In this report, Hanover provides an overview of the current status of blended and online learning, describes the major considerations that a district or school wishing to implement a blended program should take into account, and profiles successful blended learning programs that operate on different basic models.
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Introduction and Key Findings

Introduction

The idea – and practice – of providing instruction through a screen rather than through face-to-face interactions with a teacher is not a new one. During World War II, films were used to train the American military, and in the 1950s and 1960s this medium was used in public schools as part of the curriculum, especially in the social and physical sciences. The low levels of interactivity that this mode of instruction provided, however, precluded its rise as a possible replacement for teachers and books.¹

Early computer-based training was more interactive, and used a technique of “drill and practice” to communicate its content to users. The next step in the progression came in the form of internet-based training, which began its rise in the 1990s. The first article in internet-based training appeared in 1997. Less than a decade later, as a response to concerns that online learning was “not delivering satisfactory results due to the cost and time of developing courses and the inadequacies of the learning process,” blended learning came into being.²

There exist many different definitions of the term “blended learning.” For the purposes of this report, Hanover will use one created by the Innosight Institute, a think tank specializing in education and healthcare research in the framework of Harvard Business School Professor Clayton Christensen’s theories of “disruptive innovation.”³ According to the Innosight Institute:⁴

Blended learning is any time a student learns at least in part at a supervised brick-and-mortar location away from home and at least in part through online delivery with some element of student control over time, place, path, and/or pace.

Other definitions may be more concrete or focus on specific aspects of the content delivery; the Sloan Consortium, for example, specifies that blended courses have between 30 and 79 percent of their content delivered online.⁵

² Ibid.
Regardless of the definition used, many view blended learning as a way of preparing students for the 21st century workplace, which is increasingly based on information and services. Students in blended learning are generally more active and interactive learners than students who partake solely in online courses – they communicate more readily among themselves, with their instructors, and with outside resources. Blended learning also has the potential to be more economical than traditional face-to-face learning, as it requires fewer teachers to supervise students. It comes as no surprise, then, that much of the growth in online courses has occurred in blended-learning environments. Indeed, blended learning is likely to become far more common than face-to-face learning or online learning alone.

In retrospect, the trajectory of blended learning is easy to follow. Online course provision has skyrocketed in the past ten years. In 2000, about 45,000 K-12 students took an online course; in 2009, more than 3 million K-12 students took an online course. Nationally, about 2 percent of all students do some form of online learning, and it has been predicted that by 2019, 50 percent of all high school courses will be delivered online. Parallel to this boom in online learning has been the increasing use of web tools in traditional classrooms. More and more teachers incorporate blogs, online research, and many other internet-based activities into their curricula, unconsciously facilitating a shift towards a blended learning environment, both in the classroom and in their own pedagogies. Multiple trends in separate settings, then, are responsible for the rise of blended learning.

In the pages that follow, Hanover provides an overview of the considerations that an educational entity should take into account when planning the implementation of a blended learning program and examines case studies of successful blended learning programs.

The report is organized as follows:

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6 Ibid., p. 16.
7 Ibid., p. 6.
Section 1:
We compare the effectiveness of purely online curricula with that of blended ones; discuss the logistics of designing a blended learning curriculum and the challenges of implementing it; explain the blended learning environment's potential for increasing minority and high-need student success; and describe in detail the technical and physical aspects of blended learning programs.

Section 2:
Provides an overview of different types of blended learning models, and contains case studies of six successful blended learning programs across the country.

Below we present the key findings from our research.

Key Findings

- Although there are scant data on online learning for K-12 students, a 2010 meta-analysis of online learning studies conducted by the Department of Education showed that students in online conditions performed better than those learning the same material through traditional face-to-face instruction. Additionally, blended learning showed a larger advantage compared to purely face-to-face learning and purely online learning.

- Blended learning has the potential to be more economical than traditional face-to-face learning, as it requires fewer teachers to supervise students.

- The funding of online and blended programs can be complicated, as
  1. Costs do not tend to be constant (there is a high start-up cost),
  2. Costs differ significantly depending on the content and management systems put in place, and
  3. States use different formulas to calculate per-student funding in public schools, and some have special regulations where online learning is concerned.

- Online and blended learning programs are tailored to meet individual student needs, allow students to self-pace, and are often considered more engaging than traditional courses, all of which make them well-suited to promoting the success of minority and high-need students. Blended learning programs are better suited for this purpose than purely online programs, as they are accessible to all students (not just those whose parents are able to supervise them at home) and can be customized to address the needs of students with limited English capabilities.
The implementation of a blended learning program in a school may require a redesign of the space in order to accommodate large numbers of students performing different activities. As a minimum, the blended learning technological infrastructure should include relatively new computers that are able to support multi-media programs and that are connected to the internet.

There are many different ways to implement a blended learning program at the district level – programs vary in size, purpose, curriculum, provider, and structure. A district wishing to implement a blended learning program must also consider possible combinations of service providers including content providers, student information systems, learning management systems, gradebooks, and assessment.

