

What We're Learning From Our Investments in Ed Tech

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NewSchools has been investing in education technology for 20 years.

During that time, we've also helped teams of educators around the country start more than 500 new public schools, which gives us a deep understanding of what goes on in classrooms and a unique perspective on how ed tech can support learning.

Since 2015, we've been using a "challenge" model rather than a more traditional investment approach. Challenges help surface innovative ideas and solutions that address critical learning needs teachers and students identify as important, but where innovation is lagging. We made this shift because our market analysis indicated that while ed tech products have grown rapidly in some market segments over the last decade, significant gaps exist in others. Our team conducts primary market research with educators, students and researchers to identify critical student needs where the availability or quality of ed tech tools is lacking, and then we work to attract talented entrepreneurs to address them.

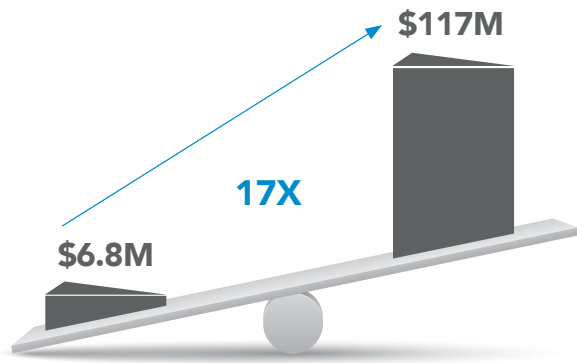
This Insight Brief will focus on what we've learned from our ed tech investments over the past four years. Between 2015 and 2018, we launched six challenges that mobilized more than 70 companies and nonprofits working to meet critical student needs in science, middle and high school math, English language learning, special education, early learning and the future of work.

Our investments enabled companies in our portfolio to grow their users by 45 percent to more than 40 million students and teachers. We ask our ventures to focus on equity by ensuring their products reach students in underserved communities and we're proud that our ed tech portfolio currently serves Black, Latino, and low-income students at a higher percentage than the national average. Eighteen percent of the entrepreneurs we've invested in are Black or Latino, and altogether the companies we've backed have gone on to raise \$117 million in follow-on funding, or 17 times our initial investment.

SNAPSHOT

NewSchools' Ed Tech Investments

- 74** Companies Funded
- 40M** Student and Teacher Users
- 18%** Black and Latino Founders
- >50%** Have Evidence of Positive Outcomes



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Among the ventures in our portfolio of investments from 2015-2018, 41 percent of early-stage companies already had some evidence of learning outcomes. Fifty percent of mid-stage companies and 87 percent of later-stage companies also showed evidence of learning outcomes. In fact, 22 percent of the companies reached our bar for rigorous evidence from a randomized control trial or quasi-experimental design conducted by an external researcher. We also paid an average of \$40,000 for each company to engage in a small-scale study of its product’s usability, feasibility and learning potential

with WestEd, a nationally recognized leader in ed tech research. These studies inform entrepreneurs’ product development cycles and generate broader lessons for our investment team and the field.

Our investment model allows us to learn quickly across multiple market segments, instructional approaches, and business models. Much of this learning is consistent with well-established lessons about the importance of strong teams, product-market fit and smart growth strategies. But we’ve also learned several distinctive lessons, three of which we share in this brief. These three insights will shape our work going forward and have the potential to inform the work of the broader community of investors and ed tech entrepreneurs.

1. The best ed tech is designed for student differences.
2. Get into classrooms early and often to build a great product.
3. Big data is not always the right data.



INSIGHT 1

The best ed tech is designed for student differences.



Schools and districts spend more than \$13 billion per year on technology, including computers and instructional and administrative software. These tools have the potential to expand access to quality education and customize learning for students or to reinforce existing educational inequities. Our experience is that good ed tech increases equity by elevating teacher expectations and student aspirations, while differentiating the support students need. Rather than designing for the “average” student, these tools are designed for difference, with learner and context variation in mind.

