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A Synthesis of Lessons from Early Innovators: The Promise of Blended Learning

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Abstract

In 2011, the Greater Houston Community Foundation (GHCF) launched the Strategic Education Fund (SEF) to engage individual donors and foundations interested in improving public education. The SEF focuses on systems improvement in two areas: Instructional Effectiveness and Parent Engagement, especially in underserved communities. This report was commissioned to provide background information about the innovative blended-learning movement for the executive committee as well as for potential funders and partners. Blended learning is defined as a formal education program in which a student learns at least in part through online delivery of instruction and content with some element of student control over time, place, path and place and at least in part at a supervised brick-and-mortar location away from home, such as school (Innosight Institute 2012). This study consisted of a literature review and interviews with 20 individuals directly involved in the field, including six school operators, one board member of a charter school, three researchers, one policy expert, seven developers and two funders. Key findings of this report are: 1) blended learning is in its early stage – 3 million students are participating in the U.S. and four models are emerging; 2) design and implementation success factors are similar to those of traditional schools, but a robust learning management system is critical to a blended learning school; 3) there is early evidence that blended schools cost about $1,100 less per student per year, but the variance is wide; 4) three blended schools studied outperformed schools with similar demographics in the region and state, but these results are based on only one to four years of student achievement data; 5) blended learning may change teachers' roles and help attract, retain and leverage the best while possibly reducing the number of teachers needed in a school; and 6) blended learning should be considered for implementation only when it enhances instructional design, not for the purpose of merely adding technology to a school. The GHCF SEF executive committee has decided to support a blended learning implementation at KIPP Courage, a new middle school that is part of Spring Branch ISD, KIPP Houston and YES Prep (SKY) Partnership. KIPP will design this implementation with the help of a leading consultant. GHCF is proud to have Caprice Young, Vice President for Education at the Laura and John Arnold Foundation, as a thought partner in this effort.

I. Study Methodology

The study was guided by six questions:

- What are the prominent blended-learning models?
- What key factors lead to good design and implementation?
- Do blended-learning schools cost less?
- Do blended-learning schools produce better student outcomes?
- What impact does blended learning have on teachers?
- What are lessons learned from early innovators?

SCHOOLS STUDIED

Our first step was to identify a good cross section of blended-learning schools representing varying years of operation, grades served, school types, and different blended-learning models using one of the four rotation models.[1] We selected the following schools shown in **Table 1**.

Table 1: Selected Schools

School	Years in Operation	Grades Served	School Type	Blended-Learning Model Type
Rocketship Education, CA	4	PK-5	Charter	Lab Rotation
Carpe Diem Collegiate High School and Middle School, AZ	5	6-12	Charter	Individual Rotation
KIPP LA Empower, CA	2	K-2	Charter	Station Rotation
Alliance Technology and Science Math High Schools (ATAMS), CA	1	9-12	Charter	Mixed Model
A.L.Holmes School, MI	1	K-8	District School	Individual Rotation
Mission Dolores Academy, CA	1	K-8	Private Catholic	Station Rotation
Lake Elmo Elementary School, MN	1	K-5	District School	Flipped Classroom

SCHOOL DEVELOPERS AND FUNDERS

We next developed two surveys consisting of open-ended questions: one for school operators and board members, the other for developers. We identified several key players in the blended learning space to interview including the following:

- Anthony Kim, Education Elements
- Rebecca Tomasini, The Alvo Institute
- Alex Hernandez, Charter School Growth Fund
- Giselle Huff, Jaquelin Hume Foundation
- David Teeter, Policy Expert, iNACOL
- Matt Pasternack, Junyo
- Joel Rose, New Classrooms Innovation Partners
- Cheryl Niehaus, Michael and Susan Dell Foundation

Our first step was to identify a good cross section of blended-learning schools representing different models.

Phone interviews ranging from 30 minutes to one hour were conducted between March 20 and May 9, 2012, with two exceptions: interviews with Rick Ogston of Carpe Diem and Mike Dronen of Lake Elmo were conducted entirely through email.

ADDITIONAL INFORMATION

In addition to operators and vendors, we contacted Paul Hill, founder of the Center for Reinventing Public Education, and Karen Hawley Miles, president and executive director of Education Resource Strategies**,** Inc.**,** to gain additional information about costs of blended learning schools. We also reviewed 16 articles and two books related to blended and online learning. Please see Appendix A for a complete list of people interviewed and Appendix D for a list of references.

COMPILATION OF DATA

The only numerical tabulation conducted pertained to key success factors. Since the sample size (or "n") is so small, percentages are noted only when 40% or more had the same response. No statistical analyses were conducted, as the study design did not warrant any.

[1] See pages 7-8 for brief explanations of the four rotation models.

II. Key Findings

Based on 20 interviews and a review of 16 relevant articles and two books, the following six key findings emerged:

1. Blended learning is early stage: more than 3 million U.S. students take part and four overarching models have emerged: rotation model, flex model, self-blend model and enriched virtual model.
2. Most key design and implementation factors are the same for any good school – blended or non-blended; however, a good learning management system is essential for a blended learning school.
3. There is early evidence of cost savings; blended-learning schools cost on average about $1,100 less, but the variance is wide.
4. Student gains are promising but results are inconclusive because of insufficient data.
5. Blended learning may change teachers' roles and help attract, retain and leverage the best, but it may also reduce the number of teachers needed in a school.
6. It is important to get into blended learning for the right reasons – to enhance instructional design and student achievement and not for the purpose of merely adding technology to a school.

Each of these findings will be examined in the next sections of this report.

III. Overview of Prominent Blended-Learning Models[2]

Innosight Institute's recently released definition of blended learning is: *a formal education program in which a student learns in part through online delivery of instruction and content with some element of student control over time, place, path, and/or pace* ***and*** *at least in part at a supervised brick–and-mortar location away from home, such as school.*[3] The migration of online, or virtual learning, into physical school environments is not surprising, given that most students need a supervised place to learn during the day.

The attraction to blended learning comes from the theory that using the Internet to deliver instruction and content can help personalize each student's education, improve student outcomes and, at the same time, maintain or even lower operating costs. Districts and charter schools are increasingly turning to blended-learning programs to help address bleak financial budgets and looming teacher shortages.

Hundreds of schools already have blended-learning programs in place and are beginning to prove the concept. Most offer more than one model of blended learning. Some students may be taking complete courses online in the computer lab or library, while others may be completing part of a particular subject online, such as a foreign language, and the rest in a face-to-face setting with the teacher. Other combinations are beginning to emerge across the K-12 sector.

> ***In 2000, roughly 45,000 K-12 students took an online course. In 2009, more than 3 million K-12 students did. What was originally a distance-learning phenomenon no longer is. Most of the growth is occurring in blended-learning environments, in which students learn online in an adult-supervised environment at least part of the time. As this happens, online learning has the potential to transform American education by serving as the backbone of a system that offers more personalized learning approaches for all students.***
>
> ■ Michael B. Horn and Heather Staker, *The Rise of K-12 Blended Learning*, Innosight Institute

[2] This section written in collaboration with Heather Staker, Innosight Institute

[3] Heather Staker and Michael Horn, *Classifying K-12 Blended Learning*, May 2012, www.innosightinstitute.org/media-room/publications/education-publications/classifying-k-12-blended-learning/

Figure 1 compares the traditional school model – 20 to 35 desks in a classroom with one teacher delivering instruction – to a blended-learning environment that mixes independent work with digital content and face-to-face time with teachers and paraprofessionals. Introducing online learning into the schoolhouse allows for modularity, which is the key to affordable customization. It can provide different types of content to meet the diverse needs and interests of students and enable student control over time, space, place and pace to foster student-centered, personalized learning.

Figure 1: Blended Learning Can Foster Student-Centered, Personalized Learning

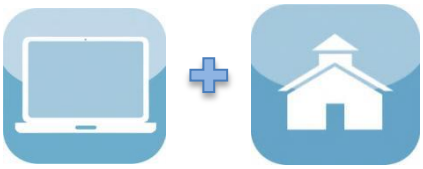
Traditional Model

Customization is prohibitively expensive because the traditional system has an integrated, interdependent architecture.

Examples of interdependencies:

- **Sequential –** Students must complete algebra and geometry before trigonometry
- **Physical –** The brick-and-mortar space constrains course schedules and options
- **Lateral –** Students must learn Spanish in a way that fits with how they learn English grammar

Blended Learning



Introducing online learning into the schoolhouse allows for modularity, which is the key to affordable customization.

Modularity allows students more control of:

- **Pace –** They can review over and over, or speed through to the next concept
- **Path –** Different students respond best to different types of content delivery
- **Time and Space –** Students do not necessarily need to be tethered to their seats

The next section provides high-level detail on the prominent blended-learning models that have been classified to date.

