Marshall Memo 690

A Weekly Round-up of Important Ideas and Research in K-12 Education
June 12, 2017

In This Issue:

Quotes of the Week

"Educators cannot control the structure of the families into which our current students are born. But we can influence how our students think about the family structures they form and the series of life choices that will likely lead to their life success and that of *their* children. Perhaps then we can achieve the intergenerational transmission of *advantage*. To make human beings human, we must accept the responsibility to empower our young scholars with this information."

Ian Rowe in "If Not Us, Who Will Make Humans Human? If Not Now, a New Generation of Fragile Families Looms" in *The Education Gadfly*, June 7, 2017 (Vol. 17, #23), http://bit.ly/2te7sKL; Rowe can be reached at irowe@publicprep.org.

"[M]ost students are remarkably poor at judging whether or not they have studied a piece of material well enough to have mastered it."

Olusola Adesope, Narayankripa Sundararajan, and Dominic Trevisan (see item #2)

"We bring knowledge to the comprehension process, and that knowledge shapes our comprehension. When we comprehend, we gain new information that changes our knowledge, which is then available for later comprehension. So, in that positive, virtuous cycle, knowledge begets comprehension, which begets knowledge, and so on. In a very real sense, we literally read and learn our way to greater knowledge about the world and greater comprehension capacity."

Nell Duke et al. (quoted in item #4)

"*Likability* reflects kindness, benevolent leadership, and selfless, pro-social behavior. Research suggests that this form of popularity offers lifelong advantages, and leads to relationships that confer the greatest health benefits. Likability is markedly different from *status* – an ultimately less satisfying form of popularity that reflects visibility, influence, power, and prestige. Status can be quantified by social media followers; likability cannot."

Mitch Prinstein in "Popular People Live Longer" in *The New York Times*, June 4, 2017, http://nyti.ms/2skCm4y; Prinstein can be reached at mitch.prinstein@unc.edu.

1. Five Dimensions of Powerful Classrooms

In this article in *Achieve the Core*, Alan Schoenfeld (University of California/Berkeley) suggests that highly effective teachers orchestrate the following elements:

• *Rigorous, appropriate content* – Classroom activities provide opportunities for students to become knowledgeable, flexible, and resourceful disciplinary thinkers. Discussions are focused and coherent, providing opportunities to learn ideas, techniques, and perspectives, make connections, and develop productive habits of mind.

• *Cognitive demand* – Students have opportunities to grapple with and make sense of important concepts and their use. Students learn best when they are challenged in ways that provide room and support for growth, with task difficulty ranging from moderate to demanding. The level of challenge should be conducive to what has been called "productive struggle."

• *Equitable access to content* – Classroom structures invite and support the active, equitable engagement of all students with core content. If a small number of students get most of the air time, things aren't equitable, no matter how rich the content.

• *Agency, ownership and identity* – Students have the opportunity to "walk the walk and talk the talk" – to contribute to conversations about ideas, to build on others' ideas and have others build on theirs – in ways that contribute to their development of agency (the willingness to engage), their ownership of the content, and the development of positive identities as thinkers and learners.

• *Formative assessment* – Classroom activities elicit student thinking, and subsequent interactions respond to those ideas, building on productive beginnings and addressing emerging misunderstandings. Powerful instruction meets students where they are and gives them opportunities to deepen their understandings.

"What Really Counts When We Teach?" by Alan Schoenfeld in *Achieve the Core*, April 18, 2017, http://achievethecore.org/aligned/what-really-counts-when-we-teach/; Schoenfeld can be reached at alans@berkeley.edu.

