Teacher quality is the key to improving K–12 education. Some policies aim to improve teacher quality through more aggressive recruitment, doing more to retain the best teachers or developing teacher evaluation systems that reward top performance and remove those who perform poorly. Those approaches may have some payoff, but any overall strategy for improving teacher quality must also take account of the fact that hundreds of thousands of classrooms will be staffed each year by recent graduates of teacher preparation programs. So the search for ways to improve teacher quality must include attention to the substance and structure of teacher preparation.

Policy makers are paying increasing attention to teacher preparation. Federal higher education legislation now requires that states make public reports about all teacher preparation programs. States and large cities encourage development of teacher preparation programs outside colleges and universities. Many think Teach for America exemplifies a dramatically different approach to teacher recruitment and preparation.

Is there research to support any of these developments? What studies have been done to answer the range of policy questions about teacher preparation, from basic requests for description to challenging questions about effectiveness? Specific questions being asked include: What is the current state of teacher preparation? How much do programs vary across nations? How are program characteristics related to the quality of graduating teachers?

Policy makers are calling for summaries of research on these questions. Congress inserted some of these questions into legislation asking the National Research Council (NRC) to examine the current state of teacher preparation in the United States. Legislators wanted a report on the characteristics of students entering teacher preparation and the instruction provided by various U.S. types of programs. They also asked that the report describe the degree to which the programs for mathematics, science and reading teachers is “consistent with converging scientific evidence.” Finally, perhaps anticipating that solid evidence on teacher preparation might not be available, Congress asked for recommendations about the data systems that would be needed to give trustworthy information about models of teacher preparation and their effects.

The NRC assembled a committee of distinguished scholars, chaired by education historian Ellen Condliffe Lagemann, to address these questions. Suzanne Wilson, chair of the MSU Department of Teacher Education, was a member. The committee gathered information by convening workshops, examining reports and commissioning small studies. In its report, “Preparing Teachers: Building Evidence for Sound Policy,” the committee expressed surprise at the absence of data available to address questions about student and program characteristics. Data on individual programs is available, but the size and variability of the teacher preparation enterprise in the U.S. makes it difficult to write an accurate description of the system as a whole. Students sometimes complete teacher preparation requirements at more than one institution, perhaps beginning in community college, transferring to a four-year college for a bachelor’s degree, then taking a few final courses after graduation. Because many teachers follow such complex pathways in their preparation, it is hard to characterize typical program types.

Although the NRC committee could not say whether U.S. teacher preparation was consistent with “converging scientific evidence,” they were able to list teacher preparation outcomes having evidentiary support. For teachers of reading, a key outcome is knowing how to help pupils master foundational skills, including phonics and comprehension; for mathematics, teachers must be able to help students develop mathematics...
cal proficiency, including conceptual understanding, procedural fluency and problem-solving skills.

The NRC committee ended its report with recommendations for developing a comprehensive system for gathering data about teacher preparation. A data system, perhaps supported by the federal government, is needed to answer questions about who enters teacher preparation, what they study and what knowledge and skills they have at program completion.

**Two studies worth noting**

Fortunately, systematic data gathering has already begun. Two recent projects, for example, have just begun reporting on systematic, nationally representative data about the preparation of U.S. teachers in two subject areas: mathematics and early reading. Both projects describe current teacher preparation content and outcomes, with some comparison data that can be used for judging the quality of current teacher preparation.

The study of mathematics teacher preparation is the Teacher Education Study in Mathematics (TEDS-M), for which MSU serves as both the lead institution for international work and as the research center for the U.S. component. Following the guidelines of the International Association for the Evaluation of Educational Achievement (IEA), each of 16 countries used a survey design that supported conclusions about teacher preparation in the nation as a whole. Thus, for the U.S., study reports include descriptions of characteristics of mathematics teacher preparation, the sorts of descriptions that the NRC committee had been unable to find in previous work. In addition, TEDS-M gathered representative data about important outcomes of mathematics teacher preparation, including assessments of graduating teachers’ knowledge of mathematics content and pedagogy.

The full reports from the study will paint a clearer picture of how U.S. mathematics teachers are prepared. Because the 16 countries in the study used a common set of data-gathering instruments, comparisons among countries can also be made, shedding light on how U.S. mathematics teacher preparation measures up to preparation in other nations, both in content and in outcome. Early results show substantial differences between the U.S. and countries known for high mathematics student achievement, especially in the mathematical preparation of middle school teachers, where U.S. teachers are far less likely to have taken linear algebra and calculus. See page 24 for an article on the U.S. TEDS-M findings.

A study just released by the U.S. Department of Education’s Institute of Education Sciences (IES) complements the TEDS-M study by offering a nationally representative description of reading teacher preparation for early elementary school teachers. The report, “Study of Teacher Preparation in Early Reading Instruction,” responded to a Congressional mandate, as did the NRC study, again showing the interest federal policy makers have in teacher preparation.

