



# What Do People Know About Excellent Teaching and Learning?

By Ulrich Boser    March 14, 2017

It's a set of questions that nags just about every parent with school-age kids: Does their child's teacher employ good instructional practices? What are educators doing to help their kid learn? Is the school using effective programs and approaches?

There's a problem, though, because it turns out that most people do not have a robust sense of what effective teaching looks like. Indeed, most Americans believe various myths about the nature of teaching and learning, and large swaths of the public support instructional practices that are ineffective or even hurtful to learning.

False beliefs about teaching and learning are a problem that goes far beyond the classroom. Myths about learning also prevent thoughtful efforts at school reform. For instance, if large segments of Americans believe in passive forms of learning, then they won't support initiatives to make learning more active and engaged.

Similarly, if the public widely believes that right- and left-brain differences affect learning or that children have different learning styles, for example, they'll expect schools to cater to students' right- or left-brain differences and styles, even though there's little evidence that these differences shape their ability to learn.<sup>1</sup>

In this regard, climate change provides a useful analogy. In some circles, skepticism around climate change runs high, and these beliefs have slowed meaningful policy action. This occurs despite far-ranging consensus that climate change is real—and potentially devastating to the planet.

There are a number of drivers of education myths, and it often seems like everyone believes that they are an education expert. Call it the been-there, done-that problem of school improvement: Since almost everyone in the United States has spent some time in schools, they are eager to expound on the quality and effectiveness of the latest reform or approach.

But what's clear is that experience in schools does not give someone a deep understanding of instruction. This is evident in the literature on teaching, and there's a library of studies that show that pedagogical training helps teachers in the classroom.<sup>2</sup>

Plus, there's a lot of teaching knowledge that's specific to certain subject areas. Accomplished math teachers know how to explain fractions, while skillful chemistry teachers have a keen sense of the common misconceptions that students might have about the nature of molecules.

Finally, there's now a science of learning, and over the past few decades, researchers have mapped out effective ways for people to learn. A tremendous amount of research exists, for instance, on how exactly young children learn to read.<sup>3</sup> For more than a century, studies have shown that students gain much more if their learning is spaced out over time rather than concentrated in a short period.<sup>4</sup> Experts have even identified the exact brain material—called white matter—that supports learning.<sup>5</sup>

To dig deeper into the public's attitudes about the nature of teaching and learning and what they mean for policy, the author conducted a research study using Amazon's Mechanical Turk website. The results of the study are discussed below.

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## Findings

**While people believe that they can identify effective teaching, they actually have limited knowledge of effective teaching practice.** In the study, nearly all respondents believed that they were relatively skilled at identifying great teaching strategies, and more than 75 percent considered themselves above average in evaluating instructional practice.

But when it came to actually identifying robust instruction, the public wasn't all that discerning. For instance, 71 percent of respondents indicated that teachers should motivate students by praising them “for being smart.” But research by Stanford psychologist Carol Dweck and others has shown that such an approach can have negative effects on student outcomes.<sup>6</sup>

Members of the public also seemed somewhat skeptical of the value of students mastering basic content, and 36 percent of the public believes that “[f]acts can get in the way of understanding,” despite the reality that researchers believe that students need to know facts in order to reach deeper levels of learning.<sup>7</sup>

To some degree, the issue is a matter of overconfidence, and there's a long line of research that suggests that people often overestimate their own expertise in just about every field, from driving a car to their grammar skills. Or as one research paper put it, “people tend to be blissfully unaware of their incompetence.”<sup>8</sup>

But other more weighty issues are also at play. For one, education schools and elementary and secondary schools have not done enough to promote the science of learning to educators—or the public—and a number of teacher education schools continue to push the idea of learning styles and other inaccurate concepts about learning.<sup>9</sup>

At the same time, the media tends to perpetuate certain myths about teaching and learning. Newspaper articles, blog posts, and TV shows often promote ideas that turn out to have little basis in fact. Books have been devoted to helping families navigate schools based on right- and left-brain differences, for example.<sup>10</sup>

**The public underestimates the amount of knowledge and practice that it takes to become an accomplished teacher.** More than 40 percent of respondents believed that teachers don't need to know a subject area such as math or science if they have good instructional skills. In other words, much of the public believes that a great middle school math teacher can easily become a great history teacher—that a “great teacher can teach any subject.”