There are six major models into which blended learning providers can be categorized: face-to-face driver, rotation, flex, online lab, self-blend, and online driver. The case study analysis in this report suggests that all of these models may be successful. In particular, the case studies suggest that blended learning and online programs:

- Hold promise to increase achievement and graduation in high-risk and minority students
- Provide opportunities to offer specialized courses like college preparatory and life-skills courses, while at the same time enabling a program to offer credit recovery and other foundational courses
- Are most often at least supplemented with options for in-person technical and academic support, and often include even higher levels of in-person support and/or instruction
- Use a mixture of purchased content and internally developed content
- Can be used for professional development purposes as well as for instructional purposes
Section 1: Blended Curricula

Blended vs. Online Curricula

Online courses are tremendously versatile. They can provide a full suite of subjects, or simply fill in the gaps in a school’s traditional curriculum. They can address the needs of the most advanced students while at the same time meet the needs of those who have the most academic difficulties. Lastly, they can be used as a supplementary tool in traditional, face-to-face courses or in lieu of traditional, face-to-face courses, allowing students to pursue their studies independently of their peers. This last point addresses the distinction between online and blended learning – blended learning includes some traditional, face-to-face instruction, online learning does not.

Below, we provide brief descriptions of the differences between online and blended learning, and the benefits and drawbacks of both approaches to education. Since each category comprises a vast array of different programs, we do not examine any in detail in this section; rather, we provide an overview of the fields, and in Section 2 describe specific models in more detail.

Online Learning

Online learning has been in existence for almost two decades. It is an interactive form of instruction that requires, as a minimum, an internet connection, a computer and access to an e-learning provider on the web.14 Students can access the content from anywhere and, for the most part, at any time of day. The content providers vary significantly, as do the products that they sell; both are discussed in more detail in a later part of this section.

However, it is possible to draw a distinction between two main types of online learning: synchronous and asynchronous.15 Synchronous learning describes a program in which a student group is obliged to work at the same pace; an asynchronous learning format, in contrast, allows students to work at different paces depending on their individual capacity. Programs can have both synchronous and asynchronous components; for example, a program might require both live videochats and independent blog posting. Most online learning is asynchronous, and as a result, according to Chicago Public Schools chief Ron Huberman, online learning “allows the most talented and gifted students to move extra fast and the students struggling to take the time they need to before moving on to the next task.”16

15 Ibid.
Online learning has a number of **benefits** compared to face-to-face teaching, namely:\(^{17}\)

- Students can learn at any time and at any location, so that neither they nor their education provider need to worry about travel time and cost.
- The cost of training the instructor is lower.
- Students can absorb materials in smaller portions, which may be more conducive to processing and retaining information.
- Online programs are scalable, so that they can easily be made to reach a large number of students for a relatively low cost.
- Online programs are consistent. The content does not vary from student to student, as it might from classroom to classroom in a traditional school setting.
- It is easier for students to integrate knowledge by drawing from a number of different sources, much the same way a teacher does when preparing a lecture.\(^{18}\)
- The collaborative process is more efficient, and students may “be able to create a narrative that has intellectual merit.”\(^{19}\)

However, there are also **drawbacks** to online learning. Some of these are:\(^{20}\)

- The lack of in-person interaction with an instructor can make the delivery of content boring.
- The up-front costs of developing an online program can be high.
- It is difficult to use real tools to demonstrate concepts.
- There is minimal in-person interaction with other class members.
- The presentation of material is fragmented; it is difficult to acquire a holistic picture of the learning process.
- There is no universal standardization, so purchasers cannot easily “mix and match” offerings from different providers.

http://search.proquest.com/socialsciences/docview/230717922/1315DECB46B34CC8663/44?accountid =132487

\(^{19}\) Ibid.
Another possible disadvantage of online programs is the “character of the internet itself,” which “subjects users to an extraordinary diversity of signals received through ‘power browsing’ rather than through concentrated learning.” Modern learners are easily distracted, more prone to skimming than reading. It is debatable whether a learning medium that encourages this type of engagement with knowledge is a positive development. Another inherent quality of the internet presents a possible downside of online teaching: the internet is ubiquitous. Since it is possible to access from almost anywhere, online learning makes the divide between work and life unclear. Convenience translates easily into invasiveness.

**Blended Learning**

Blended learning, like online learning, comprises a wide range of learning methods. Some courses use the online component merely to supplement the material that has been covered in class (for example, a teacher might assign online discussions to further develop a topic discussed face-to-face), and others incorporate very little face-to-face time (for example, a student may participate in one hour of small-group discussion and spend the rest of the day completing online coursework independently). However, all blended learning courses require that the teacher approach their role as a guide and/or mentor as opposed to a purveyor of information. Blended learning students are more responsible for their own education than traditional students.

The drawbacks of blended learning are the same as those of online learning. As Liz Pape, the president and CEO of Virtual High School, puts it, “a web-enhanced or hybrid classroom is only as effective as its online site.” But at its best, “blended learning extends teaching and learning beyond the classroom walls, developing critical thinking, problem solving, communication, collaboration and global awareness.”

Some additional benefits of blended learning are:

- Blended learning allows teaching to continue when schools close.
- Students become active learners. They can communicate their needs and interests to their teachers to become more successful.

