

Making Learning Personal for All

The Growing Diversity in Today's Classroom



Introduction

Teachers have long known that students learn differently, and learn more or less, depending on various instructional approaches. They have used this understanding to personalize learning as much as is possible in classrooms with 20, 25, or more students. However, these educators have largely been on their own, without many structured supports—curriculum, pedagogy, tools, and resources specifically designed to support personalization strategies. The growing diversity within today’s classrooms underscores the necessity for a more deliberate, supported shift to a learner-centered education system.

Personalized learning—learning that is connected to each individual’s development, background, interests, and experiences—provides an approach that broadly and equitably supports educators’ efforts to empower learners as individuals. Personalized learning offers a path to effectively support the

growing diversity of the population of students by understanding how individual learners learn best and actively engage, motivate, and inspire them with the right resources at the right time, in the right medium, and at the right pace.

Technological innovations over the past decade now make meaningful personalization possible, but we can only personalize based on what we know about the learner. Current models that drive personalization remain overly simplistic and are rarely based on research. These over-simplified models risk driving personalization in a way that leaves diverse learners behind.

Without changes, the social and economic disparities and achievement gaps of people who historically are underserved will persist and grow, and we will be at risk of marginalizing more and more students. ■

Without changes, the social and economic disparities and achievement gaps of people who historically are underserved will persist and grow, and we will be at risk of marginalizing more and more students.

The Need for Personalization Is Growing

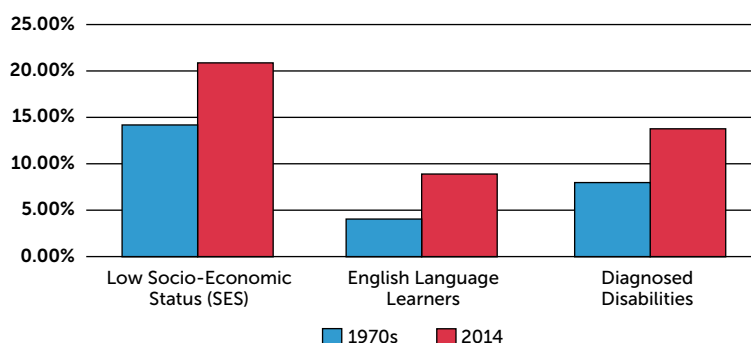
The makeup of the U.S. K-12 public school student population has changed dramatically over the last 50 years. Students today are more diverse across many categories, including linguistics, culture, geography, and socioeconomics.

This has partially been driven by significant shifts in population and society. For example, over the last several decades, the proportion of students living in deep poverty has grown from 14.3 percent to 21.1 percent, totaling over 10 million students today (U.S. Census Data, 1973, 2014).

To illustrate what this means at the classroom level, an educator in the 1970s or 1980s with a classroom of 24 students might have had five or six students (20 to 34 percent) requiring specialized interventions. In a classroom of 24 students today, between 10 and 12 students (40 to 50 percent) are living in poverty, have a disability or learning difference, are English language learners, are gifted or talented, are experiencing challenges at home or in their communities that result in trauma, or some combination of the above—each of whom research shows needs personalized approaches to learning.

Even the most capable educator cannot meet this demand for personalization without appropriate support. In response, the system must shift to a fundamentally different model that supports a personalized learning approach that addresses the growing diversity. (For more detail, see Appendix)

Growing Diversity of US Student Population



Dig a little deeper into the numbers, as Diplomas Now did in their 2016 [Assessing Early Warning Indicators](#) study, and the challenge becomes clear. Almost 30 percent of low-income students do not graduate on time. If we continue on the current path, the [2015 Building a Grad Nation report](#) reveals that we will miss our 2020 graduation rate target by 310,000 students. Given the projected makeup of the U.S. student population in 2020, of these 310,000 students, 80 percent will come from low-income families, 20 percent will be English language learners, and 40 percent will be students with learning and other differences.

As the GradNation report indicates, state-by-state graduation rates for students in these groups are considerably lower than for students in other groups. For example:

16 states
graduate
less than 70%
of low-income
students

35 states
graduate
less than 70%
of English
Language
Learners

33 states
graduate
less than 70%
of students with
disabilities

Compounding this situation is a century-old, industrial age educational system with the goal of graduating large numbers of students based on the needs of an “average” student. Thanks to Harvard Graduate School of Education researcher, Todd Rose, author of [*The End of Average: How We Succeed in a World That Values Sameness*](#) (2016), we now better understand that there is no such person as the “average” student. In what Rose describes as a “jagged profile,” there are a number of unique characteristics that guide our capacity to learn that cannot be described by a one-dimensional value like an IQ score or performance on a standardized test. Our existing system rarely, if ever, takes into account the neurobiologically-based diversity we see more and more in today’s classroom.

