- (10) Above all, be a team player with students and colleagues—even when the decisions go against your wishes.

We work on these and related teacher qualities the entire semester; class every meeting.

3. Example

Here is one of my course opening activities: "Think about the teachers you yourself have had and share each in turn with the class three positive characteristics." As simple as this is, it is a wonderfully enlightening experience for all, me included. We get nostalgic, amusing, surprising, and most of all, experiences that portend some important class goals.

They remember teachers who

- (1) knew all the student names shortly into the semester,
- (2) made it a point to ask students about their interests outside the math classroom, in other parts of their high school experience, say, the soccer team,
- (3) had them explore the material as a special assignment, or in group activities,
- (4) gave them projects that brought mathematics to life for them,

- (5) used manipulatives to explore and enrich mathematics concepts,
- (6) were attentive to students mathematical *and* individual needs,
- (7) did not “just lecture” all the time.

And more. Too many to mention here, but the point is that this activity seemed to be central to their remembering successful teachers! Interestingly, these aspiring teachers rarely gave teacher mastery of subject matter as a criterion of (in their eyes) a successful teacher. I do not interpret this as suggesting that a firm grasp of the fundamentals of mathematics is not essential to be a successful teacher. Rather, it is positive affirmation that the teachers they remember were skilled enough in the subject matter that this was never an issue, a necessary but not sufficient quality of a successful teacher.

4. Student Teachers

The coursework (approximately one year) in the credential program in mathematics begins with my class: EDSS 300M, and continues with the California Department of Education (CDE) approved single subject credential program courses that include courses in Health Science, Psychology of the Adolescent, Education of Exceptional Individuals, Technology, to mention some, and culminates with EDSS 450M, our mathematics teaching methods course designed to prime our single subject candidates for the student teaching experience, the “trial by fire” experience of teaching and managing three classes with, of course, support from the master teacher and the university supervisor. Class management: the litmus test. While most candidates had earlier demonstrated a natural sense of what makes for good teaching, very few of the one hundred plus student teachers I supervised over the years had a sense of how much time and effort is required just to maintain good classroom management, before teaching the subject begins. “Successful classroom management does not just happen,” I tell my candidates; “it takes a lot of thought, planning, the fortitude to stand firm but fair, and the decisiveness to follow through in an impartial manner.” I continually review and remind class management techniques with my student teachers over and over again during the post-observation debriefing sessions. If I had to pinpoint one “bump in the road” to earning a single subject credential, class management would be it. Keeping students engaged in the mathematics material is another important class management skill! And this, of course, implies a solid understanding of the subject.²

5. Classroom Management, A Biggie

I am and have been concerned that there is a weakness in our program: our single subject credential candidates have to have at least 45 hours of observation in

²The reader may be aware that the “subject matter mastery” requirement of the single subject programs may be satisfied with either a CTC approved subject matter program, or the ability to pass the mathematics California Subject Examination for Teachers (CSET). This translates into a wide variation of subject matter mastery on the part of our candidates.

classes in the field during the EDSS 300M class, but with very little exposure in front of the class. The weakness is that they need to be more involved; observation is not enough. Just watching an experienced teacher, his or her seemingly easy classroom management style, has a tendency to lull our candidates into thinking that classroom management is easy. It is not, and too many of our candidates hit this brick wall when they student teach.

For example, grouping students seems a simple enough activity with the expected noisy thirty plus youngsters getting up from their seats, meandering around the room (yes, even after the teacher has made it clear how the activity is going to work), and finally, after the not unexpected stolen social greetings and fist-bumping hellos settling into the group seats, ready for the teachers instructions.

“It is not magic,” I tell my credential candidates; “but you have work at it.” I follow this advice with explicit directions and have the candidates act out the many techniques and examples of assigning students to groups.

I emphasize that classroom management techniques need not be dictatorial. Far from it, since this would ultimately be detrimental to young students. In my teacher training class we practice classroom management techniques that are friendly but effective, beginning with a warm greeting for each student at the door, ending with a farewell, punctuating the class period in between with noise-reduction-attention-getting techniques like “Clap your hands (once, twice, three times).”

We practice many other teaching techniques in my class, but formative assessment is another focal point in my teacher training class. Beginning with checks for understanding during each lesson, I believe this teaching-learning process technique is central to good teaching. Such assessment must be done often: every day, at the beginning, in the middle (especially in the middle), and at the end of each lesson. I stress the importance of beginning the lesson with a check that the necessary prerequisite skills have been learned, that students retained these necessary skills, yes, since yesterday! “Don't assume your students are going to remember” I remind our candidates. “Precede each new lesson with a small initial assessment; use checks for understanding of key points throughout the lesson, and end with an short exit assessment to make sure that the students learned the material.”

In conclusion, there is, of course, a lot more than described here that I teach my future teachers in EDSS 300M. Yet, I always wish for more time in the semester to share with my students the many, many other, probably as important facts of successful teaching, but at in this course I do cover the more important ones.

Has it been worth it? Unquestionably yes! The icing on the cake is the flow of emails I get from some of our successful candidates. Here are but two recent ones I received:

Hi Professor Lau, I just wanted to thank you again for being such an amazing University Supervisor during my teaching credential process at MCHS and CSULB! I really enjoyed working with and learning from you during this semester. I've grown so much and I honestly feel so much more prepared now than ever before to run my own classroom with efficiency and ease.

Signed

Professor Lau, I just accepted a position to teach math at XYZ High School. I want to thank you for helping me develop as a teacher this semester and being patient with me. I had valuable experience through the Cal State Long Beach Single Subject Credential Program and I am blessed to have learned from great educators. Again thank you for everything you have taught me.

Signed

Yes, its worth it!