But the evidence clearly suggests otherwise, and there's a large body of research that shows that teachers need deep subject area expertise in order to succeed in the classroom.<sup>11</sup> To continue with the example above, it would be hard for a math teacher to become an effective history teacher without knowing a lot about history.

Also, many respondents underestimated the amount of dedicated training it takes to become an effective teacher, and more than one-quarter of respondents thought that a teacher needs as little as six months of practice teaching. These findings stand in stark contrast to the significant body of research that shows that novice teachers are less effective than their more experienced peers, as well as the experts who believe that most people need at least a year of residency training.<sup>12</sup>

These attitudes about teaching help explain why teaching is so devalued. If people believe that it's easy for someone to perform well in the classroom, then society shouldn't reward teaching because the job doesn't require rigorous training. In contrast, it's widely accepted that doctors and lawyers need a great deal of training to succeed, and people in those fields get paid a lot more. Those fields also do a lot more to support younger professionals. In medicine, there are residency programs, while law firms typically have systems to have experienced partners help younger lawyers.

**Most people have a hard time recognizing richer, more active forms of teaching and learning.** Within the learning sciences community, there's now a clear consensus that more active forms of learning promote richer understanding. Researchers from across the field argue that more engaged forms of education—such as quizzing, explaining, or teaching others—produce much better student outcomes and a deeper grasp of material. As psychologists Richard Mayer and Logan Fiorella argue, learning is “generative.”<sup>13</sup>

The evidence on this point is so overwhelming that some researchers, such as Scott Freeman at the University of Washington, refuse to do any more studies comparing active forms of learning against less active forms of learning. If you're an educator and "you refuse to do active learning, it raises an ethical question," Freeman says.<sup>14</sup> "It's like a doctor giving you a less effective drug. You'd think it's an issue of malpractice."

But in the present research, the public appeared skeptical of this approach to learning. In fact, the public showed a lot of support for more passive approaches to learning. For instance, almost 90 percent of respondents believed that "[r]ereading is a highly effective approach to learning," though research suggests that the approach is not all that effective.<sup>15</sup> Many also believed that highlighting is a successful approach, but again, studies show that the strategy is not that effective.

On the other hand, low-stakes quizzing is a highly effective form of active teaching and learning, and students who learn via quizzes will often learn a lot more than those who use more passive approaches such as underlining.<sup>16</sup> But the public is skeptical of the practice, and around 60 percent argued that informal tests are not an effective approach to gaining new skills and knowledge.

**An overwhelming share of the public believes in myths about teaching and learning.**

Close to 90 percent of respondents indicated that students should receive information in their own learning style. In this view of learning, an audio learner would receive material in an audio format, while a visual learner would get material in a visual format.

But there's no research to support learning styles, according to scholars. One major recent review stated simply that the authors "found virtually no evidence" for the approach.<sup>17</sup> Instead, it seems that content makes the key difference. So students should learn music by listening to music, while students should learn reading by doing more reading.

The author's research revealed other persistent myths as well. The study found that 68 percent of people believed that sugary drinks make kids hyper, though there's very little evidence to support that view.<sup>18</sup> In much the same way, many respondents believed that right- and left-brain differences shape learning, even though there's little evidence for the idea.<sup>19</sup>

The research also showed that more than one-quarter of the American population believes that "[i]ntelligence is fixed at birth." In other words, the public believes that nothing can be done to improve raw smarts, though there's plenty of research that shows that interventions such as preschool can boost scores on intelligence tests.<sup>20</sup> Reading to young children also shows benefits, raising their IQ scores by a half-dozen points.

## Methodology

For the research instrument, the author developed his own items as well as relied on items from other surveys, tests, and research efforts. In some cases, the author used the exact language from items that had been developed by other researchers.

To gauge the level of belief in specific brain myths, the author relied on a paper by Paul Howard-Jones recently published in *Nature*, and the author used some items from Howard-Jones' research.<sup>21</sup> The author also used test items from the Educational Testing Service's teacher licensure exam to determine if the public could accurately answer such questions.

The author also depended on work from the University of Michigan's Study of Instructional Improvement, which measures how much teachers know about instruction.<sup>22</sup> Also helpful was the Organisation for Economic Co-operation and Development's "Neuro-myths" publication.<sup>23</sup>

To develop the research approach, the author reviewed a large body of literature on the topic of learning.<sup>24</sup> The author also had a group of learning science experts review the final version of the instrument and provide feedback. The experts included David Daniel, Stephen Chew, Dick Clark, Anastasia Kitsantas, and Bror Saxberg. These experts are not responsible for any of the content—or errors—in this document.