Less effective ed tech tools deliver the same experience for all students, regardless of their learning needs.

Companies in our portfolio are doing this in a variety of ways, such as helping students develop knowledge and skill at their own pace, emphasizing real-world examples and hands-on inquiry that increase students’ motivation to learn, and connecting content with students’ identities to boost relevance.

For example, Education Modified lets teachers browse through a digital library of 300+ high-quality, research-based instructional strategies to support students with disabilities and enables teachers to share insights, ideas and strategies about what works for an individual student. Many programs also offer students individualized suggestions for making progress. Quill’s formative ELL Diagnostic tool provides support for English Language Learners by offering directions in both English and six other languages—Spanish, Mandarin, French, Vietnamese, Arabic and Hindi—and creates a customized learning plan for each student, with up to 10 weeks of personalized activities.

To connect academic knowledge and skills to real life, companies like Mathalicious, Motion Math, and Tuva engage students in scenarios like learning about the minimum wage, running a virtual cupcake delivery business, or using real data on topics such as homelessness in the United States to get students engaged and interested in math.

Making academic subjects and content relevant to students' identities and aspirations can be a powerful motivator for learning. Mosa Mack Science helps girls and Black students connect their identities to science disciplines. The product is a web-based series of animated science mysteries and inquiry-based curriculum activities featuring a Black girl as the protagonist. It aims to increase students' knowledge of science while improving their attitudes about a subject historically dominated by white men. Early studies of the product have found statistically significant gains in students' science content knowledge and in their attitudes toward science.

In contrast, less effective ed tech tools deliver the same experience for all students, regardless of their learning needs. They tend to isolate students by

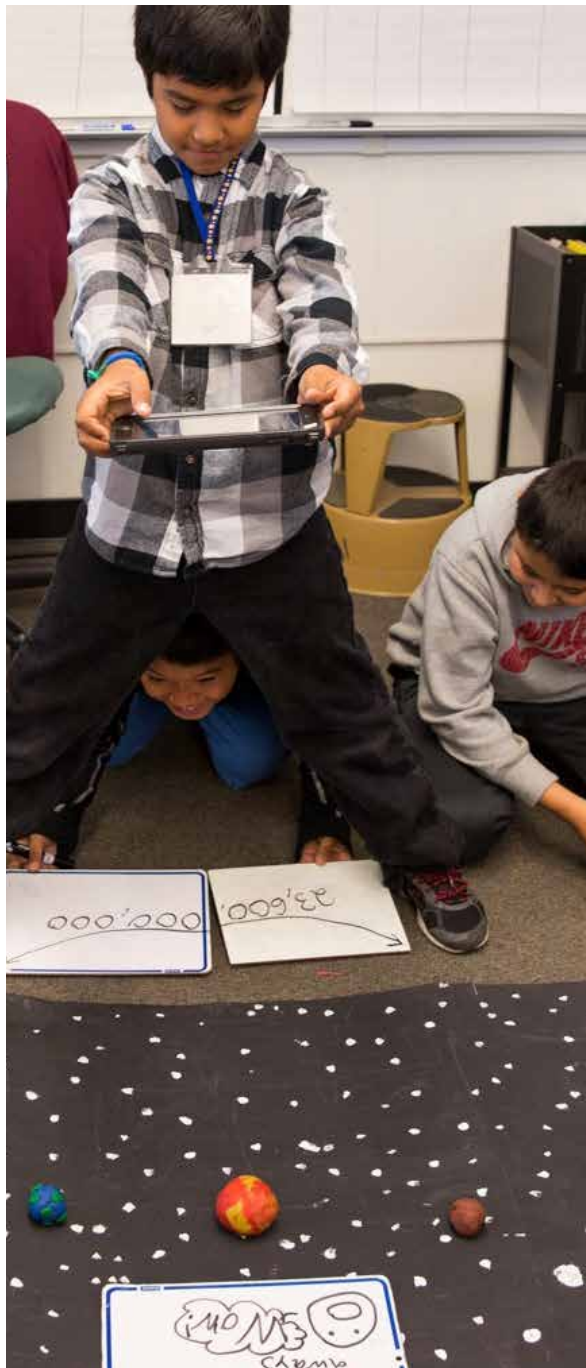
having them spend hours staring into a computer screen with headphones on. They often repackage lessons with low-level instruction in a digital format rather than maximizing students' engagement and cognitive load. And they can reinforce existing inequities by limiting some students to drill-and-skill exercises rather than providing access to rich, intellectually challenging material.