PROMINENT BLENDED–LEARNING MODELS

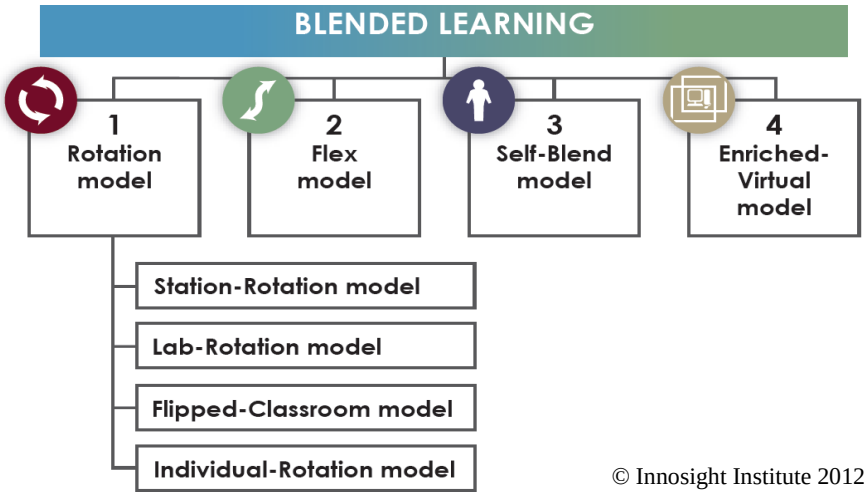
Some forms of blended learning have been around since the early days of online learning. Since it was founded in 1997, the Florida Virtual School (FLVS) has offered a menu of individual online courses in which students may enroll as part of their course schedule (an example of the "Self-Blend" model, discussed below). In 2009-10, a total of 213,926 FLVS students completed courses in its virtual program, and a little over a third of those students simultaneously attended local, traditional schools.[4] Similarly, Scholastic Inc. published its first version of the computer-based Read 180 program in 1999, and students have rotated between computer-based instruction and face-to-face teachers ever since.[5]

Meanwhile, new models of blended learning are rapidly taking center stage. Technological improvements combined with a growing interest in personalized learning are leading to a surge in entrepreneurs, administrators and teachers who are experimenting with new blended-learning possibilities. The field is likely to continue to change as new models evolve.

[4] Heather Staker, *The Rise of K-12 Blended Learning: Profiles of Emerging Models*, Innosight Institute, May 2011, http://www.innosightinstitute.org/innosight/wp-content/uploads/2011/05/The-Rise-of-K-12-Blended-Learning.pdf.
[5] Scholastic, *Compendium of Read 180 Research*, 2011, http://read180.scholastic.com/pdf/research/1_2011_EfficacyStudy_ResearchCompendium2011_READ180.pdf.

For now, four models of blended learning, depicted in **Figure 2** along with their emerging subcategories**,** have become most prominent across K-12 schools. [6]

Figure 2: Blended-Learning Models



Innosight Institute has just recently updated the definitions for each of these models. The researchers at Innosight Institute worked with roughly 100 education professionals at iNACOL's 2011 Virtual School Symposium as well as with a number of blended-learning experts to refine this taxonomy.

1. **Rotation model** – a program in which within a given course or subject (e.g., math), students rotate *on a fixed schedule* between learning modalities, at least one of which is online. Other modalities might include activities such as small-group or full-class instruction, group projects, individual tutoring, and pencil-and-paper assignments.[7]

   Examples: ***KIPP LA Empower Academy*** *is an example of the station-rotation model: each classroom is equipped with 15 computers and the teacher rotates students among online learning, small-group instruction and individual assignment stations.* ***Rocketship Education, CA*** *is an example of the lab rotation model: students rotate out of their classrooms for two hours each day to a learning lab to further their instruction in math, reading and other subjects through online learning.* ***Lake Elmo Elementary School, MN*** *is an example of the flipped classroom: students use iPads at home to watch 10 to 15-minute asynchronous instruction videos and then at school practice and apply their learning with teachers.* ***Carpe Diem Collegiate High School and Middle School, AZ*** *is an example of the individual-rotation model: each student receives an individual schedule that alternates between online learning in the learning center and learning with instructors.*

2. **Flex model –** a program in which the Internet is primarily responsible for delivering instruction and content to students, and students move on an *individually customized, fluid schedule* among learning modalities. Adults provide face-to-face support on a flexible and adaptive as-needed basis

[6] The definition of blended learning and descriptions of each model on pages 7-8 are from Heather Staker, *Classifying K-12 Blended Learning*, Innosight Institute, May 2012.

[7] For further information about the rotation models and profiles of schools using each model, see GHCF's *Emerging Blended Learning Models and School Profiles*, September 2012 , Heather Staker's *The Rise of K-12 Blended Learning: Profiles of Emerging Models*, May 2011, and the Dell Foundation's Blended Learning Case Studies, September 2012

through activities such as small-group instruction, group projects and/or individual tutoring. Some implementations have substantial face-to-face support, and others have minimal (e.g., some flex models may have face-to-face certified teachers whereas others may offer face-to-face paraprofessionals to augment the work of online teachers; others may have different staffing combinations; these are useful modifiers to describe a particular flex model).

> *Example*: At Flex Public Schools, the online-learning provider K12, Inc. delivers curriculum and instruction, while face-to-face teachers use a data dashboard to provide targeted intervention and supplemental instruction throughout the day.

3. **Self-Blend model** – a model where students choose to take one or more courses entirely online to supplement their traditional courses. Students may take the online courses either on the brick-and-mortar campus or off-site. Students self-blend some individual online courses and take other courses at a brick-and-mortar campus with face-to-face teachers. The self-blend model is the most widespread among districts and charter schools studied by Innosight Institute.

   > *Example:* Students sign up with Michigan Virtual School (MVS) at a cost of $89 to $275 per seat to take one of more than 150 online courses. They typically take these courses while also attending a brick-and-mortar middle school or high school campus.

4. **Enriched Virtual model** – a program in which students divide their time between attending a brick-and-mortar campus and learning remotely using online delivery of instruction and content. The Enriched Virtual model differs from the Flipped Classroom because in Enriched Virtual programs, students seldom attend campus classrooms. Many Enriched Virtual programs began as full-time virtual schools and then developed blended programs to provide students with brick-and-mortar school experiences. It differs from the self-blend model because it is a whole school experience, not a course-by-course model.

   > *Example:* At the Albuquerque eCADEMY, students in grades 8-12 meet face-to-face with teachers for their first course meeting. They complete the rest of their coursework in a remote location, if they prefer, as long as they maintain at least a "C" grade.

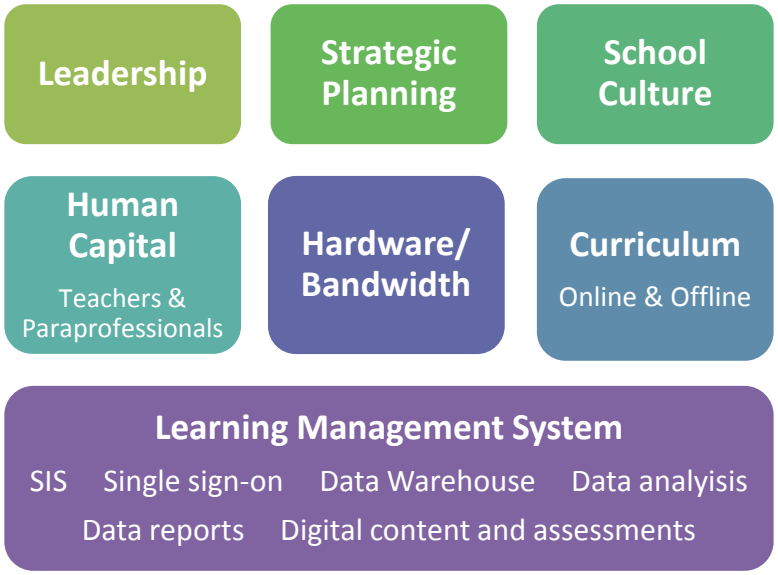
IV. Key Design and Implementation Factors

With the rapid increase of blended-learning models, educators are asking which critical design and implementation factors can lead to a successful launch. Six operators, two funders and five developers (n=14) were asked the following two questions in an open-ended phone interview or email exchange:

1. What are the key variables that led to a successful design and implementation process?
2. What would you do differently?

Their responses, coupled with a review of the literature, are blended into six key design and implementation factors diagrammed in **Figure 3**.

