Apex
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Increased Student Achievement Correlates to Engaging and Motivating Digital Curriculum

Collaboration with Michael Horn and Edweek

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Part I: Digital learning, engagement, and motivation

The relationship between motivation and learning is a two-step dance. First, students must find value in the goals of their coursework. Second, and equally as important, they need to believe that they can reach those goals by learning what they are taught.[1] In this way, higher levels of engagement and motivation lead to higher levels of achievement.

Expectancy	Value

Motivation

Leads to

Goal-directed Behavior

Supports

Learning and Performance
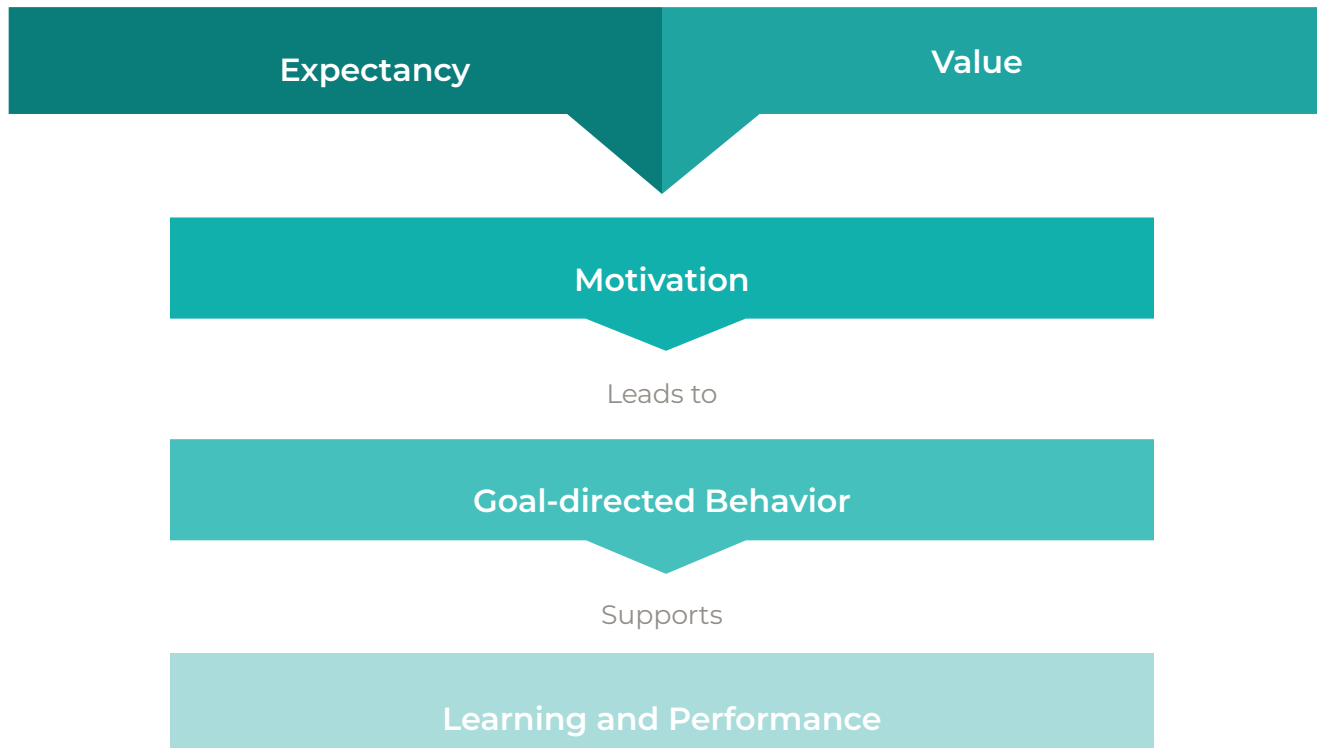
Source: Ambrose, S., Bridges, M., DiPietro, M., Lovett, M., & Norman, M. (2010). How learning works: Seven research-based principles for smart teaching. San Francisco, CA: John Wiley & Son, Inc.

A well-crafted digital curriculum teaches these dance steps far better than the traditional classroom, according to Michael Horn, author of *Disrupting class: How disruptive innovation will change the way the world learns.*

Digital curriculum can build genuine interest in learning goals by making the topics exciting through engaging media, immersive experiences, different ways of framing problems, and connections to real-world challenges far outside a classroom.

