SiliconSchools

All That We've Learned

Five Years Working on Personalized Learning

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Five years ago…

…we started the Silicon Schools Fund to support the launch of new schools figuring out better ways to educate students. We hoped that educators could reimagine schools to ensure that students got more ownership of their education and more of exactly what they needed when they needed it—so called **"personalized learning."**

Five years ago was also when one of us, Caitrin, had her first child, who is now entering kindergarten. In that span of time he's learned to walk, to talk, dress himself, and play a mean game of Uno. Seeing his growth and learning got us thinking about all that we've learned over the past five years about personalized learning.

Silicon School Personalized Learning Journey

WE'VE ALWAYS HAD FOUR STRONG BELIEFS:

1. Students' ownership of their learning is critical to long-term success.
2. When it comes to learning, students should get more of what they need exactly when they need it.
3. Ensuring equity requires getting each student what he or she needs to succeed.
4. It is possible to redesign schools to work much better for students and teachers.

What We've Learned

- Promise of personalized learning is real
- Personalized learning should not mean isolated learning
- Students benefit from working in both homogeneous groups at their own “instructional level” and heterogeneously at their “developmental level”
- Agency is important for all students

Where We Go Next

- Put in place more systematic and effective goal-setting and reflection cycles for students
- Provide teachers high-quality training and supports
- Consistently utilize rigorous curricular resources

How We Get There

- Embrace prototyping and piloting as the fastest way to learn what works
- Create systems for continuous improvement so schools iterate to better outcomes
- Ensure innovative practices show positive results before promoting them widely
- Build bridges to academic research in learning sciences
- Pay attention to change management; having a good solution is only half the battle
- Practice urgent patience

WHAT THE DATA SAYS: THE PROMISE OF PERSONALIZED LEARNING

We do not believe that there is yet definitive proof that personalized learning works better than other models. Ultimately, we hope that personalized learning will improve life outcomes for students, with clear evidence to support its efficacy. In the interim, we look to traditional academic measures (e.g. state assessments or assessments like NWEA MAP), to provide early signs of the efficacy of personalized learning.

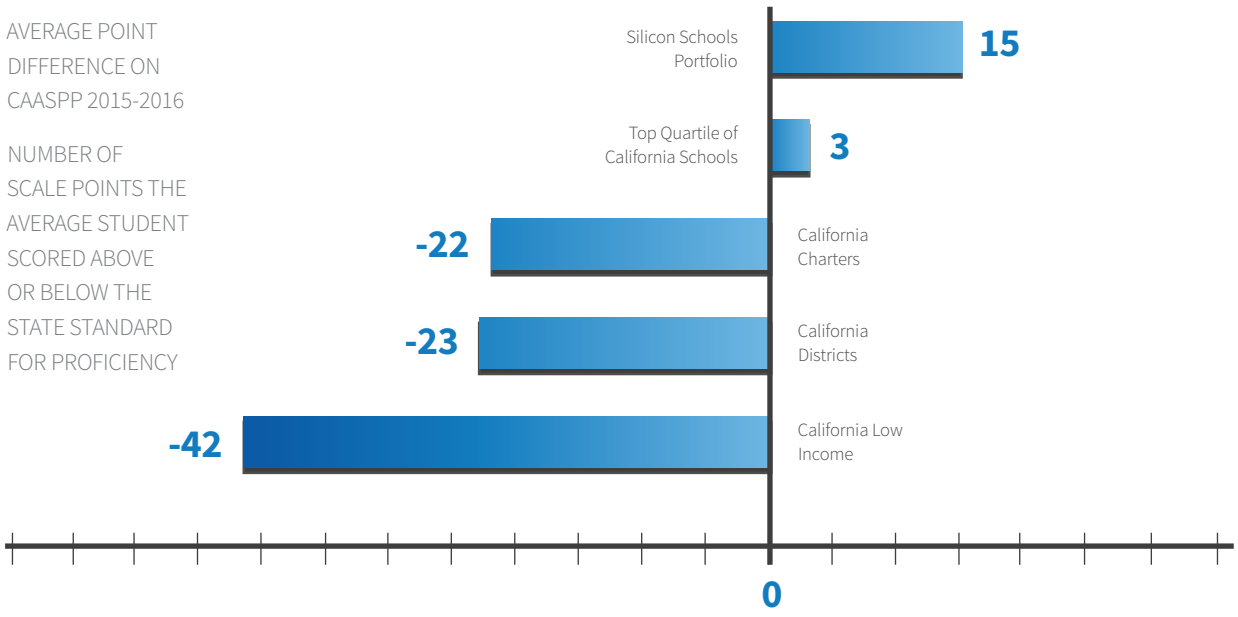
Despite the lack of conclusive proof, there are two important data sets that we find compelling. First, RAND conducted a study of 11,000 students and 62 personalized learning schools nationally and found that "students made significant gains in mathematics and reading overall, and in elementary and middle schools **[1]**." More recently, RAND published the third of its studies of personalized learning. It again found statistically significant gains in math, however, the effect size had decreased notably **[2]**.