Figure 3: Design and Implementation Factors



Leadership, Planning and Culture. The literature is clear that leadership is a critical factor in the success of any school.[8] Forty-two percent (6) of the respondents in this study considered leadership an important success factor. Marcia Aaron, KIPP LA Schools, said, "The biggest factor to KIPP Empower's success is Mike Kerr, the school leader, whose constant focus is on student learning." Leaders are responsible for two other important variables related to a successful start-up or turnaround: development of a strategic plan and the creation of a positive school culture. Fifty percent (7) of our respondents cited school culture as an important factor. Rick Ogston, Carpe Diem, stated that his number one success factor is "culture, culture, culture." Sajan George, Matchbook Learning, is seeking to develop a "feedback culture, one in which teachers need to be open to classroom observation and rapid feedback."

Human Capital. Quality teachers and other staff members are an important part of the fabric of a blended-learning school, just as they are in any other school. Anthony Kim summed it up with this statement: "It is important to realize that technology won't make up for poor human capital – that is still an essential part of the equation." Scott Hamilton, Seton Partners, added that "blended learning does not make the teacher's job easier; it changes the nature of the job." All teachers in blended schools need to become more familiar with data-driven instruction and secondary school teachers, in particular, need to learn how to facilitate small group instruction.

Curriculum. The selection of the initial curriculum, particularly the online curriculum, is critically important. Ideally, states David Teeter, iNACOL, "the digital content should address multi-ages, different learning styles, have animation, be highly engaging and produce student results." It should be noted that all of the operators have changed out some of the initial online curriculum based on disappointing student achievement results and/or lack of engagement with the digital content on the part of the students. Marcia Aaron at KIPP Empower and John Danner at Rocketship Education discussed the challenge of integrating the online curriculum with off-line classroom material and would advise putting more emphasis on this important task up front.

Hardware and Bandwidth. Respondents emphasized that sufficient bandwidth and reliable, cost effective hardware including laptops or notebooks for students are an essential design element for blended-learning schools.

[8] Lezotte, L., *School Improvement Based on the Effective Schools Research*, International Journal of Educational Research, 1989.

Learning Management System. [9]Data analysis to differentiate instruction was cited by fifty-seven percent (8) of the respondents as the most important design principle for blended schools. It is the learning management system, sometimes referred to as a learning platform, which can automate some of the work teachers now do and provide real-time, reliable student data to inform instruction. Perhaps the most important finding of this study was just how "early stage" the learning management systems on the market are. Operators are finding that teachers do not trust the assessment data from courseware vendor products that indicate a student has mastered a topic; instead, they would prefer assessment data tied to rigorous, objective standards. Marcia Aaron, KIPP LA Schools, stated that "our biggest 'AHA' was around the program – we did not think about the back end, the data disaggregation piece – we thought more about the front end – the curricula and programs. We were not able to use the data that came out the back end as well as we had hoped."

> ***One of the critical issues with a learning management system is relying on the quality of information from the content provider. The provider's assessment of mastery may not match the level of rigor set by a school. Therefore, the teachers do not trust the data coming from the system.***
>
> ■ Marcia Aaron, KIPP LA Schools

Since the quality of a learning management system is central to the effectiveness of blended learning models, we have provided some details about features, capabilities and prominent providers. The Learning Management System (LMS) is a critical technology toolkit that enables effective teaching and student learning. An LMS includes three major areas of functionality: 1) delivery of interactive and individual content and assessments; 2) administration and content management; and 3) collaboration between students and faculty. Components of an LMS shown in the diagram below and utilized by the schools studied are a student information system (SIS); single sign on capability for the students and staff; online content and assessments; a data warehouse; data analysis functions; and data reports or dashboards that feed real time data back to students, staff, and parents. A summary of how an LMS can enable blended learning is depicted in **Table 2.**

Table 2: LMS Summary

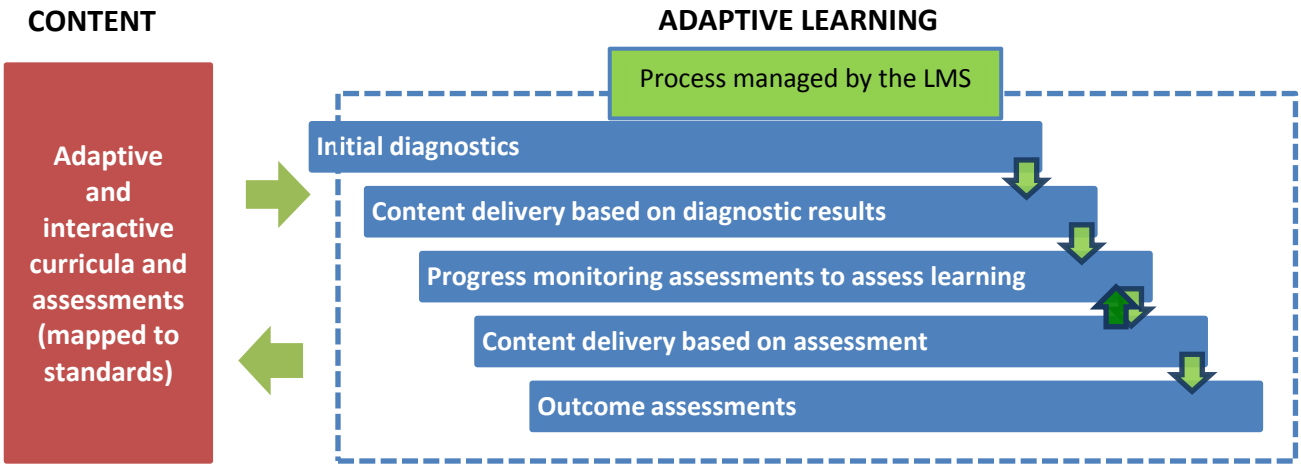
TEACHERS	STUDENTS
Create, maintain, share and manage the learning experience through one easy-to-use website	Access content anytime and anywhere
Track feedback and data on student performance, allowing data-driven modifications to curriculum	Access content tailored to ability level, progress, and preferred mode of learning
Manage administrative tasks like putting up grades, distributing materials, grouping students, etc. easily	Learn collaboratively by creating online study groups

One of the most exciting uses of LMS is the role it can play in adaptive learning. As most educators know, teachers have used adaptive learning since Socrates. The core concept is to probe the level of understanding a student has and use that information to select the correct content to deliver in the next lesson. The most basic form of adaptive learning would be to ask, "Do you understand?" A more sophisticated approach would require student demonstration of the concept via a quick assessment or applied project. Depending on the result, a remediation exercise could be used if the student failed to show complete understanding, or an enhancement exercise could be employed to provide additional examination of the subject for advanced students.

[9] This section written in collaboration with Mukta Pandit, Safal Partners

When combined with technology, adaptive learning can be a powerful tool to ensure core competency is attained at a rate tailored to a student's abilities. Content can be provided in multiple ways to allow for alternative learning approaches. For example, in face-to-face learning, teachers tend to focus on audio and visual cues, given the time constraints. In technology-based adaptive learning, the student may choose the way content is delivered, or in the ideal, the system itself could determine the best approach based on an individual student's previous assessments.

Figure 4: Adaptive Learning through an LMS



LMS products span a range of features and costs. LMS systems can be open-ended, where course content from various vendors can be assembled on one platform, or closed-ended, where the course content and LMS are integrated into one system. An LMS can range from simple content delivery systems to full-fledged adaptive learning systems. LMS vendors can provide one-stop shops or can be a single component in a broader solution. While there are numerous LMS vendors in the market, Appendix C lists some of the vendors suggested by the school operators interviewed as part of this study.

The space issue may be harder to handle than the model development. Putting a 21st century model in a 20th century space can be a challenge.