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22 Ibid.
23 Ibid.
24 Ibid.
Blended learning can mitigate the negative effect of poorly designed online programs with high quality instructor-led sessions.\textsuperscript{30}

In-class settings have proven to be more effective for building and maintaining the relationships that underlie success in the process of reflection.\textsuperscript{31}

Indeed, several studies show that it is the \textit{orchestration of the learning community} that is most important for collaborative knowledge building, rather than the technology used by the students.\textsuperscript{32} Blended learning, unlike online learning, facilitates the creation of these learning communities by requiring interaction between students and their peers and between students and their teachers.

\textit{Comparison of Online and Blended Learning}

Although both online and blended learning have gained in popularity in the past years, blended learning is increasingly popular for two reasons:

1. There is evidence that it is more effective than purely virtual learning or purely face-to-face instruction, and

2. It is available to more students than purely virtual learning.

The latter point is self-evident; in order for students to partake in purely online learning, they need to be able to work somewhere (presumably their home) under adult supervision, which many households cannot provide all the time. \textbf{Blended learning provides both education and supervision}. The former point, on the other hand, is contentious.

In 2010, the Department of Education published a meta-analysis and review of online learning studies, including those that focused on blended learning. One of the major findings of the study is that \textbf{there exists very little research on online learning for K-12 students}. Indeed, between 1994 and July 2008 there were only five experimental or controlled quasi-experimental studies that compared the learning effectiveness of online and face-to-face instruction for K-12 students and provided a satisfactory amount of data.\textsuperscript{33} However, the meta-analysis does summarize the

\begin{itemize}
  \item Mackay and Stockport. Op. cit.
  \item Ibid.
  \item http://www2.ed.gov/rschstat/eval/tech/evidence-based-practices/finalreport.pdf
\end{itemize}
findings across all studies (including, e.g., university settings), and suggests that some findings may be applied to the K-12 sphere with caution.

According to the meta-analysis, “students in online conditions performed modestly better, on average, than those learning the same material through traditional face-to-face instruction.” The effect is greater when students work collaboratively or are led by an instructor than when they work independently. It is important to keep in mind that online and face-to-face conditions differ on several levels; it is difficult to isolate the instruction medium from other circumstances that may give online students an advantage. The finding most relevant to the subject of this report, however, was that blended learning showed a larger advantage compared to both traditional, face-to-face learning and purely online learning. However, it is – again – possible that the medium is not responsible for this, but rather associated circumstances. For example, students in blended programs may spend more time on their studies than other students.

While the Department of Education’s meta-analysis is comprehensive and well-conducted, there do exist reports with conflicting information. Stephen Mackay and Gary Stockport report in the Business Review, Cambridge, that e-learning appears to work as well as or better than classroom or blended learning. Specific experiences also serve to show that there is no guarantee of program success. For example, some districts – among them Manheim Township in Pennsylvania – had a very negative experience with purely online courses. Manheim Township started a virtual high school in 1999; over 30 percent of the students dropped their virtual courses. In order to address what it considered to be the major weakness of online learning – “the lack of structured time for student work” – the district decided to adopt a blended approach, which was much more successful.

34 Ibid., p. 16.
35 Ibid., p. 17.
36 Ibid., p. 17.
http://www.aasa.org/SchoolAdministratorArticle.aspx?id=7926
Scaling Up to the District Level

There are many different types of online and blended learning programs; they vary in size, purpose, curriculum, provider, and structure. A 2009 report by the International Association for K-12 Online Learning defines the following six major categories of program:\(^{40}\)

- **State virtual schools**, which are governed by a state education agency or a nongovernmental agency serving the state.
- **Multi-district virtual schools**, which are operated by education management organizations.
- **Single-district virtual schools**, which are operated by individual school districts.
- **Consortium programs**, which are operated by networks of districts within a state or across several states.
- **University programs**, which are operated by public or private universities.
- **Private and parochial virtual schools**, which are either operated by an existing school or are fully internet-based self-contained entities.

Within these broad categories there is space for nearly infinite variety. To provide just one example of a unique setup, a program developed in Pennsylvania delivers curriculum to students in over 100 school districts that each pay $10,000 annually for 200 student slots. Blended.net, which was developed by teachers from participating districts, not only increases the variety of courses available to students, but does so relatively economically. Since the online students are taught by a rotating group of teachers who are paid by their districts, the only administrative costs are for a staff of four at the central office.\(^{41}\)

Indeed, one of the most appealing characteristics of online and blended learning programs for superintendents is their **potential for lower-cost instruction**. Not only can online-based curricula be less expensive than face-to-face delivery, but arrangements such as that described above give districts the opportunity to collect more funding from the state. **Most programs that take in students from outside their district are paid for serving them.**\(^{42}\)

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\(^{42}\) Ibid.
Funding is, however, a complicated issue in online and blended programs. Most online or blended programs are chartered; in some states, funding for a traditional school and funding for an online/blended school may differ to reflect the perceived cost of the program. For example, in Pennsylvania, a bill was introduced that would base per-student payments on the size of online programs. Online schools with 1,000 or fewer students would receive $5,000 per student; those with 1,001 to 4,999 students would receive $4,000 per student; and those with 5,000 or more students would receive $3,000 per student. Normally, per-student fund at traditional schools in Pennsylvania range from $5,000 to $12,000.43

