Readiness of America's biology teachers questioned

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In recent years, government assessments have raised concerns about the nation's science workforce. Writing in an article for *BioScience*, Gregory T. Rushton and a team of researchers looked for clues in the National Center for Education Statistics' Schools and Staffing Surveys from 1987 through 2007. These results, combined with those from prior studies, reveal some patterns with serious implications for the future of science pedagogy.

One of the authors' findings was that "biology dominates the science discipline within STEM education." According to the analysis, "in 2007, 44% of science main teaching assignments were occupied by biology educators, more than twice the percentage of educators in chemistry." Moreover, the biology education workforce increased 50% between 1987 and 2007, a result, according to the authors, of biology's position as a gateway to science education in high schools. Over the same period, the female proportion of the workforce increased from 39% to 61%, a greater percentage than in other science, technology, engineering, and math fields.

Less favorable for biology education was the finding that instructors were the "most likely among all science teachers to teach outside of their discipline as part of their workload." Moreover, the authors report, the diversity of degree tracks that might be categorized as "biology" could lead to some biology instructors' teaching subjects that fit poorly with their capabilities, despite a nominal match with their education.

Compounding the problems, "between 1990 and 2007, the proportion of teachers in their 40s with 21-25 years of experience decreased 20%, and teachers in their 50s with more than 26 years of experience fell 27%." This declining trend in teaching experience, which results in part from greater numbers of older teachers entering the workforce after previous careers, may lead to instructors for whom "the biologist identity may be stronger than that of teacher," Rushton and his colleagues write.

The authors support alternatives to the typical calls for more stringent certification and targeted professional development. In their view, it would be better to match curricula to existing expertise. They propose a model in which "instead of offering a static, predetermined slate of science courses at each school, district, or county, the curriculum is chosen largely as a function of the expertise of those teachers who they employ."

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