BLENDED LEARNING

Defining Models and Examining Conditions to Support Implementation

PERC Research Brief

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Philadelphia Education Research Consortium

RESEARCH for ACTION

Overview

This brief examines the research base on blended learning to identify a definition of this emerging concept, and to present a set of literature-based conditions for implementation that can be used to successfully integrate blended learning approaches into instructional improvement strategies. It was developed, written, and refined in consultation with partners from the School District of Philadelphia and the city's charter sector as part of the Philadelphia Education Research Consortium, or PERC. Prior to dissemination, it was thoroughly reviewed by an anonymous, nationally-known education technology expert unaffiliated with PERC or the School District of Philadelphia. The contents of this brief reflect the work of the authors alone, and are independent of the views or opinions of School District of Philadelphia and charter school PERC members, as well as those of the William Penn Foundation.

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Introduction

Over the course of the last 10 years, policymakers and practitioners alike have turned to blended learning as a way to promote innovation, reduce educational costs, personalize the learning experience for students, and, ultimately, raise student achievement. The goals of this brief are two-fold: First, to identify a clear and concise definition of blended learning; and, second, to present a set of literature-based conditions for implementation that the charter and district schools of Philadelphia can use to guide their efforts at integrating blended learning approaches into ongoing instructional improvement initiatives.

THIS BRIEF IS ORGANIZED INTO FOUR SECTIONS:

1. **Definitions:** In the first section, we present a literature-based definition of blended learning. We then expand the definition further by explaining the individual elements of various blended learning models, as well as ways to distinguish between blended learning and other technology-enriched instructional approaches.
2. **Empirical Evidence:** Next, we present the empirical evidence on blended learning using a framework that divides the existing research into three categories: meta-analyses of blended learning impact; discrete studies of program impact; and individual studies of school-level blended learning models.
3. **Conditions for Implementation:** We then identify essential considerations for schools and districts during the implementation process, moving from the most narrow concerns (i.e., how to select the appropriate supportive programs and products) to the broadest concerns (i.e., what system-wide conditions should be in place to support blended learning). Wherever possible, we include examples to illustrate how districts and schools have tackled these concerns.
4. **Next Steps:** Finally, we outline a potential mixed-methods pilot study for SDP and charter schools in Philadelphia that draws from experiences of similar cities and districts.

A Note About Our Information Sources

This brief is designed to ensure that all content is both current and relevant to Philadelphia. Accordingly, we searched for articles that would explain the pedagogical theory of blended learning, strategies for spreading the blended learning approach, media reports about the method, and studies of its efficacy on a number of school and student outcomes.

The definitions used in this brief were established by the Clayton Christensen Institute (formerly the InnoSight Institute), a strategy firm that has established its reputation around defining and refining blended learning approaches in practice.[i,ii,iii] These established definitions of blended learning have received the support of the International Association for K-12 Online Learning's (iNACOL) Virtual School Symposium, and are widely used in the empirical literature on blended learning.

For empirical evidence of the effectiveness of blended learning approaches, we relied on peer-reviewed journal articles. However, as we mention later in this brief, there were few pieces that qualified for this rigorous standard. The dearth of literature here signals that more studies of blended learning are necessary to establish causal links to specific student or school outcomes. We omitted articles prior to 2008, and also limited the scope to pieces that were relevant to the specific context of the School District of Philadelphia and charter schools in Philadelphia. We intentionally sought out studies that were conducted in places that are at least somewhat similar to Philadelphia, and excluded studies that only examined significantly different contexts, such as foreign countries, high-wealth districts, and universities or professional schools. We included evaluations of specific programs and models that might yield information on the efficacy of blended learning as a whole. We excluded promotional pieces that did not contain verifiable or empirical evidence of success, and case studies of famous blended learning schools in settings that differ significantly from Philadelphia.

I. What is Blended Learning?

Although blended learning approaches might seem omnipresent in K-12 education, the term itself is vague and poorly understood. The source of the confusion is three-fold.

1. **Blended learning is an umbrella term**. The term "blended learning" does not represent a monolithic wholesale approach to instruction. Instead, it is an umbrella term for a number of different models of learning that combine—or "blend"—either traditional or technology-enriched classrooms with online instruction.
2. **Similar learning approaches are mistaken for blended learning**. Innovative, technology-rich instructional approaches such as personalized learning, competency-based learning, customized learning, and cyberschooling contain similar elements as blended learning and may be confused with the blended learning approach.
3. **The approach is new—and still evolving**. Despite its popularity, blended learning is still a relatively new approach in education, and there is a dearth of rigorous empirical research to document its impact on educational outcomes. Accordingly, much of the "evidence" is anecdotal and based on limited experiences in select school environments.

These complications combined can understandably make blended learning seem like a nebulous, ever-changing concept.

A Literature-Based Definition

One way to understand blended learning is to picture a continuum of technology usage in education, as can be seen in Figure 1. At one end of the continuum is the "traditional" classroom. This classroom has desks that face the front of the classroom, a teacher who explains concepts in a lecture format and then involves students through class discussions, small group work, or independent work. This classroom contains very little or even no technology. All the way on the other end of the continuum is a wholly online learning program. In this setting, students learn completely off-site (for example, in their homes) and students interact virtually both with the curriculum and their teacher-of-record.

Figure 1. The Continuum of Technology Usage in Education

As suggested by its name, blended learning is not at either end of the spectrum, but rather is a blend of strategies from both ends of the continuum into one integrated approach to learning.

The specific definition we use for blended learning is from Christensen, Horn and Staker (2013)[iv] and builds on previous iterations from Horn and Staker (2011)[v] and Staker and Horn (2012).[vi]

Figure 2: A Definition of Blended Learning

Source: Christensen, Horn and Staker (2013)

The Elements of Blended Learning

To fully understand the definition, it is necessary to go deeper into the meaning of time, place, path, and pace. We also suggest another element for consideration: the teacher-of-record. These elements are summarized in Table 1.