Digital curriculum also has the unique ability to personalize learning to fit each student's needs in a way that is impossible to scale with real-world student-teacher ratios.

One way digital curriculum personalizes learning is through scaffolding. Scaffolding introduces material that is just a little harder than students can handle while simultaneously providing the guidance and support necessary. Students use this guidance to learn material they could not otherwise understand on their own. Every student has a different "zone of proximal development" where they are able to learn challenging material as long as it is scaffolded. Digital curriculum can adjust to these zones more nimbly than a teacher with 30 students in a class. In this way, a well-designed digital curriculum provides students with material that is challenging enough to stave off boredom but sufficiently scaffolded to prevent them from getting frustrated and giving up. This helps students see the value in learning while developing expectations of success.

Part II: Active learning and student success in today's classroom

Digital curriculum's ability to actively engage students and help keep them motivated has become more vital as today's classroom includes growing numbers of students with diverse needs. Teachers today are working with more students who are learning English as a second language, struggling with learning impediments due to disabilities, living in poverty, or facing other challenges that make it difficult to learn in a traditional classroom environment. As they work with students who struggle to succeed, teachers must simultaneously serve advanced students seeking enrichment experiences. In this context, personalization is more important yet more challenging than ever before.

GRAPH 1:

Growing Diversity of US Student Population
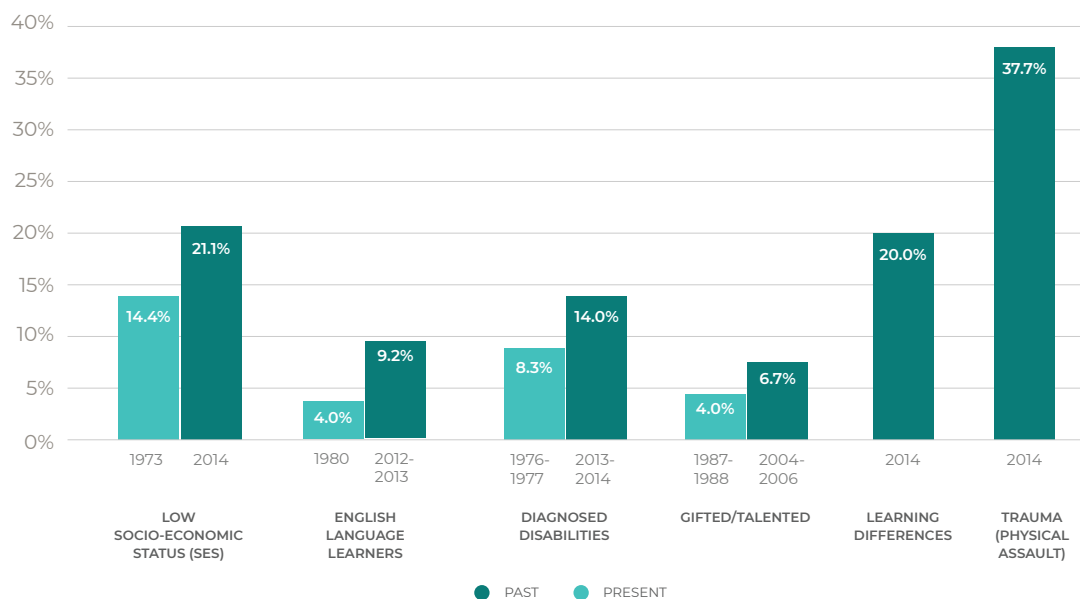
Source: Digital Promise (2016). Making learning personal for all the growing diversity in today's classroom. Retrieved from http://digitalpromise.org/wp-content/uploads/2016/09/lps-growing_diversity_FINAL-1.pdf

A growing body of evidence suggests that true personalization cannot and will not happen at scale without access to technology and well-designed digital curriculum.

In a study of 11,000 students at sixty-two K-12 schools, RAND found that students improved their reading and math scores at an above-average rate after becoming more engaged in their learning, aided by the use of personalized digital curriculum. The effect was especially pronounced with students who struggled in these subject areas. A recent review of blended learning shows how digital learning similarly provides college students with an active learning experience.

