nellie mae EDUCATION FOUNDATION

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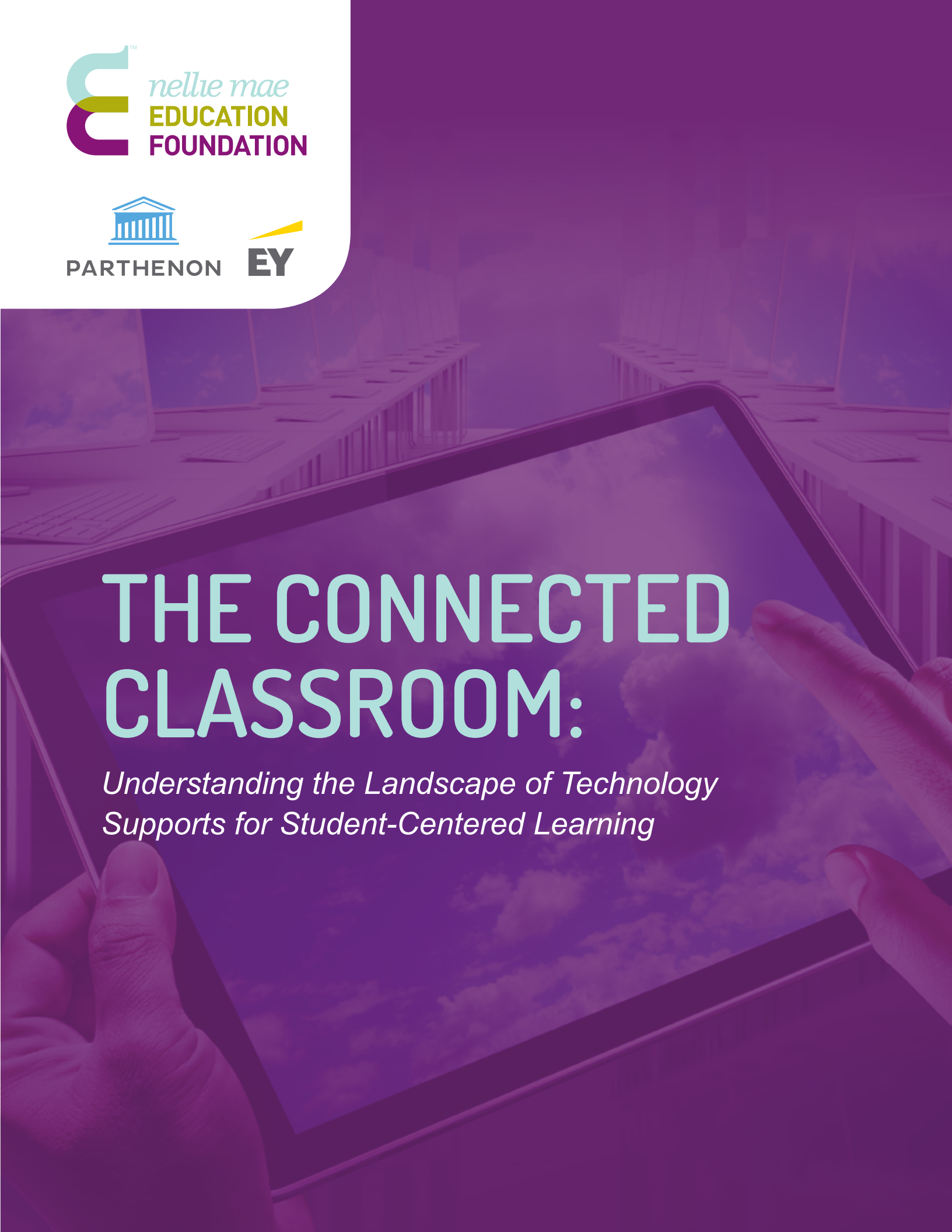


THE CONNECTED CLASSROOM:

