

Teachers and Subject Matter Knowledge

By Nel Noddings

Many people feel that teachers are not adequately prepared in the subject matter they will be asked to teach. The problem is not simply that of assigning teachers to teach outside their field of certification; almost everyone deplores this practice. Even when teachers are certified, their subject matter knowledge often seems thin. Sometimes this apparent lack of knowledge is blamed on the undergraduate education major but, even in states that do not permit such majors, subject matter competence does not seem adequate. In his introductory remarks, Alan H. Jones draws attention to related problems—"specialization versus generalization" and "professional versus public." The first raises questions about the depth and breadth of knowledge needed by teachers; the second presses us to ask who is responsible for the subject matter preparation of teachers.

Before about 1950, teachers in the United States were prepared in teachers' colleges. The great strength of these institutions was their integration of subject matter and pedagogy. Students who were preparing to teach at the high school level majored in mathematics, English, or some other subject regularly taught in high schools, but the curriculum was so constructed that pedagogical methods were interwoven with the new subject matter. Elementary subject matter was studied from

Nel Noddings is Lee L. Jacks Professor of Child Education in the School of Education at Stanford University, Stanford, California.

a deeper, more sophisticated perspective. The weaknesses of teachers' colleges were in part real and in part manufactured by academic snobbery. They were indeed likely to be staffed by professors who could not get positions in liberal arts colleges, and their faculties were unlikely to be at the cutting edge of research and publishing. Their math majors did not get as much higher math as their counterparts in liberal arts schools. Their students rarely had to qualify for admission by taking SATs. They were often under-funded. The perception, if not the reality, was that they were second-rate. For example, the American Association of University Women did not accept graduates of such institutions, and there were no chapters of Phi Beta Kappa on their campuses.

Ironically, when teachers' colleges disappeared, it was not because of their academic weaknesses. The hordes of returning veterans claiming GI rights had to be accommodated in institutions of higher learning, and not all of them wanted to become teachers. Teachers' colleges became state colleges and, gradually, many of them became state universities specializing more in teaching than in research. Whether the quality of these institutions is demonstrably better (however that is defined) is debatable, and I will not take up that question here. What is undebatable is that the responsibility for teacher preparation became increasingly divided between liberal arts departments and schools or departments of education.

The snobbery directed at teachers' colleges infects relations between the liberal arts and education even today. Too often, liberal arts departments insist on maintaining absolute control over the courses of study they offer. Mathematics departments, for example, do occasionally cooperate with prestigious departments like engineering to provide special mathematics courses for engineers, but when they are asked to create courses for teachers, they often demur—referring to such courses as “watered down.” But the recalcitrance, snobbishness, and desire to control are not all on one side. Instead of facing up to the problem squarely, education professors often insist that pedagogical knowledge is more important than subject matter knowledge. Linda Darling-Hammond has said, for example, that too much subject matter knowledge can get in the way of good teaching and that teachers require a “threshold level of subject matter knowledge” (1997, p.308). I understand and sympathize with what she means here. We all know of cases (and research supports our personal observations) in which people with high levels of subject matter preparation have been disasters in the classroom. But that observation does not support the contention that teachers need a “threshold level” of subject matter knowledge. It begs the question of what sort of subject matter preparation teachers need.

Why can't the subject matter preparation of teachers be distinctive, rigorous, and entirely respectable? It is one field in which it is still feasible to be a Renaissance person. Surely it is not asking too much that teachers should have considerable knowledge about all the courses that high school students are required to take. I'm not talking here about elective courses, particular foreign language courses, or those

advanced courses taken by only some students. I'm talking, rather, about the basic math, science, English, and social studies that all students must take for graduation and college entrance. Why shouldn't this material be firmly embedded in the subject matter preparation of teachers? This should be one aspect of a breadth requirement. In their own field of specialization, well prepared teachers should be able to teach any course their high school offers. Here we seek breadth and depth, but the depth should be defined carefully.

We have let the stacking up of courses beguile us. When we demand that a high school mathematics teacher present a math major or minor, we believe that we have ensured subject matter competence. But a math major may not have studied geometry since tenth grade in high school and may not have the slightest idea how his or her college course work can be related to geometry. How many math majors have made a serious study of the perennial puzzles that high school students like to spring on their teachers? How much recreational mathematics have they studied? Can they prepare an interesting and mathematically informative lesson on, say, the division algorithm? (Why do we insist that 9 divided by 2 is 4r1? Why not 3r3 or 5r-1? This is an interesting question.) Can they enrich lessons with stories from the history of mathematics and the biographies of great mathematicians? Can they speak knowledgeably to their students about the politics of mathematics education—how it came to be a gatekeeper, problems of access (gender and race), sound and faulty arguments for its importance? Can they relate mathematics to literature, social studies, science, religion, art, and music? (Noddings, 1992, 1993) Do they know high school mathematics thoroughly?

The questions I have raised are closely related to the "less is more" argument that has arisen in the wake of the disappointing scores of U.S. students on international tests. It is argued that we would do better to teach fewer topics in greater depth at the K-12 level. At the level of teacher education, a similar argument might be made. It is not necessarily the case that we need fewer topics, but we should depend less on the linear piling up of courses. Teachers need time to revisit topics in greater depth, and they need to branch out laterally to see how these important topics connect with the great variety of topics their students encounter in the other fields they are required to study.

In this short discussion, I have suggested possibilities from which imaginative subject matter specialists and educators could construct a wonderfully interesting and powerful undergraduate course of study for math majors planning to teach. Obviously, the same sort of thinking could be applied to other subjects. By offering these possibilities, I do not mean to suggest that constructing such a course of study will be easy work. It will be challenging, but it needs to be done, and it requires generous collaboration (Goodlad, 1994). Math majors planning to teach do not need all of the mathematics that future mathematicians need. They do not need all of the courses that engineers or economists require. But neither do mathematicians, engineers, and economists need all of the courses that teachers need. There should

be rigorous alternative strands designed to meet the purposes of students preparing for very different careers.

References

- Darling-Hammond, L. (1997). *The Right to Learn*. San Francisco, CA: Jossey-Bass.
- Goodlad, J. (1994). *Educational Renewal: Better Teachers, Better Schools*. San Francisco, CA: Jossey-Bass.
- Noddings, N. (1992). *The Challenge to Care in Schools*. New York: Teachers College Press.
- Noddings, N. (1993). *Educating for Intelligent Belief or Unbelief*. New York: Teachers College Press.