Table 1. Elements Included in Blended Learning

ELEMENTS INCLUDED IN BLENDED LEARNING	
	**Time** Students can learn on their own time and are not confined by the schedule of the school day or the school year.
	**Pace** Students work at their own speed, taking more time when needed and advancing more quickly when appropriate.
	**Place** Students learn inside the brick-and-mortar school setting, but may also have opportunities to work off-site, for example at home or at a community library.
	**Path** Students learn using a variety of "modalities" or "instructional approaches". This may include large-group instruction, small-group collaboration, or individual instruction using in-person or online tools and instructional techniques.
	**Teacher-of-Record** Students are taught by in-person teachers or by virtual teachers, and may also receive support from paraprofessionals to bolster online learning components.

The various models of blended learning, which we present later in this section, employ combinations of these five elements in different ways.

Complementary Concepts

Because technology is a popular lever for instructional change in education, many technology-rich learning approaches appear similar to blended learning. While the approaches are not interchangeable, they are not mutually exclusive; some incorporate elements of blended learning in ways that enhance the experience. In Table 2, we provide literature-based definitions of several of these approaches, explaining the commonalities, complementary components, and differences from blended learning. In several areas in the table, we refer to "online learning." Online learning is a component of blended learning, but is often a component of complementary learning approaches as well.

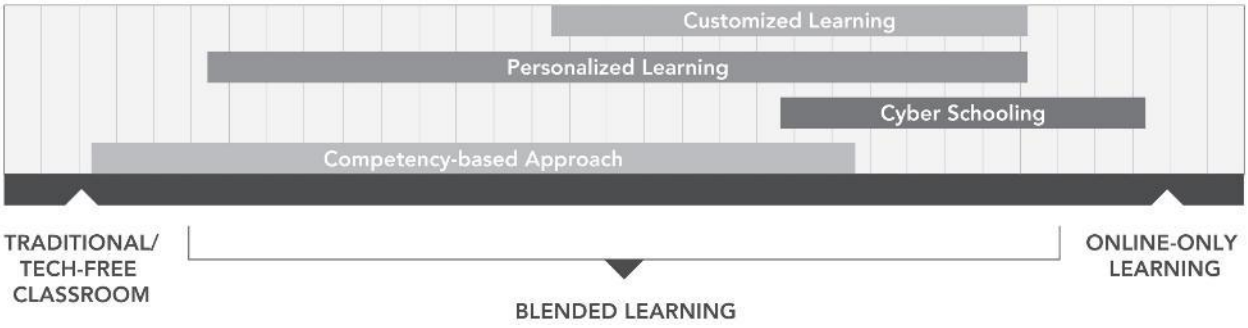
Table 2. Definitions and Descriptions of Concepts that are Complimentary to Blended Learning

LEARNING APPROACH	ELEMENTS	DEFINITION	SIMILARITIES/ COMPLEMENTS	DIFFERENCES
Competency-Based Learning		"A system of education, often referred to as proficiency or mastery based, in which students advance based on demonstration of mastery."	Online learning can support competency-based learning by: 1. helping students keep pace; 2. aligning testing to what students have learned; 3. offering multiple pathways to mastery; and, 4. providing tools to personalize learning.	Online learning is not a necessary component of competency-based learning. In fact, it is possible (though admittedly difficult) to implement a competency-based approach to instruction without using technology tools of any sort.
Personalized Learning		"[An approach that] is paced to student needs, tailored to learning preferences, and customized to the specific interests of different learners. ... In an environment that is fully personalized, the learning objectives and content as well as the method and pace may all vary (so personalization encompasses differentiation and individualization)."	If implemented using online learning components, personalized learning is blended learning. If implemented using non-online learning or low-technology strategies, it still employs similar elements as blended learning (such as time, place and path) as a way to individualize the educational experience for students.	Although personalized learning uses technology to support an individualized approach to student learning, this technology is not necessarily delivered through online tools and curricula. Similarly, although personalization is a component of blended learning, not all models of blended learning necessarily offer a completely individualized experience for each student.
Customized Learning		An approach that is "informed by enhanced and expanded student data, which is applied to boost motivation and achievement, keeping more students on track for college and career readiness."	This model is essentially the same as personalized learning, but with a greater emphasis on data-driven decision-making around student learning paths and objectives. All customized learning is personalized learning, but all personalized learning is not customized learning.	Similar to the caveat for personalized learning, customized learning does not necessarily deliver content to students via online tools and curricula.
Cyber or Online-Only Schooling	* 	"Teacher-led education that takes place over the Internet, with the teacher and student separated geographically, using a web-based educational delivery system that includes software to provide a structured learning environment."	The overlap with cyber-schooling and blended learning is, of course, the online component. Some blended learning models use the same programs and tools as do cyber-schools.	Online learning is one component of blended learning, but lacks the brick-and-mortar component of a true blend. While it can be personalized by incorporating elements of time, path, and pace, these are not requirements.

** There is wide diversity in how online schools incorporate these elements.*

These definitions can help us understand where these complementary concepts fall on our continuum of technology-enriched learning environments, as displayed in Figure 3.

Figure 3. Complementary Learning Concepts and the Technology Continuum



Each of the complementary concepts depicted above span across a defined range, which reflects the fact that there are potential variations of each approach; some of these variations may be less dependent online learning, while others may be more so.

Blended Learning Models

The literature suggests four discrete models of blended learning in practice.[vii] We describe each of the four models below, explaining how each model incorporates the different elements of the blended learning definition into its approach. We then place each on the continuum of technology use.

Table 3. Elements of Blended Learning Models[1]

MODEL	ELEMENTS
Station Rotation	
Lab Rotation	
Flipped Classroom	
Individual Rotation	
Flex	
A La Carte	
Enriched Virtual	

= Time = Pace = Place = Path

= Teacher-of-Record = Rotation Model

[1] Icons for the four models drawn from Christensen, Horn and Staker (2013).

1. Rotation Model. In this model, students rotate between learning paths or "modalities"—one of which is online learning—either on a fixed schedule or at the teacher's discretion. In practice, these rotations might mean that a student stays at her desk, but switches between a paper-and-pencil instruction and online learning on a tablet or laptop. But it also might involve students trading the classroom for a computer lab for a particular lesson. There are several popular sub-classes of the rotation model.