Back to page one

2. The "Testing Effect" – How Practice Quizzes Improve Learning

"[M]ost students are remarkably poor at judging whether or not they have studied a piece of material well enough to have mastered it," say Olusola Adesope and Narayankripa Sundararajan (Washington State University) and Dominic Trevisan (Simon Fraser University)

in this *Review of Educational Research* article. The researchers' meta-analysis found that taking practice tests is the best way to reveal gaps in knowledge and improve learning and retention. Alas, most students don't know this; they study for tests by re-reading and highlighting their textbooks and notes, which increases their *familiarity* with the material but produces a false sense of mastery. "Despite confidence in their understanding of study material when rereading it," say Adesope, Sundararajan, and Trevisan, "students actually may not be able to answer exam questions related to the material."

The authors analyzed 272 studies of practice testing and pinpointed the specific conditions that produce the biggest gains in student mastery, not only for an upcoming test but also for long-term retention and the ability to transfer knowledge to unfamiliar situations:

• *The format of practice tests* – Multiple-choice practice tests are most effective for memorization (state capitals, world language vocabulary), while short-answer questions are best for higher-level conceptual material. It's also helpful for practice tests to interleave multiple-choice and open-response questions.

• *The type of questions* – Do practice-test questions need to be identical or very similar to those on the final test? The authors explored the principle of *transfer-appropriate processing,* which says that "performance on any given task will be highest if the characteristics of the learning procedure are similar to the characteristics of the assessment procedure." Although retention was strongest with identical question formats, Adesope, Sundararajan, and Trevisan caution that this doesn't necessarily mean the learning was deeper and more lasting. The key variable is retrieving information from memory, which strengthens the memory of that material.

• *Number and timing of practice tests* – The authors found that one practice test was better than several (which can lead to test fatigue), and practice tests were most effective when given between 1 and 6 days before the final test, not on the same day as the test. "One plausible explanation," they say, "is more time between the practice and final tests allows students to mentally recall and process information, leading to deeper learning."

• *Cognitive effort* – The authors found that the more "mental sweat" students exerted working on practice tests (within reason), the greater their retention of material for final tests.

• *Feedback after testing* – Adesope, Sundararajan, and Trevisan were surprised to find that students getting feedback after practice tests didn't show up as a major factor in most studies. Other researchers have found that immediate feedback is important, helping to clarify errors and correct misconceptions in subsequent instruction. More research is needed on this issue.

• *K-12 and college* – The study found that the testing effect was robust in elementary, secondary, and post-secondary classrooms. The strongest results were at the secondary level.

Adesope, Sundararajan, and Trevisan conclude by emphasizing that they're not advocating more and more classroom testing. Students can use practice testing in low-stakes, informal settings – flash cards, mental self-quizzing – and teachers can use it by pausing for 3-5 seconds after posing a question to a class and, rather than calling on the first students who

raise their hands, getting all students to think and then write answers and or turn and talk to their neighbors.

"Rethinking the Use of Tests: A Meta-Analysis of Practice Testing" by Olusola Adesope, Dominic Trevisan, and Narayankripa Sundararajan in *Review of Educational Research*, June 2017 (Vol. 87, #3, p 659-701), http://bit.ly/2sk6QHo; the authors can be reached at olusola.adesope@wsu.edu, dtrevisa@sfu.ca, and n.sundararajan@wsu.edu.

Back to page one

3. Dealing Thoughtfully with Timed Math Tests

In this *Edutopia* article, editor Youki Terada reports on major disagreements among educators about the efficacy of timed math tests (*Edutopia* received a torrent of responses to a recent Jo Boaler article on the subject). Those who oppose timed tests say the pressure of the ticking clock "causes a kind of paralysis in children," says Terada, "throwing a wrench into students' cognitive machinery and hindering deeper thinking." Rawini Ngaamo recalls, "All I learned from them is that I was stupid and slow. I still hate maths even now because of the way it was taught." Timed-test advocates argue that they prepare students for the realities of upcoming standardized tests (children take as many as 20 a year) and, after graduation, life's many deadlines. "Maybe slowly getting used to timed tests won't make the big tests so looming," says Brenda Anderjaska.