Students Made Significant Gains in Mathematics and Reading, Overall and in Elementary and Middle Schools

Fall 2013 to Spring 2015

	ALL SCHOOLS		GRADES K-5		GRADES 6-8		GRADES 9-12	
PERCENTILE GAIN[2]	11	8	13	8	6	7	4	5
NUMBERS OF STUDENTS	11,217	10,906	7,742	7,577	2,593	2,391	882	938

● MATHEMATICS   ● READING

[1] Solid bars indicate statistical significance (p < 0.05) after adjustment for multiple hypothesis tests. Outlined bars are not significant.
[2] Percentile gains translate the treatment effect sizes into the amount of improvement experienced by the median student.

Source: Pane, J., Steiner, E., Baird, M., Hamilton, L. (2015). Continued Progress: Promising Evidence on Personalized Learning. RAND Corporation. Retrieved from http://www.rand.org/content/dam/rand/pubs/research_reports/RR1300/RR1365/RAND_RR1365.pdf

These and many other bodies of research are increasingly identifying digital curriculum's potential to reach all students where they are, providing teachers with resources to enhance instruction by stimulating engagement and achieving mastery of material while at the same time providing opportunities for advanced enrichment. Students exposed to this environment are more likely to complete coursework the first time around, pass end-of-course exams, graduate on time, and achieve advanced goals like passing Advanced Placement[©] exams.

To Michael Horn, digital curriculum is an opportunity to redesign learning environments: it is personalized, students take ownership, and progress proceeds with mastery, not just because it's time to move on to the next lesson.

Part III: The science of active learning

People are not passive recipients of information. Rather, they are active sense makers, Ruth Colvin Clark and Richard E. Mayer write in "E-learning and the Science of Instruction:"

They engage in active cognitive processing during learning, including attending to relevant information, mentally organizing it into a coherent structure, and integrating it with what they already know.

To Colvin Clark and Mayer, effective instruction not only presents information, it encourages learners to engage in appropriate cognitive processing during the lesson. This cannot occur unless a student's working memory has the capacity to accommodate additional information:

When the limited capacity of working memory becomes filled, processing becomes inefficient. Learning slows and frustration grows.

Well-crafted digital curriculum asks frequent questions of the student, or presents digital simulations or other graphic information. This helps break up material without overloading a student's working memory— thereby supporting effective learning. When learning is effective, students remain engaged because they can focus on the content instead of struggling with cognitive processing.

Part IV: Digital curriculum and student engagement

But if digital instruction is to help students reach their potential by actively engaging them in personalized coursework and motivating them to succeed, the question is, what does this look like?

First of all, says Michael Horn, here's what it doesn't look like. It's not, said Horn, "60 minutes of a human being droning on at you, and you never respond." This format, he added, is all too common:

Some have gone to online learning with a strategy that has effectively been to take an instructor and record their lecture.

The "sage on the stage" model is especially noxious for struggling students because it does not contain built in, personalized support. While advanced students may get the concept the first time around, their struggling and at-risk peers may not. Without scaffolding, they give up and tune out. Even if they have the ability to understand the material the first time it is introduced in a passive format like a lecture, English learners may find themselves similarly frustrated by language barriers that make it challenging to access subject matter like social studies or math.

Engaging and motivating curriculum is the opposite of that, says Michael Horn. Students are constantly answering questions, connecting concepts, analyzing, and synthesizing — all of which requires engaging in the material. The idea, again, is to make the material meaningful, and thereby motivate the student to achieve mastery:

Interacting with the content and answering questions frequently makes you think about what you are doing. It's different from a textbook or simply watching a lecture.

Engagement starts when students demonstrate existing understanding and misconceptions.[2] Effective curriculum can tackle these misconceptions head on while skipping subject matter that students already understand. Learners can show what they know by completing exercises that require them to explain, apply, generalize, and employ other cognitive skills.[3]

Students can share their understanding using multiple means of expression such as drawing, charting, graphing, writing, speaking, and presenting. The use of multiple expressions with varying levels of abstraction supports a student's ability to think flexibly about complex domains and transfer knowledge to new situations.[4] Students can demonstrate their understanding through tests, but also projects, performances, discussions, and interactive simulations.

Once a student has begun interacting with digital coursework, a well-designed digital curriculum can gather data in real-time on that student's progress and performance, offering a customized plan of action as needed. Here again, there's a way not to use data, however. It is critical to avoid identifying problems, then quickly moving on. This can be deeply demotivating: Instead, the idea is for the student to go back and relearn the material, perhaps relying on supports such as scaffolding to engage with it in a different way, as well as getting help from the teacher, who is also able to see where the student is having difficulty. Moving on once the student has mastered a lesson helps to ensure ongoing engagement.