Understanding the Landscape of Technology Supports for Student-Centered Learning

ABOUT THE NELLIE MAE EDUCATION FOUNDATION

The Nellie Mae Education Foundation is the largest philanthropic organization in New England that focuses exclusively on education. The Foundation supports the promotion and integration of student-centered approaches to learning at the high school level across New England—where learning is personalized; learning is competency-based; learning takes place anytime, anywhere; and students exert ownership over their own learning. To elevate student-centered approaches, the Foundation utilizes a four-part strategy that focuses on: building educator ownership, leadership and capacity; advancing quality and rigor of student-centered learning practices; developing effective systems designs; and building public understanding and demand. Since 1998, the Foundation has distributed more than $210 million in grants. For more information about the Nellie Mae Education Foundation, visit nmefoundation.org.

ABOUT PARTHENON-EY

Parthenon joined Ernst & Young LLP on August 29, 2014. Parthenon-EY is a strategy consultancy, committed to bringing unconventional yet pragmatic thinking, together with our clients' smarts to deliver actionable strategies for real impact in today's complex business landscape. Innovation has become a necessary ingredient for sustained success. Critical to unlocking opportunities is Parthenon-EY's ideal balance of strengths—specialized experience with broad executional capabilities—to help our clients optimize their portfolio of businesses, uncover industry insights to make investment decisions, find effective paths for strategic growth opportunities and make acquisitions more rewarding. Our proven methodologies, along with a progressive spirit, can deliver intelligent services for our clients, amplify the impact of our strategies and make us the global advisor of choice for business leaders. Visit www.parthenon.ey.com.

PROJECT CONTEXT

Across the country, **educators and leaders have adopted, adapted, created and implemented a broad range of technology supports** to help deepen student-centered learning opportunities. To help the Foundation best assist its grantees in effectively leveraging technology supports, it engaged Parthenon-EY to assess the education technology landscape and pinpoint the needs of education practitioners pursuing student-centered learning practices. Reflecting the diversity of approaches deployed by the Foundation's grantees, this report focused on three critical questions:

1

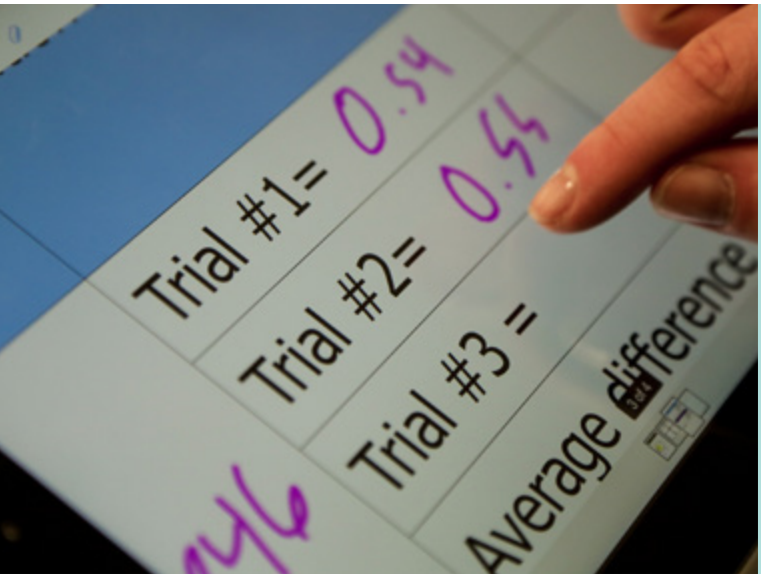
How are schools and districts currently using technology to support the implementation of student-centered learning?

2

What are the current gaps in the education technology market today?

3

What current technology supports can be scaled up to support innovative models of student-centered learning in the future?



Parthenon-EY and Nellie Mae conducted interviews with leading technology experts and education practitioners to develop a comprehensive view of evolving market trends. This paper outlines our perspective on potential gaps and contributes to a deeper understanding of educators' needs as they build and extend their student-centered learning practices. While the findings are preliminary, it is clear that a dynamic and innovative set of practitioners and providers have already done significant work in pushing the field forward over the past few years. This paper outlines our perspective on some potential gaps, and aims to contribute to a deeper understanding of the needs of educators seeking to build and extend their student-centered learning practices.