Ed tech developers should be clear about the target audience for the product they are developing. They should anticipate common student pitfalls—confusion with concepts or issues with usability—that might prevent some students from accessing their products. As noted by our research partner, WestEd, they should also create resources that are developmentally appropriate for their intended audience and grade level. This includes making sure graphics/visuals and language are age- and grade-appropriate; ensuring all information is understandable; providing users with content within their stretch zone; creating activities that can be used for learners at different levels within a grade; and providing more scaffolded content for students at the earlier years of the product's intended grade band.



INSIGHT 2

Get into classrooms early and often to build a great product.



Early-stage companies often struggle to allocate time and resources to understanding how their tools are used in live learning environments. Entrepreneurs face built-in tension between the need to drive sales to meet growth projections and continuing to refine their products so that they are easier to use and produce better outcomes. However, engaging in usability and feasibility testing in real settings—early and often—and refining products based on the results is critical to the effectiveness of a company's offerings as they grow.

Many products work in the lab and then hit roadblocks when they reach the classroom. Often developers don't have a clear understanding of the root causes of the challenges. The feasibility and usability studies WestEd conducted for our portfolio companies uncovered some consistent problems developers had not anticipated. Two categories of challenges were common for companies in our portfolio: basic technical issues and ease of use. Finding these issues and resolving them through low-stakes, formative studies helps developers

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design robust products that can function effectively in multiple environments. And identifying them before a period of rapid growth is critical for maintaining quality and impact at scale.



logging into the same account, making it impossible to respond to individual learner needs.

The easier a product is to use, the more likely it is to be used frequently and appropriately. This applies to students, but also to teachers who must incorporate it effectively into their practice. Teachers don't have extra time to figure out how to make a tool work correctly in their classrooms. To help teachers better understand a product's core features, developers should provide them with clear instructions on implementation dosage and use, such as when it is


most effective to use the product during the school year, how best to integrate the product into existing curriculum, and how often and how long students should use the software to realize its learning aims. In addition to implementation guidance, the product's

The basic technical issues our companies encounter most frequently are incompatibility with available platforms and devices and log-in challenges. Entrepreneurs should have a detailed understanding of the technology available across classrooms in the schools they serve and ensure their applications work on as wide an array of devices and platforms as possible. They should also ensure that users have multiple log-in options. For instance, ensuring a student can access a product through Google Classrooms as well as an individual email can avoid precious instructional time slipping away through multiple unsuccessful log-in attempts. And finally, companies should understand implementation scenarios in which multiple students use a single device, as with a classroom set of laptops or tablets in a middle school. When an instructional software application relies on using data about a student's progress to support their learning, the success of the product can be confounded by multiple students


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features should be as easy and intuitive to use as possible. According to our research partner, WestEd, this includes building out more flexible, reliable and intuitive search features to allow teachers to find applicable content with ease, particularly by standard and other characteristics that are important to teachers in designing lessons—such as grade level, reading level, language difficulty and activity length. The interface should be clean and the wording of directions and labels clear. If the product includes data dashboards, teachers want more streamlined processes for using them—ideally integrated into systems they already use to avoid having to create new accounts for themselves or their students.

Ventures' **Common Challenges**



Basic Technical Issues



Ease of Use

INSIGHT 3

Big data is not always the right data.