More directly, we have access to significant state academic assessment data across our portfolio of personalized learning schools that show that Silicon Schools backed schools consistently outperform state averages, local district averages, and other charters within the state of California—both overall and even more dramatically for economically disadvantaged and Latino students.

Further, there is a subset of schools in our portfolio that is dramatically outperforming all relevant academic benchmarks. For example, at Hollister Prep (a Navigator School) 85% of Latino students scored proficient in English Language Arts (ELA) on the state assessment. In comparison, only 37% of Latino students scored proficient in the district where the school resides. In addition, in our analysis of the schools in our portfolio's NWEA MAP assessment results (an assessment that measures student growth over time), we found that students in the bottom quartile of performance at the beginning of the year were the ones that made the greatest growth over the year. This was an important indicator to us given our focus on ensuring equity in personalized learning —that these models help all students succeed, in particular those that have traditionally struggled.

While we realize our portfolio's results aren't a pure or rigorous proof of personalized learning's effectiveness, strong academic outcomes at such an early stage of a movement give us hope for what is to come and make us cautiously optimistic about the promise of personalized learning to improve student learning.

Silicon Schools' portfolio of personalized learning schools significantly outperform the top quartile of schools in California, as well as California's average charter schools and district schools.



THE DEFINITION OF PERSONALIZED LEARNING

The emerging field of personalized learning has suffered from a lack of a shared and clear definition of what personalized learning is. This is not surprising given the nascent state of the field and people's different vantage points on the work. Our core beliefs around the importance of agency, equity, and students getting what they need when they need it, inform our views of what constitutes personalized learning. The Office of Educational Technology also shared a synthesis of the existing definitions of personalized learning. The definition that rang closest to our view was:

"Personalized learning seeks to accelerate student learning by tailoring the instructional environment—what, when, how, and where students learn—to address the individual needs, skills, and interests of each student. Students can take ownership of their own learning, while also developing deep, personal connections with each other, their teachers, and other adults **[3]**."

To gain perspective more concretely of what we look for when we think about personalized learning, you can access our evolving Personalized Learning Rubric **[4]**.

Comments

[1] Pane, John F., Elizabeth D. Steiner, Matthew D. Baird, and Laura S. Hamilton. "Continued Progress: Promising Evidence on Personalized Learning." RAND. November 2015.

[2] Pane, John F., Elizabeth D. Steiner, Matthew D. Baird, Laura S. Hamilton and Joseph D. Pane. "Informing Progress: Insights on Personalized Learning Implementation and Effects." Santa Monica, CA: RAND Corporation, 2017. https://www.rand.org/pubs/research_reports/RR2042.html.

[3] "A Working Definition of Personalized Learning." https://www.documentcloud.org/documents/1311874-personalized-learning-working-definition-fall2014.html

[4] Silicon Schools Fund Personalized Learning Rubric, https://drive.google.com/file/d/0B2ubnjLq02bVcjE1RmtJT1h2MUk/view

What We've Learned.

While we care about math and reading proficiency, we hope that personalized learning will do more than just raise test scores. Schools play other important roles too: teaching empathy, supporting democracy, fostering creativity, and helping create well-rounded students.

Increasingly we see educators designing schools to address these varied goals. The best educators that we work with have figured out the power of the school design choices they make to maximize student learning. These educators make decisions about how to use each minute of the day with intentionality. Rather than assuming school should always run from 8 am to 3 pm, or that every subject should last fifty-five minutes, these schools realize that making a schedule and organizing students into classes are design choices. By allowing educators to think differently, we've seen schools start to experiment with periods of flexible time during the day, adjust class sizes that can vary depending on the subject or content, and create more opportunities for students to make choices that impact these decisions on a daily basis.

Great schools also pull up to the 30,000-foot level and consider how to integrate a student's experience across a day and throughout the year. It is important to make connections between subjects and to think about the different modalities a student experiences across a day. But too often schools create chopped up days where every subject is distinct and every lesson stands on its own. In personalized learning contexts this can sometimes happen as a result of trying to "modularize" what students need to learn in hopes of being able to free students to move at different speeds and tackle information at the exact right moment. Instead, we think it is important to create a balance between some personalized time where students might be tackling individual work in a modular way, and more social and collective learning where students might work in more heterogeneous settings. Intentionality in these decisions is key. When do students work on their own and why? When in groups? What is the right number of students to have in a group depending on the task?

Our work has led us to three key insights:

1. Personalized learning should not mean isolated learning
2. Students benefit from a mix of working in homogeneous groups at their own "instructional level" and working in heterogeneous groups at their "developmental level"
3. Agency is important for all students

1

PERSONALIZED LEARNING SHOULD NOT BE ISOLATED LEARNING

A few years ago, as our team was spending more time in personalized learning schools, we were struck by something that made us a bit uncomfortable. The schools were often very quiet. Students were heads-down working on their computers, doing work at their exact level. But we missed the rich social interactions and joy. Such an environment wasn't what we wanted for our own kids, and it got us thinking about the balance of time spent learning individually versus socially.