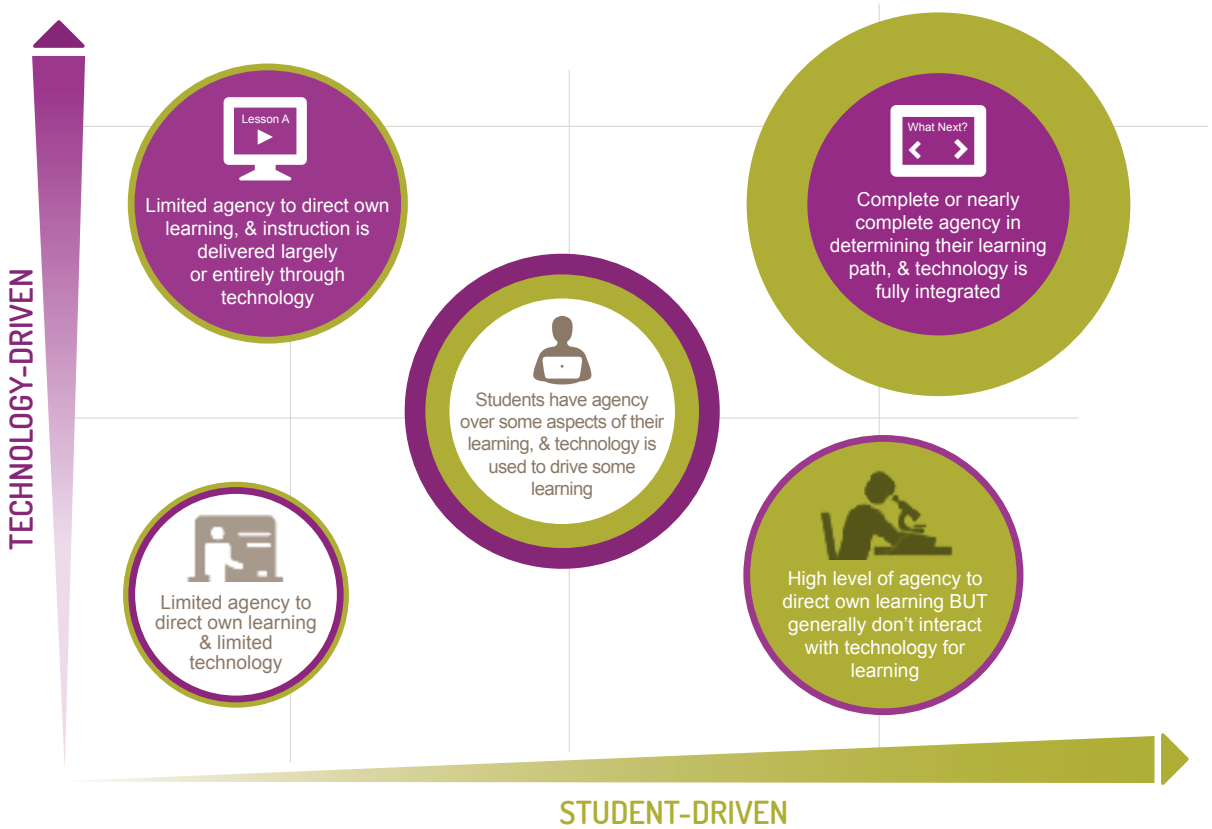
USING TECHNOLOGY TO SUPPORT STUDENT-CENTERED LEARNING

Schools and districts often vary in the student-centered learning practices they pursue, which typically reflect different goals or aspirations from their student-centered work. While some leaders are working to radically restructure the traditional learning environment and fully empower students to be agents of their own learning, others are bringing new practices into the traditional instructor-led classroom. Many practitioners land somewhere in the middle—implementing some student-centered learning practices in some settings, mixing and matching to try to figure out what works.