We must stop treating all students as if they are the same, even when the intention is to ensure equality.

While equality admirably aims for fairness, it only works if everyone starts at the same place and has the same needs going forward. A more productive path to fairness is equity, which we define as providing every learner what he or she needs to be successful. To achieve this, our educational system must shift from its current focus on the fictional “average” student and become more adept at understanding how individuals learn best. Our system must adopt personalized teaching and learning approaches and tools that help educators and students build on diversity in learning in addition to similarities. ■

What the Research Is Telling Us

In the face of growing diversity in our K-12 student population, researchers are making progress in understanding how people learn, how learning can be affected by neurodiversity, and how this knowledge can be applied to personalize learning.

Educators and developers of learning resources and products need to be aware of this expanding body of research so that this research informs how we develop and use personalized learning approaches and tools to support all learners. The following two examples demonstrate how research can underpin the development of effective instructional strategies and tools.



Living in poverty as a child affects adult working memory, which is essential for learning. Yet, personalized instruction targeting low working memory in children has been shown to produce large and lasting gains.

Cornell University researchers Gary Evans and Michelle A. Schamberg, in [Childhood Poverty, Chronic Stress, and Adult Working Memory](#) (2009), brought together two fields, neurocognition and physiological stress, to address a major societal problem: the income-achievement gap. While numerous studies have produced evidence of such a gap, what was missing was evidence of

underlying neurocognitive and biological mechanisms that might help explain what causes it—a precursor to developing learning interventions that might mitigate it. Evans and Schamberg hypothesized that a contributor is impairment in adult working memory in lower income adults caused by stress to the brain in childhood. Working memory is essential to language comprehension, reading, and problem solving and a critical prerequisite for long-term storage of information. They found that childhood poverty interferes with working memory in young adults, and that chronic stress in childhood is a major contributor.

Taking this focus on childhood working memory, psychology professors Joni Holmes, Susan E. Gathercole, and Darren L. Dunning, in [Adaptive Training Leads to Sustained Enhancement of Poor Working Memory in Children](#) (2009), studied if children with low working memory skills could improve with an adaptive technology training program. They found that this personalized training “was associated with substantial and sustained gains in working memory ...” These findings indicate that impairments in working memory and associated learning difficulties that remain into adulthood may be overcome with a personalized approach to instruction.

Phonological awareness, the knowledge of and ability to detect and manipulate sounds in words, is a significant predictor of reading development. A child’s phonological skills can be affected by a wide range of factors, from primary language to home literacy

environment to socioeconomic status. With personalized instruction, large percentages of students with lower phonological awareness can become proficient readers.

Researchers agree that instruction in phonological awareness is vital for preschool children from low SES households (Ehri et al., 2001; Locke, Ginsborg, & Peers, 2002; McDowell, Lonigan, & Goldstein, 2007). The predominant evidence-based approach for teaching phonological skills has long been a personalized one: to assess all students and create small groups with similar abilities so instruction can be provided at the appropriate level (Phillips, Clancy-Menchetti, & Lonigan, 2008; Kruse et al., 2015).

[The Northeast and the Islands Regional Technology in Education Consortium \(NEIRTEC\) project](#) (2004), funded by the U.S. Department of Education, studied the power of technology to support teachers in providing even deeper personalization. Technology programs offer individualized practice for students that incorporates actual sounds to identify and self-paced practice sets focusing on specific phonemes with immediate feedback. Combining technology's personalized practice with traditional small group instruction can provide each learner with the level of instruction and depth of support he or she needs to attain these critical literacy skills.

The instructional interventions in both of these examples were possible because of technology.

Technology has transformed fields such as health, energy, and commerce, and it holds great promise for transforming education as well.

The advent of mobile devices, the exponential availability of internet resources, and the development of ever more powerful apps to support learning have now made it possible for people to learn anything, anywhere and in multiple ways. Technology-based instructional strategies and programs for delivering more precise personalized learning are gaining more and more traction in the education community. ■

The Promise of Technology to Power Personalization

In [Individualizing Student Instruction in Reading: Implications for Policy and Practice](#) (2016), leading literacy researchers Carol McDonald Connor, of the University of California: Irvine, and Frederick J. Morrison, of the University of Michigan, tested an online program that provides “a systematic instructional program, incorporate[s] child assessment, and present[s] personalized small-group instruction.” They found that this program was highly effective in improving literacy skills in children in preschool through third grade.