- Station Rotation: In this model, students rotate between various stations within the classroom, and at least one of these stations includes an online learning component. Other stations involve more traditional instructional learning approaches, such as small group work, worksheets, and whole-class discussions. Students rotate through each station on some sort of schedule—either fixed or at the teacher's discretion.
- Lab Rotation: This rotation model is similar to the one above, but the online learning component takes place in a learning lab that is designed primarily for this purpose. Students rotate between the classroom environment and the learning lab, all while staying on the school campus.
- Flipped Classroom: In the flipped classroom, students rotate on a fixed schedule between classroom instruction during the school day and online outside of school hours. In this way, students control how, when, and where they receive their online instruction, and then rotate back into the classroom environment the following day to apply what they've learned in a project-based environment.
- Individual Rotation: In this rotation model, students customize how they rotate between modalities (again, one of which is necessarily online learning). Either the teacher-of-record or an algorithm can set individual student rotation schedules, but once set, these schedules usually stay fixed. Unlike the other rotation models, students do not necessarily rotate to each available station. For instance, high-need students may be rotated into a small-group setting that is not necessary for all students, or English Language Learners might have a set rotation to an intensive online reading program.

2. Flex Model. Similar to the individual rotation model, the flex model features students working on a customized schedule that rotates between modalities, one of which is online learning. Unlike individual rotation, however, the flex model is fluid instead of fixed, allowing for real-time changes in schedules to meet ever-changing student learning needs. Although the teacher-of-record is on-site and interacts with students face-to-face, this support is flexible and adaptive to individual student needs. This blended learning approach also allows for creative classroom/school configurations, for example by combining study space, breakout rooms, learning labs, small group work rooms, and social areas.

3. "A La Carte" Model. The a la carte model – also known as the "self blend" model – allows students to design their educational experience by selecting specific online courses to supplement their traditional in-school coursework. For the online coursework component, the teacher-of-record is virtual and learning occurs either in the school or off-site. This approach may be employed when schools do not have certain courses available on-site—for example specific Advanced Placement courses, language courses, or new approaches to teaching foundational courses that meet specific student needs (such as special education students or English language learners). If the online coursework occurs on

the school campus, schools may opt to create labs or lounges to support the online learning component.

4. Enriched-Virtual Model. In this model, students learn primarily online, but split their time between the brick-and-mortar school campus and an off-site environment. It is a "whole school experience," which means that it is a comprehensive approach to schooling (as opposed to the course-by-course approach in the self-blend model). The teachers-of-record are primarily virtual, although teachers or paraprofessionals provide supplemental support in the brick-and-mortar environment as well.

Assessing the "Disruptiveness" of Blended Learning Models

Blended learning models vary in intensity, as measured by the degree to which implementing a particular model of blended learning requires a major change to the status quo in classroom practice.

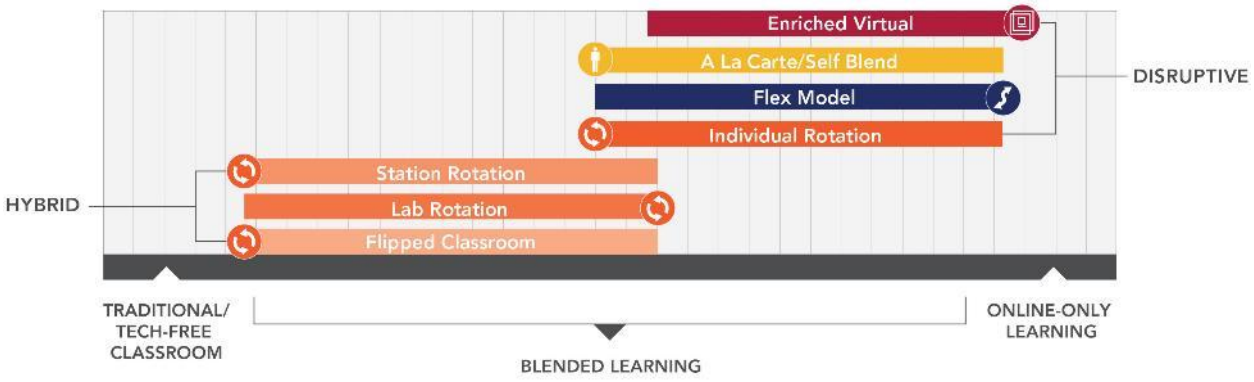
The literature describes this in terms of the "disruptiveness" of the blended learning model. Christensen, Horn and Staker (2013) explain that blended learning models can be *sustaining* innovations, *disruptive* innovations, or a combination of the two—which they call *hybrid* innovations.[viii]

- *Sustaining innovations* build on existing products and paradigms, and are directed at improving the classroom experience for students. To use an example outside of education, incremental improvements to the fuel efficiency of a standard car would be considered sustaining innovations.
- *Disruptive innovations* are new products and learning approaches that disrupt the old paradigms and reach out to new student populations. In the long-term, disruptive innovations may lower costs and even redefine the nature of quality for students. Extending the above example, electric cars are a disruptive innovation. Although expensive now, they may become cheaper than gas cars as the technology continually improves.
- *Hybrid innovations* are a blend of sustaining and disruptive innovations, introducing disruptive technology into status quo environments for the purpose of lowering short-term costs or serving as a bridge to new technology. A hybrid car fits within the hybrid innovations framework because it contains elements of the existing technology (gas engines) and the new technology (electric cars).

Each of these types of innovations can be extremely beneficial, depending on the quality of the innovation and the context in which it is implemented. Sustaining innovations improve the quality of education within the traditional, low-tech classroom; and since they tend to be incremental changes, they are generally low-risk. Disruptive innovations can yield enormous benefits, but also generally require greater investment because they are dramatically different from existing modalities; given the fact that the benefits of innovation are by nature uncertain, this means disruptive innovations can be very risky. Hybrid innovations combine elements from both extremes, allowing space for experimentation with disruptive innovation but tempering the risks by remaining within traditional frameworks.

