



Applying Research on Promoting the Right Content, Equity, and Student Agency to Personalized Learning Approaches

Can personalized learning approaches and products accelerate literacy outcomes and boost students' reading ability? To that question, we answer a qualified "yes." Though there is anecdotal evidence coming from personalized learning products and approaches, little empirical efficacy research exists to help us answer this question with precision. We are, however, optimistic that personalized learning products and approaches could help boost students' reading ability and literacy outcomes because the research base of literacy and cognitive science laid out in the following sections of this report point to many promising avenues where personalization could indeed accelerate literacy gains.

As noted in the Executive Summary, a multitude of definitions of personalized learning exist (Pane, 2018; Herold, 2019). Personalization experts remind us that much is in flux, and there is no widespread public agreement on any one definition of personalized learning. They recommend landing on one that is broad and inclusive enough to include a range of instructional strategies and materials adopted by schools to support student learning. For the purposes of this paper, we followed this advice and landed on a pragmatic practitioner-perspective definition of personalized learning:

Personalized learning is an approach to education in which teaching and other learning experiences build on each student's strengths, address each student's needs, spur student motivation and agency, and help all students meet grade-level standards and, ultimately, achieve college and career readiness.

While our definition is purposefully wide-ranging, labeling a product or approach as personalized does not make it so. LEAP Innovations, an organization that works with schools to design and implement personalized learning approaches, worked with schools to select products that would support personalized learning (LEAP Innovations, 2016). The group convened a panel of learning scientists, subject-matter experts, and educators to review personalized learning products and found that only 9 of 29 products—less than a third—met the most basic criteria established by the panel.¹

There are personalized learning products and approaches that are a force for good—valuing humans, respecting identities, motivating students, and bringing them into grade-level work. There are also products and approaches that claim to be personalized that are a force for harm. Under this "in name only" banner, we include personalized products and approaches that silo students for extended periods on computers and products and approaches that track students into lower-level work. The most effective personalized

¹ LEAP Innovations criteria included "the potential for student impact; company strength and stability; alignment to learning science and Common Core standards; augmentation of teacher capacity; and functionality around student feedback and motivation."

education techniques known to date have a profoundly human touch, ubiquitous in all cultures and with an ancient lineage: face-to-face human personalization, differentiating according to individual needs and likings. Academic tutoring, where one tutor sits with one student and educates in a way deeply responsive to that student's current skill level and current learning needs, is a prime example.

Personalized learning with an established and proven track record of success exists primarily in mathematics. But that's math; we're focused on literacy. Personalizing reading and writing for students is thoroughly distinct from doing it in math. One area of literacy somewhat akin to mathematics in linearity is foundational reading. There, skills and instruction can progress in a sequence that leads to proficient and automatic word and sentence reading. Imagine a world where teachers could summon the precise foundational skills each student needs next. Imagine those learning opportunities get served in various forms tailored to each child's inclinations—either via learning games or full-body Wii-type activities that practice foundational skills through movement and chanting, all while the teacher coaches, reinforces, encourages, and praises students to ensure progress. Imagine further students choosing what aspect of recently learned course material they want to pursue to deepen and expand their learning. They select the resources (e.g., texts, visuals, multimedia) assembled for their extended learning and interact with easily accessible readings on their chosen topic. Imagine this program providing each student with immediate, targeted feedback based explicitly on their error patterns. This activity is currently primarily teacher-directed, but could be technology-enabled or driven by student choice. Such sophisticated capacity is within reach and may already exist but is so new to the market that it hasn't yet been rigorously studied to be practicable in real settings.

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What follows are lessons from research that show us how we can best use personalized learning approaches and tools to accelerate all students' literacy learning, amplify what matters most, and do so equitably and justly to the greater good of all students.



