

BRIDGE TO THE FUTURE—WHAT THE PAST CAN TELL US

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Introduction

In March 1999, a conference was held in Charlottesville at the University of Virginia entitled, “Preparing Virginia’s K-8 Teachers in Mathematics and Science.” [1] We were expecting perhaps thirty-five to fifty attendees from Virginia’s colleges and a few state officials. We ended up with 225 in attendance from practically all thirty-seven teacher preparation programs, twelve community colleges, and many state education officials. At the end of the conference, I was guardedly optimistic about how we were going to educate Virginia’s K-8 teachers of mathematics and science.

First, let’s put things in perspective in 1999. Virginia’s *Standards of Learning* were in place; testing had begun, but early testing results were not good. New teacher licensure endorsement rules were known, but they were not yet in effect at Virginia’s colleges. Many of the PreK-8 grade programs at our Institutions of Higher Education (IHE) were not rigorous either in quality or quantity of mathematics and science taught to pre-service teachers. The NSF-supported Virginia Collaborative for Excellence in the Preparation of Teachers (VCEPT) led by Virginia Commonwealth University (VCU) was up and running with good results.

The Conference

Although there were many excellent talks at the 1999 conference, time only allows mention of a few. Patty Pitts, Director of Teacher Education and Licensure of the Virginia Department of Education, opened the conference by summarizing the new teacher licensure requirements. There was considerable interest in the endorsement via the alternative route that requires twelve semester hours each of mathematics and science for PreK-6 grade teachers. Two talks on interdisciplinary degrees received considerable attention. David Smith talked of the Liberal Studies major already in place at Longwood College (now University) that results in students having nineteen semester hours of natural science and twelve hours of mathematics [2]. Reuben Farley discussed the new requirements at VCU that require twenty-one hours of mathematics and science for K-6 pre-service teachers [3]. Robert Watson, retired Director of the NSF Division of Undergraduate Education, gave an inspiring talk about higher education’s

responsibility in educating teachers [4]. He proposed increased interdisciplinary courses in mathematics and science. Julius Sigler, of Lynchburg College, reported on the disturbing statistic that, as far as could be determined, the current statewide production of middle school math and science teachers was less than twenty, probably much less [5].

Curriculum Requirements

The situation for middle school endorsement in math and science is particularly disturbing. In order to receive this license a pre-service teacher must satisfy a concentration in two disciplines; let's assume it is math and science. Let me use the situation at UVA, even though we don't have a middle school teacher preparation program, to estimate the number of semester credit hours required:

- 21 hours of mathematics (required by state)
- 21 hours of science (required by state)
- 12 hours of English (required by state)
- 15 hours of history/social science (required by state)
- 36 hours for a major (psychology is popular)
- 30 hours of general requirements (including foreign language, etc.)
- 59 hours of education courses

This amounts to 194 semester credit hours, which is not possible even in our five-year program. What can be changed? One possibility is that the student major in mathematics or science; then, one of the two requirements of twenty-one credit hours for math and science is included in the thirty-six hours for a major. This brings the total down to 173 hours, which is still not possible. You can draw your own conclusions from these requirements. In addition, if the pre-service teacher majored in mathematics or science, he or she would probably go teach in high school, because of their content major degree.

In 1999, the Virginia Mathematics and Science Coalition (VMSC) published a white paper survey on the disciplinary preparation of Virginia's middle school math and science teachers [6]. It showed that 60-70% of teachers were teaching out of field of their initial preparation, although 50% of the teachers had obtained at least twenty-one credit hours in the

field they now teach. Since 1999, many new math and science courses have been developed and taught. There are several new interdisciplinary degree programs, and there are new middle school teacher preparation programs.

Licensure Challenges

The VMSC feels that many K-6 teacher preparation programs are not strong enough in mathematics and science. It turns out in Virginia that teacher preparation *programs* are approved, and the suggested number of mathematics and science courses (for alternative licensure) does not receive a high priority. It is generally recognized that middle school teacher licensure is too difficult. A look at the following table shows part of the challenge representing us in Virginia.

| | <u>1999-00</u> | <u>2000-01</u> | <u>2001-02</u> |
|-----------------------------|----------------|----------------|----------------|
| Graduated from Virginia IHE | 3900 | 2861 | 2646 |
| Hired from outside Virginia | 3678 | 3792 | |
| Newly hired teachers | 9304 | 10,777 | |

Virginia is simply not producing enough teachers. Of course, not all of the teachers graduating from Virginia's teacher preparation programs begin teaching in Virginia; some never teach at all. The number of provisionally hired teachers each year is over 3,000. The number of teachers completing either a mathematics or science concentration for middle school licensure is unknown; the Commonwealth has not kept this statistic. However, the total number of teachers completing any middle school licensure program was 133 in 2000-01 and 165 in 2001-02. Obviously, we need many more.

The Future

Where do we go from here? The Virginia Department of Education has proposed new licensure requirements for middle school endorsement. Dr. Thomas Elliott has already discussed the changes at this conference. The primary change is that only one concentration is required. The No Child Left Behind legislation has reported conditions for “highly qualified teachers.” Although these conditions still seem to be changing, many of us hope that the less qualified teachers will obtain needed mathematics and/or science content courses. New interdisciplinary degree programs at our IHE with specific requirements for content courses in mathematics and science should produce highly qualified teachers. More colleges and universities seem to be moving in this direction. We expect to learn many new interesting developments at this conference.

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References

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