Similarly, schools and districts are at different places in terms of their technology use, and have different needs based on where they are headed. Some are seeking to place technology right at the center, using adaptive learning platforms in 1:1 device settings to drive instruction entirely. Others are implementing student-centered learning but relying on technology only as a support, to supplement but not replace the traditional functions of an instructor. Again, many fall somewhere in the middle—using different technologies to support some, but not all, learning interactions.

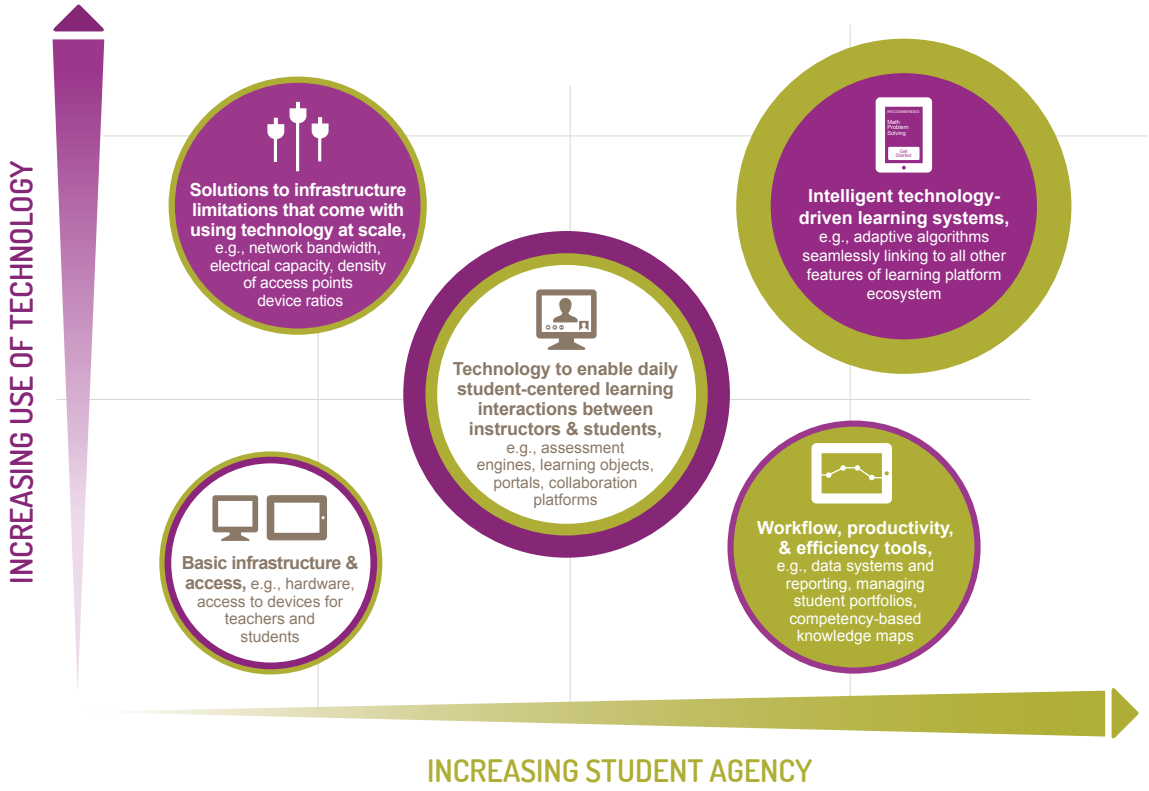
Taken together, schools and districts today fall somewhere along the spectrum below:

THE STATE OF TECHNOLOGY USE AMONG STUDENT-CENTERED SCHOOLS



Intuitively, where a school falls on the spectrum informs its most pressing technology needs. In many technology-lite settings, educators are dealing with pressing "first-order" questions of access to devices and connectivity, although in more student-centered contexts, workflow and productivity tools may assume heightened importance. In technology-centered contexts, many of those first-order challenges are likely to have already been solved. Now, educators are grappling with the challenges associated with large-scale technology usage and searching for intelligent learning platforms to drive their pedagogy. Based on a school's current level of technology usage and the depth of its student-centered learning practices, our work identified a hierarchy of most pressing needs for schools and districts:

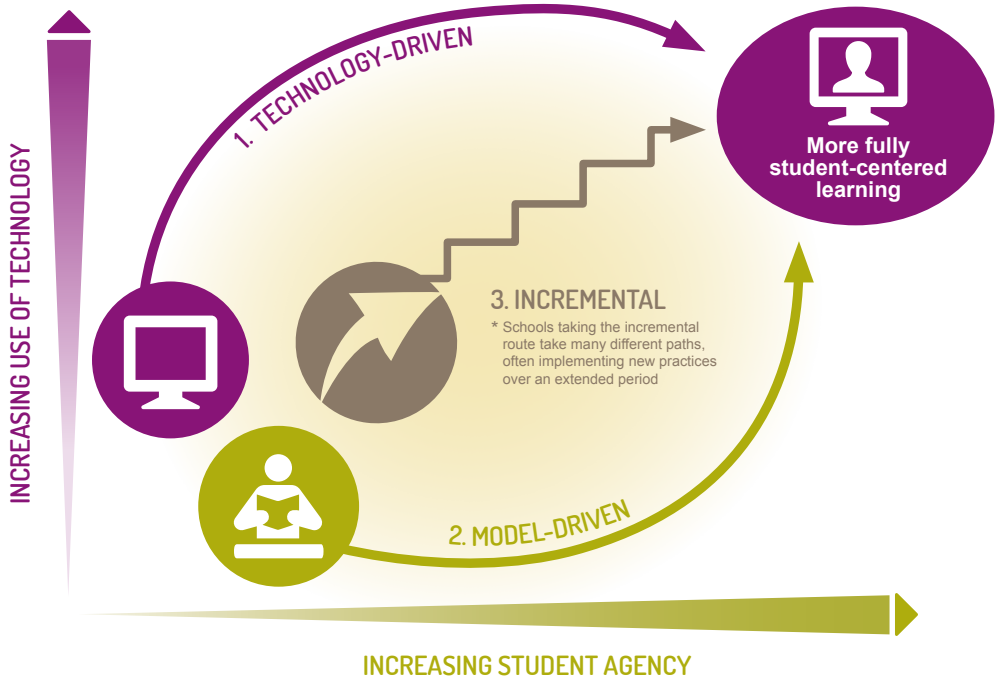
IMMEDIATE TECHNOLOGY NEEDS AMONG STUDENT-CENTERED SCHOOLS



For many schools today, especially in rural or low-income areas, basic infrastructure and access to technology remains a substantial obstacle to effective technology use. While programs such as the Federal Communications Commission's E-Rate program are helping remedy the issue, challenges persist; for educators to realize the full potential of technology to empower students, these barriers must be decisively addressed.

While the importance of technology for educators is commonly acknowledged, it should not be overstated. For educators, technology should be treated as a *potential enabler* of student-centered learning, and not a necessary component. Fully tech-saturated environments can be not at all student-centered—a fully online lecture-based class is not inherently more "student-centered" than an in-person lecture-based course simply because the delivery channel is virtual. By the same token, classrooms where little or no technology is in use can be very student-centered. In many schools serving over-age/under-credited students, for example, instruction is necessarily student-centered given the vastly different needs of each individual student, and often not reliant on significant technology use.

Our evaluation of practices in the field informed a picture of the different pathways schools take to achieve student-centered learning:



Generally, schools that seek to implement a more fully student-centered learning environment do so in one of three ways:

1 TECHNOLOGY-DRIVEN

School develops a sophisticated technology infrastructure (devices, connectivity) and uses it as a platform for developing a student-centered learning model

2 MODEL-DRIVEN

School adopts a highly student-centered learning model and looks for technology to improve the effectiveness and efficiency of implementation

3 INCREMENTAL

School takes incremental steps to develop student-centered practices, aided by the addition of new technology

The types of supports a school needs are conditioned by what it looks like today and where it would like to be going forward. As such, accurately diagnosing and articulating each of these components is crucial to ensuring educators receive the right technology supports, when and where they are needed.