Clearly students need to move past rote memorization to deeper mathematics learning, says Terada: "You don't build safe bridges or send rockets into space with multiplication tables alone." But fluency and speed with basic math facts and skills is a necessary foundation for higher-level problem solving. "When students get to more complex math problems, they get bogged down by having to actually think to calculate basic math facts," says Beth Kappauff. "A kid who has to consider the answer to '3 x 4' will struggle in algebra and beyond. They need math facts to free up time and attention for deep thinking about harder concepts." If students don't have speed and fluency, they're being set up for failure, so maybe timed tests are important.

Terada accepts this reality and suggests some basic guidelines for teachers deciding how to handle timed tests. First of all, be mindful of students with disabilities. As many as 15 percent of students may need more time to process math problems. Second, avoid high stakes and student-to-student competition. Teachers might get students working against the clock but grade their work on accuracy, not completion, with students tracking their improvements. "My tactic," says teacher Dot McGee, "was to give a Mad Math Minute page with a lot of problems – and announce that no one could possibly finish this many correctly, and you weren't expected to. Our goal was to do at least one more problem than you did the last time. Not competing against anyone but yourself, and keeping your own score."

"Tips for Tackling Timed Tests and Math Anxiety" by Youki Terada in *Edutopia*, May 11, 2017, https://www.edutopia.org/article/should-we-abolish-timed-math-tests-youki-terada

Back to page one

4. Improving Middle-School Students' Motivation to Read

In this *Teachers College Record* article, Margaret Troyer (Harvard University) reports on her study of inner-city seventh graders' reading motivation, a key factor in comprehension and achievement. Using test results, surveys, and interviews, Troyer created four motivation profiles and closely observed two students in each category in their classrooms.

• *Average achievement, high motivation* – These students did fairly well on tests and were strong on self-efficacy, intrinsic and extrinsic motivation, belief in the importance of reading, and independent reading, and were in the average range on classroom compliance. The two focus students were most motivated by grades, keeping track of how much various class assignments and tests counted. One of the focus students was an avid reader, the other read very little on her own.

• *High achievement, average motivation* – These students scored well on tests but were much lower than the first group on intrinsic and extrinsic motivation, belief in the importance of reading, compliance, and the amount they read on their own, and they were more apt to avoid reading. One of the focus students said he always listened to the teacher and followed along, but Troyer observed him walking around the classroom socializing and teasing classmates. The other focus student read ahead of the class and made her own notations in texts, but almost never engaged in recreational reading after school hours. Both were very motivated by grades.

• *Low achievement, low motivation* – These students scored poorly on tests and were low in all the profile categories except for recreational reading on digital devices. Teachers said the two profile students lacked skills and motivation and sometimes caused discipline problems, for example, throwing a pencil at another student. Both students blamed the difficulty of classroom texts or confusing questions for their lack of success as readers, and neither did much reading outside of class.

• *Average achievement, low motivation* – These students were low in self-efficacy, intrinsic and extrinsic motivation, belief in the importance of reading, were average on compliance and recreational reading, and scored well above average on avoidance. The two focus students were the only ones in the study who said they weren't that concerned with grades; they showed some impatience with test-prep activities and the tests themselves. Both reported enjoying specific books; one found *A Long Way Gone* "dramatic" and "crazy" while the other read *Of Mice and Men* and said the treatment of Lenny "makes me sick inside." One of the students said she had read a lot when she went to school in Jamaica but was now intensely self-conscious about her accent when asked to read aloud in class.

Analyzing these four profiles, Troyer was struck by the fact that low motivation didn't necessarily translate to low test scores, and also by variation within the categories as revealed by watching and interviewing the profile students. She had several other observations on these classrooms and how teachers did and didn't motivate students to read:

• *The perverse impact of the IRE dynamic* – In classroom discussions, teachers almost always followed the Initiate-Respond-Evaluate pattern, posing questions that had a single correct answer and quickly affirming or correcting students' responses. Although two of the

teachers in the study said they were philosophically committed to encouraging students to take risks, says Troyer, "in my observations, both were brusque in acknowledging correct or incorrect answers, and more importantly, they did not acknowledge that some questions, particularly in literary analysis, have more than one possible right answer. This instructional practice seemed to be reflected in students' statements about the importance of getting the right answer, and their apparent belief in their ability to get this answer as a sign of their cognitive ability."