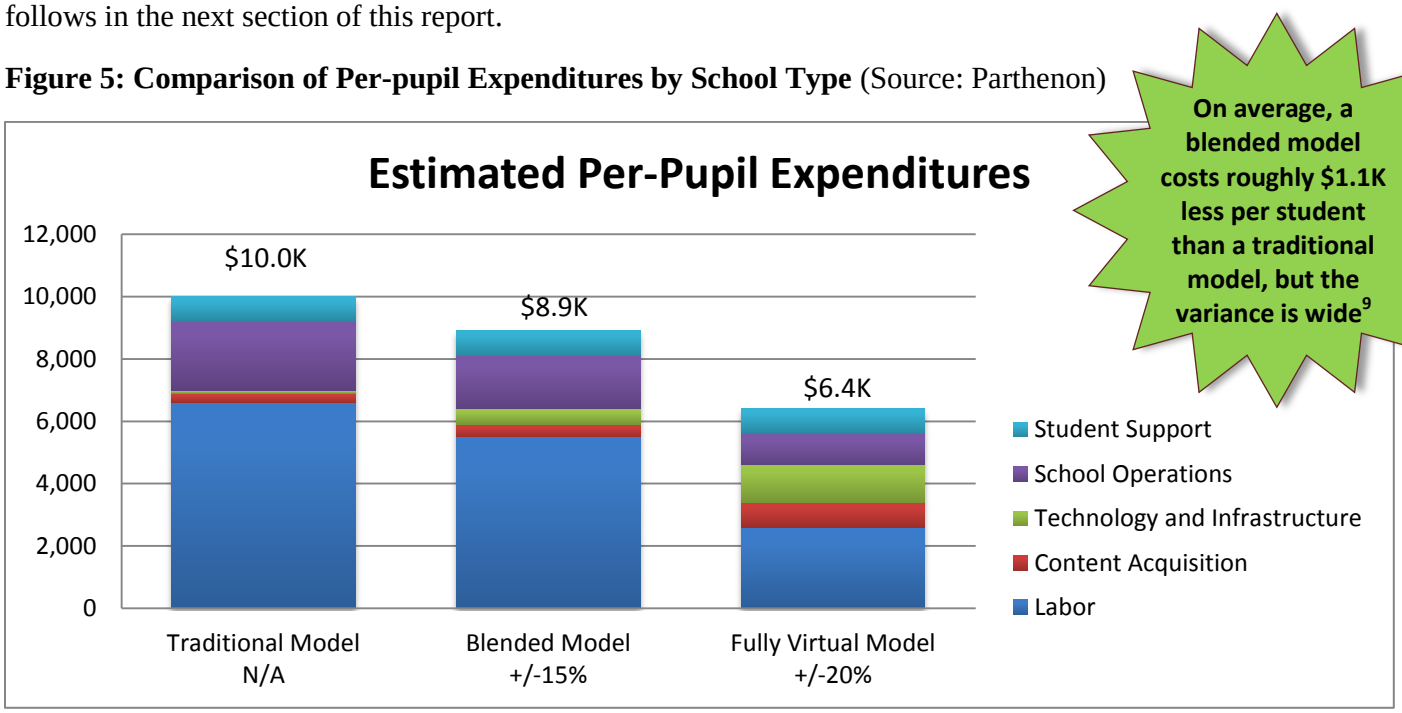
- Frank Baxter, Alliance Public Schools

Additional Advice. For those engaged in using blended learning as a turnaround strategy, respondents offered two valuable pieces of advice. Schools already in existence that plan to convert to blended-learning schools are advised to have advocates from within rather than have those in authority imposing the shift to blended learning and an infusion of technology from the top down. With regard to facilities, Frank Baxter cites the challenge of engineering a blended school model into a traditional school facility: "In our model, we have a 48 to 1 student/teacher ratio so we need large spaces. Most buildings are not designed for these spaces – the maximum you can usually fit in a classroom is 35. It will be interesting to see the evolution of school structures in blended learning. One model being tested is Carpe Diem – pretty much a big warehouse with smaller rooms off to the side. I can see in the future a big warehouse model with moveable partitions."

V. Costs Savings Associated with Blended and Online Learning[10]

Early evidence suggests that replacing all or part of the instructional model of a school with online learning has the potential to reduce costs per pupil by approximately $1,100 less per student per year.[11] An understanding of the cost levers involved is needed to compare the relative costs of the various models. The report cautions readers "against looking for one simple 'price tag' for online learning, or assuming that savings necessarily translate into a lower overall cost per pupil." For schools that deliberately use technologies to reduce costs in one category in order to free up resources to invest elsewhere, the 'savings' are often an important component of the school's overall resource-allocation strategy. Ideally, costs should be weighed in light of school quality and student outcomes. This would provide a balanced picture of productivity resulting from investment in any particular model. A discussion of the effectiveness of blended-learning models in terms of student achievement follows in the next section of this report.

Figure 5: Comparison of Per-pupil Expenditures by School Type (Source: Parthenon)



The above summary compares three models (traditional, blended and fully virtual). In the traditional school model, content and technology costs are a small fraction of overall costs, while more than half the budget is allocated to labor and most of the remainder goes to school operations. In blended and fully virtual models, with increased investment in technology, there is a reduction in costs for school operations and labor.

Table 3 on the following page outlines the major cost drivers underlying the total cost per pupil for any of these models, costs estimates and cost fluctuations. Key cost drivers are labor, content acquisition and development, technology and infrastructure, school operations, and student support. Note that in the Fordham study, costs for labor varied plus or minus $825, or 15 percent; for content $200 or $50, and so on. Hence, we caution that the cost estimates in the Fordham study have wide variations.

[10] This section written in collaboration with Mukta Pandit, Safal Partners

[11] Battalino, Haldeman, Laurens, *The Costs of Online Learning*, Thomas B. Fordham Institute, 2011

Table 3: Blended Model[12]			
Category	Cost Estimate	Fluctuation	Cost Levers
Labor (Teachers and Administrators)	$5,500	+/-$825	Time spent in computer-facilitated learning
			Human capital during computer-facilitated learning
			Human capital model for the remainder of the day
Content Acquisition	$400	+/-$200	Content quality (level of personalization)
			Inclusion of content-management system
Technology and Infrastructure	$500	+/-$100	Student-laptop ratio
			Wireless needs
School Operations	$1,700	+/-$85	Potential small-cost savings around facilities and transportation from staggering student schedules
Student Support	$800	+/-0%	May potentially change depending on student mix, but a critical component of all schools
Total	$8,900	$7,600—10,200	

Source: The Costs of Online Learning, Fordham

Labor may be the cost area in which the most significant savings can be achieved through resource reallocation. Use of technology could reduce labor costs by either increasing the student-teacher ratio or by changing the instructor mix. For example, by replacing part of the teacher base with paraprofessionals, average teacher pay can be reduced. However, blended and virtual schools will need additional labor investments in professional development programs and additional IT support staff. Virtual models result in the lowest average labor cost of the three models researched, averaging $2,600 per student, with potential variation of about 15 percent in either direction. Blended models, on the other hand, show much less savings in terms of labor compared to traditional schools, with an average labor cost around $5,500 per student and fluctuating by 10 to 15 percent. This reflects the cost of support staff during online learning, IT staff as well as instructional staff during the rest of the day.

Content costs in traditional schools, consisting primarily of textbooks and workbooks, average around $200 per student; for blended schools, they average about $400 per student but vary widely depending on the approach for the online content. Open source and teacher-created materials could cost very little except for upfront acquisition efforts. Alternatively, schools and districts can purchase sophisticated off-the-shelf content, or millions of dollars could be spent on development of tailored content or proprietary learning management systems. Online content also requires support from specialists in data integration and management tools, depending on the complexity and approach for dissemination.

Technology takes up a very small proportion of traditional schools' budgets, about $200 per pupil, but averages around $1,200 for virtual schools and $500 for blended schools. For schools with a significant online component, this includes significant investments in hardware, instructional devices and supporting software costs, as well as infrastructure for connectivity and storage.

School operation costs include non-instructional requirements such as support staff, food services and transportation, and forms about 15 to 25 percent of a traditional school's budget. Virtual schools have the potential to reduce these costs significantly depending on their operating models. In cases where instructional staff is centralized or students convene for key activities such as field trips, more spending will be required in this area. On average, virtual schools are trending around $1,000 per student for operational costs. Blended

[12] The validity of the above cost models and comparisons derived from the Fordham report has been questioned by experts in the field. Concerns include the report's focus on costs rather than on productivity. Experts also question the size and breadth of the research base for the paper, the appropriateness of the data sources used for the cost estimates, and the limited investigation conducted in defining instructional models, resulting in models that are too vaguely defined for an effective comparison. For further discussion, see Jennifer Rice, *Review of the Costs of Online Learning*, National Education Policy Center, March 2012.

schools tend to maintain most of the operational requirements of traditional schools, averaging around $1,700 per student, but could potentially see opportunities for savings by exploring options such as staggering student schedules.

Student-support services include staff, such as guidance counselors and special-education teachers, and cost about $800 per student in a traditional setting. Blended schools have support models that are similar to traditional schools, and therefore see similar costs in this area. Virtual schools also carry a similar cost for student support, but the nature of the support comes in a different form, such as in-person visits. In virtual schools, a reduction in the need for additional support staff may also mean principals and teachers playing the role of guidance counselors.

Start-up costs for blended-learning schools are not trivial and include digital curriculum development or acquisition, hardware including servers and laptops or notebooks, improvements to the facilities to accommodate the new model, consultants and the LMS. One estimate for these up-front costs is $505,000[13]. A major strategic decision shaping the size of this investment depends on the nature of the online content to be purchased (a complete packaged solution from an outside vendor, combining content, servers and support from various vendors, or developing a custom solution). According to the Fordham report, "the build-versus-buy question hinges on: a) the vision for scale, and b) the need for customization." The report further indicates that states and districts that build their own online system typically expect sufficient enrollment to cover initial investments or are working to develop an innovative or customized model not currently offered by outside vendors. Initially, all three models would need to budget for leadership planning time and professional development, which can be a substantial investment given the technical training and instructional approach change required for start-up.