Figure 4 places each of the models (including the subcomponents of the rotation model) on the continuum. The figure illustrates the degree to which each model disrupts the status quo instructional environment, which is assumed to be the traditional tech-free or low-tech classroom.

Figure 4. Blended Learning Models and the Continuum of Technology/Online Learning



Both hybrid and disruptive innovations can be beneficial to student learning, and school and district leaders can choose any number of the several discrete blended learning models shown in Figure 4. Moreover, the models can vary in terms of frequency and intensity of their online components, as shown by the wide bands of each model in the figure. As districts and schools choose which blended learning model (or models) to adopt, they must also make decisions about how to incorporate and implement the models.

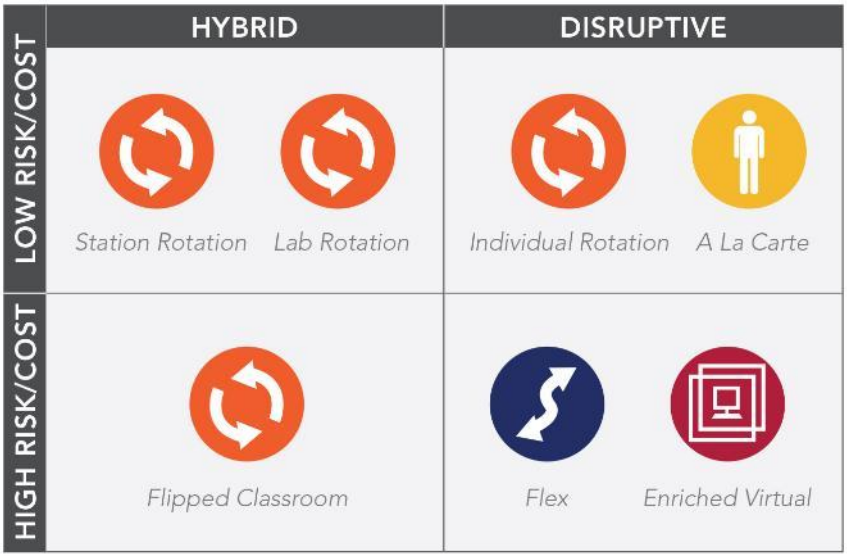
As schools and districts determine the "best fit" models for their contexts, it is important to consider the degree of disruptiveness of those models:

- The station rotation, lab rotation, and flipped classroom versions of the Rotation Model are *hybrid innovations*.
- The Flex Model, A La Carte Model, and Enriched Virtual Model are *disruptive innovations* and are farther to the right on the continuum.[ix]

Assessing the Risks and Costs of Blended Learning Models

It follows that some blended learning models are riskier and more costly than others, due to the degree to which they differ from traditional educational models and the technology needed for implementation. Figure 5 characterizes the models broadly according to risk and cost.

Figure 5. Blended Learning Models, Risk, and Cost



We employ a comprehensive definition of "cost" in Figure 5 that includes not only the straightforward cost in dollars, but also the associated costs of investing student and teacher time in implementing the various models. Each model has a set of characteristics related to both cost and risk, which are detailed below:

- The Station Rotation and Lab Rotation are lower-cost and lower-risk because they utilize technologies that can be more easily incorporated into existing classroom and/or school structures.
- The Individual Rotation and A La Carte models are relatively lower-cost and lower-risk versions of disruptive approaches because they are student-specific strategies that do not necessarily require school- or district-wide systemic change.
- The Flipped Classroom model is in the higher-cost, higher-risk quadrant in Figure 5 because this model requires an investment (whether from students or from the school) in technology that can be accessed from home.
- The Flex and Enriched Virtual models are higher-cost and higher-risk because they require a more significant time commitment from students than do Rotation models that can be implemented on a more limited basis.

We emphasize that high-risk and high-cost models are not inferior to the lower-risk models – a full assessment of the quality of the various options would require estimating the gains to student learning that would result from implementation of each model. Rather, the high-risk/high-cost designation means only that these models will require greater investment, and as such, their benefits must be larger for implementation to be justified. Finally, readers should recognize that there is considerable variability within models, and that the risks and costs of each model will vary depending on existing infrastructure.

Although Figures 4 and 5 depict a straightforward relationship between the various models, it is important to keep in mind the inherent complexities with defining blended learning. Even

within one model, there might be an innovative new technique, product, or approach that might make the model more "disruptive" than another. And the large number of permutations of any one model means that districts looking to implement blended learning approaches have a variety of decisions to make regarding implementation. In the remainder of this brief, we explore the empirical research on blended learning, and then discuss conditions to support implementation, including the barriers to implementation. In these sections, the research does not always parse out or specify the type of blended learning model that was employed; however, we make note of the model wherever possible.

II. Empirical Evidence of the Effectiveness of Blended Learning

As one might expect in a relatively new and evolving area of study, the empirical evidence on the effectiveness of blended learning is thin and is based on differing or vague definitions of the technique. Moreover, few studies have looked at district- or school-wide implementations of specific blended learning models, instead assessing the impact of specific online learning products on student outcomes. An additional complication is that much of the existing evidence was gleaned from college courses or wealthier suburban school districts. It was therefore a challenge to find high-quality evidence that is relevant to urban schools with a low-income population and constrained funding sources.

In compiling evidence for this section, we relied on peer-reviewed journal articles. In order to ensure the relevance of our findings, we omitted articles prior to 2008 and sought out studies that were conducted in places that are at least somewhat similar to Philadelphia. We included evaluations of specific programs and models that might yield information on the efficacy of blended learning as a whole, and excluded promotional pieces that did not contain verifiable or empirical evidence of success. Unfortunately, a very limited number of articles fit these rigorous criteria.