Research tells us that personalized learning must advance the right content in the right ways

The five key literacy accelerators lead the way. They lay out a research-aligned blueprint for how teachers can advance students' reading and writing capacities.² Tools and techniques that promote these activities should be given priority so students grow the vocabulary and knowledge they need and learn how to deal with complicated syntax and cohesive links in texts. When tied directly to one or more of the literacy accelerators, personalizing learning has the potential to boost outcomes and provide opportunities for students to explore particular topics driven by their individual interests.

The research on literacy and learning science is more settled than that on personalization and strongly points to the idea that content should drive instruction. Decades of work have gone into developing rigorous instructional materials that follow this research and should not be discarded to “personalize” instruction for individual students (Pane, 2018). By that same logic, personalized platforms (or non-tech-based personalization strategies) that provide skill- or knowledge-based practice can (and should) be integrated within a more extensive research-based content-rich curriculum. While there is compelling evidence to suggest that personalized virtual tutoring programs (where student work is responded to by an avatar or other AI device) can be effective at improving student learning generally (VanLehn, 2011), merely putting students in front of a supplemental computer-assisted instructional program a few times per week is not sufficient to improve student literacy skills (Slavin, et al., 2009).

There is a robust body of research on the benefits of social and collective learning that should be held in mind as schools work to personalize instruction (Slavin, 2015). Students learn more when they can talk and work together than when they work independently (Cohen et al., 1989). Personalized learning can be most impactful to fill in gaps in the core content of the course, including building background knowledge, appealing to different modalities of learning, practicing particular skills, and using opportunities to go deeper on a topic of interest or relevance, individually or with similarly interested peers.

This all suggests that the time students spend on personalized tasks—whether working by themselves or on a small project group—should be closely monitored and intimately tied to the broader content of the course. And how we need to personalize to foster one accelerator is often different than how we need to personalize for another. Although personalized products and approaches are promising, they hinge on the extent to which the programs used are easily aligned with the wider curriculum. Bottom line, a Brookings study (Whitehurst, 2009) found using high-quality instructional materials—that is ones that include all five of the literacy accelerators—to be more cost-effective from an effect-size perspective than other reform measures.

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² The five literacy accelerators are securing foundational skills, expanding vocabulary, building knowledge, marshaling evidence when writing and speaking, and practicing with complex text.

Research Tells Us That Personalized Learning—Like All Other Learning—Must Promote Equity and Counteract Bias

Personalized learning has potential to promote equity and counteract bias, but if it is not done carefully and intentionally (as with any instruction), there is potential for inequitable approaches.

There are ways to promote equity and mitigate bias in instruction that apply powerfully to personalized products and approaches. When teachers:

- Make learning meaningful, personal, and culturally congruent, students prosper (Gay, 2000).
- Know and affirm students' identities—rather than require students to leave their racial and cultural backgrounds at the classroom door—when they respect students in all their wholeness, students respond positively (Milner & Howard, 2004).
- Have and exhibit high expectations and seek to develop strong relationships with their students, especially those whose backgrounds differ from their own, students respond accordingly (Douglas et al., 2008).
- Show respect for English language variations and know how to bring such variations into the instructional lifeblood of the classroom, as shown in the work of Devereaux & Palmer (2019), students feel valued and perform better.

Our reading of the available research on promoting equity and mitigating bias should lead all potential implementers (and developers) to approach personalized learning with clarity about who they are designing for and how the product or approach will impact students who have various identities. To personalize instruction means to tailor instruction to each student by assigning students to individualized or small-group work. That necessitates teachers make judgments about each student's strengths, needs, and interests when designing, or co-designing, the personalized learning experiences.

As suggested by personalization experts (and members of the research team for this report), Drs. Doug Ready and Shani Bretas, three main avenues exist through which bias might be likely to operate in a particular personalized approach:

1. the assessment of student skills;
2. the nature of the content that is assigned based on those measured skills; and
3. the pedagogical approaches used to deliver that content.

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Let's review how these operate in personalized learning products and approaches.