Table 4: Start-up Costs for Blended-Learning School

Start-up Cost Example	Recurring	Non-Recurring	Total Year 1
Digital Curriculum	$75,000	$250,000	$250,000
Hardware		$250,000	$250,000
Tenant Improvements		$50,000	$50,000
Blended Learning Consulting Services		$50,000	$50,000
Integrated Software Platform	$50,000	$15,000	$65,000
Total:	**$125,000**	**$380,000**	**$505,000**

VI. Blended Learning Student Outcomes

META-ANALYSIS

The key question on everyone's mind is – do K-12 blended learning schools produce higher student achievement?

The U.S. Department of Education sought to answer this question through a meta-analysis of existing studies entitled the "Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies" (Washington, D.C., 2010). In the report, analysts reviewed 1,132 empirical studies of

[13] Estimates provided by Education Elements

online learning conducted between 1996 and 2008 and screened the studies to find those that (a) contrasted an online to a face-to-face condition, (b) measured student learning outcomes, (c) used a rigorous research design, and (d) provided adequate information to calculate an effect size. Only 176 of these studies used an experimental or quasi-experimental design and objectively measured student outcomes; of these, only 99 had at least one contrast between an online or blended learning and face-to-face (offline) instruction that could be used in the quantitative meta-analysis.[14] Just nine of the 99 involved K-12 learners.

The meta-analysis found that, on average, students in online learning performed modestly better than those learning the same material through traditional face-to-face instruction. Instruction combining online and face-to-face elements had a larger advantage relative to purely face-to-face instruction than did purely online instruction. The authors caution that many of the studies did not attempt to equate all the curriculum materials, aspects of pedagogy, and learning time in the treatment and control conditions, which is challenging to do. Since only nine of the studies contrasted online and face-to-face learning conditions for K-12 students, one should not generalize these results to the K-12 population since the results are derived primarily from studies in higher education, medical training and other settings.

STUDENT OUTCOMES: ACADEMIC

Since the meta-analysis did not include sufficient K-12 studies of blended learning, we conducted our own analysis of the few schools that have one to four years of student achievement data. Although the results shown below are promising, again, we cannot draw any definitive answers because the data is insufficient.

BLENDED SCHOOL STUDENT ACHIEVEMENT DATA

The following tables and figures show student achievement results for three schools that had completed at least one year of operation at the time of this study.

KIPP Empower Academy (KIPP LA Schools), Los Angeles, CA

Table 5 shows Stanford Achievement (Version 10) test results for students attending the KIPP Empower Academy compared to students attending high performing KIPP Raices Academy,[15] a more traditional KIPP school. KIPP Empower, in its first year of operation, outperformed its sister KIPP School in both reading and math for kindergarten students, with scores almost double in mathematics. These results were enough to catapult KIPP Empower to the top performing KIPP elementary school in 2011. Do note that this school *only* had Kindergarten students in 2011, and therefore it is impossible to extrapolate results to higher grade levels. We added KIPP Los Angeles College Preparatory School, whose students take the MAP test in grades 5 to 7, to give the reader an idea of the performance levels of students in higher grades.

Table 5: 2011 KIPP Empower Academy Results

School	Economically Disadvantaged	Test Given and Grades	Students making 1+ year progress in Reading	Students making 1+ year progress in Math
KIPP Empower Academy, LA ***Comparison***	**91%**	**SAT 10, K**	**96%**	**92%**
KIPP Raices Academy, LA	96%	SAT 10, K	82%	48%
KIPP LA College Preparatory	91%	MAP, 5-7	58%	73%

KIPP Empower will not take the state assessment until next year and therefore only norm-referenced tests in comparison to other KIPP schools are recorded here.

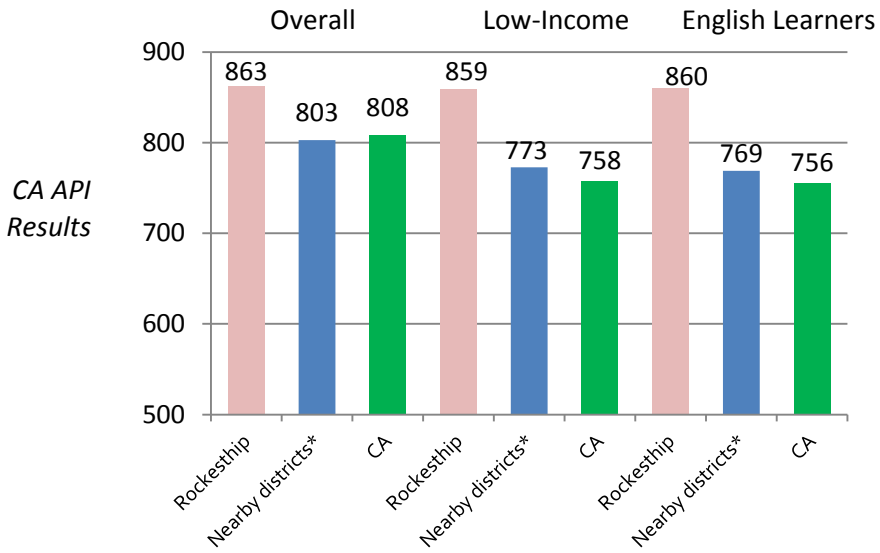
[14] *Evaluation of Evidence-Based Practices in Online Learning: A Meta-Analysis and Review of Online Learning Studies*. U.S. Department of Education.

[15] KIPP Raices is the fourth highest performing elementary school out of 552 schools in LAUSD, 2010.

Rocketship Education, headquartered in San Jose, CA

Founded in 2006, Rocketship Education is a network of free, public K-5 college prep elementary charter schools. In the graph shown in **Figure 6**, Rocketship Education's Academic Performance Index[16] (API) for low-income students is 86 points higher than for nearby districts and 101 points higher than for the state of California; for English Language Learners, Rocketship's API compared to nearby districts and the state of California as approximately 100 points higher.

Figure 6: 2011 Rocketship Education Results



**Nearby districts include aggregate average of elementary schools in Alum Rock Unified, San Jose Unified and Franklin –McKinley school districts.*

Carpe Diem Collegiate High School and Middle School, headquartered in Yuma, AZ

Carpe Diem Collegiate High School and Middle School has been in operation since 2007. We compared the proficient and advanced student achievement scores on the state test for Carpe Diem with the region, state, and two schools with similar demographics in **Table 6.** The results are striking. Carpe Diem outperforms the region, state, and comparison schools by significant margins for both proficient and advanced results. For example, 24% of Carpe Diem's students are advanced in reading; 48% are advanced in math, compared to 6% and 11% for schools in the state, respectively.

Table 6: 2011 Carpe Diem HS and MS Results

	Economically Disadvantaged	**Proficient** Reading	**Proficient** Math	**Advanced** Reading	**Advanced** Math
Carpe Diem	**55%**	**93%**	**87%**	**24%**	**48%**
COMPARISON	~~~~~~~~~~~~	~~~~~~~~	~~~~~~~~	~~~~~~~~~	~~~~~~~
Region	68%	54%	36%	3%	9%
State	51%	57%	32%	6%	11%
Yuma HS	66%	54%	40%	4%	5%
Crane MS	70%	76%	62%	10%	24%

[16] API, a single number ranging from a low of 200 to a high of 1000, reflects a district or school's performance level and is calculated by converting a student's performance on statewide assessments across multiple content areas into points on the API scale. See www.cde.ca.gov/ta/ac/ap/documents/infoguide12.pdf.

STUDENT OUTCOMES: NON-ACADEMIC

The Greater Houston Community Foundation was interested in learning more about non-academic student outcomes – changes to social skills and interaction and changes in student behavior. Alex Hernandez, Charter School Growth Fund, commented: "It is too early for data on discipline and social interaction skills. What we have now is anecdotal**."** We therefore present non-academic outcomes anecdotal data, as reported by those interviewed.

- **Increased student engagement. "**In blended learning schools, there is an opportunity for much greater engagement on the part of students," according to David Teeter, iNACOL. "Teachers establish individual connections with students because they are often working in smaller groups. Even with special education students, there is a huge opportunity for more individual instruction and engagement." Frank Baxter, Alliance Public Schools, adds: "The attitude of the kids is different. They say that the school day flies by. In their previous schools, sitting in class for one hour was painful." Marcia Aaron, KIPP LA Schools, noted that "Student engagement, especially for those with special learning needs, often increases when students are online because content providers use a variety of learning modalities to engage and reach children."

- **Increased motivation.** "In this model, the students feel empowered and have a college readiness frame of mind," reports Mickie Tubbs, ATAMS. "No one really assesses them – the system does – and it makes them feel very connected to their effort and work. They get immediate feedback for their work – they don't have to wait a week to get their papers back in most cases. With our digital content, each kid knows what he or she needs to do to complete the agenda. Kids assign themselves and each other homework. They average 90 minutes of self-imposed homework a day."