Big data's potential to accelerate learning began attracting significant attention from entrepreneurs and investors around 2008. Many of the companies at the forefront of this trend raised significant amounts of capital but have struggled to develop practical use cases or sustainable business models. We are still optimistic that big data can support breakthrough improvements in learning, but believe the field has a long way to go to integrate this potential into high priority use cases. For most ed tech companies, it's far more important to focus on generating and analyzing the right data during early product development.



Our research partner WestEd found that some of our ventures confuse vast amounts of information about product use with meaningful data that can help determine the impact on student outcomes. Streams of clickstream data might show where users are navigating on a site but not the content they are engaging with. Or the data might show what users did within the product but not what they learned by using the product. We work with the ed tech developers we

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fund to clarify their logic model for how their product will lead to changes in student outcomes, and then to use a blend of evidence—including qualitative and quantitative data—to explore whether they're having impact.

A logic model provides a clear articulation of how the functionality and usage of a product should produce results. When some of our portfolio companies saw little to no association between usage and positive outcomes in our small-scale studies, this revealed weaknesses in their logic models, which they could then revisit. In other situations, the use case – the purpose, target audience, and how often and long the product should be used – was unclear and needed to be made explicit in order to support implementation and collect the appropriate data to improve the product.

Identifying the most appropriate indicators for the goals of an early stage product can be a challenge. Subjects like reading and mathematics have established measures and instruments, but outcomes for other areas, such as early learning, science or social-emotional learning are more difficult to measure. Many of our small-scale studies required researchers to develop assessment items or compile items from different sources in order to measure the early effectiveness of products in different

domains. Increasing the validity and comparability of standardized formative measures in areas outside of reading and math would be a big step forward in using the right data to improve early-stage products.

It's essential that companies listen to teachers and school leaders to understand the outcomes they value. Many educators are interested in how a product has worked in classrooms and schools that are demographically or geographically similar to their own, not on average. This requires a company

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to collect that kind of descriptive data along with outcome metrics. At NewSchools, we work with Empirical Education to help our portfolio companies collect information about the students and schools that use their products so they can better understand who they are reaching and how their product is working for different students.



Product Maturity	Evidence Level	Study Types and Costs	What Can Be Learned?
<p>Early Stage</p> <p>Less than 100,000 users and less than \$250,000 in annual revenue</p>	<p>Preliminary (Does not meet ESSA evidence standard)</p>	<p>Usability (\$1,000-\$20,000)</p> <p>Feasibility (\$20,000-\$60,000)</p>	<p>Is the product intuitive and easy to use?</p> <p>Are users able to use the product’s features as intended?</p> <p>How do students/teachers use the product in the classroom?</p>
<p>Mid Stage</p> <p>100,000 -1 million users and/or \$250,000-\$1 million in annual revenue</p>	<p>Preliminary evidence still appropriate at the lower end of mid stage range</p> <p>Promising evidence (ESSA Tier 3) is more appropriate as revenue and number of users grow</p>	<p>Pre-post or Generic Controls (\$10,000-\$50,000)</p> <p>Correlational (statistical controls) or Randomized Control (underpowered) (\$40,000-\$250,000)</p>	<p>Surface feedback that can drive product improvement</p> <p>Generate early data about learning outcomes</p> <p>Communicate potential impact to decision-makers</p> <p>Feedback to tweak product/ implementation in preparation for more rigorous/expensive studies</p>
<p>Later Stage</p> <p>More than 1 million users and/or \$1 million in annual revenue</p>	<p>Moderate evidence (ESSA Tier 2) becomes appropriate as products reach later stage benchmarks</p> <p>Strong evidence (ESSA Tier 3) is desirable as product development becomes stable and the user base continues to grow</p>	<p>Quasi-Experimental with well-matched comparison groups (\$27,000-800,000)</p> <p>Randomized Control Trial (\$250,000-\$3 million+)</p>	<p>Performance comparison among demographic subgroups</p> <p>Possible inclusion in What Works Clearinghouse “with reservations”</p> <p>Differentiation - very small percentage of products offer evidence that meets this standard</p> <p>Possible inclusion in What Works Clearinghouse “without reservations”</p>