Personalized approaches typically assign students content through standardized assessments, including both short-cycle daily measures and longer-interval formal assessments. Regardless of the particular measurement approach, the consideration is to guard against assessment methods systematically under- or over-estimating

skills among certain student populations, exacerbating inequalities in the nature of the content provided. When these processes rely on standardized assessments, results will be biased to the extent the standardized assessment itself is biased. Stereotype threat in assessments always remains a concern for students of color (Koretz, 2008). Tech-enabled products that rely on other assessment approaches, such as voice recognition, are also vulnerable to inaccuracies related to language and dialect variations among diverse groups of students. If a tech-enabled product is going to be used, it must not conflate dialect variations with lack of skill.

Of course, in their efforts to personalize content, teachers also rely on their own interpretations of their students. Teacher perceptions of student's academic abilities are not immune from bias either. They typically result in frequent underestimation of boys' skills, as well as the skill and knowledge bases of students of color and students from lower socioeconomic backgrounds (Ready & Chu, 2015; Ready & Wright, 2011). School contexts matter as well. Perceptions teachers hold of their students' abilities are strongly related to students' backgrounds and are too often inaccurate (see Jussim & Harber, 2005 and Weinstein, 2002). Only about half of a teacher's perceived disparities are explained by actual between-group differences. Specifically, even holding students' social and academic backgrounds constant, teachers working in lower SES and lower-achieving classrooms more often underestimate their students' abilities (Ready & Wright, 2011). This is not to say that teacher bias is exclusive to personalized learning; it is not. Bias can and does occur in all forms of instruction. But with personalization, because students are being assigned certain content matched to their skills, and other students in the class are being similarly but differentially matched, teachers should have heightened awareness of the potential for skewed perceptions.

Shifting membership in learning groups can and should be a key tenet of personalized learning.

For instance, teachers need to be aware that research shows that students who speak varieties of English beyond what is standardly accepted in school frequently experience teacher bias, which subjects them to deficit thinking about student intelligence (Delpit & Dowdy, 2002; Nieto, 2010). Language bias pressures students to make decisions about their identity and asks them to choose who they will be with the effect of identity shelving and alienation (Campbell, 1994; Devereaux, 2015; Reed Marshall, 2017). Bias against students' use of home language (e.g., African-American Vernacular English, world language) as a bridge to learning entrenches the belief that equates English use and intelligence. This is particularly true for students employing African-American or Black Vernacular English (Campbell, 1994). Again, this bias is not exclusive to personalized learning, but neither does it exclude personalized learning from its grip. In fact, in addition to teacher perceptions about students' language use, personalized learning programs may have built-in language biases.

In terms of the nature of the content provided, there are clearly equal concerns across both tech-enabled products and human approaches, given that both rely on adults to populate the collection of personalizable content available to students. Similarly, both tech-enabled and teacher-led approaches to personalized learning can—but certainly don't have to— isolate students on the margins of the classroom. From decades of research, we know teacher-created ability groups tend to segregate and stratify students (Brown Center on Education Policy, 2013; Lucas, 1999) unless group membership is permeable and students are regularly assessed and given the ability to move among groups. Shifting membership in learning groups can and should be a key tenet of personalized learning.

Those implementing personalization should guard against producing a form of within-class academic tracking where some students are working at grade-level and others are stuck in remedial loops. Doing so limits the quality of student educational opportunities, decreases students' perceptions of their own academic abilities, and negatively impacts student achievement (Lucas & Berends, 2002; Oakes, 1985; Werblow et al., 2013). Students are stigmatized and lose self-worth while teacher expectations for their capabilities plummet further. Dropout rates can increase among students who are perpetually tracked. When school systems begin tracking and grouping students by ability in early grades, they tend to maintain these structures year after year, making

it difficult for students to move among academic levels. Students placed in lower tracks are given fewer opportunities to move “up” into higher academic levels. This is especially problematic for students of color and those whose families are economically insecure (Reichelt et al., 2019). These students are victims of belief systems about students from such backgrounds (Lucas & Berends, 2002). Such practices entrench and widen achievement disparities. In their work in gaining insight into tracking, Lucas and Gamoran (2002) found that the practice increases academic as well as racial and economic isolation, particularly for students tracked into classes identified as below grade level. Placement in course pathways identified as below grade level or less rigorous have the effect of widening academic achievement outcomes. Stratified class placement of students within courses identified as less rigorous has been shown to magnify inequality. Students in more rigorous courses are more likely to have more experienced teachers, more rigorous curriculum, and more research-based pedagogical process versus those in less rigorous classes (Applebee et al., 2003).