This bill assumes that online delivery of curricula is less expensive than face-to-face delivery, but in reality, the cost of the program depends heavily on the content provider (we will discuss this in more depth later in the report).44 The early stages of an online program can be particularly expensive—“setting up a program isn’t as simple as connecting to an Internet server and flipping a switch.”45 Online programs also require constant revenues for maintenance and improvement, such as computer upgrades, curriculum development and teacher training. Different states allot funding using different formulas, not all of which take into account these additional expenses of online programs.46 For the same reason, it is possible that blended programs receive more funding than purely online programs; some states pay less per student for online teaching, but blending online and face-to-face teaching may make a district eligible for traditional funding.47

The intradistrict distribution of funds poses yet another challenge. As mentioned above, programs may be structured a number of different ways. Those that are based on a partnership between a district and a company must ensure that the allocations of funds and duties are strictly delineated and realistic. In a program in Waukesha, Wisconsin, for example, the partner company KC Distance Learning wanted an unfeasibly high proportion of the program income: more than half of the state revenues from the program. After a year of operations under this arrangement, the superintendent of the district, Dave Schmidt, negotiated a more sustainable deal, and the different administrative duties were more concretely divided between the district and KC Distance Learning. The duties are now divided as follows: the school district

44 Ibid.
46 Ibid.
47 Ibid.
manages teacher and administrative staff costs, while KC contributes curriculum, technology, computers, administrative support, marketing and software costs.48

This brings us to another consideration: the use of outside companies for content purposes. When designing a district-wide blended learning program, **administrators must decide whether to create course material or purchase it from a vendor. Some districts take a middle road and customize purchased content.** Each of these options presents advantages and disadvantages. Purchased content is usually developed by a team with high levels of expertise in a broad range of subjects; can be more easily updated than self-developed curricula; and has built-in student assessment features that are easy to implement. However, the curricula can be expensive, and are not necessarily closely aligned to state- and district-specific standards.49 In the last part of Section 1 of this report, we describe a number of popular content providers.

**Self-designed curricula,** on the other hand, are more likely to be based on local standards; may involve teachers more than purchased products; and are more flexible in terms of pedagogical philosophy. They do, however, require a good deal of planning and organizing, and a development team with “a mix of teachers, instructional designers, information designers, a solid base of research of learning theory, multimedia experts and technologists.”50 Some schools or districts may not have the human or financial resources to put together such a team.

Regardless of the type of curriculum upon which a district decides, **professional development is an important component of any blended learning program.** Like the curricula, districts can either develop these trainings on their own or purchase courses created by online course providers (an example is **21st Century Teaching Best Practices** released by the VHS Global Consortium).51 Some programs also intentionally make space for teacher collaboration and mentoring, both of which foster “a collegial work environment that encourages teachers to contribute innovative ideas.”52 In order to facilitate this collegial environment, successful programs have:53

- **FLVS uses a co-teaching approach** that mimics some of the techniques being successfully employed in brick and mortar institutions to provide better one-to-one instruction and teacher availability, and a team-teaching approach largely defined by the FLVS teachers themselves. Each teacher team decides how they prefer

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48 Ibid.
50 Ibid., p. 7.
51 Ibid., p. 12.
53 Ibid.
implementing shared instructional tasks, from monthly student phone calls to being on call for student questions, or sharing the tasks of lesson planning and grading duties. All teachers are supported by a team of educators including trainers, content buddies, mentors, instructional coaches, instructional managers and instructional leaders.

- K12 has established a Founder’s Club to recognize outstanding teaching efforts within its community of teachers, and to gather and use feedback from this group to identify and address teacher issues from across the country. Teachers are recognized based on a set of quantitative and qualitative standards. Selected Founder’s Club teachers attend an annual conference and work year-round to help with student retention, socialization and community building, student achievement, parent training and student motivational issues. Feedback from this group and other teachers led K12 to launch a study of high performing teachers.

Equally vital to the success of a blended learning program is the support of its students – not only academic, but also social, technical, and administrative. Some programs, in addition to online teachers and/or on-site instructors that provide real-time academic support to students, also have systems in place to contribute to their social success. For example, USC Hybrid High School, which is still in its planning stages (and which is profiled in Section 2 of this report), proposes to make college-preparatory and life-skill classes available both students and their parents or guardians. Other supportive structures may take the form of a clearly stated set of expectations for teaching practices. Teachers may, for example, be required to respond to student e-mail within 24 hours.54 The student support network at a blended program is often multifaceted and complex, but its effectiveness hinges almost entirely on one aspect: communication.55 The better access students have to their teachers, mentors, and counselors, the greater their chance of success.

