Marshall Memo 413

A Weekly Round-up of Important Ideas and Research in K-12 Education
December 5, 2011

In This Issue:

Quotes of the Week

"The quantity of students' homework is a lot less important than its quality."
Annie Murphy Paul (see item #1)

"In adolescents – and younger college students, according to recent data from my lab – sleep is a neurologically important process during which the fast-growing brain becomes better organized."
Mary Carskadon (see item #8)

"Caffeine is no more a substitute for sleep than are CliffsNotes for reading original works of literature."
Mary Carskadon (*ibid*.)

"We argue that having to choose between reading comprehension and science content instruction is a false choice because both are essential components of a literate society."
Gale Sinatra and Suzanne Broughton (see item #4)

"Journalists in Britain have traditionally justified shady practices by arguing that they are in 'the public interest.' Asked by an inquiry lawyer how he would define that, [former Murdoch editor] Mr. McMullan said that the public interest is what the public is interested in."
Sarah Lyall in "Ex-Editor Defends Phone Hacking as Worthy Tool" in *The New York Times*, Nov. 30, 2011 (p. A3), http://nyti.ms/vtxCP2

"Too often, we gravitate toward like-minded people, a behavior that insulates us from expanding our perspective… Preparing for a global society requires that we become curious about how others think."
John D'Auria (see item #9)

1. Three Ways to Make Homework More Effective

"Do American students have too much homework or too little?" asks author Annie Murphy Paul in this *New York Times* article. "Neither, I say. We ought to be asking a different question altogether… How effectively do children's after-school assignments advance learning?" Studies indicate that for many students, homework fails on two counts – there's too much of it and it's too often low-level busywork.

But there's hope, says Paul. She cites a promising new line of research by neuroscientists, cognitive scientists, and educational psychologists on how children absorb, retain, and apply knowledge. This new field – Mind, Brain, and Education – has three insights that she believes could make homework far more productive for students:

• *Spaced repetition* – Rather than studying material in concentrated chunks (the Civil War one evening, Reconstruction the next), students learn better when they study the same material in shorter sessions spread over a longer period of time (learning about the Civil War and Reconstruction throughout a semester). One study showed that students using spaced repetition had double the retention rate of students using the traditional chunked method. "The reason the method works so well goes back to the brain," says Paul. "When we first acquire memories, they are volatile, subject to change or likely to disappear. Exposing ourselves to information repeatedly over time fixes it more permanently in our minds, by strengthening the representation of the information that is embedded in our neural networks."

• *Retrieval practice* – This is self-quizzing – using a test not to assess learning but to reinforce it – for example, reading a chapter of a textbook, closing the book, and writing down as much as we can remember. Paul cites the brain research on how memory works. When we access information, it's not like going into a computer's chips and pulling it out (which doesn't affect the chip or the electron): "Every time we pull up a memory, we make it stronger and more lasting," says Paul, "so that testing doesn't just measure, it changes learning. Simply reading over material to be learned, or even taking notes and making outlines, as many homework assignments require, doesn't have this effect." In one study, students using retrieval practice remembered 80 percent of the vocabulary words they were studying, while those using traditional study methods remembered only 33 percent.

• *Desirable difficulty* – A common misconception about studying new material is that if it seems easy, we'll remember it. "In fact," says Paul, "the opposite is true. When we work hard to understand information, we recall it better; the extra effort signals the brain that this knowledge is worth keeping." Desirable difficulty can be applied to homework by interleaving different kinds of assignments and problems rather than giving a single assignment. "When students can't tell in advance what kind of knowledge or problem-solving strategy will be

required to answer a question," says Paul, "their brains have to work harder to come up with the solution, and the result is that students learn the material more thoroughly." In baseball batting practice, interleaving consists of throwing a variety of pitches at batters so they don't know what's coming next – which, of course, is what's going to happen in the actual game. In a study of interleaving with fourth graders, students getting mixed math problems did twice as well as students who did not.