Moreover, while most educators, policymakers, and observers agree instruction should be at least somewhat differentiated to meet students, there is little evidence teachers alone are capable of implementing differentiation successfully at scale (National Mathematics Advisory Panel, 2008; Tomlinson et al., 2003; Petrilli, 2012). Acknowledging the challenge teachers face delivering differentiated (much less personalized) instruction, most modern models of personalized learning incorporate technology to aid in decision-making, provide ongoing feedback to students, and provide content targeted to students’ skill (Pane et al., 2017; Escueta et al., 2017).

Differentiating instruction through personalization, however, does present opportunities for teachers to work with students to co-construct learning opportunities that best meet students’ identified needs. When students are invited to work with teachers to determine their academic needs and structure the necessary learning to ensure they are moving toward and beyond proficiency, bias is mitigated. Equally important, student agency is boosted through such empowerment. Bias can also be counteracted when personalization focuses on all students—not only on students who need support acquiring grade-level skills but also on students who are ready to move beyond grade level to advanced levels of proficiency.

Personalized products and approaches must design for equity from the start and continuously improve as those products and approaches are used in racially, socioeconomically, and linguistically diverse classrooms (EF+Math Program, n.d.). We are well past the time for equity to be an add-on after development or for superficial gestures like adding models or avatars that are racially diverse and thinking that will satisfy.



Research Tells Us That Central to Personalization Should Be Student Agency and Student Interest in Their Own Learning

For students to learn at high levels, they need to 1) have a sense of belonging and safety through relationships with teachers and other students, 2) know their teachers and other key adults believe they can succeed, 3) have frequent opportunities to engage in relevant and culturally responsive work, and 4) develop a strong sense of agency over their learning.

Too often with personalization, the decision-making around who gets what and which products or approaches to adopt stem from the adults, in effect making students into the done-to—the receivers of the personalized approach. Students need to see value and understand the relevance to their lives in what they are learning, and that is even more important with personalization, where presumably the customization is being tailored to each student.

Why shouldn't students be engaged in these decisions, or at the very least have a clear understanding of the point of what's being applied? These student-facing factors are foundational to enabling academic success and thriving in life.

Maslow's hierarchy of needs demonstrates the importance of building a sense of belonging as a critical aspect of student learning (Maslow, 1943, 1954). Research pioneered by Northwestern University professor Kirabo Jackson demonstrates that improving students' motivation, work habits, and social skills produces even better results than schools that work only to improve test scores. Students rise to the occasion when they feel valued and supported. Jackson et al.'s (2020) research follows findings from several others that students' sense of belonging holds implications for academic outcomes (Slaten & Baskin, 2014) and is an important variable to academic adjustment, higher level of academic motivation, less absenteeism, better school completion, less truancy, and less "misconduct" (Pittman & Richmond, 2007; Gillen-O'Neel & Fuligni, 2013; Demanet & Van Houtte, 2012).

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Bringing students into the rationale—into the decision-making when possible—and engaging students deeply in their own learning takes extra time; it requires paying close attention to providing content that students find worthwhile and directly engaging students in decision-making about what topics, products, and approaches they find are worth attending to.

Providing K-12 students with some choice in their learning is positively associated with their engagement and academic performance (see Royer et al., 2017 for a literature review). Extant research, however, suggests that learners' self-reported learning *preferences* are only weakly correlated with their actual learning outcomes. Too much student choice can be overwhelming and move students too far away from their zone of proximal development (Kirschner & Merrienboer, 2013; Pane, 2018). To balance the positive and negative aspects of choice, Corbalan et al. (2006) suggest a process of shared control over tasks wherein teachers select a subset of tasks tailored to learners' needs, and students exercise choice within that subset. This, of course, should be adjusted for student maturity level.

