



AMERICAN PSYCHOLOGICAL ASSOCIATION'S

PSYCH LEARNING CURVE

WHERE PSYCHOLOGY AND EDUCATION CONNECT

[HOME](#) [GRADUATE AND POSTGRADUATE STUDENTS](#)

Is Research-Based Instruction A Reality In Education? The Example Of Learning Styles And Dual Coding

TOPICS: [Resources For Teachers](#) [Student Learning](#)



[JOSHUA A. CUEVAS, PHD](#) JULY 11, 2016

Over the last quarter century, as public education has made a hard shift towards “accountability” and increased standardized testing, the trend towards the use of research-based instruction in classrooms has become nearly as ubiquitous as the Scantron sheets students are asked to bubble

in multiple times each semester. For those of us in the field of educational psychology, this would seem like a golden opportunity to capitalize on empirical evidence to improve the educational outcomes for millions of school children. Yet there are legitimate questions about whether empirical research findings have made their way into classrooms during this time or if the term “research-based instruction” has simply become a catch phrase for the latest anecdotal trends in education. Is there a disconnect between “research-based” practices employed in schools and the actual research compiled on human learning?

No practice exemplifies this concern more than the use of learning styles instruction. While the term “learning styles” has existed for decades, instruction devoted to the concept began to proliferate around the turn of the century, gaining popularity in public school classrooms, at the college level, and even in medical schools and business training. It has had broad appeal beyond the U.S. and is widely used in England, Australia, Asia, and the Middle East. It has generated a host of business ventures, from seminars, to how-to-manuals, paid speakers, training sessions, books, videos and various other sources. But if our goal is truly to improve education by delivering research-based instruction, then we must examine the research evidence behind the methods we use, particularly those that are as prevalent as learning styles instruction (and ideally, we would do this prior to widespread implementation).

There are many different learning styles paradigms, but the one most commonly used in public school settings involves sensory learning and is often associated with Fleming’s VAK or VARK model, with “V” representing a preference for visual stimuli, “A” for auditory learning, and “K” for kinesthetic learning. The “R” was added later to characterize those learners who showed a preference for learning through reading or writing. The basic premise for this model is that students learn more efficiently when the type of instruction they receive matches their preferred learning modality, so that if an auditory learner was presented with instruction using predominantly auditory stimuli (lecture, discussions, debates, etc.) then he or she would learn more or learn faster than if that instruction was delivered via means that did not match the learner’s preference, in this case visual or kinesthetic modes. This has come to be known as the matching hypothesis or meshing hypothesis, the idea that matching the sensory preference of the learner to the instructional mode will result in enhanced learning.

In 2009 Pashler and a team of cognitive psychologists were tasked with examining the research evidence underlying the practice. They determined that the only type of research that could support the learning styles hypothesis would be experiments that tested the matching hypothesis and found an interaction effect. This means that when the student’s learning preference matched the mode of instruction (V to V, for instance), those factors would interact to produce greater learning or retention. This would have to be true for each condition (V, A, and K). What Pashler and colleagues found was that there was almost no research to support this popular instructional method, and even more alarmingly, the most rigorous research consistently refuted the notion that teaching to learning styles had any effect on learning whatsoever.

I recently reviewed the research published in the last six years and found that current evidence does not support styles-based instruction. Most of the “research” that has been published on learning styles has been opinionated in nature or anecdotal. The vast majority of empirical studies on the subject have not been experimental ones like the type that Pashler et al. advocated

for. Instead, they have been correlational, seeking to find relationships between, for instance, learning style and gender, without ever testing to see if the method actually increased learning. And one of the first things we teach in any introductory research or statistics course is that correlation cannot reveal causation. Yet the most rigorous recent studies, those that actually did test the matching hypothesis, have almost universally found no effects on students' learning when learning styles were put to the test.

Still, despite mounting research evidence that learning styles instruction is ineffective, many undergraduate level teacher-education textbooks advocate for pre-service teachers to incorporate a learning styles approach in their classroom instruction, though it must be noted that educational psychology texts took a much more measured perspective, generally warning that the practice was not well supported by research. Considering the current evidence, learning styles instruction must be considered a suspect practice at best and likely a detrimental one because it has the potential to waste valuable instructional time on a method that has clearly been shown *not* to improve student learning. Yet it continues to be stressed at the college level in teacher education programs, in textbooks, at the district and school level, and seems as prevalent as ever. In this case we can conclude that what is portrayed as research-based instruction in public schools is anything but research based.