"Science has shown us how to turn homework into a potent catalyst for learning," concludes Paul. "Our assignment now is to make it happen."

"The Trouble with Homework" by Annie Murphy Paul in *The New York Times*, Sept. 11, 2011, http://nyti.ms/vyLpDb

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2. Extending Learning Time Without Breaking the Bank

(Originally titled "Time – It's Not Always Money")

In this *Educational Leadership* article, Harvard lecturer Chris Gabrieli (who chairs the National Center on Time and Learning) argues that extended learning time – a key success factor in more than a thousand schools across the country – needn't be prohibitively expensive if schools use approaches that are more creative than simply paying teachers for extra hours. Some schools spend an additional $1,300 per student, but others have virtually no extra costs. Here are Gabrieli's suggestions for cost-effective ways of extending learning time:

• *Teacher schedules* – Having teachers arrive at school and leave at the same time is administratively convenient but "squanders opportunities," says Gabrieli. "By staggering teachers' work schedules, schools can significantly add to students' total learning time without adding to teacher work time." For example, Brooklyn Generation School, a regular New York City public school, operates for 200 seven-hour days each year, which means students get 320 more hours than conventional schools – with no additional cost. The school prioritized learning time in its schedule, asked teachers to take on expanded responsibilities (which meant not hiring instructional coaches, resource room teachers, and athletic directors), and staggered the yearly schedule so teachers work 180 days with some working while others are on vacation. Students get intensive two-month classes taught by a different team from their regular teachers. Brooklyn Generation accomplishes all this while maintaining small classes (14-18 students), manageable student loads (60 or fewer) and giving teachers two hours a day for collaborative planning and 20 days each year for professional development. Ninety percent of its first cohort graduated on time, and 90 percent were accepted by colleges.

• *Partnerships* – Schools can save teacher time by hiring external partners – for example, a school in Revere, Massachusetts contracts with a nonprofit, Playworks, to send a trained coach to manage six periods of recess and physical education. A middle school in Boston brings in Citizen Schools to offer students apprenticeships in law, cooking, urban planning, and computer science.

• *Blended or hybrid instruction* – The right mix of computers, software, and human contact can get students working at their own level and pace and help teachers be more

productive. "Students might take radically different amounts of time to reach mastery," says Gabrieli, "shattering our current notions of grade level, and they could learn in and out of school – anywhere they can connect their personal computer, tablet, or smartphone." Rocketship Education, a network of charter schools in California, is a pioneer of this approach – see http://www.rsed.org – as is New York City's School of One.

Gabrieli concludes by suggesting possible sources of funding for extended learning time (Title I, Perkins, School Improvement Grants, and other federal and state programs) and urging schools and districts to ask, "What amount of learning time do we need to succeed?" rather than, "How can we afford more time?"

"Time – It's Not Always Money" by Chris Gabrieli in *Educational Leadership*, December 2011/January 2012 (Vol. 69, #4, p. 24-29), http://www.ascd.org

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3. Getting the Biggest Instructional Bang from Technology Bucks

(Originally titled "Stretching Your Technology Dollar")

In this *Educational Leadership* article, Minnesota district media/technology director Doug Johnson suggests ten ways to get the most from technology dollars:

• *Use effective budgeting techniques*. "Good technology budgets should not just be practical, but moral as well," says Johnson, "clearly showing how every dollar spent directly or indirectly improves educational opportunities for students." This means the budget is aligned with goals, is transparent, is specific, and includes input from key stakeholders.

• *Take advantage of group buying power*. Get quotes and use intermediate service agencies to get discounts.

• *Practice sustainable technology*. Don't purchase more technology than a school can regularly maintain, upgrade, and replace – and rotate hardware and software.

• *Purchase the right tool for the right job*. This means asking whether this is a job for technology, what exactly will users do with the equipment, where will it be used, will a reconditioned machine serve just as well as a new one, and could families rather than the school provide this item?