Clearly software can be a powerful addition to the classroom, but students should not spend the majority of their time working independently on software. The goal of personalized learning was never to have students sitting alone on a computer all day long.

When schools buy into personalized learning and shift to more independent and small group work, they should be careful to protect enough time for social and collaborative learning too.

Comments

[5] Peterson, Paul and Michael B. Horn. "The Ideal Blended-Learning Combination: Is one-third computer time about right?" Education Next. Spring 2016, Vol. 16, No. 2.

[6] Annotation 6: Steenbergen-Hu, Saiying, Makel, Matthew C., and Paula Olszewski-Kubilius (2016). "What One Hundred Years of Research Says about the Effects of Ability Grouping and Acceleration on K-12 Students' Academic Achievement: Findings of Two Second-Order Meta-Analyses." Review of Educational Research. Vol 86, Issue 4, pp. 849 - 899.

What percent of time should students be spending on computers? Michael Horn and Paul Peterson surveyed parents, blended learning experts, and teachers and landed on a range of 20-40% of the day **[5]**. None said more than 50% of the day. We would tend to agree. Depending on the school model, 20-40% of a day devoted to individual work via a computer is consistent with our upper bound, based on what we've seen in classrooms and our analysis of the academic outcomes that result from different models.

Across many successful personalized learning schools, we have seen how critical it is for students to learn through a variety of settings. For example, all students (especially English language learners) need to produce a lot of "academic talk". In a personalized learning school, students need opportunities for discussion with space for student voice and peer-to-peer conversations. Collaborative work also helps students navigate relationships and teaches students to work with many different types of people.

A few years ago, a school that we support concluded that learning in their school had become too isolated—that the students were too quiet for too much of the day. They began to shift to more time for students and teachers to interact with each other, working on communal tasks and interacting with communal texts. When we walk through their school now, we hear a din of discussion—students conferencing with teachers and with each other, students working in groups, students in a Makerspaces, and yes, sometimes students working independently on or off a computer. We think this is the right balance of personalization and communal learning. We have come to listen for that productive hum rather than silence as an indicator of success.

TIME STUDENTS SHOULD BE SPENDING ON COMPUTERS BASED ON A SURVEY OF PARENTS, BLENDED LEARNING EXPERTS, AND TEACHERS

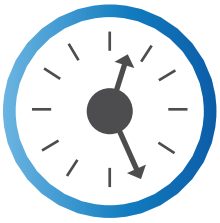
20-40%

STUDENTS BENEFIT FROM WORKING BOTH AT THEIR PERSONAL "INSTRUCTIONAL LEVEL" (WHAT THEY PERSONALLY ARE READY FOR) AND AT THEIR "DEVELOPMENTAL LEVEL" (OR GRADE LEVEL).

Traditionally, schools sort students by age, not by readiness to learn a given topic. In personalized learning settings, students are more often grouped so that they can tackle the right material when they are ready for it, regardless of age. A recent meta-analysis confirmed the power of grouping students so they can work at their instructional level. Co-author, Matt Makel, shared that "most forms of ability grouping can be powerfully effective interventions. They help increase academic achievement for both lower- and higher-achieving students **[6]**." We believe that students benefit most from a mix of these homogeneous "personal instructional level" experiences and heterogeneous "developmental level" times with their peers.

Two of the top performers on academic assessments in our portfolio are Summit Public Schools and Navigator Schools. Depending on when you walk into one of their learning environments, you might see all of the students wrestling with a concept at their developmental level or you might see groups of students working on topics that are grades above or below their age level.

When we began this work five years ago, we focused most on meeting students at their instructional level, regardless of what grade they were in. However, we have come to appreciate the value in students being exposed to a mix of on-grade level material in heterogeneous groups as well as personalized work in more homogeneous groups. For students who are struggling, the mix can accelerate their progress, ensuring they aren't left behind and giving them time to shore up weaknesses and experience the rigor of working on-grade level. If we separate struggling students into purely homogeneous groups, we create the downside of tracking – lower expectations that ensure students at the bottom stay at the bottom.



ESTIMATED MIX OF ON-GRADE OR DEVELOPMENTAL LEVEL VS. ON-INSTRUCTIONAL LEVEL. BASED ON OUR HIGH PERFORMING SCHOOLS.

50/50

For students at the top, time to work at an accelerated speed allows them to feel challenged and learn more material. However, also having them in heterogeneous groups for part of the day allows them to benefit students who are struggling, while helping them learn how to navigate diverse groups, which they will experience in college and the workforce.

We should remember that the distinction between students "at the bottom" and "at the top" is much more complicated than it appears.