Reaching Minority and High-Need Students

Many proponents of online learning laud its potential to increase access to high quality courses and teachers, especially for historically underserved students. Minority and high-need, or at-risk, students fall into this category. High-need students are those at highest risk of dropping out of school for any number of academic or non-academic reasons. These students tend to have certain characteristics in common, and a number of indicators help identify them early, namely: pregnancy; having incarcerated parents; having parents with a history of drug or alcohol abuse; having low socio-economic status; coming from a single-parent family; having an older sibling who dropped out of school; having changed schools two or more times; having an average grade of “C” or lower from 6th to 8th grade; and having repeated a grade.56

54 Ibid., p. 13.
55 Ibid., p. 18.
While the categories of minority and high-need students may overlap, not all minority students are at risk of dropping out, and not all high-need students have minority status. However, the dropout rates of minority students do tend to be much higher than average. According to a recent report, “nearly one third of all public high school students – and nearly one half of all African Americans, Hispanics and Native Americans – fail to graduate from public high school with their class.”

Leaving high school early is a problem on many different levels. Individuals who drop out from school stand to make, on average, $9,200 less per year than their graduated counterparts; on an individual level, their chances of leading successful careers are severely diminished. Society at large also suffers from high drop-out rates; it “would reap $45 billion in extra tax revenues and reduced costs in public health, crime, and welfare payments if the number of high school dropouts among 20-year-olds in the U.S. today were cut in half.”

Over the years, many programs have been developed in an attempt to curb the number of high school dropouts. These programs usually take one of three forms: supplemental services for at-risk students; different forms of alternative education for students who do not succeed in traditional classrooms; and/or school-wide restructuring efforts for all students. Many at-risk students also participate in credit recovery programs, which, in different formats, may fall into either of the first two categories. Historically, however, many of these credit recovery programs have not differed significantly from the programs in which the students originally failed. Susan Patrick, the CEO of the North American Council for Online Learning, says, “The options for earning credit towards graduation are often limited to using the same book, often with the same teacher, within the same seat time approach.”

Recently, online learning has been embraced as a promising alternative practice for addressing the needs of at-risk students; indeed, online courses that are geared towards credit recovery are now very common. Even online courses in conventional subjects, though, share a number of characteristics that make them particularly well-suited to high-need students:


57 Ibid., p. 6.
58 Ibid., pp. 6-7.
59 Ibid., p. 8.
First, online programs are tailored to meet individual student needs.

- This means that students who have completed some but not all of the coursework for a class that they have failed to pass do not need to repeat the work that they have already done; the program meets them at their competency level.

Secondly, online programs are self-paced.

- Students can progress at a comfortable speed and remain interested in the subject matter.

Finally, many students find online courses more engaging than traditional courses, as they convey information through animation, video, simulations and other stimulating formats.

Another advantage of online programs is that they can be easily made to assess pre-versus post-program gains, as opposed to absolute attainment level, which is particularly useful for the students who have historically struggled most.61

Online learning has great potential for promoting the success of high-need students, but blended learning programs are even better suited for this purpose. In fact, most online programs serving credit recovery and high-need students have a face-to-face component.62 There are several reasons for this. Purely online learning is not a feasible option for two-working parent families, as a caretaker generally needs to stay at home to watch over the student. Blended learning programs, on the other hand, can be accessible to all students; since they often provide students with a physical space to learn in, they fill both the educational and supervisory roles.63 Also, some blended learning programs have directly addressed the needs of students with limited English abilities through their technological platforms. Leadership Public Schools, for example, has incorporated into its College Access Readers text-to-speech features and translation from English to Spanish.64 These Readers, and Leadership Public Schools, are described in more detail in Section 2 of this report.

http://www.hepg.org/hel/article/506#home
Both online and blended learning programs have the potential to serve minority and high-need students in ways that traditional programs cannot. Indeed, many are already doing so. Florida Virtual Schools, for example, which has a total of nearly 100,000 students in 67 Florida districts, serves a higher number of minority and low-income students than the general population.\(^6^5\)

**Technology and Infrastructure Needs**

When designing a blended learning center, two major considerations must be taken into account: the physical space where the learning is primarily to take place, and the technology that will support the learning.

James Rydeen, an architect and facility planning specialist, describes the ideal blended learning space as one that provides **freedom of access and interaction with peers**. Learning spaces should be “comfortable with good acoustics, accessibility, security, lighting and air quality,” and also flexible, i.e. accommodating groups of varying size performing different activities.\(^6^6\) Students will be using the same space, or different parts of the same space, for individual work, group work, presentations, labs, and other activities; since it is likely that modes of learning delivery will continue evolving, the space should also be **easily adaptable**.

These guidelines pose a **challenge to schools or districts that are hoping to convert existing buildings into blended learning centers**. Many existing school buildings were designed to accommodate one specific type of learning: lectures in a classroom. Thus, they tend to be structured around hallways that are lined with classrooms on either side. Generally, though, **walls between classrooms can be removed to create a single and larger workspace, which not only accommodates more students, but also makes them easier to supervise with fewer staff**. This is preferable to many smaller learning spaces scattered throughout the building.\(^6^7\) The process of converting a traditional school building into one more suited for blended learning can be gradual. Some schools may at first designate part of their space for blended learning and then expand blended learning into other parts of the building; others may choose to limit their blended learning offering to a single room.