• *Take advantage of free software*. This includes open-source material, minimally featured versions of commercial products, and web-based software applications – see http://schoolcomputing.wikia.com/wiki/Best_Free_Software.

• *Use the cloud*. This can save storage and backup expenses at the school and district level.

• *Enforce standardization through single-point purchasing*. Standardizing equipment, software, and services increases bulk purchasing discounts, decreases inventory of supplies and parts, increases the amount of training time, decreases the need for technical support, and increases the likelihood of compatibility with legacy systems.

• *Maximize your E-rate funding*. The Universal Service Rate (E-rate) has made major contributions to the affordability of technology for schools. Johnson advises using an E-rate

consultant, working with regional telecommunication consortia, saving documentation, taking the process seriously, and lobbying your U.S. representatives and senators.

• *Get rid of outdated stuff*. This includes 16mm film projectors, filmstrips, cassette tape players, opaque projectors, Microsoft Works and AppleWorks software and phasing out overhead projectors, CRT televisions, VHS tapes and players, and desktop rather than web-based software.

• *Provide sufficient training*. This ensures that the equipment you've invested in will be used well.

"Stretching Your Technology Dollar" by Doug Johnson in *Educational Leadership*, December 2011/January 2012 (Vol. 69, #4, p. 30-33), http://www.ascd.org; Johnson can be reached at doug0077@gmail.com.

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4. How Reading Can Support Science Literacy – and Vice-Versa

In this *Reading Research Quarterly* article, Gale Sinatra (University of Southern California) and Suzanne Broughton (Utah State University) say that "learning in science is a matter of changing one's preconceived notions about the natural world." For example, children have every reason to doubt that the earth is round; it contradicts their background knowledge and experiences:

- The earth doesn't *look* like it's round.
- If it were round, wouldn't people fall off as it spins?
- Children don't see the earth's actual shape first-hand (which is why early explorers assumed the earth was flat).
- The links between the earth's shape and seasonal change, gravity, and night and day are far from obvious.

Sinatra and Broughton believe that reading *refutation texts* – material that challenges misconceptions and leads students to rearrange their mental baggage – is the best way to improve science literacy – more effective, says the research, than expository or persuasive texts. Here's an example: "Some people think that seasons change because the earth is closer to the sun in the summer and farther away from the sun in the winter. However, that is not the case Rather, it is the tilt of the earth's axis that causes the seasons to change." Specific evidence and diagrams would follow. The idea is to surface children's misconceptions and then refute them with clear evidence.

The problem is that in recent years, teachers have assigned less and less reading in science lessons. Why? Because science textbooks make unrealistic assumptions about readers' background knowledge, use unfamiliar and technical vocabulary, present new concepts too quickly, and are often not as coherent as they could be. This leaves most reading comprehension instruction to literacy classes, which distresses Sinatra and Broughton. "We argue that having to choose between reading comprehension and science content instruction is a false choice because both are essential components of a literate society," they say. Refutation texts build science literacy while also developing better reading comprehension.

"Bridging Reading Comprehension and Conceptual Change in Science Education: The Promise of Refutation Text" by Gale Sinatra, Suzanne Broughton in *Reading Research Quarterly*, October/November/December 2011 (Vol. 46, #4, p. 374-393), http://onlinelibrary.wiley.com/doi/10.1002/RRQ.005/abstract

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5. What Happens When All Students Take Algebra?

In this *Review of Educational Research* article, Mary Kay Stein (University of Pittsburgh), Julia Heath Kaufman (Carnegie Mellon University), Milan Sherman (Portland State University), and Amy Hillen (Kennesaw State University) examine what happens when students take algebra in eighth or ninth grade. Research shows that students who take it at this point have markedly better downstream results, which reinforces the idea that algebra is a gateway to advanced mathematics and science courses in high school and college, and thence to high-paying technical careers. Taking algebra early seems to be particularly important to launching students toward high achievement.

