

Learner Variability Is the Rule, Not the Exception

Barbara Pape



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School systems that use a one-size-fits-all model continue to under-serve nearly all of their students. These schools prepare young people for an industrial world that no longer exists. Rigid class structures are the norm.

Little, if any, attention is given to the social and emotional skills that even the business community has listed as [top priorities for its workforce](#).

For decades, policy discussions have focused on the shortcomings of these factory-model schools that do not prepare students for current and future work, [personalize their opportunities for learning](#), nor do they nurture them to reach their potential. While there are shining examples, gains have been slow to come in schools nationwide to make learning relevant, productive, and fulfilling for each learner.



One reason we are stuck in outdated classrooms is that too many school systems are frozen in sameness – the same books, the same lessons, the same pace, the same treatment of each learner. Yet, if there is one takeaway from the burgeoning learning sciences research, it is that no two of us learn in exactly the same

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way. Each of us go to school with a backpack filled with very different experiences that we draw from to master content, create meaning, work in groups, share our voice, and achieve our potential. Understanding and addressing our differences will, in fact, help us be confident learners in school and beyond.

Edging into the conversation now is the term “learner variability.” It is a recognition that all students differ, and learning sciences research shows that these differences matter for learning. In some cases, the term is tightly defined to mean any student struggling with a learning difference that rubs up against the expectations of the sameness of school. But, learner variability, as defined here, embraces both students who struggle and those who thrive. Why? Because of the natural variability found in each person, in school and beyond.

Learner variability is the young person who lives in poverty, or is learning to speak English and may not yet have the background knowledge to enable comprehension of a reading passage. Or, the student who already has the skills to excel at a pace beyond the curriculum and is bored because traditional methods of instruction do not engage her or meet her needs. It is the student who has experienced trauma in a single event or on a day-to-day basis. Learner variability is the learner whose learning difference, color, ethnicity, or gender makes

them susceptible to stereotype threat and low expectations. It’s the learner with working memory, decoding, or attention challenges who retreats into silence or acts unruly out of fear they will be asked a question they are not yet ready to answer. It also defines the student who excels at classwork but is



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devastated socially and emotionally in school. Todd Rose, director of the Mind, Brain, & Education Program at the Harvard Graduate School of Education, and cofounder of Populace, a social impact organization, is leading path-breaking research on the “science of the individual¹,” providing guideposts to broker an understanding of the depth and breadth of learner variability.

He and his colleagues argue that for those seeking to address the needs of the individual, two notions exist: 1) the object of interest is the individual, not the statistical average; and, 2) human individuals are remarkably variable. The science of the individual depends, according to Rose, on pathways and context.² For example, initial thought heralded a

single progression for developing strong reading skills. Those who did not succeed were thought to have delays. More current research, though, shows that multiple pathways exist to learn to read and that those children may not have delays, but were progressing on alternative pathways.

Context also matters in learning. According to Rose, the context principle of individuality “asserts that individual behavior cannot be explained or predicted apart from a particular situation, and the influence of a situation cannot be specified without reference to the individual experiencing it.”³ In essence, an individual’s behavior is the result of an interaction between their traits and the situation at hand, not one or the other. Both pathways and context have implications

¹Rose, T., Rouhani, P., & Fischer, K. (2013) *The Science of the Individual*. *Mind, Brain and Education*, 7(3), 152-158.

²Rose, T. (2016). *The End of Average: How to Succeed in a World that Values Sameness*. San Francisco, CA: HarperOne.

³Rose, T. (2013) , p. 106.

for classroom learning and the need to understand and address learner variability.

Another researcher revolutionizing the way we think about learning is Mary Helen Immordino-Yang, Professor of Education, Psychology and Neuroscience at the University of Southern California, whose work centers on emotion, learning, and the brain. For Immordino-Yang, learning is “dynamic, social and context dependent because emotions are, and emotions form a critical piece of how, what, when, and why people think, remember, and learn.”⁴ She argues that if goals of learning include motivating students, developing deeper understanding, and enabling students to transfer what they learn in school to the world of work and life, then “we need to find ways to leverage the emotional aspects of learning in education.”⁵

A brief look at the nature vs. nurture debate helps to further explain learner variability. The old tug-of-war between nature and nurture is being proven outdated, according to current research. Instead, Immordino-Yang underscores the dynamic relationship between nature and nurture, that “children’s experiences shape their biology as much as biology shapes children’s development.” Once it is recognized that the brain is a “dynamic, plastic, experience-dependent, social, and affective organ,” it becomes clear that learner variability is found in each student. It also is apparent that given the burgeoning learning sciences, a bond must be formed between neuroscientists and educators to connect over the science

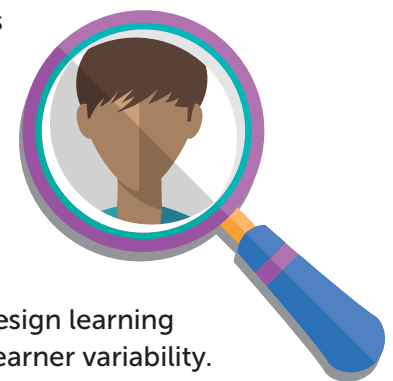
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of human development in order to build “increasingly tailored educational experiences, interventions, and assessments”⁶ to meet the needs of each learner. And, while the research is growing in this field, Immordino-Yang suggests that the more thoroughly teachers can appreciate the relationship between cognition and emotion, “the better they may be able to leverage this relationship in the design of learning environments.”