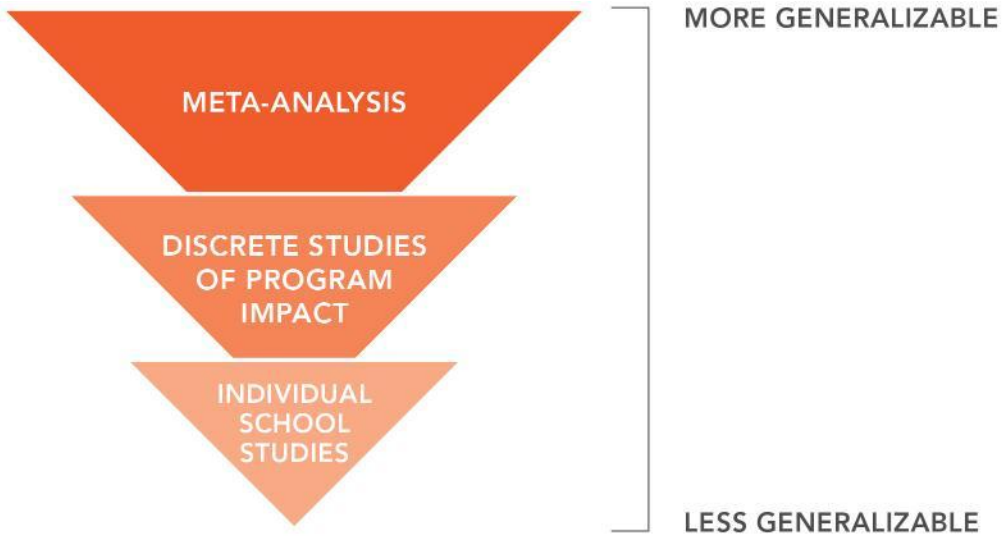
Still, the available evidence provides reasons to be optimistic about the potential for blended learning to improve educational outcomes. Table 4 below summarizes the research discussed in this section. Overall, the evidence on blended learning is encouraging but not nearly comprehensive enough to make firm statements on its efficacy.

Table 4. Summary of Empirical Evidence on Blended Learning Approaches and Models

STUDY	TYPE	FINDINGS	STRENGTH OF EVIDENCE
U.S. Department of Education	Meta-Analysis	0.35 SD improvement in student outcomes	Moderate
Read 180	Several programmatic studies	Positive effects on comprehension and general literacy attainment	Moderate to Strong
Cognitive Tutor Algebra I	Single programmatic study	Positive impact on high school student learning in Algebra I	Moderate
Rocketship Education	School-wide randomized control trial	Modest positive impact on math scores	Weak to Moderate

Below we provide evidence on blended learning at three different levels, moving from the broadest level of impact to the narrowest (see Figure 6):

Figure 6. Levels of Empirical Evidence on Blended Learning



Meta-Analysis of Blended Learning Effects

The most rigorous piece of evidence on blended learning comes from the United States Department of Education, which commissioned a meta-analysis of existing studies of K-12 online and blended learning in 2009, updated by the authors in 2013.[x] The authors were able to identify 45 studies as high-quality, from which they pulled 50 estimates of effectiveness, 23 of which measured the impact of blended learning.

Means and her co-authors define blended learning as "Learning through a combination of online and face-to-face … where students learned 25% or more but not all of the assessed content over the Internet"[xi] Studies that were considered in the meta-analysis met five specific criteria. They:

1) Involved learning over the Internet;
2) Compared varying levels of exposure to online learning;
3) Described a study that had actually been completed, not simply planned;
4) Reported outcomes for treatment and control groups in comparable ways; and,
5) Used either an experimental or quasi-experimental design.

Overall, the 2013 report identified an effect size of 0.35 in the contrast between blended learning and face-to-face instruction, meaning that exposure to blended learning produced an average shift of 0.35 standard deviations in learning outcomes. In a normal distribution, this shift would be enough to move a student at the median (50th percentile) to roughly the 64th percentile, a substantial improvement. However, the number of K-12 estimates included in the study was very small—only five studies encompassing seven effects met the criteria for inclusion. When the authors examined only those seven effects, they did not find a statistically significant effect –

meaning that the observed effects were too small for researchers to state with confidence that there truly was an impact from blended learning programs, given the sample size.

Discrete Studies of Program Impact

Several studies published since the premiere of the DOE meta-analysis may help shed light on this murky picture.

Read 180. The What Works Clearinghouse (WWC) has analyzed very few blended learning programs, but they did conduct a comprehensive review of Read 180, a program currently in use at the School District of Philadelphia.[xii] Read 180 is designed to help students with below-proficient reading levels, and it blends software, direct instruction, and reading material. WWC identified seven studies of Read 180 as meeting evidence standards with reservations, and none that met evidence standards without reservations. These seven studies provided enough evidence of a positive effect that WWC rates the program as having potentially medium to large effects on comprehension and general literacy attainment.

Cognitive Tutor Algebra I. A recent study of another program compared traditionally taught algebra courses with Cognitive Tutor Algebra I (CTAI), a blended learning model that includes software-enabled self-pacing.[xiii] The study, which assessed the program at urban, suburban, and rural high schools and middle schools across the country in back-to-back years, found evidence of success at the high school level in the second year of implementation. This may imply that greater familiarity with the program on the part of teachers led to improved outcomes. The researchers randomized assignment among matched pairs of schools, but allowed treatment schools to choose which students would be assigned to classes in which the program was used. This design choice was meant to be minimally disruptive, and to simulate the way in which schools would assign the program should it be expanded, but it also introduces the possibility that students were strategically assigned in ways that confound the ability to make accurate assessments of the program's impact. Indeed, pre-test scores were substantially lower among the treatment groups at both the high school and middle school levels in both years, implying that counselors and schedule-makers may have non-randomly assigned lower-performing students to treatment classrooms. Still, evidence of success in the second year of the program is encouraging.

Individual School Studies of Blended Learning Effectiveness

Rocketship Education, a charter management organization with schools primarily located in California, has attracted some attention, both positive and negative, for pioneering blended learning models – in particular the lab rotation model. One specific mathematics-focused program called Dreambox was subjected to a randomized control trial evaluation by researchers from SRI International.[xiv] The researchers found modest effects on overall math scores generally, and in measurement and geometry specifically. However, the conditions between treatment and control groups differed in such a way that ascribing the effect to the program or the teaching method is difficult. In particular, while both treatment and control groups received equal amounts of time in a traditional math classroom, the treatment group alone received an additional period of math instruction, in which they used the Dreambox software. This key

difference makes it impossible to prove that the observed effects were a result of blended learning and not simply increased exposure to math instruction.

