

ADDITIONAL RESOURCES

The Motivation Equation

Designing Motivation into Student Learning



Workshop, School Administrators of Iowa Conference

Des Moines, Iowa • August 6, 2014

facilitated by Kathleen Cushman (kathleencushman@mac.com)

Co-Founder, What Kids Can Do, Inc. (WKCD.org)

Author, *The Motivation Equation* (MotivationEquation.org)

and *Fires in the Mind: What Kids Can Tell Us About Motivation & Mastery*

Additional resources at www.HowYouthLearn.org

The Motivation Equation Presentation Protocol for use in lesson study by collegial groups

Guidelines for teacher presentations

- Describe a learning episode (unit, project, etc.) that really worked for students.
- What were the learning targets of that episode? (Link with any applicable standards.)
- Identify the essential question or culminating task of that learning episode.
- To answer that essential question or complete that culminating task in a way that met your standards, what did your students need to know and be able to do?
- What helped your students *connect this learning challenge with something they already valued* or that *mattered* to them?
- How did you support students' *expectation that they could succeed* in the learning challenges you presented?
- What opportunities and activities did you provide as support for their new learning?
- What did *you* have to know about your students in order to draw them in to this learning challenge? In order to keep them going?
- In what ways did you ask students to reflect on their learning? (E.g., journals, self-assessments, comments, reflections regarding their motivation, their practice, their mastery)
- What evidence do you have that students did learn what you wanted them to learn?

Big questions to explore after every presentation

- For this learning episode, what are the big issues a teacher struggles with, relative to motivation and mastery?
- What connections can we make between those issues and emerging research on the “science of learning”?
- How do this teacher’s practices add to the students’ experience of *value* and *expectation of success* in this learning episode?

REFLECTION: Do you see possibilities for trying out a protocol like this with your own colleagues? Make some notes on your thoughts about what would work well and what might pose challenges.

Student Questionnaire for Investigating Motivation

About your activities and interests:

What do you do after school? _____

What would you like to do after school? _____

What are some other things you really enjoy doing? _____

About the way you learn:

Do you like this subject? Why or why not? _____

What would you really like to learn about in this class? _____

How much homework do you expect? _____

Describe the way you learn things best. _____

How do you feel about working in groups? _____

Is there anything that makes this class especially hard for you? _____

Can you think of a way I could help you with this? _____

Who would you like me to tell when you do something especially well? _____

Is there anything else about you that you would like me to know? _____

Resources from What Kids Can Do (WKCD)

ONLINE PROFESSIONAL DEVELOPMENT

Building Student Motivation. This EduPlanet21 Learning Pathway by Kathleen Cushman is designed for use by cohorts or individual teachers. In-depth case studies of curriculum planning and instruction by middle and high school teachers in different subject areas provide a robust basis for analysis and planning with student motivation in mind. Commentary by teachers and their students as well as by learning scientists from the NSF Science of Learning Center at the University of California, San Diego; real-time facilitation, aligned with the Danielson Framework for Teaching. For the free introductory module, go to <http://bit.ly/building-student-motivation>

VIDEOS

How Youth Learn: A NED Talk. In this fast and funny six-minute animation, an adolescent brain named Ned Cephalus brings to life his “Gr8 8” conditions, which science has proved to support learning for youth (and you!). Go to <http://bit.ly.NEDtalk>

Just Listen: Students Talk About Learning. In more than 300 one-minute video clips, diverse adolescents speak directly from experience about key issues affecting their lives and learning. Browse them by theme on YouTube, at <http://bit.ly/Just-Listen-playlists>

Case Studies in Practice. Middle and high school students tell how they gained proficiency in reading, math, engineering, debate, media technology, and ballroom dance in these six videos (each about 5 minutes long). Bonus video: Middle schoolers speak about their social-emotional learning. Go to <http://firesinthemind.org/videos/>

