

PERSPECTIVE

Teacherpreneurs: A Bold Brand of Teacher Leadership for 21st-Century Teaching and Learning

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Challenges facing our public schools demand a bold brand of teacher leadership. Teacherpreneurs, effective teachers who teach students regularly but also incubate and execute the kinds of policies and pedagogies students deserve, represent a new culture of training and ingenuity. Teachers who lead outside the classroom but do not lose their connection to students are best positioned to develop and disseminate best policies and practices for 21st-century teaching and learning.

Since the release of the Coleman Report in 1966, there has been a steady drip of empirical evidence showing that teachers are the most crucial in-school factor for student learning (1–4). And while U.S. policy-makers have sought to reform education by improving teacher quality, in doing so they have not paid a great deal of attention to the research on teaching and learning. Making matters more complicated, America's approach to the teaching profession has been driven more by ideological agendas and power politics than by scientific evidence.

Just as dusty blackboards still hang in some classrooms, many reformers fail to envision schools that look different than they did when they were students. We have entered a new era with advanced learning technologies (5) and growing scientific evidence on how humans learn, with enormous implications for teachers and teaching (6). New methods of assessing cognition, emotion, and learning make it possible for teachers, if they are well prepared and supported, to serve students in ways previously unimaginable (7, 8).

Although teachers are paramount to student learning, too few education policies promote leadership from those who teach.

Why We Need a Bold New Brand of Teacher Leadership

Isolated behind the closed doors of individual classrooms, teachers traditionally have had little time to observe and learn from their peers. However, education research demonstrates that when teachers collaborate with one another, their students' achievement improves (9). Economists, using sophisticated statistical methods and large databases, have concluded that students score higher on achievement tests when their teachers have opportunities to work with colleagues over long periods of time and spread their expertise (10). And in the 2009 MetLife Survey of the American

Teacher, over 90% reported that their colleagues contribute to their individual teaching effectiveness (11).

Richard Elmore made the compelling case that many education policies and practices often wither, primarily because reformers fail to “develop organizational structures that intensify and focus” the new reforms supported by too few “intentional processes for [the] reproduction of successes (12).” His research pointed out that reform is about learning, and for teachers to teach more effectively they must have “encouragement and support, access to special knowledge, time to focus on the requirements of the new task, time to observe others doing it (12).”

But these conditions rarely are in place. Compared to teachers in nations with top-performing education systems, like Singapore, most U.S. teachers have very limited access to leadership and learning opportunities or time to engage in high-quality professional development—such as the “lesson study” common in Singapore and Shanghai (13). Because of the hierarchical structure of U.S. schools, teachers who want to lead outside their



Teacherpreneurs lead in many capacities inside and outside the classroom. Though they are exceptional teachers, they are not the exception.

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own classroom have had to leave it to become administrators, district leaders, or policy-makers.

The Coming Age of Teacherpreneurs

America's public education system needs teacherpreneurs—classroom experts who teach students regularly, but also have time, space, and reward to spread their ideas and practices to colleagues as well as administrators, policy-makers, parents, and community leaders. The Center for Teaching Quality has supported as well as documented how this special brand of teacher leaders has begun to serve as online coaches, edugame developers, community organizers, and policy analysts, without leaving the classroom (14). In doing so, they have begun to solve problems of student and teacher learning that today's reformers have yet to identify. Daunting barriers remain, including the relatively large number of educators in school systems who never teach, the highly prescriptive teaching day, and top-down reformers whose political agendas are out of sync with the ideas of classroom experts. However, teacherpreneurs, because of their deep knowledge of students, families, and communities, are more likely to be embraced by their colleagues.

I am optimistic. Most Americans have trust and confidence in individual teachers (15), and new technologies that amplify teachers' collective wisdom and the impact of their leadership will resonate with parents and the public. Addi-

tionally, MetLife's most recent survey revealed that one in four teachers nationwide are extremely or very interested in hybrid roles that would allow them to both teach and lead outside their schools, districts, and states (16).

While these classroom experts should be highly paid, teacherpreneurship is not mainly about establishing a new income stream for underpaid professionals. It is much more about rewarding a new culture of schooling and creativity. As Peter Drucker said of entrepreneurs almost 50 years ago, "search for change, respond to it and exploit opportunities (17)." It is time for America to cultivate teacherpreneurs who will do the same, deepening and spreading best policies and practices for 21st-century teaching and learning.

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REVIEW

Professional Development for Science Teachers

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The Next Generation Science Standards will require large-scale professional development (PD) for all science teachers. Existing research on effective teacher PD suggests factors that are associated with substantial changes in teacher knowledge and practice, as well as students' science achievement. But the complexity of the U.S. educational system continues to thwart the search for a straightforward answer to the question of how to support teachers. Interventions that take a systemic approach to reform hold promise for improving PD effectiveness.

Calls for improving science education in the United States, such as raising standards for all children and focusing the curriculum, are loud and clear. The Next Generation Science Standards (NGSS) [www.nextgenscience.org (1)] press for a vision of science teaching that emphasizes students' active engagement in genuine scientific problems, a commitment to "less is more," and an approach to make science appealing to all students. Of central importance are scientific practices and the integration of students'

learning of core disciplinary concepts with active engagement in doing science (2). In addition, an increased emphasis on studying engineering is integrated throughout this new vision of science teaching and learning. Helping current teachers acquire the knowledge, skill, and will to meet these new standards is a daunting enterprise requiring large-scale professional development (PD) of high quality that is adaptable across myriad contexts.

Teachers in the United States have access to a wealth of PD opportunities, including summer institutes, coaching, mentoring, school-based professional learning communities, research experiences with practicing scientists, and "make-and-take" events that introduce teachers to new materials.

Teachers study together, conduct inquiries, read research, learn new technologies, navigate multimedia environments, and read cases. These PD programs have different goals: Traditionally, much PD has focused on enriching teachers' content knowledge (CK), introducing new curriculum and instructional materials, enhancing pedagogical CK, or educating them about scientific inquiry. The U.S. PD system is a carnival of options.

Research on Science PD

Carefully designed research, drawing from a range of disciplinary approaches from ethnographies to randomized clinical trials, has begun to shed light on what makes for effective PD. Five general characteristics have been identified: (i) focusing on specific content, (ii) engaging teachers in active learning, and (iii) enabling the collective participation of teachers (sometimes administrators), as well as (iv) coherence (aligned with other school policy and practice) and (v) sufficient duration (both in intensity and contact hours) (3–6).

Researchers have nominated five additional factors for effective PD: (i) activities are close to practice (7), (ii) participants' physical and psychological comfort is taken into account (8), (iii) teachers are immersed in inquiry experiences and witness models of inquiry teaching (6), (iv) curriculum materials are educative for teachers and students (9, 10), and (v) teachers receive direct instruction in the teaching specified in inno-

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