Consistent with the NRC study’s assertion that scientific evidence is converging on conclusions about what reading teachers need to know, the study of reading teacher preparation is focused on a set of teacher skills linked to both phonics and comprehension. The report asked a representative sample of teacher education students whether their preparation programs included content on these key areas of reading instruction. Like the TEDS-M study, the reading study also collected teacher outcome data, in this case through an assessment of graduating teachers’ knowledge about the “essential components of reading instruction.”

As seen in Figure 1, about 30 percent of teachers reported that their coursework had a strong focus on alphabetic fluency, but only 14 percent reported that coursework had a strong focus on meaning. For the field experience component of teacher preparation (i.e., student teaching and other school-based experiences), the proportions indicate that preparation had a stronger focus on meaning (see Figure 2).

These reports on program focus differ from teachers’ reports of how well prepared they felt to teach in each of these areas. As Figure 3 shows, almost all teachers felt at least moderately well prepared in the area of meaning, with three-quarters of them feeling adequately prepared. For alphabetic tasks, however, less than half felt adequately prepared, with 12 percent feeling inadequately prepared. This contrast between low program focus on meaning, yet high feeling of preparation, is evidence that can inform ongoing discussions about the content of teacher preparation.

**Evidence is emerging**

The reading teacher education study also did an assessment of teachers’ knowledge in each of the three component areas. To give a context for interpreting the results, they compared the performance of teacher preparation graduates to the performance of experts (a group of reading researchers and teacher educators) and to the performance of novices (recent college graduates with no coursework or project experience related to reading instruction). For all three component areas, the teachers scored significantly better than novices, and significantly lower than the experts. The results indicate, in other words, that teacher preparation results in knowledge beyond what comes with a college education, but not yet at the level of experts.

These two new studies demonstrate that, despite the enormous variability in U.S. teacher preparation, it is possible to conduct systematic studies that can ground policy discussions in trustworthy evidence about the content and outcomes of teacher preparation. As other research studies are carried out, policy makers will begin to have a basis for answering their questions about the current state of teacher preparation. The next challenge for researchers will be to move beyond descriptive studies to gather evidence about the differences in outcomes produced by varying the content of programs.
A look at U.S. teacher preparation: Early reading

**FIGURE 1: Coursework Emphasis**

Percentage of pre-service teachers reporting weak, moderate, or strong coursework emphasis on the essential components of early reading instruction, by essential component.

- **Alphabetics**
  - Weak: 33%
  - Modest: 12%
  - Strong: 55%

- **Fluency**
  - Weak: 29%
  - Modest: 8%
  - Strong: 63%

- **Meaning**
  - Weak: 14%
  - Modest: 9%
  - Strong: 77%

*Note: Pre-service teachers reporting a “weak” focus are those with an estimated value ≤ 1, “moderate” focus include those with an estimated value > 1 but ≤ 2, and “strong” focus are those with an estimated value > 2 on the 4-point scale of the Program Survey items. N of teachers = 2,187; N of institutions = 99; and N of states = 24.*

**FIGURE 2: Field Experience Exposure**

Percentage of pre-service teachers reporting weak, moderate, or strong field experience exposure on the essential components of early reading instruction, by essential component.

- **Alphabetics**
  - Weak: 48%
  - Modest: 13%
  - Strong: 38%

- **Fluency**
  - Weak: 47%
  - Modest: 4%
  - Strong: 49%

- **Meaning**
  - Weak: 30%
  - Modest: 5%
  - Strong: 66%

*Note: Pre-service teachers reporting a “weak” focus are those with an estimated value ≤ 1, “moderate” focus include those with an estimated value > 1 but ≤ 2, and “strong” focus are those with an estimated value > 2 on the 4-point scale of the Program Survey items. N of teachers = 2,187; N of institutions = 99; and N of states = 24.*

**FIGURE 3: Feelings of Preparedness**

Percentage of pre-service teachers reporting feeling inadequately, moderately, or adequately prepared to teach the essential components of reading instruction, by essential component.

- **Alphabetics**
  - Inadequate: 46%
  - Moderate: 12%
  - Adequate: 42%

- **Fluency**
  - Inadequate: 0%
  - Moderate: 24%
  - Adequate: 76%

- **Meaning**
  - Inadequate: 2%
  - Moderate: 21%
  - Adequate: 77%

*Note: Pre-service teachers reporting feeling “inadequate prepared” are those with an estimated value ≤ 1, pre-service teachers reporting feeling “moderately prepared” include those with an estimated value > 1 but ≤ 2, and pre-service teachers reporting feeling “adequately prepared” are those with an estimated value > 2 on the 4-point scale of the Program Survey items. N of teachers = 2,187; N of institutions = 99; and N of states = 24.*