Students often excel in some areas and struggle in others, and there are dangerous historical race and class issues at play in how we sort students through tracking. For these reasons we are much more in favor of sorting students more dynamically and allowing grouping to be somewhat flexible based on what any student demonstrates on any given subject rather than into fixed tracks. Lastly, but importantly, there are also broader social and communal benefits to all students learning to work in both homogeneous and heterogeneous groups that benefit our democracy.

We don't yet have a conclusive answer on the exact right mix of time on-grade or developmental level vs. on-instructional level. But many of the higher performing schools in our portfolio seem to be landing close to a 50/50 split throughout the day.

3

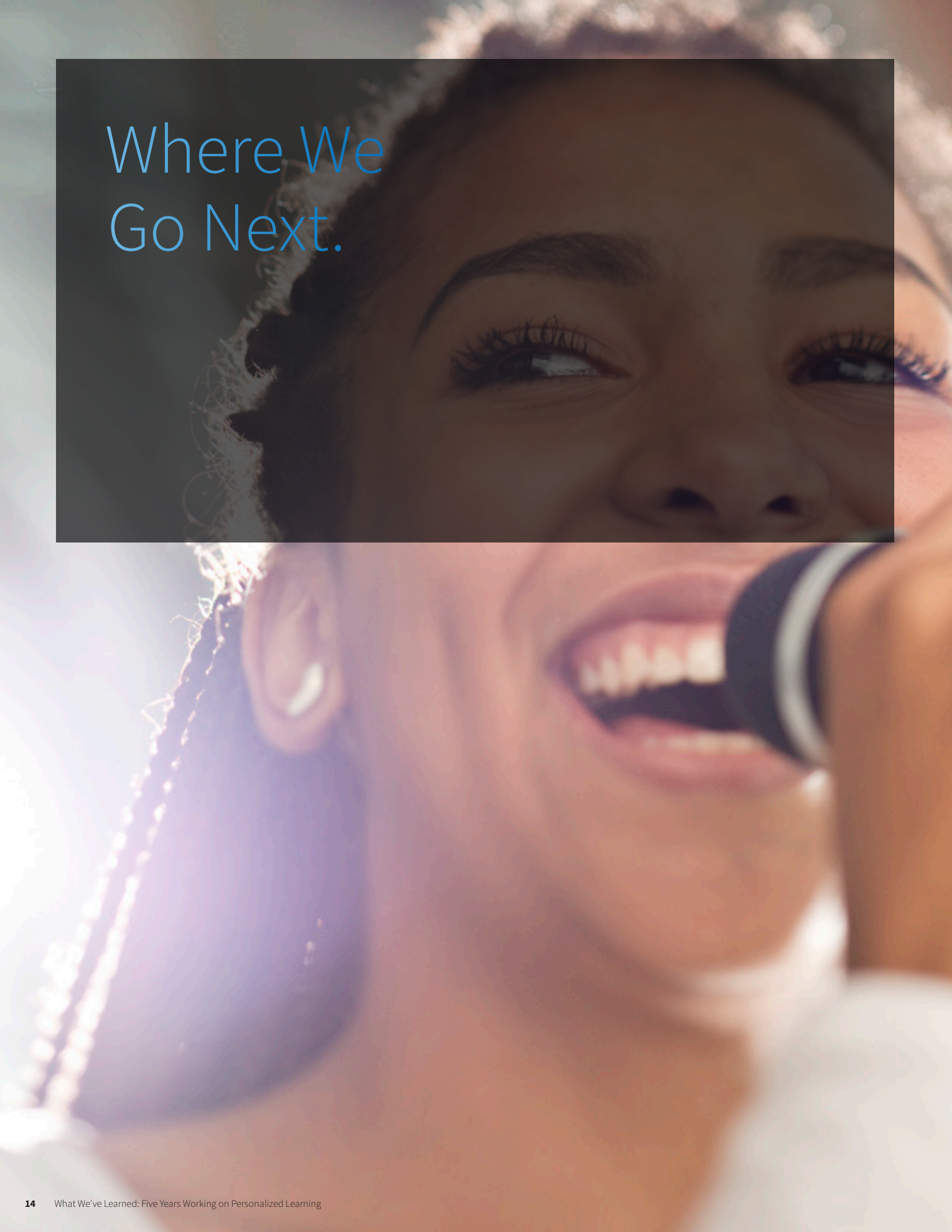
AGENCY IS IMPORTANT FOR ALL STUDENTS

Caitrin's son's experience in a Montessori preschool classroom with a mix of three to five-year olds, gives a glimpse into how capably younger students can direct their own learning. Some days he choses to spend 60 minutes constructing a decanomial square (a conceptual representation of multiplication), and some days he chooses to polish metal and dust shelves. Within clear boundaries, he has the ability to make choices in how he spends his time. If the activity is not available, he must choose another; if he hasn't had a lesson on the materials yet, he may not use them; and if he isn't using the materials respectfully, he must put them away. His teacher's role is to keenly observe his choices and the learning he demonstrates. When the time is right, his teacher may nudge him towards an activity that he should spend some more time on (like the movable alphabet). Over his years in the Montessori classroom he has learned both content and how to self-direct his learning.