Learner variability, then, includes but stretches beyond students with an identified or unidentified learning difference. Each learner, driven by emotion and varying over context and pathways, presents a unique reservoir of skill sets and challenges that can change among subjects and situations, throughout the day and year.

Why does it matter that we understand learner variability in this way? It informs design. If we

start with the assumption that there is a lot of variability among learners in each classroom, different decisions are made on how to create optimal environments to support learning. Burgeoning learning sciences research, coupled with the flexibility and precision of digital technology, present a new opportunity to design learning that is responsive to learner variability. When we understand learner variability in this way, classroom challenges become



⁴ Immordino-Yang, Mary Helen. (2016). *Emotions, Learning, and the Brain: Exploring the Educational Implications of Affective Neuroscience*. New York, NY: W.W. Norton & Company. p. 17.

⁵ Immordino-Yang p. 18.

⁶ Immordino-Yang p. 80.

a design problem, not a student problem.

At Digital Promise, we recognize how much variability plays in the life of each learner.

Starting from that point, through our [Learner Positioning Systems](#)

(LPS) initiative, we are building systems that help support teachers and edtech developers in addressing learner variability. We have embarked on a rigorous examination of the learning sciences to offer Factors and strategies for how learners learn in specific content areas. A goal of LPS is to put

insights from research at the fingertips of educators, as well as developers of learning technologies, so they can more easily infuse their instruction or product with evidence-based resources to support the full diversity of learners, rather than just a mythical average.

LPS has defined four pillars – Content, Cognition, Social and Emotional, and Student Biographical Background – to provide a framework of Learner Factors for specific domains. Given the context principle of variability, the Models are situated in the

context of a learning goal. Each Factor includes an explanation of what it is and how it connects with other Factors. A robust list of research-based strategies complements the Factors so teachers, product developers,

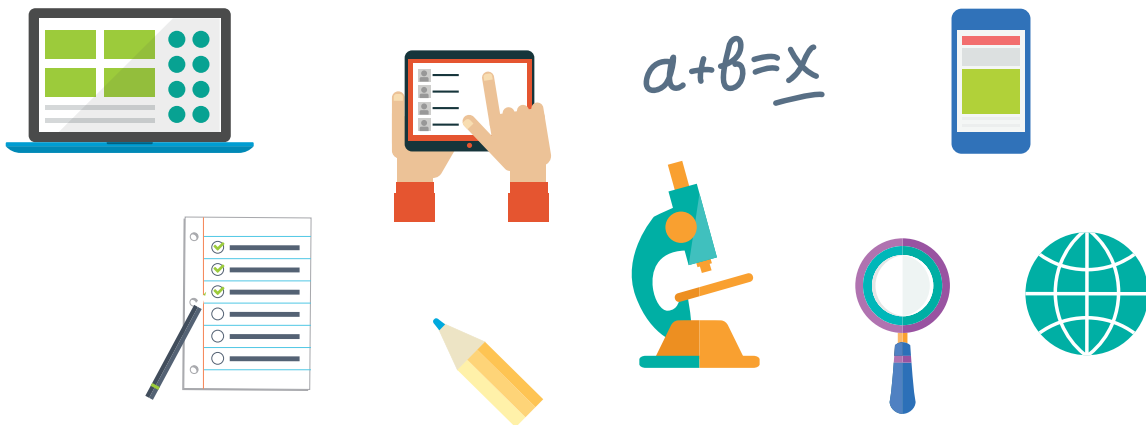
and others interested in learning can see how research may be applied in practice and product development. Currently, the LPS's Learner Models include: Math pre-K to 2nd grade; Reading pre-K to 3rd grade, and Reading and Writing 4th-6th grade, with others in development.

Learner variability

is a term to describe all students who enter the classroom and bring with them a unique constellation of abilities and experiences that matter when it comes to learning. LPS strives to expedite addressing each learner's variability by distilling the research into a comprehensive yet brief and accessible form, and presenting examples of strategies that will improve the classroom and learning technology products that find their way in. The end goal? For each learner to know themselves and be supported and inspired to reach their full potential.

LPS has defined four pillars:

- 1. Content**
- 2. Cognition**
- 3. Social and Emotional Learning**
- 4. Student Background**





Citations

Gray, A. (2016, January). *The Ten Skills You Need to Thrive in the Fourth Industrial Revolution*. The World Economic Forum. Retrieved from <https://www.weforum.org/agenda/2016/01/the-10-skills-you-need-to-thrive-in-the-fourth-industrial-revolution/>

Immordino-Yang, M. (2016). *Emotions, Learning, and the Brain: Exploring the Educational Implications of Affective Neuroscience*. New York, NY: W.W. Norton & Company.

Pape, B., & Vander Ark, T. (2018). *Making learning personal for all: Policies and practices that meet learners where they are*. Washington, DC: Digital Promise Global.

Rose, T. (2016). *The End of Average: How to Succeed in a World that Values Sameness*. San Francisco, CA: HarperOne.

Rose, T. Rouhani, P., & Fischer, K. (2013) *The Science of the Individual*. *Mind, Brain and Education*, 7(3), 152-158