• *The effect of round-robin reading* – Many teachers' use of turn-taking oral reading in class inadvertently conveyed the idea that good readers are those who can read aloud "without, you know, stopping all the time," said one student. "Like not too slow and not too fast," said another. "I try not to mess up on words too much," said a third. For the girl from Jamaica who worried about her accent, oral reading seemed to have totally turned her off reading.

• *Tracking out-of-class reading* – The teachers in the study knew how important it was for their students to read a lot, but they didn't systematically gather data on how much kids were reading on their own. Some of the focus students were, in fact, reading a lot, but their teachers weren't the key factor. What all the students needed was (a) class time for independent reading, (b) access to high-interest books, and (c) adult support in text selection.

• *Compliant pretenders* – Teachers mostly believed students were motivated and successful if they were well-behaved the followed directions; as one teacher put it, "she just does what you ask her to do and there's never any pushback." Troyer found that teachers often didn't recognize high levels of interest and motivation because the students were less manageable behaviorally.

• *Text selection* – Students were assigned quite different texts by different teachers – some read classics like *Of Mice and Men* and *Lord of the Flies* while others read high-interest young adult novels like *Make Lemonade* and *Absolutely True Diary of a Part-Time Indian*. Interestingly, Troyer's surveys and interviews didn't find a big difference in students' perceptions of the two types of texts.

Troyer says teachers "could benefit from gathering more information about students' reading motivation, beyond observations of work completion and class participation – and that teachers should continue to gather such information over the course of days and weeks, paying close attention to the contexts within which students are motivated to read, rather than relying on a single static measure." The best way to get such information, she says, acknowledging how busy middle-school teachers are, is through brief informal conversations. She also believes teachers need to tune in to the context and texts that motivate individual students, working to build intrinsic motivation (as opposed to focusing on grades) by nurturing students' autonomy (through choice of texts), competence (through in-class success), and relatedness (through a wide selection of relevant texts). "Ideally," says Troyer, "teachers might expand students' ability to self-select texts, and provide them with support in choosing texts which are relevant and in using talk about those texts to engage with peers and adults." In addition, she has the following suggestions:

- De-emphasize oral reading in front of the whole class;

- Move away from the IRE discussion dynamic; instead, prompt students to give extended answers.
- Don't convey the idea that there's one right answer and that "smart" students answer quickly.
- Keep track of what students are reading outside of class;
- Don't judge students' motivation by their behavior in class;
- Provide students with a rich variety of texts.
- Continuously work on building relationships with students.

"A Mixed-Methods Study of Adolescents' Motivation to Read" by Margaret Troyer in *Teachers College Record*, May 2017 (Vol. 119, #5, p. 1-48), available for purchase at http://en.buaa.findplus.cn/?h=articles&db=a9h&an=122716887; Troyer can be reached at margaret_troyer@mail.harvard.edu.

Back to page one

5. The Impact of Students Reading Culturally Relevant Texts

In this *Teachers College Record* article, Kathleen Clark (Marquette University) reports on her study of the impact of African-American elementary school students reading books featuring culturally familiar characters and settings. The study compared a study group and a control group (reading books without African-American characters and settings) over a semester of instruction, measuring student outcomes using the Qualitative Reading Inventory (QRI).