- **Decrease in behavioral issues.** Mickie Tubbs, ATAMS, reported seeing a decrease in disciplinary infractions. "When you trust 800 students with laptops, they are dumbfounded with this level of trust," she said. "And it changes them. Also, students who have been behind who catch up have positive attitudes which leads to better behavior." John Danner added, "A mitigating factor is that kids have to be interested in what they are doing. Therefore, the digital content has to be really engaging. It is a very different setting for kids – much larger – and lots of the same age people are in one of our labs. The lab has to be very well managed and there have to be strong norms for behavior that are reinforced in the learning labs."

> ***"The attitude of the kids is different. They say that the school day flies by. In their previous schools, sitting in class for one hour was painful."***
>
> ■ Frank Baxter, Alliance Public Schools

- **No significant differences in students' social skills and interactions.** All respondents reported no difference in students' social skills and interactions among their peers. Given the increases in student-teacher ratios, it was surprising that several respondents reported increased interactions between students and adults – teachers and paraprofessionals. "Even though the adult to student ratio may be 1 to 30 or even 1 to 50, the adult interaction time is different," said Alex Hernandez, Charter School Growth Fund. "Instead of standing in front of classes of kids all day, we see teachers spending much more time in small groups or 1:1 conferencing. Some schools use paraprofessionals to focus specifically on student relationships. Students know that, when they are with an adult, it's a high-touch, personalized instruction."

VII. Blended Learning Impact on Teachers

Digital learning has the potential to transform education, but technology will never replace teachers. As stated earlier by Anthony Kim, technology is not a substitute for good human capital. As digital tools proliferate and improve, solid instruction in the basics will become "flat" – available anywhere globally. The elements of effective teaching that are most difficult for technology to replace, such as motivating students, mentoring, developing higher-order thinking skills, and building children's social and emotional skills, will increasingly differentiate student outcomes.[17]

So if blended learning will not replace teachers, how may it impact them? Based on interviews and a literature review, we have identified five key areas where blended learning has the potential to impact teachers:

- **Attract, retain and leverage the best teachers.** As student teacher ratios increase and schools require fewer teachers – even one less teacher per grade – teachers' salaries can increase. At Rocketship with ratios of 28 to 1, teachers are paid 20% more. Couple this with automating difficult tasks via an adaptive learning management system such as pulling data and trying to individualize instruction, and you create another reason for teachers to stay. Perhaps the greatest motivation will come from increased student achievement, as any good teacher gets the greatest satisfaction from seeing his or her students succeed.

- **Boost the average teacher's effectiveness.** Digital fare will eventually accomplish much of the diagnosis of learning levels and provision of matching instruction, particularly in the core knowledge and skills that today distinguish excellent teachers from peers.[18] Matchbook Learning's fundamental thesis is to use technology to help "mediocre teachers become high performing."[19] If this thesis bears out, boosting the effectiveness of the 50% of teachers in the middle can truly transform American education.

- **Decrease the number of traditional classroom teachers needed but increase numbers of paraprofessionals.** The pioneer blended learning models – Rocketship, Carpe Diem, KIPP Empower and ATAMS – have student to teacher ratios between 28 to 1 and 48 to 1, thereby requiring fewer classroom teachers. This can be positive, if schools have strong evaluation systems and policies allowing them to release the lowest performing teachers. Eric Hanushek, a noted Stanford researcher, calculates that the U.S. could achieve the levels of student achievement performance of top ranking Finland and Canada by replacing the lowest performing teachers with even average teachers.[20]

- **Diversify instructional delivery.** What we observe in the blended-learning models are fewer classroom teachers, but an increase in other professionals as well as paraprofessionals such as lab facilitators, interventionists and tutors. Rocketship, for example, added a position of academic dean at a salary of $100,000, made possible in part by paying its lab facilitators, recent high school graduates, $15 an hour plus benefits. This shift opens up a reshaping of the education labor force in U.S. schools and an opportunity to increase productivity, as labor accounts for 60 to 80 percent of costs in any given school. This shift has already occurred in the professions of law and medicine. At the turn of the 20th century, medicine was delivered primarily by a doctor, sometimes supported by a nurse. Fast forward to the 21st century and medicine is delivered through a wide array of professionals – doctors, RNs, LVNs, physicians' assistants, nurse anesthetists, and more. Digital learning offers a rare and exciting opportunity to rethink the delivery of education in America and the diversification of the labor force.

[17] Teacher in the Age of Digital Instruction, page 11.
[18] Teachers in the Age of Digital Instruction, page 12.
[19] Interview with Sajan George, Matchbook Learning
[20] Erick Hanushek, *Valuing Teachers: How Much is a Good Teacher Worth?*, Education Next, Summer 2011

Increase teacher satisfaction. There is early evidence that teachers in blended schools have high levels of satisfaction. KIPP Foundation conducts a national survey of teacher satisfaction. The KIPP LA Empower Academy received the second highest rating among 102 schools in the KIPP Network – in its first year of operations, an extraordinary result. Matchbook Learning surveyed its teachers at A.L. Holmes School in Detroit and 100 percent said they would not go back to the time before the school was blended. This turnaround school retained all of its existing teachers.[21]

TEACHER AND LEADERSHIP TRAINING FOR BLENDED SCHOOLS

How do teachers and leaders need to be trained in these new blended schools? Who is providing the training? Teacher training is being developed and delivered in the following ways, according to respondents:

- Leadership training programs, such as the Emerging Leaders program at Rocketship Education;
- Teacher training developed and provided by the charter management organizations of the schools;
- Teacher training provided by content and learning management system (LMS) vendors and consultants;
- Teacher and leader training and technical assistance provided by consultants or nonprofit organizations;
- Teacher training through school partnerships with universities, such as the emerging partnership between Alliance Public Schools and Pepperdine University.

> ***The role of the teacher is too broad. Teachers should not be grading worksheets but students need the practice that worksheets are intended to offer and teachers need the data. In a hospital, the person who performs an operation is not the same person who changes the linens or files the insurance papers. Different tasks need different levels of expertise. If a student needs 180 hours to practice math concepts to achieve mastery, the most efficient and effective path is moving that practice time to a high quality data savvy online experience with instructional aide supervision.***
>
> ■ Rebecca Tomasini, The Alvo Institute

VIII. Lessons Learned from Early Innovators

Blended-learning pioneers were eager to share lessons learned and give advice to those following in their footsteps or leading the way to new blended learning models. Strong project management, sufficient lead-time, and careful analysis of up-front costs will enhance a smooth first year implementation. These same principles would apply to any school start-up. Specifically related to blended-learning models are the following factors:

- **Bandwidth and technology experts**. For blended learning to function, sufficient bandwidth and technology experts must be in place. KIPP LA Empower advises schools that share district facilities with another school to plan for when both schools are in full operation, to demand network and firewall restrictions, and to have a backup plan for how time will be spent when a networking issue arises.[22] Leaders at KIPP Empower, A.L. Holmes and Lake Elmo Elementary stressed the importance of having a technology expert on staff to provide support to teachers and students. "A dysfunctional IT system can sabotage efforts quickly," stated Brian Greenberg of Silicon Schools Fund.[23]

- **Data usability**. For students and their teachers to achieve personalized, mastery learning, it is critical that the learning management systems produce reliable assessment data that is tied to rigorous

[21] Interview with Sajan George, Matchbook Learning
[22] KIPP Empower website, lessons learned
[23] www.blendmylearning.com/category/funders/silicon-schools-fund/

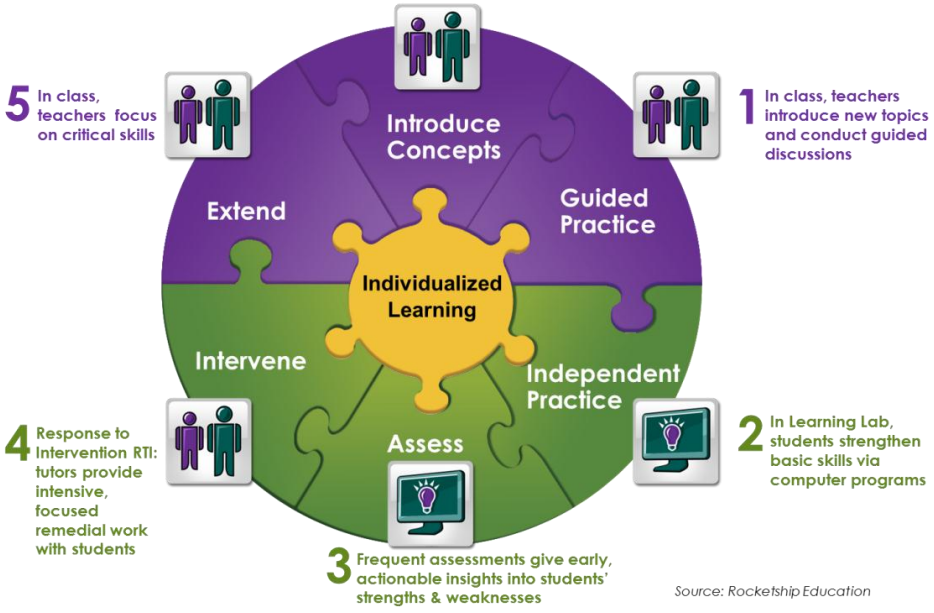
standards. Innovators are shifting from relying on content vendor assessments to adding standardized assessments such as Northwest Evaluation Association (NWEA) assessments to their learning management systems, and eventually, adding assessments tied to the new common core standards. Junyo is partnering with four blended-learning schools, including KIPP Empower and Rocketship Education, to create micro-assessments based on the common core standards to include in the learning management systems.

