

Deborah Loewenberg Ball

Summary of Testimony to the U.S. House of Representatives Committee on Education and Labor
May 4, 2010

My name is Deborah Ball. I am a former public school elementary school teacher and currently professor and dean of the School of Education at the University of Michigan in Ann Arbor, Michigan. I conduct research on mathematics teaching and learning. Every summer I also teach mathematics to fifth grade students who are struggling in school.

My goal is to provide you with an overview of the problem that is often called "teacher quality" and to explain what it would take to get high quality teaching at scale in our nation's classrooms.

I hope you will remember two things from my testimony:

First, what we are doing in this country is unethical. We let people start teaching who have not yet demonstrated that they can perform. And, further, the students who most need skillful and highly effective teachers are least likely to get them.

Second, we know how to change this and must do so deliberately and without delay. I will explain the key elements of what it will take.

Let me begin by explaining the problem that we must urgently try to remedy: We do not have a coherent system to supply skilled teachers to every classroom and to every student in this country. This is a problem of crisis proportions when we consider the persistent underachievement of American young people, and of schools that lack the resources and expertise to prepare our youth for this rapidly changing global society.

Every profession has this problem. There is a difference between reading about how to put in an intravenous line and the first time one tries to do it on a patient. Or landing an airplane in fog, rain, or blowing snow using only the instrument panel. These skills take both head knowledge and hand knowledge, and they take time to develop. In no other profession in this country do we presume that people who are trying something for the first time, or second, or third, can be given full responsibility for the task or left alone to figure it out.

Many people have ideas about improving "teacher quality." Some proposals focus on how to identify and fire incompetent teachers. Others seek to increase the pay of teachers who are effective in producing student learning. Still others create incentives to attract more bright people to the teaching profession. And some focus on restricting the programs through which teachers may be prepared for practice. Not one of these is sufficient to solve the core problem: that of ensuring that every teacher, in every classroom, can do the work we are asking of him or her. What we need is quality teaching. This is a problem of training, both initial and continuing, and not merely one of sanctions, rewards, or other incentives.

There are two reasons why: First, despite how commonplace it may seem, teaching is far from simple work. Doing it well requires detailed knowledge of the domain being taught and a great deal of skill in making it learnable. It also requires good judgment and a tremendous capacity to relate to a wide range of young people, understand culture, context, and community, and manage a classroom. It requires interpreting and using data to improve the effectiveness of instruction. And as we seek to increase the academic standards and demands that we want our young people to meet, the challenges of good teaching will only escalate. Teaching complex academic skills and knowledge, not to mention skills of collaboration, interaction, and

resourcefulness in an increasingly networked world, is still more difficult than teaching more basic skills.

Second, building teaching quality is a problem of massive scale. The teaching force numbers over 3.6 million—a staggering size. No other occupation even comes close. This means that it is crucial that we create high quality teacher education and professional development that will help large numbers of regular people develop the ability to teach effectively, whoever their students are. Simply recruiting bright people to the profession or providing incentives to effective teachers cannot come even close to solving the problem.

One problem is that although one needs to know the domain really well, accomplished experts and very smart people are not automatically good at making their expertise explicit to others. And they can have a really hard time figuring out how someone else is thinking.

The following simple example illustrates my point. Compute the basic multiplication problem 49 times 25. The answer? 1225.

Can you figure out why a fourth grader might think the answer was 1485? Try to figure out what steps would produce this result:

$$\begin{array}{r} 45 \\ \times 25 \\ \hline 405 \\ 108 \\ \hline 1485 \end{array}$$

(If you cannot figure it out, I provide an explanation at the end.¹ Don't worry: Interestingly, most mathematicians are stumped by this, too.)

This example helps to show the kind of insight about the subject that teachers must have in order to help others learn the subject. Even if very smart and highly educated people could teach effectively without training, there are just not enough such people to fill every classroom in this country. And skilled teaching requires much more than being "good at math" or being a good writer. To achieve high levels of learning for all our nation's students, good professional training and assessment of teaching are essential.

We need to build a system so that *all* beginning teachers can perform competently from their first day in the classroom, no matter how they enter teaching. Right now, teachers are considered "qualified" simply by virtue of graduating from an accredited program or completing a major in the subject that they teach. This sidesteps the real issue, for it relies on poor proxies for teaching effectiveness instead of demonstrated capacity to do the actual work that will help students learn. This is perilous for our students.

The initial training of teachers must be connected to a comprehensive curriculum of professional training and licensure that spans pre-service education through at least the first five years of teaching practice, with corresponding assessments providing information about teachers' increasing competence as they become more experienced. This approach is a significant departure from current practice in which teachers start teaching with little training in the complex work of teaching and are expected to learn this work from experience. Experience is an unreliable method of learning in any domain, from athletics to skilled trades to teaching. Although knowledge and skill can improve with experience, mislearning often develops and is reinforced through repetition. Many important skills cannot be developed without direct training, supervised practice, and rigorous feedback.