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\(^{67}\) Ibid.
The figure below illustrates alternative ways of organizing a classroom to incorporate new kinds of technology and instructional methods.

**New Design of Schools (School of One)**

Source: Architectural Record

Whatever the physical layout of the space, a solid technological foundation is essential for the success of a blended learning program. **As a minimum, the blended learning space should have relatively new computers that are able to support multi-media programs and that are connected to the internet.** One online curriculum provider suggests the following technical specifications:68

<table>
<thead>
<tr>
<th><strong>Browser</strong></th>
<th>✓ Firefox 2.x or higher</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>✓ Internet Explorer 6.x or higher</td>
</tr>
<tr>
<td></td>
<td>✓ Safari 3.x or higher</td>
</tr>
<tr>
<td><strong>Operating Systems</strong></td>
<td>✓ Windows XP</td>
</tr>
<tr>
<td></td>
<td>✓ Windows Vista</td>
</tr>
<tr>
<td></td>
<td>✓ Macintosh OSX</td>
</tr>
<tr>
<td><strong>Ram</strong></td>
<td>✓ 256 MB</td>
</tr>
<tr>
<td><strong>Screen Resolution</strong></td>
<td>✓ 800 x 600</td>
</tr>
<tr>
<td><strong>Media</strong></td>
<td>✓ Soundcard and speakers/headphones</td>
</tr>
<tr>
<td></td>
<td>✓ Microphone (required for certain courses)</td>
</tr>
<tr>
<td><strong>Plugins</strong></td>
<td>✓ Sun Java Runtime Environment 1.4 or higher</td>
</tr>
<tr>
<td></td>
<td>✓ Flash Player Version 9.0 or higher</td>
</tr>
<tr>
<td></td>
<td>✓ QuickTime Version 7.1 or higher</td>
</tr>
<tr>
<td></td>
<td>✓ Real Player (required for certain courses)</td>
</tr>
</tbody>
</table>

While technical specifications may vary depending on the provider and content of the courses, the ones listed above give a reasonable idea of the basic infrastructure required for blended learning.

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There exist hundreds of products that provide the services necessary to run a successful blended learning program. These services can be divided into five general categories:

- **Content Providers**: Companies or organizations that develop the online curricula and (usually) deliver them to students. This service is often made available to both educators (districts and schools, large-scale) and individual students who wish to purchase individual courses.

- **Student Information Systems**: Software used to manage student data, such as test scores and schedules.

- **Learning Management Systems**: Software used to manage, deliver, track and report training and online learning programs.

- **Gradebooks**: Software used to store and organize student grades.

- **Assessment**: Software used to measure students’ pre- and post-course knowledge and ability.

A report published by the Innosight Institute profiles forty organizations, including schools and school districts, that provide blended learning to their consumers. The report lists the most commonly used technologies employed by these forty programs; we present those products used by two or more organizations in the table below. *The companies/products with the greatest presence appear in italic text.*

### Technology Used at Forty Profiled Organizations That Offer Blended Learning

<table>
<thead>
<tr>
<th>Technology</th>
<th>Products</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Content Providers</strong></td>
<td>Apex Learning, Aventa Learning (K12), NROC HippoCampus, K12, Rosetta Stone, Achieve 3000, ALEKS, Connections Academy, Dreambox Learning, e2020, Edison Learning, Florida Virtual School, Headsprout, Michigan Virtual School</td>
</tr>
<tr>
<td><strong>Student Information Systems</strong></td>
<td>PowerSchool (Pearson), Aeries, K12, Acuity (McGraw-Hill), ATS, STARS</td>
</tr>
<tr>
<td><strong>Learning Management Systems</strong></td>
<td>Blackboard, Moodle</td>
</tr>
<tr>
<td><strong>Gradebooks</strong></td>
<td>Blackboard, PowerSchool (Pearson)</td>
</tr>
<tr>
<td><strong>Assessment</strong></td>
<td>NWEA MAP, Blackboard</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Other Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adobe Connect Professional, ANGEL Learning, Centra Symposium (Saba), Elluminate, Explore Learning Gizmos, Filemaker Pro, Geometer’s Sketchpad, Google Education Network, iPad apps, Mobile phones, Q2L social network, SMART Technologies, SMARTTHINKING, Suvery Monkey, uBoost, WebEx, Wimba Pronto, Wireless Generation</td>
</tr>
</tbody>
</table>


Individual organizations use **different combinations of these programs to meet their needs**. Indeed, some use multiple products in the same category; School of One, for example, uses more than 50 content providers in all.⁷⁰

As an example of the multi-product systems that support online learning, **Broward County Public Schools**, the sixth largest school district in the nation, recently redesigned its business system to improve all aspects of management and training. Broward’s Innovative Tool for Education (BRITE) runs on a SAP 6.0 platform but also uses “robust technologies such as Remedy Incident Management System, Blackboard Academic Suite, Elluminate Live!, Trainer Blogs, Camtasia Studio screen recorder and presentation software, an interactive project Web site using Web application programming interfaces, and LANDesk software” in order to accomplish its work.⁷¹ As the names of several of the products suggest, part of BRITE’s mission is to provide Broward’s employees with training. For this purpose it employs the services of the Blackboard Academic Suite, Elluminate Live!, a blog, and Camtasia Studio – the first two of which appear in the table above.