- **Training for staff.** In our study, schools were on two ends of a spectrum: Rocketship Education that hires primarily Teach For America corps members and alumna and A.L. Holmes, a turnaround school that kept the entire staff that is "using technology to help mediocre teachers become high performing."[24] All operators interviewed indicated that staff training was very important to successful implementation.

- **Relentless focus on personalized, mastery learning**. Every school studied is using blended learning to achieve personalized, mastery learning for its students with an outcome that all students, regardless of economic background, will achieve at high levels. Mickie Tubbs, ATAMS stated, "You need to believe that this is the best thing for kids and keep your core values and mastery learning as a focus.[25]" John Danner is forceful with his admonition, "Don't get into this space just to focus on technology – that's a big mistake. Blended learning is a mechanism to deliver a much better approach to figuring out what each kid needs in order to learn the core material and providing it in a cost effective way."[26]

Rocketship Education uses technology to implement a new approach to student learning—its *Individualized Instruction Model*—in **Figure 7** shown below. In this model, the teacher introduces concepts and provides guided practice, students practice in the learning labs and receive frequent feedback on their progress through the learning management system, and the teacher or tutors provide intensive intervention as needed. A student's learning in class is extended through projects that apply learning and discussions to enhance critical thinking. The learning cycle repeats.

Figure 7: Rocketship Individualized Instruction Model



[24] Interview with Sajan George, Matchbook Learning
[25] Interview with Mickie Tubbs, ATAMS
[26] Interview with John Danner, Rocketship

Alex Hernandez, Charter School Growth Fund, shared the following as an important take away: "Here is the real shift. With technology, we have the chance to be much more effective in helping students learn basic skills. . Instead of stretching out the school day to eight or ten hours to ensure minimal proficiency, what if more effective learning means freeing up time for other learning experiences that we say are important but never find the time or money to do: inter-disciplinary projects, Socratic seminars, social development, more intensive interventions, etc. For example, Acton Academy (Austin, TX) compresses basic skills instruction into three hours a day, leaving two hours a day for students to work on challenging projects."[27]

IX. Possibilities and Challenges Ahead[28]

Educators are just beginning to understand how instructional technology can and will transform teaching and learning. The four blended-leaning models outlined in this report are early attempts to integrate new technologies into education. They should not be viewed as an end state of what is possible, nor should they be replicated as the last word. Because there is early evidence that blended learning schools costs less and produces positive student outcomes, blended learning is expanding rapidly. Michael Horn, Innosight Institute, elected not to estimate the number of new blended schools opening in 2012, but offered that one vendor serving five schools this year has an additional 65 schools planning to open in the next two years.

Over the next few years, several changes will take place that may contribute to an even more rapid scaling of blended learning. The first is already happening. A generation of young educators fluent in personal technologies they use daily are integrating those technologies into their teaching methods with, and sometimes without, support from their administrators. Our job is to enable that experimentation and innovation to flourish. The second big change is the inevitable improvement of the instructional technologies themselves, especially as they relate to the integration of educational content, assessment and student information. These linkages will be the next steps forward that enable a truly individualized educational experience for students with real data transparency for students, teachers and parents to map progress. The third major change is that funding for public education is on the decline in virtually every state, necessitating that education leaders cope with the "new normal" and do more with less. Frank Baxter, Alliance Public Schools, responded to this challenge by piloting an Alliance blended school, ATAMS.

> ***I came to the realization that although we were quite successful as a Charter Management Organization (CMO), what we were doing was neither scalable nor could lead to rapid growth. We went to blended learning for the economics – more productivity – and to reach our goal of every student in the nation having a great education.***
>
> - Frank Baxter, Alliance Public Schools

Forty-five states (excluding Texas) and three territories have adopted the common core education standards. Product developers will no longer have to tailor their products to each individual state, enhancing the opportunity to develop, sell and scale more rapidly. Blended school operators are working with vendors to create learning management systems 2.0 and 3.0 that embed more rigorous assessments and apply analytics, similar to those at Amazon and Facebook, to enable delivery of online instruction that matches even more closely students' interests and abilities. The content provider sector is primed with investment capital and is speeding up, adding to the existing market more engaging tools for students and teachers, including instructional games.[29] What will occur when these positive market forces meet the public policies that hamper blended-learning expansion and further innovation in how to create student-centric learning any time, pace, path or place? This may prove to be the greatest challenge in the blended learning space. Policies such as giving course credit and funding based purely on "seat time", class size caps, restrictions on the supply of

[27] Interview with Alex Hernandez, Charter School Growth Fund
[28] This section written in collaboration with Caprice Young, Laura and John Arnold Foundation
[29] www.blendmylearning.com/category/funders/silicon-schools-fund/

virtual education courses, charter school caps, and certain teacher credentialing that may prohibit tech savvy and other talented individuals from serving as teachers or leaders, will hamper the expansion of blended learning in traditional public and charter schools. Moving blended learning to the next level will require an investment in further research, pilot projects and advocacy to support the development of policies recommended by Digital Learning l Now! that can "foster a high quality, customized education for ***all*** students."[30] We must do everything possible to remove regulations and policy restrictions that inhibit real creativity and innovation when it comes to learning. With modern instructional technologies, students can learn anytime, anywhere, and at any pace. Such a day cannot come soon enough for the millions of students languishing in schools that offer no hope for a brighter future.

> ***Technology isn't a series of devices for programming our students; rather it is a series of windows and doors thrusting students out of the classroom warehouse into an exciting world of ideas and interaction. One thing we can hope for and cultivate is a time when no one differentiates between "school" and "real life." We must move from "going to school" as the end product, to learning and academic achievement as a means to gradually integrate the next generation into real life roles with authority and responsibility. We are at the early stage of what promises to be the most exciting and transformative era in public education in 100 years.***
>
> - Caprice Young, Vice President for Education, Laura and John Arnold Foundation

X. GHCF SEF Project Implementation[31]

The Greater Houston Strategic Education Fund (SEF), created in 2011, is creating a critical mass of influence and funding to have a break through moment in education reform. The SEF commissioned this report in order to gain a better understanding of blended school models, design and implementation factors, costs and outcomes. Based on the findings in this report, the SEF Executive Committee members have decided to support Houston's first rotation model blended-learning implementation at KIPP Courage College Prep. KIPP Courage College Prep is the 21st school in the KIPP Houston network and is a program charter inside of Landrum Middle School in the Spring Branch Independent School District (SBISD) as part of the SKY Partnership, a collaboration between Spring Branch ISD, KIPP Houston Public Schools and YES Prep Public Schools. KIPP Courage serves 104 college-bound fifth graders from Houston's Spring Branch community and will grow to serve roughly 400 students in fifth through eighth grade by the 2015-2016 school year.

Leaders of the SEF believe in the principal of this school, Eric Schmidt, a Fisher Fellow[32], and in the leverage of a district/charter compact between Spring Branch ISD and KIPP Houston. Mr. Schmidt graduated from Rice University's Jones Graduate School of Business with a Master of Business Administration (MBA) as a member of the Rice Education Entrepreneurship Program (REEP).

KIPP will design this implementation with the help of a leading consultant whom the SEF will fund. The Laura and John Arnold Foundation is a key thought partner on this project. KIPP Courage is implementing the Lab

[30] www.digitallearningnow.com/ten-elements-of-high-quality-digital-learning/
[31] This section written in collaboration with Renee Wizig-Barrios and Stephanie Blair, GHCF
[32] The national KIPP organization has a leadership program called the Fisher Fellowship program. See www.**kipp**.org/school-leaders/leadership-programs

Rotation model of blended learning. Priority one for the Learning Lab will be to differentiate instruction for students depending on their proficiency in English and Spanish. Priority two for the Learning Lab is differentiated instruction in reading and math. This project will: (1) enable KIPP Courage to develop a customized blended- learning strategy and plan; (2) provide a framework for other KIPP schools to more deliberately implement blended learning in their classrooms, and; (3) introduce proven technologies that facilitate more effective teaching and learning.