The authors recap the national debate on access to algebra: on one side, equity advocates want to make algebra available to all because some qualified students are excluded when algebra is a selective course; on the other side, rigor advocates have stressed the downside of admitting students with weak mathematical preparation to algebra: many of them fail the course and lose academic momentum.

The authors examined districts that have removed selective barriers and made algebra available to all students, as well as districts that have mandated algebra in eighth or ninth grade. The results have been decidedly mixed. It turns out that both sides in the equity/rigor debate have a point: universal algebra allows some previously-excluded students to take algebra, and most of them do well, but it also opens the door to unprepared students, many of whom fail.

The authors conclude that "simply taking algebra will not result in the desired outcomes." Rather, students' entering characteristics (i.e., being motivated and mathematically prepared) or certain factors within algebra classrooms lead to higher achievement across the board.

"Relying on universal access alone to produce increased achievement and to guarantee advanced mathematics course taking and enhanced careers is incomplete," conclude the authors. "Given current trends toward universal algebra, it is time for policymakers to turn their attention to questions of how all students can prosper in algebra courses and how to better prepare students who are in the pipeline moving toward algebra." They urge further research on the role of teacher selection, teaching methods, student grouping, instructional materials, and extra time in giving all students the opportunity to excel in algebra.

"Algebra: A Challenge at the Crossroads of Policy and Practice" by Mary Kay Stein, Julia Heath Kaufman, Milan Sherman, and Amy Hillen in *Review of Educational Research*, December 2011 (Vol. 81, #4, p. 453-492), http://rer.sagepub.com/content/current

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6. Problems in Guided Reading: Too-Difficult Texts and Too Much Support

In this "Toolbox" feature in *The Reading Teacher*, Jan Burkins and Melody Croft list the consequences of giving students texts that are too difficult in guided reading sessions. They say this happens a lot with teachers who are most knowledgeable about literacy because they know how to scaffold to make the text more manageable.

- Students are off task, fidgety, or engaged in inappropriate behaviors;
- Students read haltingly with repetitions or self-corrections;
- The teacher has to intervene frequently and help students problem-solve;
- The teacher can't administer a running record for one student;
- The teacher can't take notes about the lesson;
- The teacher is frustrated and tired from extensive explanations and frequent prompting;
- The teacher is doing most of the work;
- The lesson takes longer than it should;
- Students develop inefficient habits.

If guided reading is fragmented, frustrating, and teacher-dependent, students are likely to carry this pattern over into their independent reading. "Once teachers understand this cause and effect," say Burkins and Croft, "they exclaim, 'I can't believe I was doing that!'" When students are given texts at the appropriate instructional level, things look and sound quite different:

- Students are focused on the text and engage in conversations about their work;
- Students sound like good readers most of the time, with occasional stops to problem-solve;
- Most problem-solving is independent;
- The lesson lasts 15-20 minutes;
- The teacher's role is mostly or entirely discussing with students what worked;
- The teacher is able to make notes on the guided reading session;
- The teacher has time to take a running record on one student;
- The teacher is a listener for most of the session.

Pulling all this together, Burkins and Croft say the key questions teachers should ask themselves about guided reading are:

- How did the students feel?
- How did the reading sound?
- How long was the session?
- What records did you take?
- How hard did you work?

"Handy Helpers for Guided Reading" by Jan Burkins and Melody Croft in *The Reading Teacher*, October 2011 (Vol. 65, #2, p 147-149), http://onlinelibrary.wiley.com/doi/10.1002/TRTR.01020/abstract;
this article is adapted from Burkins's and Croft's book, *Preventing Misguided Reading* (Corwin, 2010).

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7. How Valid is RateMyProfessors.com?

In this *Chronicle of Higher Education* article, Marc Parry reports on the widely-read RateMyProfessors.com website, which allows university students to anonymously evaluate their instructors on "helpfulness" and "clarity" (more than 10 million comments and ratings have been posted since the site launched in 1999). Some professors and university officials don't take the website very seriously, regarding it as a place where disgruntled students rant ("He will crush you like an academic ninja!") and frivolous students evaluate instructors' "hotness."