More and more districts are looking to use an effective digital curriculum to reach a diverse range of students, from Advanced Placement© students to at-risk students who aren't succeeding in the traditional classroom.

Checklist: Is Your Digital Curriculum Ready to Engage Students?

A well-designed digital curriculum encourages higher student achievement by keeping students motivated and engaged. Here's how to tell whether the digital curriculum at your school is getting the job done.

	Digital Curriculum Checklist	Yes (✔)
1	Are there embedded scaffolds to support learners, enabling them to guide their own pace and path through instruction?	
2	Do students engage with content through interactive activities such as sorting, organizing, categorizing, and responding?	
3	Can students and teachers access data on usage, progress, and achievement?	
4	Are students required to go beyond memorization to think critically?	
5	Are there multiple opportunities for formative and summative assessment such as pretests that help students focus in on weaknesses and skip material they already know?	
6	Is mastery (rather than completion only) the ultimate goal?	

Part V: Conclusion: increased student achievement and engaging and motivating digital curriculum

Increased curriculum achievement correlates with engaging and motivating digital curriculum. Well-designed digital curriculum is personalized and challenging, so that students remain engaged as they are pushed beyond their comfort zones into ever-higher levels of achievement. In today's increasingly diverse classroom, this personalization is critical because every student's zone is different.Teachers simply lack the resources and the time to create an individualized curriculum for every single student in the class.

Digital curriculum fills that gap, exponentially multiplying the number of opportunities each student has to learn. Gifted students receive the additional enrichment they need to master complex topics and pass Advanced Placement[©] exams. This keeps them engaged at the same time that struggling students are receiving the additional support they need to catch up, keep up, and moved forward rather than disengaging and dropping out. In this way, digital curriculum plays a significant role in the intimate dance of student motivation, engagement, and learning.

The Dorchester Story

Dorchester School District Two, in Summerville, South Carolina, began using digital curriculum in 2009 for credit recovery and to preemptively intervene with struggling high school students at risk of dropping out, before recovering credits. Nearly seven years later, the district has seen increases in graduation rates and decreases in dropout rates.

In fact, the district has started using digital curriculum with all its secondary students, expanding access to the curriculum from several hundred to more than 7,000. Administrators note how students had difficulty seeing material as interesting or important before they began using digital curriculum. The personalized scaffolding provided by the digital curriculum offered more entry points into the material. Students opened the door and went on in.

Additionally, data on student performance allows teachers to provide additional supports along the way. One administrator noted that teachers have become more like coaches, while students have increasingly been active participants in their learning, setting goals and achieving mastery.

Dorchester School District Two: Fast Facts

- Students: 26,000

- Percent Minority: 31%

- Graduation rate in 2016: 88%

- Graduation rate increase, 2013-2016: 7 percentage points

- Percent end-of-course tests with scores of 70 or above: 83% (vs 77% statewide)

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[1] Ambrose, S., Bridges, M., DiPietro, M., Lovett, M., & Norman, M., 2010.

[2] Bransford et al., 2000

[3] Anderson & Krathwohl, 2001; International Center for Leadership in Education, 2009; Keene, 2008.

[4] Bransford et al., 2000

About Apex Learning

Apex Learning puts rigorous, standard-based curriculum within reach for all students—from those struggling to those capable of acceleration—to prepare them for the next course, the next stage in their education, work and life. Schools use Apex Learning digital curriculum because it is proven that more learning happens with the powerful, actionable data that gives educators insight into student performance, and the personalization and engagement students need to succeed. During the 2015-2016 school year, there were more than three million enrollments in Apex Learning Comprehensive Courses for original credit and credit recovery and Adaptive Tutorials for intervention, remediation, and to prepare for high-stakes assessments. Headquartered in Seattle, Apex Learning is accredited by AdvancEd and its courses are approved for National Collegiate Athletic Association eligibility.

For more information, visit http://www.apexlearning.com or call 1.800.453.1454

Contact

Apex Learning

1215 Fourth Ave., Suite 1500
Seattle, WA 98161
Phone: 1 (206) 381-5600
Fax: 1 (206) 381-5601
ApexLearning.com