Teachers in the study group used leveled texts from Lee and Low's *Bebop Books*, Scholastic's *Just for You* series, and McGraw Hill's *Visions* series. Trade selections included *Somebody's New Pajamas* by Isaac Jackson, *Tippy Lemmey* by Patricia McKissack, *Solo Girl* by Andrew David Pinkney, and series books like Juanita Havill's books about Brianna and her friends, Ann Cameron's books about Julian and his friends, Sharon Draper's *Ziggy and the Black Dinosaurs* series. Teachers in the control group read books not featuring African-American characters, including Ed Young's *Lon Po Po*, Gary Soto's *Too Many Tamales*, Peter and Connie Roop's *Keep the Light Burning*, *Abbie*, Kevin Henkes's *Margaret and Taylor*, Dick King-Smith's *Jenius, the Amazing Guinea Pig*, animal fantasy books including the Cynthia Rylant *Poppleton* series, Marc Brown's *Arthur* books, and informational texts like Gail Gibbons's *Bats* and Marge Kennedy's *Pets at the White House*. All teachers in the study used the same instructional approach:

- Oral retelling and review of a previously read text;
- 20 minutes of word study;
- 20 minutes of guided reading;
- 15 minutes of writing in response to reading.

Here are the results:

• *Contextual word recognition* – Students who used culturally relevant texts significantly outperformed students in the control group at figuring out unfamiliar words in an unfamiliar text. Clark believes this happened because students in the study group used their

background knowledge to pay more attention to meaning and, with their teachers' help, developed the skills of detecting word inaccuracies and solving reading problems in real time.

• *Word recognition in isolation* – There weren't significant growth differences on this measure between study group and control group students.

• *Comprehension* – Students who worked with culturally relevant texts were able to transfer their reading skills to texts that were not culturally relevant. "It seems that reading culturally relevant texts in concert with ongoing teacher-guided instruction in how to comprehend," says Clark, "coupled with daily contextual reading practice, enabled children to draw upon their existing knowledge to not only expand their knowledge of places, things, and events, but also to develop their strategic comprehension processes – processes that transfer across texts and time – in a virtuous cycle such that children emerged from the 10-week program able to construct more coherent situation models when reading generally than children who did not read culturally relevant texts… This transfer of reading processes is crucial to African-American students' academic achievement as most of the texts that they encounter in schools will not be culturally relevant."

To drive home the point about virtuous cycles, Clark quotes from a 2011 study by Nell Duke et al.: "We bring knowledge to the comprehension process, and that knowledge shapes our comprehension. When we comprehend, we gain new information that changes our knowledge, which is then available for later comprehension. So, in that positive, virtuous cycle, knowledge begets comprehension, which begets knowledge, and so on. In a very real sense, we literally read and learn our way to greater knowledge about the world and greater comprehension capacity."

What are the implications of this study for schools? Clark believes that the amount of instruction in culturally relevant texts in her study – about 180 minutes a week – would be "easy to accommodate within school-based contexts." Out of the 700 minutes typically devoted each week to literacy instruction in an urban public school, this would be about a quarter of literacy time. "Such instruction could occur during regular classroom time," says Clark, "or within supplemental intervention contexts." And the payoff for African-American students would be significant.

"Investigating the Effects of Culturally Relevant Texts on African-American Struggling Readers' Progress" by Kathleen Clark in *Teachers College Record*, May 2017 (Vol. 119, #5, p. 1-30), available for purchase at http://www.tcrecord.org/Content.asp?ContentId=21756; Clark can be reached at kathleen.clark@marquette.edu.

Back to page one

6. Teaching Climate Science in a Rust Belt High School

In this *New York Times* article, Amy Harmon reports on the challenges faced by James Sutter, a second-year AP environmental science teacher covering climate change in a high-poverty Ohio community where many coal-mining jobs have been lost in recent years. When Sutter said the recent warming of the planet was caused by heat-trapping gases released by burning fossil fuels, a feisty straight-A student who had enjoyed his biology course said global

warming could be the result of natural causes. When Sutter said that flooding, droughts, and fiercer storms predicted for the next century were linked to climate change, the student said, "Scientists are wrong all the time." When she pushed Sutter to be more open to students' opinions, he pushed back: "It's not about opinions. It's about the evidence." To her friends, the girl said, "It's like you can't disagree with a scientist or you're 'denying science.'" At one point, Sutter exclaimed, "Why would I lie to you? It's not like I'm making a lot of money here."