But a recent University of Wisconsin/Eau Claire study by April Bleske-Rechek and Amber Fritsch (published in *Practical Assessment, Research & Evaluation*) suggests that students' ratings contain valid feedback for professors. The researchers looked at the consistency of the ratings of 366 instructors, on the assumption that a wide variety of ratings of any given professor are an indication of students settling scores and not taking the process seriously.

To their surprise, Bleske-Rechek and Fritsch found a high degree of consistency in each teacher's ratings, even when only ten students filled out the RateMyProfessors.com surveys. "This is similar to what you see on traditional student evaluations of instruction," said Bleske-Rechek. "In other words, it seems like students are homing in on the same experiences in the classroom, because otherwise they wouldn't be showing consensus."

But what about self-selection? Do certain kinds of students fill out this kind of questionnaire? An earlier paper co-authored by Bleske-Rechek showed that there are no significant differences in grades, attitudes, and learning goals of students who evaluate their professors on the website and those who do not. "They don't seem to be heated people, or the easy-A people," she said; "they aren't the only ones posting."

In short, the ratings closely match students' actual concerns about their teachers' competence, knowledge, and helpfulness. Personality, entertainment value, easy workload, generous grading, and physical appearance are treated as secondary by most students.

But not everyone agrees with this assessment of RateMyProfessors.com. Elizabeth Davison of Appalachian State University (NC) wrote in a 2009 paper, "My biggest validity issue with the site is that Overall Score is being perceived as 'teaching effectiveness' and yet is only based on perceptions of helpfulness and clarity. "I believe teaching effectiveness is more complex and should include more-robust measures such as how much did a student learn, preparedness of the instructor, or the challenging nature of the material."

"Researchers Find RateMyProfessors.com Useful, If Not Chili-Pepper Hot" by Marc Parry in *The Chronicle of Higher Education*, Dec. 2, 2011 (Vol. LVIII, #15, p. A4), http://chronicle.texterity.com/chronicle/20111202a?pg=4#pg4

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8. Why Sleep Is So Important During Adolescence

"In adolescents – and younger college students, according to recent data from my lab – sleep is a neurologically important process during which the fast-growing brain becomes better

organized," says Brown University professor Mary Carskadon in this *Chronicle of Education* article. "Many neural connections forged earlier in life during rapid growth are pruned away if they are no longer needed, and new pathways are established to the parts of the brain that are responsible for such things as planning, organizing, and abstract thinking."

When teenagers don't get enough sleep, they feel tired, they get lower grades, they do poorly with coursework, they drink more, and they're more likely to fall asleep at the wheel. Carskadon is on a campaign to educate young people about these troubling facts and get them to sleep 8-1/2 hours a night (most kids are getting an hour less than that). She counters Red Bull's advertising pitch – *Nobody ever wishes they'd slept more during college* – by saying, "Caffeine is no more a substitute for sleep than are CliffsNotes for reading original works of literature." Other culprits are high schools with early start times, excessive homework, and students' late-night texting, Tweeting, and Facebooking.

"Forget A's, B's, and C's – What Student Need Is More Zzzz's" by Mary Carskadon in *The Chronicle of Higher Education*, Nov. 25, 2011 (Vol. LVIII, #14, p. A22),

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9. What's Needed to Be a Global Citizen in the 21st Century

In this article in *Perspectives*, Massachusetts educator/author John D'Auria suggests four proficiencies that students will need to be "nimble learners responding to challenges and opportunities that none of us can foresee":

• *Seeking out diverse perspectives* – "Too often, we gravitate toward like-minded people," says D'Auria, "a behavior that insulates us from expanding our perspective… Preparing for a global society requires that we become curious about how others think." It also helps to learn another language.

• *Valuing emotional insights* – "Recent research into emotional intelligence helps us to appreciate that emotions often contain important data," says D'Auria, "information that our cognitive processes are slower to grasp… Emotional connectivity also links us to other human beings, even when we cannot speak their language."