Another learning model, dual coding, offers more promise for both research and practice. Dual coding predicts that there are separate pathways for encoding information into memory, one visual and one verbal, and that learning can be enhanced when both are activated. A substantial amount of research has shown that if verbal information is supplemented with visual information, the effect is additive, and instead of causing cognitive overload and subsequent dumping of information, memory storage capacity actually increases. In colloquial terms, it's as if there are two tanks for memory storage, a verbal one and a visual one, and if you fill up the verbal one too much it spills over, but you can fill up the verbal one and also fill up the visual one without causing the verbal tank to spill over.

Dual coding theory is important when considering learning styles because the two make contradictory predictions so they cannot both be accurate. Learning styles would predict that visual learners learn best when they encounter visual information and auditory learners learn best when they encounter linguistic information. Dual coding, in contrast, predicts that all learners, regardless of their so-called learning style, retain information better if linguistic information is supplemented with visual information. And this is exactly what we see- in general, learners retain information better when visual information is paired with linguistic information, and it doesn't matter what learning style they prefer.

Some might call for further study in the area of learning styles, and as researchers, we must always view additional data as a benefit and a way to expand our understanding of cognition. However, research on learning styles has now been conducted for decades, and the results have largely been very consistent: Learning styles do not appear to impact learning at all. It is likely that teaching to learning styles in the classroom is detrimental, as it channels important resources towards an ineffective practice and away from real research-based strategies that have been shown to be effective. But beyond the concept of learning styles, public school teachers and those who prepare them in pre-service teaching programs should make a concerted effort to

familiarize themselves with the most credible and accurate research in their fields in the hopes of bringing the most effective methods to the classroom while eliminating those methods that simply don't work for students.

Suggested readings:

Cuevas, J. A. (2015). Is learning styles-based instruction effective? A comprehensive analysis of recent research on learning styles. *Theory and Research in Education*, 13(3). 308-333. doi: 10.1177/1477878515606621 <http://tre.sagepub.com/content/current>

Cuevas, J. A. (2016). An analysis of current evidence supporting two alternate learning models: Learning styles and dual coding. *Journal of Educational Sciences & Psychology*, 6(1). 1-13. http://jesp.upg-ploiesti.ro/index.php?option=com_phocadownload&view=category&id=24:journal-vol-vi-lxviii-no-12016&Itemid=16

Jessen, F., Heun, R., Erb, M., Granath, D. O., Klose, U., Papassotiropoulos, A., & Grodd, W. (2000). The concreteness effect: Evidence for dual coding and context availability. *Brain and Language*, 74, 103-112. doi: 10.1006/brln.2000.2340 <http://www.ncbi.nlm.nih.gov/pubmed/10924219>

Paivio, A., Walsh, M., Bons, T. (1994). Concreteness effects on memory: When and why? *Journal of Experimental Psychology*, (20)5, 1196-1204. <http://psycnet.apa.org/index.cfm?fa=buy.optionToBuy&id=1995-04383-001>

Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2009). Learning styles: Concepts and evidence. *Psychological Science in the Public Interest*, 9, 105-119. https://www.psychologicalscience.org/journals/pspi/PSPI_9_3.pdf

Rogowsky, B. A., Calhoun, B. M., & Tallal, P. (2015). Matching learning style to instructional method: Effects on comprehension. *Journal of Educational Psychology*, 107(1), 64-78. doi: 10.1037/a0037478 <https://www.apa.org/pubs/journals/features/edu-a0037478.pdf>

Sadoski, M., Goetz, E. T., & Avila, E. (1995). Concreteness effects in text recall: Dual coding or context availability? *Reading Research Quarterly*, 30(2), 278-288. <http://www.jstor.org/stable/748038>

Scott, C. (2010). The enduring appeal of "learning styles". *Australian Journal of Education*, 54(1), 5-17. (EJ889818) <https://www.ofs.edu.sg/resources/plc-differentiation/wp-content/uploads/sites/49/2014/10/Enduring-appeal-of-learning-styles.pdf>

SHARE
TWEET
PIN
SHARE

ABOUT THE AUTHOR



Joshua A. Cuevas, PhD

Josh is a cognitive psychologist and assistant professor in the College of Education at the University of North Georgia where he teaches undergraduate and graduate courses in assessment, research methodology, and literacy. After teaching at a public high school near Atlanta and working in assessment for a decade, he earned his Ph.D. in educational psychology at Georgia State University. His research interests include applied cognition, memory, literacy development, instructional strategies, and evidence-based reasoning.