III. Conditions to Support the Implementation of Blended Learning

Although there is a dearth of high-quality evaluative research on blended learning at this time, there are a considerable number of reports that detail how stakeholders have implemented blended learning interventions, as well as best practices they have gleaned from their experiences. In this section, we highlight those best practices and call attention to some road blocks that can inhibit implementation. We also describe the experience of specific schools and districts that have employed some of these practices. Again, however, we caution that we lack definitive empirical evidence to support these practices.

When considering any new blended learning initiative or supplement, district and charter schools in Philadelphia have a number of critical questions to consider.

- What programs and products will we use?
- How can we create a culture for success school-wide?
- What can the system (either District or charter network) do to support blended learning implementation?

We organize our findings around these questions, addressing first the issues that arise at the programmatic level, and moving through to system-level concerns.

Product/Program Choice: Questions to Consider

In blended learning, as with most education initiatives, there is a wide range of products and programs from which to choose. It is important to establish parameters by which Districts and school administrators can judge the value of the products and program in order to answer the essential question: What do high-quality blended learning computer programs and products look like?

In Table 5 below, we pose a series of questions related to selecting the products and programs that will support blended learning initiatives.

Table 5. Blended Learning Product/Program Checklist

PRODUCT/PROGRAM CHECKLIST	Y	N
Is the product/program aligned to existing curriculum?		
Is the product/program aligned to the blended learning model?		
Can the product/program be supported by existing technology tools?		
Is the product/program a worthy investment from a cost-benefit perspective?		
Does the product/program show evidence of success?		

We explore each issue in greater detail below.

Is the product/program aligned to existing curriculum? As schools and districts grapple with the ever-changing landscape of education curricular reforms, it is important to consider how blended learning products and programs complement or conflict with existing curricula. Specifically, schools and districts can assess whether certain programs contain an integrated curriculum or are meant to complement other externally-created curriculum materials. Schools may also question whether products and programs incorporate standards-aligned assessments and performance tasks.[xv]

Is the product/program aligned to the blended learning model? Not all products and programs are ideal for all types of blended learning models. If the model involves station rotation, for example, the product must work well as a standalone station in the classroom. If, on the other hand, it is meant to be used in a lab environment or off-site, these considerations must be taken into account as well. In the Oakland Unified School District,[xvi] for example, teachers in a blended learning pilot learned that "less is more"—and that committing to a few carefully selected programs allowed them to more strategically implement the district's station rotation model.

Can the product/program be supported by existing technology tools? Many districts and schools already have technology tools in place that are meant to promote a technology-rich learning environment. These may include both hardware (e.g., tablets, handheld devices) and software (e.g., licenses to supplemental instructional programs, membership to online portals). It is therefore important to consider how new products and programs can be integrated into existing resources.[xvii]

In many cases it is not possible to support blended learning programs without purchasing new technology. School districts across the country have often turned to voters or outside funders to supplement these investments. Houston Independent School District, for example, received $8.9 billion in funding from a bond passed by voters in 2012, part of which is devoted to technology improvements.[xviii] Fulton County Schools, which serves a large low-income population in the Atlanta metropolitan area, partnered with a local foundation to help fund innovations at its schools.[xix]

Is the product/program a worthy investment from a cost-benefit perspective? There is great risk in committing to a single product or program, as costs may be high and return on investment is unknown. Many blended learning programs are in Beta form right now, and research is mixed on how some programs impact student outcomes and achievement.[xx] Given the high cost of many new and innovative programs and products, administrators may opt to survey a variety of potential options so that they can compare the features and associated costs of several different options. Criteria to consider during this decision include the length of the license, the cost structure of the license (e.g., per pupil, per device), compatibility with existing programs and tools, and the maintenance required for program/product implementation (e.g., mandatory or voluntary upgrades, technology maintenance requirements).[xxi] Additionally, the cost of the new service can be weighed against the potential for cost savings due to new instructional and staffing configurations.

Potential Barrier: High Cost of Products/Programs

Given the financial constraints on schools and districts, it can be difficult for administrators to budget for new blended learning products or programs. Additionally, the online component to blended learning raises issues about whether the school and district have the necessary infrastructure (both the technology tools and Internet connectivity) to support these new strategies. Getting infrastructure up to speed (literally and figuratively) can be expensive.

One way that some schools and districts are addressing these challenges is by negotiating license deals with publishers. Another strategy is to bypass the publishers altogether by encouraging teachers to access Open Education Resources (OER). OER is online content that is open to everyone, and is available free-of-charge (although some sites may require a user registration). Accessing OER opens many doors for teachers, schools and districts—for example, providing access to learning simulations, social networking sites, wikis, blogs, and virtual learning communities—but it also requires a great degree of time and planning to select the right content and tailor it to lesson plans. Accordingly, districts and school must examine the potential of OER while keeping in mind the blended learning model and goals they hope to pursue.

Source: Brown, J.S. and Adler, R.P (2008). Minds on Fire: Open Education, The Long Tail, and Learning 2.0. Educause Review, 43(1), 16-32.

Does the product/program show evidence of success? Given the lack of high-quality research on blended learning at this time, administrators and practitioners may need to rely on informal reviews of products and programs. These reviews can come either through word-of-mouth recommendations from local colleagues, or from a broader set of users, for example social media or online reviews. Bailey et al. (2013) specifically recommend product reviews from EdSurge, an online resource community for educators and administrators involved in education technology efforts.[xxii]

School-Level Conditions to Support Blended Learning Implementation: Questions to Consider

Although the products and programs that serve as platforms for blended learning are important, perhaps even more important is the school ecosystem that allows blended learning initiatives to thrive. Bailey et al. (2013) posit four critical blended learning implementation components at the school level, which are described below.[xxiii] We include these four components in our checklist (see Table 6), and include an additional component as well, namely that of selecting the appropriate blended learning model(s) for the school.