• *Embracing creativity* – "The global economy thrives on inventive thinking," he says. "We need to value creative skills and develop them in our students. This should not be the domain of a 'talented' few" – nor should it be buried in test preparation.

• *Developing a growth mindset* – Students will need to be continuous learners, which requires perseverance and resilience in the face of unknowable challenges and setbacks, says D'Auria. He believes educators need to explicitly teach Carol Dweck's key insights – that intelligence and talent develop through working hard using effective strategies. "We need to provide time and support for our students to value experimentation and strengthen their capacity to learn from mistakes," he concludes. "Though errors, failure, and setbacks are not what we seek, we need not fear them, and we should learn to recycle them into new learning."

"Preparing Our Students for Global Citizenship" by John D'Auria in *Perspectives*, Fall 2011 (p. 14-15); D'Auria can be reached at jdauria@teachers21.org.

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10. Web Resources for Global Teaching

(Originally titled "Teaching and Learning Resources for the Global Classroom")

In this *Education Update* feature, Willona Sloan compiles a list of helpful websites for teaching about global issues:

• Asia for Educators from the Weatherhead East Asian Institute of Columbia University has lesson plans, videos, maps, timelines, and primary-source documents for teaching Eastern Asian history and culture: http://afe.easia.columbia.edu

• Asia Society has resources on the arts, culture, history, math, and more: http://asiasociety.org/education/resources-schools

• Cleveland Museum of Art has an award-winning distance learning program in which students can view art and artifacts in the museum's collection and interact with museum educators: http://www.clevelandart.org/learn/distance%20learning.aspx

• Global Dimension, managed by Think Global, connects current events with background information, news reports, research, videos, and other resources: http://www.globaldimension.org.uk

• iEARN connects students around the world with news, project updates, videos, and educational resources aimed at improving health and quality of life: http://www.us.iearn.org

• One World Education showcases writing by middle- and high-school students to promote youth literacy and shares monthly project-based learning activities and materials: http://www.oneworldeducation.org

• Peace Corps/Paul D. Coverdell World Wise Schools taps the experiences, knowledge, and writing of Peace Corps volunteers in lesson plans, classroom materials, and multimedia resources: http://www.peacecorps.gov/wws

"Teaching and Learning Resources for the Global Classroom" by Willona Sloan in *Education Update*, November 2011 (Vol. 53, #11, p. 6-7), http://www.ascd.org

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Do you have feedback? Is anything missing?

If you have comments or suggestions, if you saw an article or web item in the last week that you think should have been summarized, or if you would like to suggest additional publications that should be covered by the Marshall Memo, please e-mail: kim.marshall48@gmail.com

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 41 years' experience as a teacher, principal, central office administrator, and writer, lightens the load of busy educators by serving as their "designated reader."

To produce the Marshall Memo, Kim subscribes to 44 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 about 50 issues a year).

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Publications covered

Those read this week are underlined.

American Educator
American Journal of Education
American School Board Journal
ASCD, CEC SmartBriefs, Daily EdNews
Better Evidence-Based Education
Ed. Magazine
EDge
Education Digest
Education Gadfly
Education Next
Education Week
Educational Leadership
Educational Researcher
Elementary School Journal
Essential Teacher (TESOL)
Harvard Business Review
Harvard Education Letter
Harvard Educational Review
JESPAR
Journal of Staff Development
Kappa Delta Pi Record
Language Learner (NABE)
Middle Ground
Middle School Journal
New York Times
Newsweek
PEN Weekly NewsBlast
Phi Delta Kappan
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Principal Leadership
Principal's Research Review
Reading Research Quarterly
Reading Today
Rethinking Schools
Review of Educational Research
Teachers College Record
Teaching Children Mathematics
The Atlantic Monthly
The Chronicle of Higher Education
The Language Educator
The New Yorker
The Reading Teacher
The School Administrator
Theory Into Practice