When educators redesign schools there is often buy-in to the power of student agency but questions about what younger students are capable of. We hear claims that students "are not ready for" independence or that high-stakes exams require teachers to drive the learning process. Interestingly, when we work with educators in the upper grades who are increasing agency in their students, we hear how much effort they devote to "undoing" the passivity and lack of agency that students have learned over years of traditional schooling. If we focused on agency from the beginning, we are inspired to imagine what students would be able to do by the time they reach the middle and high school years. We have been particularly impressed to see a strong focus on student agency in the early elementary school years at schools such as Lighthouse Lodestar (Oakland), Urban Montessori (Oakland), Khan Lab School (Sunnyvale) and Montessori for All (Austin). With all this being said, there is still significant work ahead to determine how effectively to build ownership of learning in all students. There have been struggles in the past in Montessori schools for example, to ensure every learner, especially those who are historically disadvantaged, succeeds.

We don't believe providing agency, especially to younger students, is easy, but we are asserting its importance in improving students' long-term trajectories.

Where We Go Next.



Personalized learning has come a long way in the last five years and yet it still has a long road to travel to reach its full potential. There are three areas that require further focus:

THE PROCESS OF STUDENT GOAL-SETTING AND REFLECTION

Imagine that you give Student A a basketball, point to a hoop, and say “throw this at the basket for 20 minutes." Then you hand Student B a basketball saying, “free throws are critical in basketball--sometimes the difference between winning and losing. If you can improve your free throw shooting, you might win the game for your team. Last week, you averaged making 50% of your shots. This week, what goal do you want to set for yourself to practice towards?”

Which student do you think would use their time more intentionally and improve more? Too often we see classrooms that look more like Scenario A. Students are told, “Spend 20 minutes of this software. Go.” How bought-in to their learning are these students likely to be? How much does this approach unlock any intrinsic (or even extrinsic) motivation?

When students are learning on their own for chunks of time, goal setting and reflecting on progress are critical for success. If a school creates a schedule where students work independently for five hours a week, would it be worth an investment of ten minutes per week for a student to meet with their teacher to set appropriate targets and reflect on progress against goals? Too often we see schools commit significant time to independent learning without building in structured time for goal-setting.

Further, we'd suggest that the process for goal setting and reflection should be based on the considerable academic research base on motivation, self-efficacy, and learning sciences. For example, the advice given to Student B above is in part based on research that demonstrates that students persist through tedious tasks if they have broader social/communal purpose such as the team winning **[7]**.

Students persist through tedious tasks if they have a broader social or communal purpose.

The social sciences have learned a lot about what makes for effective goals and how you develop the meta-cognition to reflect on your progress. But we can't expect teachers and principals to figure this out on their own. The examples of homemade goal-setting systems that we've observed in schools rarely include the elements that academic research has determined are key (identifying likely obstacles and how one will overcome those obstacles, for example). Of course, it is hard to build a bridge between what academics have learned through research and what practitioners do in the field. We are optimistic in two areas, however. First, some organizations are explicitly tackling the link between academic research and teacher practice including the *Character Lab, Carnegie's Student Agency Improvement Community,* and *Transcend Education*. Second, we see potential in this area for software products to build some of these goal-setting and reflection techniques directly into their programs. If researchers can inform how software thoughtfully asks students to set goals and reflect on progress, more classrooms will likely benefit from these approaches than if we were to attempt to train teachers and schools through traditional means.

TWO FINDINGS ON GOAL SETTING FROM SOCIAL SCIENCE RESEARCH

Self-Transcendent Motives:
When students have goals that are not only self-directed (I want to be a doctor) but also self-transcendent (I want to help people), they are able to persist through tedious tasks (like math problems) for longer than a student who has no goal, or just a self-directed goal **[8]**.

Mental Contrasting and Implementation Intentions:
Many goal-setting activities encourage students to visualize the future state they want to strive for. However, research has shown that this is not nearly as effective (and sometimes not effective at all), as when students go through a different process called mental contrasting and implementation intentions (MCII). With MCII, students contrast their desired outcome with the relevant obstacles that are in the way of achieving this future state. They then form implementation intentions ("if-then" plans) for what they will do when they encounter these obstacles to overcome them. In a recent study, students taught MCII improved their GPA, attendance, and their conduct relative to students randomly assigned to merely positive thinking about their academic wishes **[9]**.

PRACTICALLY, THERE ARE THREE AREAS THAT SCHOOLS SHOULD FOCUS ON AS THEY ARE FIGURING OUT GOAL SETTING:

1 Make time in the schedule for 1:1 goal setting and check-ins. These 1:1s won't reliably happen if they are not built into the weekly schedule.