The author used Mechanical Turk to administer the instrument in spring 2015 to almost 3,000 individuals and then weighted the results by race, poverty, and education level. In the parlance of researchers, Mechanical Turk provides a convenience sample, which may not be representative of the public. Recent studies do, however, suggest that the Amazon Mechanical Turk website is a methodologically robust approach to collecting public opinion data, and the author weighted the results to make them more representative.<sup>25</sup>

To the author's knowledge, this research is the first to look at the intuitions of the American public about teaching and learning, showing a wide gap between the public's understanding of good educational practice and actual good educational practice. This gap has important implications for policy and the future of education reform, as the author argues in the recommendations section below.

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## Recommendations

Science does not always win out against public perception. A large number of people refuse to vaccinate their children, for instance. While the evidence on the benefits of vaccines is conclusive, many families decline vaccines because they believe—erroneously—that the shots are dangerous and could potentially harm their children.

While the myths about teaching and learning aren't quite as high-stakes as vaccines, the issue remains pressing. In order to successfully reform schools, policymakers need to make the case for better teachers and richer forms of learning. To that end, the author recommends the following.

**Policymakers at all levels should do more to promote the science of teaching and learning, including:**

- **Funding a center within the U.S. Department of Education to develop more practitioners guides that focus on the science of learning.** Some of the Department of Education's practitioners guides have a dedicated following. But more could be done, and some of the guides have not been sufficiently disseminated. The department should also create a program similar to the White House petition program, through which parents and teachers could suggest ideas for guides and produce material that is easily disseminated to the public.
- **Providing more funding for research on the science of learning and the translation of that research into practice.** The National Institutes of Health currently gets far more funding than the Department of Education's research arm.<sup>26</sup> Policymakers should realize the benefits of learning science research and allocate more funding to basic and applied education research. Much more funding should also go to helping educators apply the research into classroom contexts, as David Daniel has argued.<sup>27</sup> "The science of learning does not design interventions for use by educators," Daniel says, thus recommending more "translation" efforts.

**Policymakers at all levels should help modernize the teacher workforce.** As part of its TeachStrong effort, the Center for American Progress and its partners have outlined a set of principles that would dramatically modernize and elevate the teacher workforce.<sup>28</sup> A few of the recommendations are particularly relevant, including:

- **"Reimagin[ing] teacher preparation to make it more rooted in classroom practice and a professional knowledge base, with universal high standards for all candidates."**<sup>29</sup> By ensuring that teacher preparation programs have rigorous standards for entry and training, policymakers can raise the status of the teaching profession to levels of other, more highly regarded careers. Improving teacher preparation would help correct the public's conception of teaching as a profession that does not require training, knowledge, and a specified skillset.

- **“Increas[ing] compensation in order to attract and reward teachers as professionals.”** By increasing compensation for all teachers and shortening the amount of time it takes for a teacher to achieve maximum salary, policymakers can send a clear signal to the public that teaching is a challenging career that requires advanced training and continued skill-building.

**Policymakers at all levels should support demonstration projects of successful, next-generation learning.** Such projects would go a long way toward building public narratives that support good practice. Recommendations include:

- **Developing so-called super charter schools based on the science of learning.**

Taking a page from the Small Business Innovation Research program, the author proposes that each state that receives Title I funds set aside 0.5 percent of those funds for super charters. These competitive contracts would help schools rethink education in ways that support the new science of learning. For instance, a school might develop a proposal to do more to space out student learning over time.

- **Providing active learning grants.** Policymakers at the federal or state level should consider funding district-level programs devoted to developing more active forms of learning, such as quizzing, pretesting, and elaboration. This pilot program would help districts and schools develop active learning programs by providing funding as well as waivers for some current requirements. Similar to the innovation grants offered by the Department of Education, winners would need to work to publicize their lessons learned.

## Conclusion

The misalignment between what the public thinks and what the research says about student learning and effective teaching is troubling. But the problem is clearly solvable, and researchers, practitioners, and policymakers must take focused steps to elevate the science of learning and communicate the findings to the public.

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