The power of students' having agency over their own learning has been shown to interact positively with academic engagement and resultant learning outcomes. Having a degree of control and a solid understanding of why and how students are conducting their learning has results across grade levels. Work by the Chicago Consortium (Farrington, et al., 2012) and Azevedo, Guthrie, and Seibert (2004) attests to improved outcomes in general academic settings when students have agency. Wigfield et al. (2004) demonstrated this power in improving motivation and outcomes in reading comprehension when third-graders got a measure of control over what and how they were studying. Personalized learning can deliver here because, when done right, it fosters academic agency in students. Academic agency is evidenced by students developing skills to manage their learning, including setting academic goals (beyond achieving test scores), having opportunities to practice skills within the space of lesson design and execution, and gaining feedback on how their decision-making led to the goals set (Sen, 1985). Clearly this is a case where what is equitable and good for students is also very good for their learning outcomes.

Research Tells Us That Personalized Learning Must Be Easy to Use and Easy to Implement to Be Embraced by Teachers

Especially now, but always true, teachers are asked to flex to a variety of demands and situations. When considering personalized learning products and approaches, what the challenge in implementation will be needs to be considered and accommodated. If a given personalized approach, program, or strategy is capable of effecting meaningful change, it needs also to be doable in the classroom. That increases the likelihood that the reform will be sustained over time. Many personalized products and approaches, including tech-enabled tutoring programs, are easy to implement as add-ons and ask little of teachers in return. Add-ons can be just the extra boost students need to progress, and once teachers learn how to use them, they can make life easier for teachers. The central question—easy to implement or not—is whether or not there are academic benefits for the students who experience them? Equally important is whether or not the product or approach is perceived by teachers as coherent with what is already being learned in the class. Since the focus here is on applying personalization products and approaches to benefit and accelerate literacy accelerators, such coherence is already a nonnegotiable consideration.

One set of factors for ease of implementation can be organized under teacher “will and capacity”—do teachers want to implement a particular reform, and if so, are they capable of doing so (McLaughlin, 1987)? In terms of teacher will, buy-in among those implementing any policy is often key to successful adoption, particularly when the implementers (such as teachers) have discretion about the extent to which they will faithfully implement the reform (Lipsky, 1980). This is particularly true when the implementation is going to demand a lot from the teacher.

A second set of considerations is related to the scale of the personalized product or approach. Efforts to deeply integrate personalized products or approaches often present a more challenging undertaking. Given this, any effort to implement a large-scale personalized product or approach must be accompanied by meaningful professional development. And we know from the literature on successful professional development that teacher support for any new intervention must be: 1) participatory; 2) focused on specific subject-matter content; and 3) sustained over time (Darling-Hammond et al., 2017; Lynch et al., 2019; Kraft et al., 2018). Serious efforts to adopt meaningful personalized products or approaches that do not scaffold learning for the adults responsible for implementation are unlikely to find success.

There are some promising approaches in this regard. Station-based blended models—where students rotate through a series of tasks either as a group on a specified schedule or individually with more flexibility over timing—seem to be particularly appealing and potentially useful (Staker & Horn, 2012). Many teachers are

already familiar with the idea of a station rotation, which can ease some of the implementation challenges and make teachers more open to incorporating a personalized component into their already existing understandings. Bumping up the quality of what students engage in during stations is a positive.

As noted above, personalization can also involve the adoption of simple supplemental personalized products or technologies that are aligned with the broader literacy curriculum and serve to support the five literacy accelerators. These are likely easy to implement, often ask little of teachers in terms of changes to instruction, and can bring instructional value. More actionable specifics are explored in the recommendations at the end of each literacy accelerator synthesis as well as the Implementation Guidance for Literacy Acceleration ([Appendix B](#)).

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