The SEF seeks additional partners for the full implementation of this project and other projects that are emerging at charter and district schools in the Houston area.

XI. Author's Note

On a personal note, I would like to share how I ventured into blended learning – for the *right* reasons. My introduction to the power of technology occurred in 1972 while I was a junior at Stanford University. I had enrolled in my first music theory course as a late blooming music major. One day, the teaching assistant played a tune on the piano and asked us to write it down. My initial response was, "Are you kidding?" That was my introduction to ear training and music dictation. I was lost and clearly the weakest student in the class.

But I was a tenacious student. I quickly learned that there were several ways to master ear training: 1) take dictation from the teaching assistant and get my paper back a week or 10 days later; 2) listen to Benward tapes and look up the answers in the back of the lesson; or 3) go to the computer lab where a smart Stanford student had written an ear training program. There the computer would play intervals of notes, I would type in the answer and the computer would *instantly* give me feedback – often humorous with a "great job" or "better luck next time" response. Clearly the third choice was my best option. With almost daily trips to the computer lab, I went from the weakest student in the class to the best – all because a computer program had provided me with instant, objective, nonthreatening feedback and many opportunities for practice—both important principles of learning.

> ***For while charters (perhaps due to the constraints they have faced) remain a smallish subset of different schools that operate alongside the traditional system, digital learning has the potential to alter the system itself both fundamentally and irreversibly. It isn't even the center ring. It's the circus tent itself.***
>
> ■ *Education Reform for the Digital Era*

That experience led me to employ blended learning in what I dubbed back then, *The School of the Future* – The John Cooper School – which I founded in The Woodlands in 1988. Dr. Pat Suppes, Stanford professor and founder of Computer Curriculum Corporation, agreed to use Cooper School as a beta test site for his new system. We developed a lab rotation model, with students rotating into the lab to work on basic skills. As a new independent school, we did not dare increase our student teacher ratios and kept our class sizes small. What is interesting to me almost 25 years later is that the very issues we faced back then are the same shared in this report: inadequate learning management systems that produced less than reliable data and digital content that was not engaging. Imagine the power that will come when we can create truly adaptive learning management systems with high quality, exciting content so that students can indeed begin to own their learning and work any time, any place, any pace.

XII. About the Authors and Contributors

Marina Ballantyne Walne, CEO of EduStart, has 35 years of experience in education including Women's Athletic Director at St. John's School, Director of Admissions at Rice University, Founding Head of The John Cooper School, consultant to the Governors Business Council and Assistant Secretary of Education, Executive

Director of the Institute for Public School Initiatives at The University of Texas System, and Vice President for Education at the Laura and John Arnold Foundation. As a consultant, she helped develop six schools including The University of Texas Elementary School, the first university sponsored charter school in Texas. She holds a B.A. with distinction, an M.A. and a Ph.D. from Stanford University.

About the Contributors

Heather Staker is a Senior Research Fellow for the Education Practice at Innosight Institute. She is the author of many publications, including *The Rise of K-12 blended learning: Profiles of Emerging Models*," and *Classifying K-12 Blended Learning*. Staker is a frequent keynote speaker and panelist at education innovation conferences around the country and testifies regularly before state policymakers. Prior to joining Innosight Institute, Staker served under Governor Pete Wilson's administration as a member of the California State Board of Education. She also was a strategy consultant for McKinsey & Company, a sales manager for Procter & Gamble, and the co-founder and CFO of Karaeiga, LLC, and now Yoostar Entertainment. Staker graduated magna cum laude from Harvard College, with a concentration in government. She received an MBA, with distinction, from Harvard Business School.

Mukta Pandit, President of Safal Partners Inc., brings extensive experience in the education sector. Prior to founding Safal in 2010, Mukta was with the Michael & Susan Dell Foundation for five years, where she led development of MSDF's education strategy and drove portfolio analysis for grants totaling over $160M. Prior to her work at MSDF, Mukta was an Engagement Manager at McKinsey & Company and led strategy and operational engagements. Prior to McKinsey, she worked in the information technology sector, managing IT teams and leading data warehousing projects. Mukta holds an MBA from the Wharton School of Business, where she graduated as a Palmer Scholar.

Special thanks go to **Stephanie Blair**, Greater Houston Community Foundation, for her support with the graphic design and formatting of this report.

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Appendix A: List of People Interviewed

All interviews were conducted by phone except for interviews with Mike Dronen, Michael Horn and Rick Ogston, who responded to questions via email exchange.

Name	Title	Vendor
Marcia Aaron	*Executive Director*	KIPP LA Schools
Frank Baxter	*Board member*	Alliance Public Schools
John Danner	*CEO*	Rocketship Education
Mike Dronen	*District Technology Coordinator*	Lake Elmo, Stillwater Public Schools
Sajan George	*Founder and CEO*	Matchbook Learning
Scott Hamilton	*Co-founder and Managing Partner*	Seton Partners
Alex Hernandez	*Partner and Vice President*	Charter School Growth Fund
Paul Hill	*Founder*	CRPE and Research Professor, Center for Reinventing Public Education, University of Washington
Michael Horn	*Co-founder and Executive Director*	Innosight Institute
Gisele Huff	*Executive Director*	Jaquelin Hume Foundation
Anthony Kim	*Founder and CEO*	Education Elements
David McCreary	*Special Projects*	Harris County Department of Education
Karen Hawley Miles	*President and Executive Director*	Education Resource Strategies
Cheryl Niehaus	*Program Officer*	US Education, Dell Foundation
Rick Ogston	*CEO*	Carpe Diem
Matt Pasternack	*Founder*	Junyo
Joel Rose	*Co-founder and CEO*	New Classrooms Innovation Partners
David Teeter	*Director of Policy*	iNACOL
Rebecca Tomasini	*Co-founder and CEO*	The Alvo Institute
Mickie Tubbs	*Principal*	Alliance Technology Math and Science High School (ATAMS)

Appendix B: Design and Implementation Vendors

Vendor	Key Contacts	Attributes
The Alvo Institute http://www.thealvoinstitute.com/	Rebecca Tomasini and Russ Ballati	Supports design, implementation, and professional development of blended models. Extensive assessments of attitudes and competencies around data use foundational to blended; has created personalized Professional Development delivered online and blended with in-person workshops and free informational webinars for people interested in blended learning
Integrated Educational Strategies http://fromvisiontoreality.org/	Lisa Gillis	Works with district implementation; has extensive checklist of necessary conditions for strong implementation
2 Revolution http://www.2revolutions.net/index.html	Todd Kern and Brian Setser	Education Design Lab
Evergreen Education Group http://evergreenedgroup.com/	John Watson	Direct support to schools, districts, agencies engaged in online learning; also does policy research
Education Elements http://educationelements.com/	Anthony Kim	Can take a client through design, implementation (including LMS), support, and sustainability
Matchbook Learning http://www.matchbooklearning.com/	Sajan George	Specialists in turning around low performing schools with blended learning
OpenEd Solutions http://openedsolutions.com/home.html	Tom Vander Ark	Provide multi-year blended-learning plans for states, districts, networks, and schools; offer academic support services for leadership and professional development as well as curriculum, achievement analytics and assessment tools
New Classrooms http://www.newclassrooms.org/index.html	Joel Rose and Christopher Rush	Help clients integrate blended learning approaches by partnering with educational publishers, content providers, and their own math experts as well as supporting implementation of technology and the use of a self-developed scheduling algorithm; clients include district, charter, and independent schools

Appendix C: Learning Management System Vendors

Vendor	Key Contacts	Attributes
Open Systems		
Education Elements http://educationelements.com/	Anthony Kim	Has LMS that pulls in varied digital content and creates a single user sign on; uses content provider assessments; working now in 74 schools
Junyo http://www.junyo.com	Steve Schoettler Matt Pasternack	Is working with 4 pilot schools to build a prototype of an LMS tied to micro-assessments for the common core standards
Agilix: Brain Honey http:www.brainhoney.com	Duane Call	LMS that pulls in varied digital content; uses content provider assessments
Illuminate Education http://www.illuminateed.com	Lane Rankin	Jirard Foundation is working with Illuminate Ed to create an LMS, own it and provide it free. Currently in beta testing
New Classrooms http://www.newclassrooms.org/index.html	Joel Rose and Christopher Rush	Portal to access content on vendor sites; assessments; scheduling algorithm to create "play lists" for each student
Closed Systems		
E2020 http://www.education2020.com/	Lynette McVay	Virtual school service that works with districts to provide student-centered instruction; uses Student Support model to provide academic support; Tracks performance based on grade, activity and forward progress
K-12 www.k12.com	Ron Packard	Online schools focused on providing each child with an individualized learning experience; work with public schools across the nation, provide support directly to families and serve as a full-time online public school in many states

Appendix D: References

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