BOOKS

The Motivation Equation: Designing Lessons that Set Kids’ Minds on Fire (2013), by Kathleen Cushman. This “enhanced e-book” links text to audio, video, and scholarly research to create a lively conversation with teachers, students, and learning scientists on the subject of planning for student motivation. Discussion prompts make it a great study-group book for teachers. Print edition also available. Go to www.HowYouthLearn.org/educator_resources

Fires in the Mind: What Kids Can Tell Us About Motivation and Mastery, by Kathleen Cushman. Adolescents describe what fuels their interest and effort, bringing alive the research on developing

mastery both in and out of school. “Smart and thoughtful and brimming with good advice” (Mike Rose). Go to <http://FiresInTheMind.org>.

WEBSITES

What Kids Can Do (WKCD). Abundant and up-to-date stories, resources, and exemplars document the “powerful learning with public purpose” that results when youth and adults create partnerships in the classroom and beyond. Go to www.WhatKidsCanDo.org

How Youth Learn. Brings together research and resources for teachers with an emphasis on adolescent development, social and emotional learning, the science of learning, and adolescent learning. www.HowYouthLearn.org.

Questions? Contact kathleencushman@mac.com

WKCD materials herein were made possible with generous support from MetLife Foundation, Nellie Mae Education Foundation, and the NoVo Foundation.

Academic Research That Connects to This Workshop

If you’ve come this far, you have already encountered many examples of how the teaching that most excites students also mirrors what recent research in the learning sciences has discovered. However, as I pored over that academic research while preparing *The Motivation Equation*, I was continually surprised and delighted that the opposite also holds true. Though the prose in these academic sources necessarily follows the daunting conventions of scientific writing, it nonetheless evoked countless images and echoes of the students and teachers whose voices fill this book. The scholarly readings below also contributed to our understanding of how science bears out what good teachers do with students and the messages they bring lend sturdy support to our view of how youth (and you!) learn.

Arias-Carrión, O., & Pöppel, E. (2007). Dopamine, learning and reward-seeking behavior. *Acta Neurobiologiae Experimentalis* 67, 4, 481–488.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review*, 84, 191–215.

- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, N.J: Prentice-Hall.
- Bangert-Drowns, R. L., Kulik, C., Kulik, J., & Morgan, M. T. (1991). The instructional effect of feedback in test-like events. *Review of Educational Research, 61*(2), 213–238.
- Beesley, A. D., & Apthorp, H. S. (2010). *Classroom instruction that works, second edition: Research report*. Denver, CO: Mid-Continent Research for Education and Learning.
- Bengtsson, S. L., Lau, H. C., & Passingham, R. E. (2009). Motivation to do well enhances responses to errors and self-monitoring. *Cerebral cortex, 19*, 4, 797–804.
- Blackwell, L.S., Trzesniewski, K.H., and Dweck, C.S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development, 78*, 1, 246–263.
- Bransford, J. D., Brown, A. L., & Cocking, R. R. (eds.). (2000). *How people learn: Brain, mind, experience, and school*. Washington, DC: National Academy Press.
- Brophy, J. E. (1998). *Motivating students to learn*. New York: McGraw- Hill.
- Brown, J.S., Collins, A., & Duguid, S. (1989). Situated cognition and the culture of learning. *Educational Researcher, 18*, 1, 32–42.
- Carpenter, C. J. (2013). A meta-analysis of the effectiveness of the “but you are free” compliance-gaining technique. *Communication Studies, 64*, 1, 6–17.
- Crawford, K. (1996). Vygotskian approaches to human development in the information era. *Educational Studies in Mathematics, 31*, 43–62.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper and Row.
- D'Argembeau, A., & Mathy, A. (2011). Tracking the construction of episodic future thoughts. *Journal of Experimental Psychology: General, 140*, 2, 258–271.
- Dean, C., Pitler, H., Hubbell, E., & Stone, B. (2012). *Classroom instruction that works: Research-based strategies for increasing student achievement* (2nd ed.). Alexandria, VA: ASCD.
- deCharms, R. (1977). Students need not be pawns. *Theory into Practice, 16*, 4, 296–301.
- Deci, E., Vallerand, R., Pelletier, L., & Ryan, R. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist, 26*, 325–346.
- Delaney, P. F., Ericsson, K. A., & Knowles, M. E. (2004). Immediate and sustained effects of planning in a problem-solving task. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 30*, 6, 1219-1234.
- Eccles, J. S., & Wigfield, A. (2002). *Motivational beliefs, values, and goals*. *Annual Review Psychology* (109–32).