Below we describe in greater detail the products most commonly used in blended learning programs.

**Apex Learning**

Apex Learning is a **provider of digital curricula** in high school math, science, English, social studies, world languages and certain electives. It offers these courses through several different “pathways.”⁷²

- **Foundations Courses**: Geared towards middle and high school students who are behind grade level

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⁷⁰ Ibid., p. 161.
General Studies Courses (which include Literary Advantage Courses, Core Courses, and Honors Courses): Created to meet the needs of students who are on-track academically

Advanced Placement Courses

Exam Prep Courses: Designed to improve performance on the AP, Arizona AIMS, California CAHSEE, Florida FCAT, and Texas TAKS standardized tests

Apex Learning has a built-in learning management system that includes course calendars, student integrity checks, and the opportunity for teachers to tailor courses to meet the needs of individual students. Also, student performance and progress are automatically entered into an online gradebook that is accessible to teachers.

According to its website, Apex Learning has served one million students in 50 states and 72 countries across the world since 1999. Since it sells its products to both educators and individual students and parents, its reach is broad.

Aventa Learning (K12)

Aventa Learning, part of K12, Inc., the nation’s leading producer of proprietary curriculum and online education programs for K-12 students, is a provider of digital curricula in middle and high school math, social studies, science, technology, and world languages. It offers courses for students at grade level as well as credit recovery and Advanced Placement courses. The courses are tailored state-by-state to ensure that specific standards are being met.

Aventa Learning delivers its online courses and content (which includes tests, communication tools, grades and progress reports) through an external web-based Learning Management System; its products are compatible with Blackboard, eCollege, Moodle, Desire2Learn, ANGEL, and several other systems.

Unlike Apex Learning, Aventa Learning sells its products only to schools and districts, and not to individual students and parents. According to its website, Aventa Learning served more than a thousand school districts in 2010 and worked
with over 72,000 students. Aventa Learning also has experience implementing blended learning programs, especially for at-risk or highly advanced students.

**NROC HippoCampus**

The National Repository of Online Courses (NROC) is a library of online course content for students and faculty in high school and higher education. Created by the Monterey Institute for Technology and Education (MITE), it offers digital educational content donated by various institutions to organizations such as schools, districts, or state departments of education on a membership basis. The membership fee is priced based on the size of the organization. Organizations with fewer than 3,000 students pay $3,000 for a year-long membership; those with 3,000 – 4,999 students pay $4,000; those with 5,000 – 9,999 students pay $5,000; and so on.

The same content is available free of charge to individual high school and college students through the website HippoCampus. Courses are available in math, history, science, psychology, religion, and statistics at a number of different academic levels, ranging from Foundations Courses to Advanced Placement courses. Since HippoCampus is not a school, completion of courses does not result in credit; a representative states that they “provide the content at our websites for self-improvement only as part of our mission.” Furthermore, HippoCampus does not employ tutors or educational staff to provide guidance and track student progress. The website is not intended to provide comprehensive educational services the same way Apex and Aventa do.

**K12**

K12, Inc. is a provider of a diverse array of online educational content for students in grades K – 12. Among its products are Aventa Learning, which is profiled above. K12 provides online public schooling through virtual schools in in different states. Its high school-level math, English, science and history courses are offered in six different levels, namely Core, Comprehensive, Honors, Advanced Placement, Remediation, and Credit Recovery; language, technology, and miscellaneous elective courses are also available. Languages include some less-common offerings such as Japanese, Chinese, and Latin.

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K12 also produces administrative tools such as a learning management system and a student administration management system (which combines the features of a Student Information System and a gradebook). An additional service provided by K12 is Total View Schools, an internal communications network for students, parents and educational staff.\(^{82}\)

According to its website, K12 products have delivered over one million courses since its founding. The implementation of these courses is flexible; they can be used in a variety of blended learning contexts, and K12 emphasizes its experience with this type of arrangement.\(^{83}\) Furthermore, K12 courses can be purchased for credit or for no credit, and with or without K12 teacher support and supplemental materials; all of these options have different corresponding prices, which gives institutions flexibility when allotting their budget.

**Rosetta Stone**

Rosetta Stone is a provider of courses in over 30 different languages. It caters to a variety of clients, from individuals who wish to learn a new language for personal reasons to government organizations to educational institutions, such as school districts and universities. At high schools, Rosetta Stone can be used either to complement teacher-led classroom teaching or to give students the opportunity to learn independently. Its ESL program also makes it a promising option for English Language Learners. In fact, Rosetta Stone meets the criteria for ARRA stimulus funds through its support of limited English proficient students, which means that schools could apply for federal funds to implement its programs.\(^{84}\)

In addition to its language content courses, Rosetta Stone produces a management tool called Rosetta Stone Manager. This system tracks and reports student progress, and allows teachers to customize individual students’ or classes’ learning plans to better reflect their needs and goals.\(^{85}\)

**PowerSchool (Pearson)**

PowerSchool, a Pearson product, is a web-based student information system. Its thousands of pages and functions allow teachers and parents to perform a large number of management tasks, including: accessing real-time grades and attendance information; creating reports to present educational data at the classroom, school and


district levels; transferring student records and transcripts; managing addresses and confirming that students reside within district boundaries; managing family information; managing health information (such as health screenings and immunization screenings); and many more. 