Three key elements must comprise the redesign of teacher training:

1. Focus teachers' preparation on the work of teaching to high levels of skill and detailed and specialized knowledge of the academic content they teach;
2. Provide a range of settings for close practice and feedback so that teachers can be deliberately taught and explicitly coached with the skills to reach a wide range of learners; and
3. Develop highly credible and predictive assessments of professional knowledge and skill so that no one enters a classroom without fundamental capacity for effective performance as a beginning teacher.

At the heart of this system must be a set of core skills of teaching that are crucial to student learning. No beginning teacher should be allowed to teach young people if he or she cannot perform these flexibly and skillfully. These include skills of communicating content clearly to students, holding students to high standards while explicitly showing students how to do complex work, establishing and maintaining a productive classroom climate, interpreting and using evidence of student performance, and connecting effectively with students' families. In addition, teachers must demonstrate the detailed knowledge of subject matter needed to help students learn it.

This is not how we prepare teachers in this country today.

What is needed is an explicit curriculum to develop teachers' skills with these tasks and a system of performance assessments to determine whether teacher candidates can perform each one competently. This curriculum must also include carefully designed and sequenced opportunities to practice these skills in a variety of settings. Teacher candidates must demonstrate proficient performance with each set of skills before they are granted an initial teaching license.

We must build a professionally valid licensure system that requires all teacher candidates to demonstrate the required level of capacity to teach young children responsibly. The assessments would focus on measuring teachers' content knowledge used for teaching, their actual skill with the instructional practices most important for student learning, and their persistence in working to make sure that every one of their students learns. These assessments would be different from the ones we currently have in this country which do not, for the most part, focus on the ability to teach. These assessments will rigorously measure teachers' ability to mobilize knowledge in teaching and to do actual tasks of teaching. Examples include diagnosing students' learning difficulties, designing a test, conducting a discussion, giving pupils feedback on their work, choosing and using strategic instructional examples, and interpreting data on student progress and using it to calibrate instruction.

My argument is not an argument for or against either "traditional" or "alternative" pathways into teaching. We should encourage multiple pathways into teaching and multiple providers of training in order to recruit the diverse teaching force that our country needs. What is most important is that graduates of any pathway must be capable of effective practice.

Students must have teachers who are prepared to help them learn, not beginners who are struggling with or naïve about their responsibilities. Allowing teachers to learn on our young people is unethical. Teaching is intricate work that can be learned to high levels of skill with appropriate training. What we need in this country is a professional continuum that would provide teachers with high-quality training in increasingly advanced practice, and that would tie their continued advancement in the profession to their ability to demonstrate higher levels of professional skill.

We need to consider along with what I have described here significant changes in the educational infrastructure in this country—in the organization of schools, teachers' work, and their compensation. For example, schools should be set up to provide integral support for early career teachers so that they can more effectively and rapidly increase their professional skill, just as hospitals support beginning nurses. Teachers with different levels of license should have different assignments in schools and should be compensated differentially. Schools would need to be staffed to include teachers of all levels of licensure to ensure that all schools have the full complement of professional expertise. To make use of that expertise in improving students' learning, teachers' professional work days would have to include—as they do in other countries—time and space for interaction with other teachers of these different levels of expertise, with a focus on examining student performance, student difficulties, curriculum issues, and on developing focused instructional strategies. All of this, too, is what we see in other professions.

Finally, we need in this country an appropriately-resourced and expertly directed system of design, development, and research that will produce the evidence base and resources to make it possible to accomplish high levels of success in K-12 education. Doing this would require a coordinated plan to build the knowledge and tools to achieve these specific goals. To be effective, this comprehensive system of design, development, and research must be oriented toward understanding and solving our core problems of education and must be fundamentally rooted in and connected to practice and policy.

One important footnote to all of this is that this work I am describing would be helped immeasurably if we had a common ambitious curriculum for K-12 schools—consisting of goals, standards, and metrics for their attainment—that would provide a consistent and coherent infrastructure for teaching and learning. This curriculum would need to be accompanied by assessments that were well coordinated with this common curriculum and that could be used at scale with high degrees of reliability and validity. These assessments would use new technologies and the best expertise drawn from across disciplines to build a new suite of assessments to track the kinds of outcomes we must be seeking to achieve with all of our students.

The most important point overall is that we must stop wasting energy debating whether teachers recruited one way or another are more effective. Instead, we must turn now to training people to do the real work of teaching and to building a system that can reliably supply good teaching to every pupil in our nation's classrooms, every year.

ⁱ $9 \times 5 = 45$. If someone "carries" the 4 and places it above the 4 in 49, and *adds* the 4's together ($4 + 4 = 8$) and then multiplies 8×5 , the result is 40; hence, 405 on the first row. Similarly, if someone multiplies $5 \times 2 = 10$, writes the 1 above the 4 in 49, and then adds $1 + 4 = 5$, and multiplies $5 \times 2 = 10$, the result is 108. In this multiplication, the "carried numbers" must be added *after* multiplying, not before. Can you explain why, beyond saying that you were taught to do it that way? Teachers not only need to be able to figure out, swiftly, what processes might lead to difficulties, but they must also be able to explain or remedy in ways that students can understand. Being able to do this is more than simply knowing how to multiply.