2 Make 1:1 meetings effective and high-impact: put data in student and teacher's hands ahead of time so they can be prepared. Provide students and teachers a thoughtful protocol to follow. Students and teachers can accomplish a great deal in ten minutes if both parties come in prepared and clear on the focus of the conversation.

3 Give teachers the chance to practice goal-setting meetings, get feedback, and observe other more skilled teachers lead successful goal-setting sessions.

1:1

MAKE TIME IN THE SCHEDULE FOR 1:1 GOAL SETTING AND CHECK-INS.

Comments

[7], [8] Yeager, D., Henderson, M.D., D'Mello, S., Paunesku, D., Walton, G. M., Spitzer, B., Duckworth, A.L. "Boring but Important: A Self-Transcendent Purpose for Learning Fosters Academic Self-Regulation." Journal of Personality and Social Psychology, 2014, Vol. 107, No. 4.

[9] Duckworth, Angela Lee, Grant, Heidi, Loew, Benjamin, Oettingen, Gabriele and Gollwitzer, Peter M. (2011) "Self-regulation strategies improve self-discipline in adolescents: benefits of mental contrasting and implementation intentions." Educational Psychology, 31: 1, 17-26. First published on: 14 September 2010.

2

ALIGNED TRAINING AND SUPPORTS FOR TEACHERS

Like students, teachers need a combination of increased agency and support if they are going to learn to effectively lead in more personalized classrooms.

Returning to the goal-setting example, if we want teachers to learn how to effectively facilitate goal setting, we should provide great examples along with opportunities to practice and receive feedback. Too often we've seen administrators hesitate to observe 1:1 goal setting meetings for fear of being intrusive. But at Khan Lab School, staff videotape their 1:1 sessions, give feedback to each other, and share positive examples across the faculty.

Similarly, we should not simply ask teachers to do less "stand and deliver" teaching, but rather train them on strategies to use once they are freed from the front of the class. It is easy to quote the educational maxim that teachers should be a "guide-on-the-side not a sage-on-the-stage." But what does a good guide-on-the-side do? How should teachers prepare the night before for lessons that will take place in small groups rather than to the whole class? What are highest leverage uses of a teacher's time during a personalized learning class? At one school in our portfolio, the leadership team is building a rubric of "teacher moves" for when the students are working independently. It starts with basic monitoring (are students on task) and progresses to more advanced moves that require preparation, looking at data, running mini-lessons, or intervening based on potential misconceptions.

*"Personalized learning will not help students if they are working with content that is below their capacity. Rigor and personalization need to go hand in hand...it's easy for schools caught up in these sweeping changes to lose sight of what will really push student learning forward: high-quality, challenging, rich content **[10]**."*

RIGOROUS, QUALITY CURRICULAR RESOURCES THOUGHTFULLY UTILIZED

With leaders from across our portfolio of schools, we recently visited some of the highest-performing East Coast charter schools (Success Academies, Uncommon Schools and Achievement First) to understand what was driving their success. One of the things that stood out was that teachers received strong base curriculum rather than creating lessons from scratch. The base curriculum elevated classroom learning and discussion because the teachers had used their prep time to intellectually grapple with the material. They had clearly thought deeply about the material ahead of time, and it showed in the lessons.

As the schools in our portfolio discussed this, most agreed that by providing high quality curriculum, we could create more time for teachers to prepare for class by intellectually grappling with the material, analyzing student data, and planning how to differentiate for students. The pushback we sometimes hear on this topic is that teachers prefer to make their own curriculum, crave autonomy, and don't want to teach someone else's lessons.