Looking Ahead



Investment in U.S. K-12 ed tech has been on the decline in recent years. After growing rapidly from \$175 million in 2010 to \$741 million in 2015, total investment dropped precipitously by more than 40 percent to \$434 million in 2016. Early estimates for 2018 show a total of around \$550 million, but angel- and seed-stage investment totals continue to shrink while later-stage rounds expand. In this environment, it's more important than ever for ed tech developers to distinguish themselves by understanding what happens in classrooms and for investors to identify early-stage teams focused on improving student learning. How might they do this?

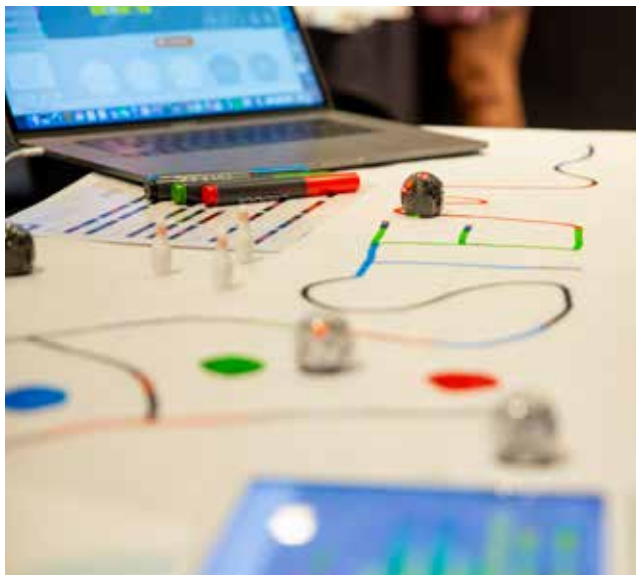
science into their solutions from the start and commit to generating and using the right data to iterate and make them better.

Investors should look for teams with clear ideas about how to improve learning and a plan for generating and collecting the right data to improve their product quickly and demonstrate learning outcomes credibly. Investors should also actively work to diversify their pipelines to source a broader range of ideas and more innovators who understand their target market. This year, 40 percent of U.S. public school students are Black or Latino. Yet Black and Latino entrepreneurs currently make up fewer than

Ed tech has made its way into most U.S. classrooms. This has produced positive benefits for many teachers and students, but we have yet to see the full potential of learning technologies.

Entrepreneurs should develop products that address core instructional use cases, are easy to use, and fit into the workflow of classrooms. They should understand and incorporate relevant learning

10 percent of ed tech founders. The sector has a long way to go to invest in and support entrepreneurs who are more representative of the demographics of today's students.



Over the last decade, ed tech has made its way into most U.S. classrooms. This has produced positive benefits for many teachers and students, but we have yet to see the full potential of learning technologies. Within the next few years, we expect to see an uptick in innovation and investment to levels we saw at the beginning of this decade. We hope the lessons in this Insight Brief are helpful in establishing a strong foundation to build on when the next wave of innovation emerges.

newschools
venture fund

At NewSchools Venture Fund, we believe every young person should finish high school prepared and inspired to create a good life full of opportunity, choices, connection, and meaning. To realize this aspiration, students need a strong academic foundation, as well as other mindsets, habits and skills that are correlated with success in young adulthood. Our investment strategy supports teams of educators and entrepreneurs with the vision and skills to reimagine learning in the following ways:

Innovative Public Schools

Invest nationally in teams of educators who are creating new schools and redesigning existing ones to help students meet an expanded definition of success.

Ed Tech

Increase the availability and effectiveness of ed tech products that deepen and enrich student learning.

Diverse Leaders

Fund organizations that attract, develop, and place Black and Latino education leaders to bring more innovative, effective, and sustainable solutions to the field.