Table 6. Blended Learning School Checklist

SCHOOL CHECKLIST	Y	N
Has the school settled on a blended learning model?		
Does the school have the appropriate infrastructure to support blended learning initiatives?		
Does the school have a mechanism to support the data management aspect of blended learning?		
Is there a comprehensive plan for professional development and training?		
Does the school have on-site tech support?		

Has the school settled on a blended learning model? Selecting a blended learning model that is aligned to school goals and capacity is a critical first step in blended learning implementation. For example, a flipped classroom model may be appealing for schools, but implementing this model may require technology outlays for students who do not already have the requisite technology or connectivity at home. One report[xxiv] suggests that a station rotation model may be easier to implement in the primary grade levels, where students are used to rotating from activity to activity within a confined classroom environment. On the other hand, a flex model may be integrated more easily into the secondary environment where students are already expected to learn more independently and on divergent schedules. Given its needs and capacity, the Iowa City Community School District, in partnership with the University of Iowa and the Iowa Department of Education, adopted an a la carte model for certain courses such as middle school German. By utilizing interactive web-based video technology and remote access laptops, students could learn the language even if it was not offered at their school.[xxv] Even though the teacher of record was not physically on site, the teacher could access the screen of any student working from a designated remote station and thus, could give real-time feedback to individual students and the entire class.

Does the school have the appropriate infrastructure to support blended learning initiatives? Several infrastructure issues can limit the effectiveness of blended learning in classrooms and schools. One of the biggest is connectivity. Research on blended learning implementation has documented that unreliable internet connectivity, inadequate bandwidth, and technical problems with software programs can hamper blended learning efforts.[xxvi] Although there are some grant funds and programs to support robust Internet access in schools *(e.g.,* the federal E-Rate program) and at home (*e.g.,* the private/non-profit Connect-to-Compete program), the burden of ensuring proper infrastructure to support blended learning still falls mainly on the shoulders of districts and schools. Daily schedules are another consideration, as it may be necessary to make changes to daily course schedules to allow for greater flexibility and personalization within content areas. For example, 90-minute blocks may allow students more time to dive more deeply into course modules and collaborative or inquiry-based projects.[xxvii]

Potential Barrier: Lack of "Next Generation" Data Management Systems

According to blended learning expert Tom Vander Ark, despite the popularity of blended learning, the education sector still lacks data management systems that offer easy, affordable, and comprehensive access to aligned student data. A "next gen" data system, he says, includes the following elements:

- Student services (tutoring, guidance, health, youth and family services);
- Teacher services (professional development, lesson- and tool-sharing);
- School services (implementation support, new school development, and school improvement); and
- Back-office service (enrollment, finance, personnel, and facilities)

Source: Vander Ark, T. (2012). "Why Aren't There Any Next Gen Learning Platforms?" Getting Smart. http://gettingsmart.com/2012/07/why-arent-there-any-next-gen-learning-platforms/

Note of Caution: **The elements listed above are what one expert believes should be included in the next generation of data systems for the education sector. For schools and districts looking to implement blended learning in the near term, however, it is important to consider how existing systems can help support the newly introduced blending learning platforms.**

Does the school have a mechanism to support the data management aspect of blended learning? Most comprehensive blended learning products and programs incorporate what is commonly called a "learning management system"—essentially a portal through which teachers, students, and parents can access information and make informed decisions about student progress. Learning management systems often have built-in tools for teaching and learning, for example a syllabus tool, discussion board, quiz tool, assignment tool, and online grade book.[xxviii] There are many different learning management systems to choose from, but many blended learning products and software already come with built in systems. It is advantageous for schools to consider this additional feature when making decisions about purchasing new products and tools.

Is there a comprehensive plan for professional development and training? Professional development goes beyond simply familiarizing teachers with new software and infrastructure. It also prepares them for broad changes in teaching and learning. The research on quality professional development in teaching, which says that training should be intensive, ongoing, and connected to practice,[xxix] applies to professional development around blended learning as well, and is especially important because the pedagogical approach behind blended learning may be quite different from many teachers' training and current practice.[xxx] Key areas of focus for professional development include: differentiated instruction; classroom management in a rotational model; evaluating resources; and facility with adaptive instruction and tools.

An important consideration for schools is the role of the teacher and supporting staff. As one report puts it, "Blended learning is a team sport."[xxxi] The lead teacher may take on the role of

facilitator, and additional staff, such as paraprofessionals, may provide support to students working independently in the classroom. Since such major changes to classroom arrangements and professional norms might be disconcerting to long-time teachers, integrating blended learning into more traditional school cultures may pose significant school culture challenges for administrators.

Potential Barrier: Classroom Management

Monitoring a classroom and keeping all students on task is always a challenge, but blended learning environments pose particular issues for teachers. While in theory it can be easier for learners to engage in interactive content that is customized to their ability level, the independent nature of blended learning means that things can easily fall through the cracks. In a recent visit to a San Jose Rocketship school, an Education Week reporter noted one child who managed to go 15 minutes without logging on to his computer, and another who stuffed his arms inside his shirt and fell asleep.

In their first-year evaluation of Oakland's blended learning pilot, SRI International found that 50% of teachers felt that "using computers introduces too many management challenges." Four commonly cited strategies for management were defining clear expectations for independent work and use of technology, practicing routines, creating systems for tech support, and using highly visible tracking systems for grades—for example, trackers posted to the classroom wall. The researchers also found that having a second adult in the room made the entire process much easier.

Sources: Woodworth, K., Greenwald, E., Tyler, N., Comstock, M. (2013). Evaluation of the First Year of the Oakland Blended Learning Pilot. Menlo Park, CA: SRI International.
Herold, B. (2014, January 21). "Flexible Classrooms: Blended Learning 2.0?" Education Week.