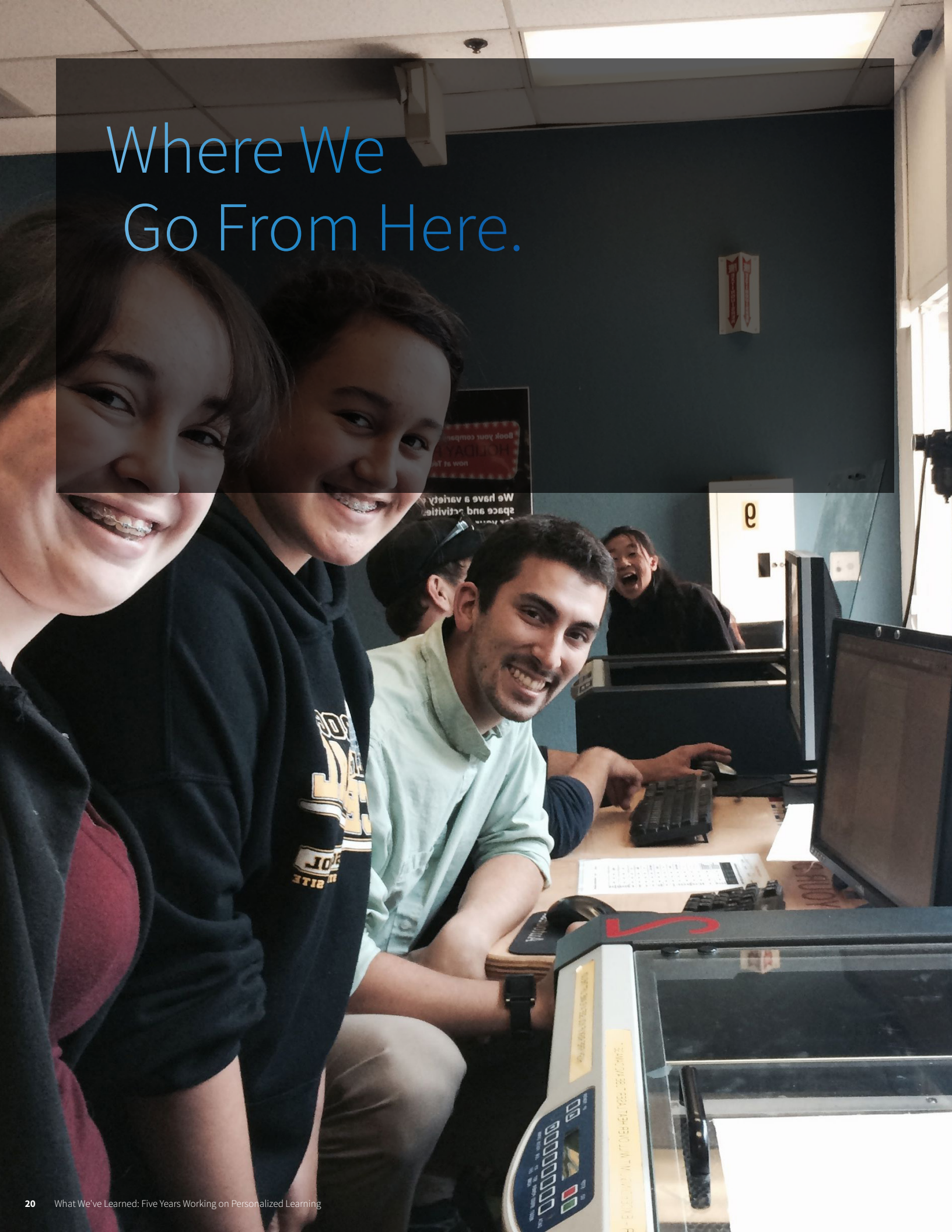
But teachers who have experienced both settings tell us they prefer significant curriculum support— they just want it to be high quality and want the freedom to make improvements. For example, when one charter management organization in our portfolio rolled out more standardized curricular supports to their math teachers, they worried about resistance to centralization. Instead, they found that their English Language Arts teachers were upset that they didn't get the same curricular supports as the math teachers did.

One challenge, however, is that much of the best curriculum being created by Achievement First, Success Academies, and others is built for classrooms that are more traditional rather than personalized. We want personalized classrooms to benefit from this base curriculum, but we don't want to inadvertently push them back towards more direct instruction pedagogy. We are curious about how easily teachers can modularize this more traditional curriculum so that it can be deployed in more personalized learning environments.

Comments

[10] Gross, Betheny. "Beware the Iconography Trap of Personalized Learning: Rigor Matters." Education Next, September 22, 2016.

Where We Go From Here.



With these learnings in mind, we propose six practices to guide our work in the years ahead:

1

EMBRACE PROTOTYPING AND PILOTING AS THE FASTEST WAY TO LEARN WHAT WORKS.

We have a strong bias towards action rather than discussion on these matters. We have seen schools make huge progress when they commit to quickly and effectively testing out new ideas for personalized learning. In technology, this concept is referred to as rapid prototyping, as championed by Eric Rees in "Lean Startup" as well as many others. The core idea is to build a minimum viable product version of any new idea, one that is just barely good enough to try out and see if it works. In schools, this can look like building a test for a new classroom approach or way to organize students and running a pilot for as little as a few days to observe, collect data, and decide if the idea is promising. When launching new schools, prototyping is even more important because it allows educators to test out elements of their proposed models before the school opens. It's so much better to make mistakes and learn as part of a three-day pilot rather than once a brand-new school opens its doors, only to find out that a fundamental part of their model is flawed. Instead of rolling out new software across the whole school, we have seen schools thoughtfully test out new programs with a single class, look at the data, tweak implementation, and then assess whether it should be used more broadly. Smart educators look for opportunities to test out new approaches when the stakes are lowest. Teacher sick days, for example, are a great opportunity for administrators to test a new approach by taking over class for a day and deploying a model they've been working on. Maternity leaves, after-school time, break weeks, summer school, etc. all provide opportunities to embrace prototyping with greater risk tolerance. Prototyping new approaches and bringing them to scale, takes time and resources. We, as funders, must find ways to support this work if we value it.

2

CREATE SYSTEMS FOR CONTINUOUS IMPROVEMENT SO THAT SCHOOLS CONSTANTLY ITERATE TO BETTER OUTCOMES.