- Ericsson, K. A., Krampe, R. T., & Tesch-Romer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, *100*, 393–394.
- Farrington, C. A., et al. (2012). *Teaching adolescents to become learners: The role of noncognitive factors in shaping school performance: a critical literature review*. Chicago: University of Chicago, Consortium on Chicago School Research.
- Carrier, M., & Pashler, H. (1992). The influence of retrieval on retention. *Memory & Cognition*, *20*, 6, 633-42.
- Daniels, H., Cole, M., & Wertsch, J. V. (2007). *The Cambridge companion to Vygotsky*. Cambridge: Cambridge University Press.
- Cervone, B. T., & Cushman, K. (2013, February 7). “You’re constantly revising yourself”: The dispositions of a student-centered teacher. *WhatKidsCanDo.org*.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper and Row.
- Davidson, M. (2011, January 13). The case for competition. *Excellenceandethics.com*.
- Delaney, P. F., Ericsson, K. A., & Knowles, M. E. (2004). Immediate and Sustained Effects of Planning in a Problem-Solving Task. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *30*(6), 1219–1234. doi:10.1037/0278-7393.30.6.1219
- Dunlosky, J., Rawson, K. A., Marsh, E. J., Nathan, M. J., & Willingham, D. T. (2013). Improving students’ learning with effective learning techniques: Promising directions from cognitive and educational psychology. *Psychological Science in the Public Interest*, *14*, 1, 4–58.
- Eccles, J. S., & Wigfield, A. (2002). Motivational beliefs, values, and goals. *Annual Review Psychology*, *53*, 109–132.
- Ericsson, K. A., Krampe, R. T., & Tesch-Romer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, *100*(3), 363–406.
- Expeditionary Learning Outward Bound. (2011). *Core Practices of Expeditionary Learning*. New York: Expeditionary Learning Outward Bound.
- Fischer, K. W., & Daley, S. (2006). Connecting cognitive science and neuroscience to education: Potentials and pitfalls in inferring executive processes. In L. Meltzer (Ed.), *Understanding executive function: Implications and opportunities for the classroom* (pp. 55-72). New York: Guilford.
- J. Forgas (ed.). (2005) *Hearts and minds: Affective influences on social cognition and behavior*. (Frontiers of Social Psychology Series). New York: Psychology Press.
- Fredrickson, Barbara L. & Christine Branigan. (2005). Positive emotions broaden the scope of attention and thought-action repertoires. *Cognition and Emotion*, *19*, 3, 313–332
- Gaspar, K., & Clore, G. L. (2000). Do you have to pay attention to your feelings in order to be influenced by them? *Personality and Social Psychology Bulletin*, *26*, 698–711.