MEETING THE NEEDS OF A COMPLEX MARKET

The first wave of technology solutions that emerged to support educators were designed to support the type of learning experienced by most students in most schools across the country—learning that was instructor-led and classroom-based, where the teacher assumed sole responsibility for planning, selecting and delivering learning experiences to the student. Serving mostly to facilitate a new delivery channel rather than dramatically altering a teacher's pedagogy, these solutions adapted traditional elements of the classroom for the digital world and could be categorized into one of the following three broad classifications: **Learning Management Systems,** which served as the platform to facilitate learning interactions between teacher and student; **Student Information Systems,** which provided the back-end data storage needed for a range of administrative functions; and **Content and Assessment Resources,** which provided teachers with digital access to the academic resources that students interacted with on a daily basis.

In schools where a more traditional approach to learning is still used, significant challenges remain in selecting and implementing technology effectively. Schools are mixing and matching solutions from a range of providers, requiring planning and setup for enhanced interoperability among systems that were not designed to interact. Educators often lack training and professional development time to learn how to thoughtfully incorporate technology into their teaching practice, and frequently do not use a product to its full potential or do so in a way that feels distracting. Furthermore, though district leaders are not typically the end users of the technology and may lack the knowledge or experience necessary to differentiate among services and vendors, they are often responsible for purchasing decisions.

In schools that are adopting innovative pedagogical approaches, these challenges are only exacerbated. Legacy systems designed for one approach to learning are ill-suited for the types of learning interactions that characterize many of today's student-centered learning practices. Learning management systems designed to support instructor-led subject- and grade-delineated courses do not easily lend themselves to competency-based progression. Student information systems designed to support a single learning environment are poorly equipped for managing students' accruing learning experiences in a variety of academic and non-traditional settings. Providers of content and assessment resources must strike a difficult balance between accessibility and quality, while competing against an ever-growing pool of open-education resources available online.

These emerging practices and the proliferation of technologies and providers have triggered a significant shift in education technology. Traditional definitions of products and services are becoming increasingly irrelevant. For educators seeking to use technology as the key enabler of deep student-centered learning practices, replicating elements of a traditional classroom in digital form simply does not cut it. Instead, what matters is **how effectively a solution can drive the key elements of student learning.**

Our extensive experiences in the field, coupled with education practitioners and technology experts, and an extensive review of existing literature, have helped our team develop a set of common pairings between technology-enabled features and the specific learning elements they support:

TECH-ENABLED FEATURE	LEARNING ELEMENTS	FEATURE DESCRIPTION
KNOWLEDGE MAPS	ACADEMIC STANDARDS	A framework (aligned relevant standards) that demonstrates how the learning of one skill interacts with others (e.g., learning progressions); used to produce individualized learning paths
ASSESSMENT ENGINE	ASSESSMENTS	Formative and interim digital assessments that produce data on what students know and how they are progressing
LEARNING OBJECTIVES	CONTENT AND CURRICULUM	An organized collection of content, practice and measurement items that are combined based on a single learning objective; resources to support scaffolding and student re-learning
ADAPTIVE ALGORITHM	SCOPE AND SEQUENCE	Recommendation engines that consider learning level, history and optimal learning modality in directing students from one learning moment to the next
STUDENT PORTAL	STUDENT RE-LEARNING	Digital portal for students to complete work, monitor their own progress, access resources, etc.; includes DIY, student authoring tools, etc.
TEACHER PORTAL	CLASSROOM ORGANIZATION AND ANALYSIS	Digital portal for teachers to manage classroom (grouping, resource selection, administrative functions); includes teacher data analytics resources, as well as parent communication tools
STUDENT-TEACHER COLLABORATIVE PLATFORM	TEACHER FEEDBACK AND COMMUNICATIONS	Digital platform facilitating student-teacher interactions; includes competency-based grading and feedback tools, communication and sharing capabilities, etc.
STUDENT PORTFOLIO BACK-END DATA SYSTEMS AND REPORTING	RECORDING AND REPORTING STUDENT ACHIEVEMENT	Comprehensive storage of student work in all forms, easily accessible by relevant parties and shareable; integrated data flows with internal and external systems (both academic and administrative); facilitates proactive communication among teachers, parents, and students