Things did not end well between Sutter and this student. When he showed an Emmy Award-winning documentary on climate change in class, she became extremely agitated and bolted from the school, refusing to return to the class for the rest of the semester. "It was just so biased toward saying climate change is real," she said, "and that all these people that I pretty much am like are wrong and stupid." Her uncle backed her up: "If she was in math class and the teacher told her two plus two equals four and she argued with him about that, I would say she's wrong. But no one knows if she's wrong." Sutter polled his students and 14 of 17 said their parents thought he was wasting their time. "My stepdad says they're brainwashing me," said one.

In this town, reports Harmon, "rejecting the key findings of climate science can seem like a matter of loyalty to a way of life already under siege. Originally tied, perhaps, to economic self-interest, climate skepticism has itself become a proxy for conservative ideals of hard work, small government, and what people here call 'self-sustainability.'" Yale researcher Dan Kahan, a student of political polarization, says, "What people 'believe' about global warming doesn't reflect what they know. It expresses who they are."

Nevertheless, some students in Sutter's class changed their minds. One girl, a close friend of the student who fled the class, wrestled with the evidence and was swayed by the video, scientists who visited the class, and field trips that focused on the effects of climate change on animal life and pollution. "O.K., I'm not going to lie," she said, casting a guilty look at her friend. "I did a 180. This is happening, and we have to fix it."

"Obstacle for Climate Science: Skeptical, Stubborn Students" by Amy Harmon in *The New York Times*, June 5, 2017, http://nyti.ms/2qQORI5; Harmon wrote a follow-up article reflecting on her experience covering this issue: http://nyti.ms/2rbpU6w.

Back to page one

If you have feedback or suggestions,
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About the Marshall Memo

Mission and focus:

This weekly memo is designed to keep principals, teachers, superintendents, and others very well-informed on current research and effective practices in K-12 education. Kim Marshall, drawing on 48 years' experience as a teacher, principal, central office administrator, consultant, and writer, lightens the load of busy educators by serving as their "designated reader."

To produce the Marshall Memo, Kim subscribes to 60 carefully-chosen publications (see list to the right), sifts through more than a hundred articles each week, and selects 5-10 that have the greatest potential to improve teaching, leadership, and learning. He then writes a brief summary of each article, pulls out several striking quotes, provides e-links to full articles when available, and e-mails the Memo to subscribers every Monday evening (with occasional breaks; there are 50 issues a year).

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- A collection of "classic" articles from all issues

Core list of publications covered

Those read this week are underlined.

All Things PLC
American Educational Research Journal
American Educator
American Journal of Education
American School Board Journal
AMLE Magazine
ASCA School Counselor
ASCD SmartBrief
Communiqué
District Management Journal
Ed. Magazine
Education Digest
Education Next
Education Update
Education Week
Educational Evaluation and Policy Analysis
Educational Horizons
Educational Leadership
Educational Researcher
Edutopia
Elementary School Journal
English Journal
Essential Teacher
Exceptional Children
Go Teach
Harvard Business Review
Harvard Educational Review
Independent School
Journal of Adolescent and Adult Literacy
Journal of Education for Students Placed At Risk (JESPAR)
Kappa Delta Pi Record
Knowledge Quest
Literacy Today
Mathematics Teaching in the Middle School
Middle School Journal
Peabody Journal of Education
Phi Delta Kappan
Principal
Principal Leadership
Principal's Research Review
Reading Research Quarterly
Responsive Classroom Newsletter
Rethinking Schools
Review of Educational Research
School Administrator
School Library Journal
Teacher
Teachers College Record
Teaching Children Mathematics
Teaching Exceptional Children
The Atlantic
The Chronicle of Higher Education
The Education Gadfly
The Journal of the Learning Sciences
The Language Educator
The New York Times
The New Yorker
The Reading Teacher
Theory Into Practice
Time Magazine