- Hannaford, C. (1995). *Smart moves: Why learning is not all in your head*. Arlington, VA: Great Ocean Publishers.
- Hassabis, D., Spreng, R. N., Rusu, A. A., Robbins, C. A., Mar, R. A., & Schacter, D. L. (2013). Imagine all the people: How the brain creates and uses personality models to predict behavior. *Cerebral Cortex*, 3.
- Hattie, J. (2012). *Visible learning for teachers: Maximizing impact on learning*. London: Routledge.
- Hinds, P. J. (1999). The curse of expertise: The effects of expertise and debiasing methods on prediction of novice performance. *Journal of Experimental Psychology: Applied*, 5, 2, 205–221.
- Hinton, C., Fischer, K. W., & Glennon, C. (2012). *Mind, Brain, and Education* (pp. 1–34). Boston: Jobs for the Future.
- Hulleman, C.S., and Harackiewicz, J.M. (2009). Making education relevant: Increasing interest and performance in high school science classes. *Science*, 326, 1410-1412.
- Immordino-Yang, M.H., & Damasio, A.R. (2007). We feel, therefore we learn: The relevance of affective and social neuroscience to education. *Mind, Brain and Education*. 1, 1, 3-10.
- Immordino-Yang, M.H., Christodoulou, J.A., & Singh, V. (2012). Rest is not idleness: Implications of the brain's default mode for human development and education. *Perspectives on Psychological Science*. 7, 4, 352–365.
- Kapur, M., & Bielaczyc, K. (2012). Designing for productive failure. *Journal of the Learning Sciences*, 21, 1, 45–83.
- Karpicke, J. D., & Blunt, J. R. (2011). Retrieval practice produces more learning than elaborative studying with concept mapping. *Science*, 331, 772-775.
- Karpicke, J. D., & Roediger, H. L. (2008). The critical importance of retrieval for learning. *Science*, 319, 966–968.
- John M. Keller. (2010). *Motivational design for learning and performance*. New York: Springer US.
- Kounios, J., Frymiare, J.L., Bowden, E.M., Fleck, J.I., Subramaniam, K., Parrish, T.B., & Jung-Beeman, M. (2006). The prepared mind: Neural activity prior to problem presentation predicts solution by sudden insight. *Psychological Science*, 17, 882–890.
- Kuhn, D. (1992). Thinking as argument. *Harvard Educational Review*, 62, 2, 155–178.
- Lave, J. (1988). *Cognition in practice: Mind, mathematics, and culture in everyday life*. Cambridge, UK: Cambridge University Press.
- Lave, J., & Wenger, E. (1990). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.
- Lehrer, J. (2008). Annals of science: The Eureka hunt. *The New Yorker*, July 28, 2008: 40–45.
- Cushman, *The Motivation Equation: Designing Motivation into Student & Teacher Learning*

- Li, J. (2011). Cultural frames of children's learning beliefs. In L. A. Jensen (Ed.), *Bridging cultural and developmental psychology: New syntheses in theory, research and policy* (pp. 26–48). Oxford University Press.
- Lickona, T., Davidson, M., Templeton Foundation, & Character Education Partnership. (2005). *Smart and good high schools: Integrating excellence and ethics for success in school, work, and beyond*. Cortland, N.Y: Center for the 4th and 5th Rs/Character Education Partnership.
- Means, M. L., & Voss, J. F. (1996). Who reasons well? Two studies of informal reasoning among children of different grade, ability, and knowledge levels. *Cognition and Instruction, 14*, 139-178.
- Mednick, S., Nakayama, K., & Stickgold, R. (2003). Sleep-dependent learning: A nap is as good as a night. *Nature Neuroscience, 6*(7), 697–8.
- Meyer, D. (2011, November 29). Pretending closed questions are open. Wordpress, blog.mrmeyer.com.
- Meyer, D. (2012, September 4). UnGoogleable problems. Wordpress, blog.mrmeyer.com.
- National Scientific Council on the Developing Child. (2011). Building the brain's "air traffic control" system: How early experiences shape the development of executive function. Working Paper 11. Available from Center on the Developing Child at Harvard University. Also see video at bit.ly/exec-function
- Otten, S. (2011). Cornered by the real world: a defense of mathematics. *Mathematics Teacher 105*, 1, National Council of Teachers of Mathematics.
- OECD. (2007). An ABC of the brain. In OECD, *Understanding the brain: The birth of a learning science*. Paris. Organization for Economic Co-operation and Development.
- Oyserman, D., Bybee, D., & Terry, K. (2006). Possible selves and academic outcomes: How and when possible selves impel action. *Journal of Personality and Social Psychology, 91*, 188–204.
- Park, N., & Peterson, C. (2009). Character Strengths: Research and Practice. *Journal of College & Character, 10*(4).
- Pashler, H., Rohrer, D., Cepeda, N.J., Carpenter, S.K. (2007). Enhancing learning and retarding forgetting: Choices and consequences. *Psychonomic Bulletin & Review 2007, 14* (2), 187–193.
- Pintrich, P. R. & Schunk, D. H. (eds.). (2002). *Motivation in education: Theory, research, and applications*. (2nd ed.). Columbus, OH: Merrill.
- Prensky, M. (2010). *Teaching digital natives: Partnering for real learning*. Thousand Oaks, Calif: Corwin.
- Richland, L. E., Kornell, N., & Kao, L. S. (2009). The pretesting effect: Do unsuccessful retrieval attempts enhance learning? *Journal of Experimental Psychology: Applied, 15*, 3, 243–257.
- Riordan, R. C. (ed.). (2008). Learning as production, critique as assessment. *UnBoxed, (2)*. Retrieved from http://www.hightechhigh.org/unboxed/issue2/learning_as_production/