Technology providers that are recognizing the demand for greater system compatibility are introducing comprehensive and integrated products that drive many, if not all, of these learning elements. At the same time, many point solutions have emerged to support individual learning elements, while other solutions enable a more unified user experience across technologies.

Though providers are building more comprehensive systems, technology and education experts express the need for caution around their design and marketing as a universal solution, due to the high levels of inherent variability across grades and subject areas. While the elements of learning might be common across subject areas and levels, how those learning elements interact varies greatly.

Designing an all-encompassing platform does not solve these deeply complex pedagogical challenges. As one technology expert put it:

> ***"It's really hard to do this work outside a theory of a domain—it doesn't make sense to say 'we don't have a theory for how learning should work, we're just going to test different approaches within an algorithm and then fit our adaptive platform to that.'"***

Multiple experts voiced some concern that in jumping to a comprehensive "intelligent learning system" before these questions have been answered, the field might be saddled with a product that does everything it needs to do but is not particularly effective in helping students achieve. Given the potential stickiness of a purchased comprehensive system, there is a fear that a product like this—if widely adopted—could actually limit progress or constrain innovation in the near-term.

PERSPECTIVES FROM THE FIELD

Our conversations with educators, school and district leaders have helped us capture a snapshot of a promising but developing market. Educators and leaders alike indicate that implementing effective technological supports to their everyday work is still a challenging process.

To begin with, districts have trouble identifying the precise nature of their technology needs. Even when they can identify their needs, they may have trouble articulating them through the standard RFP and procurement process. As one school principal put it, "we just don't know what we want, we don't know what's out there, and we don't know what we can afford." Another cited the "huge amount of churn in public education that makes it incredibly difficult to manage [technology selection] in a systematic way." Schools end up adopting solutions based on word of mouth, or because a sales representative is willing to give them a deal, or as the first principal put it, "because it feels like that's just the way it has to be."

These purchasing dynamics create a challenging environment for technology providers. Because district purchasing cycles typically align with the academic calendar—and because contracts are often for multiple years—there can be significant lag time between product innovation and adoption. Purchasers are different in every setting and the regulations can vary significantly from district to district and state to state, making scale challenging to achieve for all but a few major providers. Products get adopted and then become burdensome as educator practices and needs evolve—significant resources on both the provider and educator side then get expended trying to solve these problems as they arise. One technology expert lamented that "there's no space to actually figure out how to do things right … it takes serious capacity, schools, experts, money, but most of all patience, and in the market you don't always get the runway you need."

Yet despite these challenges, innovation is occurring rapidly, and some "next-generation" platforms have gained traction and garnered plaudits for effectively supporting elements of student-centered learning practices. Solutions such as JumpRope, a competency-based grading system, ShowEvidence, a performance assessment provider, and Motivis Learning, a "learner relationship management system" incubated at Southern New Hampshire University, were mentioned repeatedly as being at the forefront in designing around the needs of student-centered learning environments. Other solutions such as Fishtree, an adaptive learning platform, won praise for their adaptability and flexibility in meeting the needs of different educators.

Continued market innovation in support of student-centered learning will require rigorous evaluations of the effectiveness of new products and support for educators as they implement technology solutions.

As one technology expert put it:

> **"If the field were mature enough, you would want someone to come in and prove what's best in breed in each of these technology capabilities. Right now everything's so primitive that you want to find something that works for each of the elements before you try to architect a unified system."**

While exciting progress has certainly been made, the market is still evolving, and all signs indicate that it will continue to do so in the years ahead.

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S. Patrick, personal communication, December 15, 2014

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E. Rudden, personal communication, December 4, 2014

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