Other technology programs have been developed that target personalized learning in specific content areas and/or age levels. For reading, text-to-speech software such as [Ivona](#) and [NaturalReader](#), which was initially developed to assist the visually impaired, has become a powerful support for students with reading difficulties. [Branching Minds](#) is a web application designed to track student progress in K-12 literacy and math through a set of guided questions for stakeholders to answer to determine possible individual needs. Programs such as these are starting to explore and demonstrate what assistive, adaptive, and other technology can provide for personalization.

However, personalized learning supported by technology has its detractors. Some argue against it because they believe it means giving students complete control over what, when, and how they learn, aided only by technology and absent guidance from educators. They say this runs counter to what we know about effective learning practices and that leaving students entirely on their own to determine the course and progression of their own learning without support is bound to fail. We agree.

For personalized learning to reach its potential, educators, family members, researchers, learning technology developers, and entrepreneurs must work together on multiple fronts.

Educators must know how to use technology to engage, motivate, and personalize learning with their students. Researchers must evolve new methodologies that embrace the diversity of learners for testing the effectiveness of products, programs, and interventions that personalize learning. Developers and designers must create tools that are more precisely and intentionally tuned to the specific aspects of learning for individual learners across all content areas and developmental stages. ■

Personalized Learning Needs to Become Fully Personal

Personalized learning is most effective when:

Guided
by educators
and family
members in and
out of school.

Supported
by administrators
and networks that
extend educators'
capacity to
teach.

Aligned
with the myriad
interests and
abilities of
each learner.

Informed
by research
findings from
the learning
sciences.

By understanding how people learn to support the growing diversity of students we can indeed *make it personal*.

Existing and emerging accessibility technologies, as well as internet resources and adaptive applications, are key for providing this fully personalized support of each student.

Each person develops and learns in various ways, and the ability to use technology and learning science to truly personalize learning has never been greater. To make the most of this opportunity, students need to understand their personal learning characteristics to enable them to guide their own learning. The technology must not only provide quantitative measures of progress, content knowledge, skills, and dispositions, but also information on one's learning preferences, and interests including supportive strategies that work for the individual learner.

To guide this type of learning, we envision "Learner Positioning Systems" (LPS), much like a GPS system helps us position ourselves geographically. An effective LPS would include information about the learner; a map of learning topics and progressions; and a bank of programs and resources tied to the learning map and the student's unique characteristics. With these, students can self-identify their specific strengths, preferences, and challenges; select learning

trajectories; and find appropriate resources, communities, and programs to support their learning goals. In addition to supporting the learner, the LPS will help teachers and parents better support their students and children.

The need for change has never been greater. It's estimated that nearly 50% of the students in today's classrooms have some form of learning diversity that impacts how they learn best, which equals more than 26 million students in the U.S. alone. In reality, we are learning much more about the neurodiversity of all students, and learning science has accelerated our understanding of how to better address this learner diversity.

With these large numbers of underserved students, we have an economic, political, and moral imperative to seize the opportunity to build a research-based, educator-supported system that engages the diverse needs of all learners. ■