- Rohrer, D., & Pashler, H. (2010). Recent research on human learning challenges Conventional instructional strategies. *Educational Researcher*, 39, 5, 406–412.
- Schank, R. C. (1990). *Tell me a story: A new look at real and artificial memory*. New York: Scribner.
- Schön, D. (1991). *The reflective turn: Case studies in and on educational Practice*. New York: Teachers College Press.
- Senay, I., Albarracín, D., & Noguchi, K. (2010). Motivating goal-directed behavior through introspective self-talk: The role of the interrogative form of simple future tense. *Psychological Science*, 21(4), 499–504.
- Shute, V. J. (2008). Focus on formative feedback. *Review of Educational Research*, 78(1), 153–189.
- Tamminen, J., Payne, J. D., Stickgold, R., Wamsley, E. J., & Gaskell, M. G. (2010). Sleep spindle activity is associated with the integration of new memories and existing knowledge. *The Journal of Neuroscience*, 30, 43, 143–56.
- University of California, Los Angeles, Center for Mental Health in Schools. (2002). *Addressing Barriers to Learning*, 7, 1. Center for Mental Health in Schools at UCLA, Department of Psychology, <http://smhp.psych.ucla.edu>.
- Van Dongen HP, G, M., JM, M., & DF, D. (2003). The cumulative cost of additional wakefulness: dose-response effects on neurobehavioral functions and sleep physiology from chronic sleep restriction and total sleep deprivation. *Sleep*, 26(2), 117–26.
- van Geert, P. & Steenbeek, H. (2008). Brains and the dynamics of “wants” and “cans” in learning. *Mind, Brain, and Education*. 2(2), 62–66.
- Vygotsky, L.S. (1978). *Mind and society: The development of higher mental processes*. Cambridge, MA: Harvard University Press.
- Waelti, P., Dickinson, A., & Schultz, W. (2001). Dopamine responses comply with basic assumptions of formal learning theory. *Nature*, 412, 6842, 43–8.
- Wiggins, G. (2012). Seven Keys to Effective Feedback. *Educational Leadership*, 70, 1, 10–17.
- Wilhelm, I., Rose, M., Imhof, K. I., Rasch, B., Büchel, C., & Born, J. (2013). The sleeping child outplays the adult's capacity to convert implicit into explicit knowledge. *Nature Neuroscience*.
- Wiliam, D. (2011). *Embedded formative assessment*. Bloomington, IN: Solution Tree Press.
- Willis, J. (2010). Rubrics as a doorway to achievable challenge. *New Horizons for Learning Quarterly of Johns Hopkins University School of Education*, 8, 2.
- Zull, J. (2002) *The art of changing the brain*. Sterling, VA: Stylus Publishing.