Does the school have on-site tech support? Having on-site tech support can be critical as schools will inevitably encounter technology-related problems.[xxxii] Doug Levin of the State Educational Technology Directors Association (SETDA) warns policymakers not to "confound instructional tech coaches—focused on helping teachers to use tech well—with tech support, the folks who fix the stuff that breaks."[xxxiii]

System-Level Conditions to Support Blended Learning Implementation: Questions to Consider

System-level support for both traditional public schools and charter schools is an important component of any blended learning implementation plan. District and charter administrators can provide support in four areas: goal alignment, large-scale support, data-sharing agreements, and continuous evaluation and refinement. These four components are included in the checklist for blended learning integration in Table 7.

Table 7. Blended Learning System-Level Checklist

SYSTEM-LEVEL CHECKLIST	Y	N
Are the goals of the blended learning initiative aligned to district and/or charter system goals?		
Is there sufficient capital (human and fiscal) to support blended learning?		
Do data sharing agreements need to be revised?		
Is there a plan to leverage outside partnerships to support blended learning environments?		
Is there a plan for continuous evaluation and refinement?		

Are the goals of the blended learning initiative aligned to district and/or charter system goals? If the goals of blended learning are not directly aligned with the district's strategic plans and student learning goals, there is little hope for the long term sustainability of the work. Districts must consider how blended learning can help accelerate system-wide goals. Included in this assessment is a decision around which blended learning models and permutations will fit best in which particular school environments (including schools, grade levels, and subject areas). Again, there is no one best model of blended learning, and districts often opt for a number of varied approaches that fit specific school environments and student learning needs. For example, under a new superintendent in 2012, Baltimore redesigned its strategic plan to emphasize the role of technology in the classroom, which eased the introduction of blended learning methods.

Potential Barrier: District Culture

Districts can encounter barriers to blended learning implementation if a balance between support, autonomy, and intention is not reached.

The Iredell-Statesville School District in North Carolina is one district that has approached the district culture question in a comprehensive way. First, they aggressively pursued external funds to implement a district-wide blended learning strategy. In 2012 they successfully bid for and won a $20 million U.S. Department of Education Race to the Top award. Next, the district created a detailed roll-out plan, taking care to engage teachers and students in the planning process. The district also deployed coordinators and instructional coaches to develop professional development that was tailored to teacher needs. "We didn't jump the gun and make this about devices," said Superintendent Brady Johnson said. "We made it about blended learning, and then purposefully tailoring professional development to get our teachers ready for that. That's turned out to be a very, very wise decision."

Source: Brenneman, R. (2014, June 18). Betting big on personalized learning. Education Week

Is there sufficient capital (human and fiscal) to support blended learning? District support and capacity, both in terms of human and fiscal capital, is essential to start and sustain blended learning approaches long-term.[xxxiv] For example, the DC Public School District (DCPS) created an office of blended learning that deployed staff to schools to work with teachers on implementing aspects of blended learning in the classroom. DCPS was able to provide this human capital via an initial investment of $750,000 from Google in 2012. Although the district

provided support, they also gave schools autonomy in how they structured blended learning at the school level. Brian Pick, head of the DCPS Office of Teaching and Learning explained, "We believe that ed tech and the blended learning solutions that are out there will help us reach our goals in the short timeline we have."[xxxv]

Do data sharing agreements need to be revised? As the timely use of data is a very important component of most blended learning models, districts may need to consider constraints that may arise from existing data-sharing and privacy agreements. A recent blended learning strategy paper[xxxvi] notes that improved data sharing is important to accurately assess how a given course or program is serving an individual student, but that introducing data-sharing agreements (i.e. between districts and blended learning product/program providers) may pose political difficulties for the district. One good resource for navigating privacy and data-sharing issues is a recent report from the Consortium on School Networking (CoSN),[xxxvii] which offers a step-by-step guide to the Family Education Rights and Privacy Act (FERPA), the Children's Online Privacy Protection Act (COPPA) and other privacy issues.

Is there a plan to leverage outside partnerships to support blended learning environments? In implementing blended learning, schools and district need not do so alone. There is an opportunity to partner with outside partners—for example, the creators of products, programs, and platforms that support blended learning. Partnerships with institutions of higher education, where blended learning approaches are also popular, may be another option. These partnerships may help to align efforts, share best practices and avoid potential pitfalls, and create cost-effective options for the K-12 education sphere. For example, the Elizabeth Forward School District in Elizabeth, Pennsylvania, partnered with Carnegie Mellon University to develop a high school program that teachers 21st century skills using video games.[xxxviii] Iowa City Community Schools has multiple partnerships with the University of Iowa,[xxxix] and Charlottesville, Virginia, teachers receive training at the University of Virginia.[xl]

Is there a plan for continuous evaluation and refinement? Given the dearth of high-quality research on blended learning, districts may need to carefully consider how to assess the effectiveness of blended learning strategies employed in their schools. Learning management systems are one tool schools and districts have used to not only collect summative data on student achievement but also to provide formative feedback to students, parents, and teachers about student progress.[xli]

IV. Next Steps

Although strategy pieces and lessons from select school district point to important conditions to support implementation, there is still much to learn about how blended learning can be used to boost student achievement and spur innovation in the K-12 sector. The three checklists provided in the previous section are intended as a set of prompts for district and charter schools in Philadelphia as they continue to incorporate blended learning into the Philadelphia education ecosystem.

Many of the questions posited above point to the need to continuously learn from the work of others in similar district and charter settings. Accordingly, it will be important to formulate an evaluation strategy that is appropriate for Philadelphia that draws from experiences of similar cities and districts. An important next step in a long-term blended learning agenda would include a mixed-methods study where researchers would:

- Identify blended learning models and high-quality content used in districts that are similar to the Philadelphia context;
- Conduct cost-benefit analysis to assess the feasibility of these models within the Philadelphia context;
- Define the needs to support these models; and
- Recommend one or two models to implement.

This study would likely begin in Fall 2014 and include delivery of a brief that outlines key findings based on the defining features listed in this initial report, recommendations on blended learning models to employ in Philadelphia, and a longer-term implementation research and evaluation plan.

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