References

- Civic Enterprises & Everyone Graduates Center at the School of Education at Johns Hopkins University. (2015). [Building a grad nation: Progress and challenge in ending the high school dropout epidemic](http://www.gradnation.org/sites/default/files/18006_CE_BGN_Full_vFNL.pdf?_ga=1.16877113.1827327236.1469643718). Retrieved from http://www.gradnation.org/sites/default/files/18006_CE_BGN_Full_vFNL.pdf?_ga=1.16877113.1827327236.1469643718
- Connor, C.M., & Morrison, F.J. (2016). [Individualizing student instruction in reading: Implications for policy and practice](#). *Policy Insights from the Behavioral and Brain Sciences*, 3(1), 54-61. DOI:10.1177/2372732215624931
- Corrin, W., Sepanik, S., Rosen, R., & Shane A. (2016). [Assessing early warning indicators: Interim impact findings from the Investing in Innovation \(i3\) evaluation of DIPLOMAS NOW](#). Retrieved from <http://diplomasnow.org/wp-content/uploads/2016/06/DiplomasNow-3rd-2016.pdf>
- Ehri, L. C., Nunes, S. R., Willows, D. M., Schuster, B. V., Yaghoub-Zadeh, Z., & Shanahan, T. (2001). [Phonemic awareness instruction helps children learn to read: Evidence from the National Reading Panel's meta-analysis](#). *Reading Research Quarterly*, 36, 250–287.
- Evans, G.W., & Schamberg, M. (2009). [Childhood poverty, chronic stress and adult working memory](#). *Proceedings of the National Academy of Sciences of the United States of America*, 106(16), 6545-6549. DOI: 10.1073/pnas.0811910106
- Holmes, J., Gathercole, S.E., & Dunning, D.L. (2009). [Adaptive training leads to sustained enhancement of poor working memory in children](#). *Developmental Science*, 12(4), F9-F15. DOI: 10.1111/j.1467-7687.2009.00848.x
- Kruse, L. G., Spencer, T. D., Olszewski, A., & Goldstein, H. (2015). [Small groups, big gains: Efficacy of a tier 2 phonological awareness intervention with preschoolers with early literacy deficits](#). *American Journal of Speech-Language Pathology*, 24(2), 189-205.
- Locke, A., Ginsborg, J., & Peers, I. (2002). [Development and disadvantage: Implications for the early school years and beyond](#). *International Journal of Language & Communication Disorders*, 37, 3–15.
- McDowell, K. D., Lonigan, C. J., & Goldstein, A. (2007). [Relations among socioeconomic status, age, and prediction of phonological awareness](#). *Journal of Speech, Language and Hearing Research*, 50, 1079–1092.
- Northeast and the Islands Regional Technology in Education Consortium (NEIRTEC). (2004). [Technology and teaching children to read](#). Retrieved from <https://education.ucf.edu/mirc/Research/Technology%20and%20Teaching%20Children%20to%20Read.pdf>
- Phillips, B. M., Clancy-Menchetti, J., & Lonigan, C. J. (2008). [Successful phonological awareness instruction with preschool children: Lessons from the classroom](#). *Topics in Early Childhood Special Education*, 28(1), 3-17.
- Rose, T. (2016). [The end of average: How we succeed in a world that values sameness](#). New York, NY: HarperCollins Publishers.
- Snyder, T., & Musu-Gillette, L. (2015). [Free or reduced price lunch: A proxy for poverty?](#) NCEB Blog. Retrieved from <http://nces.ed.gov/blogs/nces/post/free-or-reduced-price-lunch-a-proxy-for-poverty>
- U.S. Census Bureau. (2014, 1973). *Annual census*.

Growing Diversity of U.S. Student Population

Subcategory	Past	Present	Notes
Low Socio-economic Status (SES)	1973: 14.4% of people in U.S. under 18 lived in poverty. Source	2014: 21.1% of people in U.S. under 18 live in poverty. Source	In 2012-2013, 50% of U.S. elementary and secondary school students qualified for reduced/free lunch. Source
Diagnosed Disabilities	1976-1977: 8.3% of people in U.S. between 3 and 21 have a disability recognized by IDEA, Part B. Source	2013-2014: 14.0% of U.S. elementary and secondary students have a documented disability. Source	
Learning Differences	No directly comparable data available	2014: 20% (5% identified and estimated 15% unidentified). Source	Understanding and definition of learning differences are changing rapidly.
English Language Learners (ELLs)	1980: Estimated 4.0% of people in the U.S. between 5 and 18. Estimate based on using US Census language questions as proxy data. Source	2012-2013: 9.2% of U.S. elementary and secondary students. Source	Current NCES data likely underestimated current percentage of ELL students in the U.S.
Gifted/Talented	1987-1988: Estimated based on best available data: 4.06% of U.S. preK-12 student population receiving services. Source	2004-2006: 6.7% of U.S. elementary and secondary school students. Source , Source	Race, class, and language biases in diagnostics mean students of color, low SES students, and ELLs are under-represented.
Trauma	1990-2007: Trends in abuse and trauma from March 2010 paper by Finkelhor et al.: Physical abuse substantiated by state child welfare authorities dropped 52% from 1990 to 2007, and substantiated sexual abuse dropped 53% during this same period." Source	2014: 37.3% of children and youth experienced physical assault in the last year. Source	Trauma can result from many experiences, including physical assault, maltreatment, sexual assault, bullying, witness to family violence, and exposure to community violence.