Many people focus on innovation and design prior to the launch of a new school. But it is perhaps even more important to build the culture and systems within an organization to consistently test, measure, and learn on an on-going basis. Frameworks such as the Carnegie Foundation for the Advancement of Teaching's *Continuous Improvement* process help schools learn how to identify problems, test solutions, evaluate outcomes, and revise solutions. We rarely see schools get innovations right the first time out of the gate.

This is an area where a bit of external support and training can go a long way, and we have seen real power in schools embracing approaches like Carnegie's Continuous Improvement process to bring a rigorous approach to test out new ideas and solve problems. We have also seen the benefit of devoting a coach, administrator, or project manager to lead the improvement process within a school.

Great schools build the system to formalize continuous improvement, devote enough resources, and make their schools true learning organizations.

3

ENSURE INNOVATIVE PRACTICES SHOW POSITIVE RESULTS BEFORE PROMOTING THEM WIDELY SIMPLY BECAUSE THEY ARE "COOL" OR INTERESTING.

There is so much demand for new models and practices in education right now that we worry about over-hyping innovation. We need to hold a high bar for personalized learning's academic and non-academic outcomes for all students, in particular for disadvantaged populations.

We need to give new ideas time to ripen and mature before trying to scale them too broadly.

We cannot tell you the number of times that visitors have asked (with the best of intentions) how they could replicate a practice they've observed, without taking the time to first inquire about the outcomes. When it comes to scaling solutions, we think a balance is required between the desire to replicate and scale a promising practice and waiting for the prototype to unfold to ensure positive outcomes. We need to de-risk failure in education so that people are not paralyzed from acting, but we shouldn't try to spread practices at a macro-level until we have some evidence that they improve student outcomes.

4

BUILD BRIDGES TO ACADEMIC RESEARCH IN LEARNING AND SOCIAL SCIENCES.

Cognitive science, psychology, and other learning sciences are rapidly increasing what we know about how students learn and how humans are motivated. As educators design new school systems, we should be building upon the learnings from this research. This has been a historically hard problem to solve, as academics often produce research that does not feel practical to K-12 educators, while teachers and principals feel too busy to find relevant research. We see promise in intermediaries who share the most applicable findings directly with educators as well as the potential for software products to incorporate some of the findings of learning science so that students and teachers are guided to effective practices.

5

PAY ATTENTION TO CHANGE MANAGEMENT AND REALIZE THAT HAVING A GOOD SOLUTION IS ONLY HALF OF THE BATTLE.

We regularly get asked, “Why don’t you just spread the best practices working in your top schools to all the other schools in the country?" Unlike consumer tech or other sectors where winning solutions scale rapidly, education is a human endeavor, and change is hard. Teachers and principals have understandably built up scar tissue towards new innovations because of all the past innovations that failed to deliver on promises. The best leaders we see doing this work devote a lot of energy towards change management within their organizations. We have seen frameworks such as *Kotter’s 8 Steps to Leading Change* help organizations become much more strategic in executing change.

6

PRACTICE URGENT PATIENCE.

The transition to widespread personalized learning will not come quickly. Basic use of technology in classrooms is already happening quite broadly. However, the changes that we’ve discussed in this paper towards much more student agency, effective differentiation, and radically new models will likely take more than a decade. We must move with urgency but not rush our efforts to reach scale. We have yet to see evidence that real personalized learning is ready for the masses because it still requires high quality human capital, willingness to endure initial challenges, and devotion of significant mindshare and effort to be done well. There is a danger in trying to scale too quickly because if we do not have the right conditions, we run the risk of worse outcomes, thus killing the innovation before it has time to mature.


"Five years of work has convinced us of personalized learning's potential. The work of the next five years is to deliver on its promise."

The next 5 years...

We plan our work over five-year periods at Silicon Schools. In our first five-years we saw personalized learning transform from a niche concept to a solution that is intriguing educators all over the U.S. and abroad. In the next five years, we hope to support many more examples of innovative schools delivering compelling student outcomes on the leading-edge of the movement. We hope to push innovation even farther while laying the groundwork for scale so that others can replicate these models.

Five years is both a long period of time and a very short amount of time. Five years from now, Caitrin's son (and many other children) will be almost done with their elementary school experience. We feel the tension in our work between urgency and patience because we feel responsible to ensure that personalized learning lives up to its potential.

Based on what we have seen over these past five years, we are cautiously optimistic about the power of personalized learning to truly improve our schools. And we are aware of how hard it is to embrace prototyping, build bridges to academic research, navigate change management, and balance urgency with patience.

It is with these challenges and opportunities in mind that we are excited to launch into our next five years of work in partnership with so many of you.

We would love to hear any thoughts or feedback at info@siliconschools.com.

If you are interested in opening a school like the ones described in this paper please reach out to us at http://www.siliconschools.com/apply/

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