According to its website, PowerSchool is used in all 50 states and 65 countries, and supports nearly 10 million students worldwide.

*Aeries*

Aeries is a multifaceted student information system that uses a centralized SQL database that most users can access via the internet. The full suite of Aeries products allows teachers, nurses, system administrators, counselors and office clerks to access and input information about student attendance; grades; schedule; discipline records; medical histories, and more from any computer with a modern web browser. Parents and students also have access to much of this information, and the system allows students to keep track of their assignments and request courses online. Aeries is compatible with handheld devices, such as iPhones and iPads. Also, the system can be implemented in both large and small districts, even ones with limited internet connectivity.

According to its website, Aeries is California’s most popular student information system and is in use in over 530 California school districts and education agencies.

*Blackboard Academic Suite*

Blackboard is a provider of a number of different services; it incorporates gradebooks and assessment into its learning management system, and specializes in online and blended learning programs. Blackboard, and more specifically its academically-focused branch Blackboard Learn, supports “more than 90 applications specific to teaching and learning including locally-developed software and open-source technologies, in addition to all of the leading commercial applications.” Blackboard works with these applications to provide platforms for grading, course management, and collaborative content management. In addition to

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facilitating the delivery of online courses, Blackboard collects data about student learning outcomes and provides teachers and institutions with the tools necessary to analyze and interpret them.

Blackboard’s products are used around the world by educational institutions, corporations, the government, and the military. Its presence in the academic sphere is strong.

**Moodle**

Moodle is a free web-based learning management system used by many institutions to conduct fully online courses or supplement face-to-face courses. It is an extremely versatile system; once installed on a web server, it can be used to create dynamic websites, forums, databases, and wikis for students, and also as a platform for delivering assignments and assessing learning through quizzes. Mood can be scaled to serve the needs of educational organizations of any size, from districts serving thousands of students to individual schools. Though its services are free, Moodle partners with specific companies across the globe who can provide additional support in implementing the learning management system. There are, for example, 29 consulting companies worldwide that specialize in developing and structuring online courses through Moodle.

According to its website, Moodle is used by over a million teachers in over 200 countries.

**NWEA MAP**

The Northwest Evaluation Association (NWEA) is a not-for-profit organization that specializes in student assessment. It provides schools and districts with computerized adaptive tests called Measure of Academic Progress (MAP), which assess student learning in reading, mathematics, language usage, and science. These tests are aligned with state standards and allow teachers to identify areas of weakness in specific students or classrooms throughout the year. They can use the information to better prepare their students for standardized tests, as well as for the purposes of instructional planning. NWEA facilitates this process by hosting professional development workshops, online courses, and conferences, and also by

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93 Ibid.
making available instructional materials that guide teachers through the full assessment process.

According to its website, NWEA has performed 24 million assessments, and is used by more than 1,200 school districts and educational agencies.97

Section 2: Case Studies of Successful Virtual Academies

There are many different models of blended learning. In its report profiling forty blended learning organizations, Innosight Institute lists six general models into which these organizations can be categorized. The table below presents general descriptions of these models and the name of one school/district in each category that is profiled in this section of the report. We also profile a case study that examines the use of a blended learning system to provide teacher professional development.

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Case study</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Face-to-Face Driver</td>
<td>Teachers deliver most of the curricula face-to-face but deploy online learning on a case-by-case basis to supplement or remediate. Online learning is usually delivered in the back of the classroom or in a technology lab.</td>
<td>Leadership Public Schools</td>
</tr>
<tr>
<td>2. Rotation</td>
<td>Students rotate between self-paced online learning and face-to-face class time with a teacher. The online learning can take place remotely or on-site, and is usually overseen by the face-to-face teacher.</td>
<td>Chicago Public Schools – VOISE Academy</td>
</tr>
<tr>
<td>3. Flex</td>
<td>An online platform delivers most of the curricula. Teachers provide on-site support as needed through tutoring and small group sessions. This model is commonly used for dropout- and credit-recovery programs.</td>
<td>USC Hybrid High School</td>
</tr>
<tr>
<td>4. Online Lab</td>
<td>An online platform delivers the entire course on-site in a lab environment. The courses are usually guided by online teachers, and the lab is supervised by a paraprofessional. Students participating in an online lab program often take traditional courses in addition.</td>
<td>ACCESS Distance Learning</td>
</tr>
<tr>
<td>5. Self-Blend</td>
<td>Students supplement their traditional learning with online courses completed remotely. This is a very common form of blended learning among American high school students.</td>
<td>(Same as above. All virtual schools that offer a la carte courses to individual students enable self-blended learning.)</td>
</tr>
<tr>
<td>6. Online Driver</td>
<td>An online platform and teacher deliver all curricula. Students work remotely, and may or may not have occasional face-to-face check-ins. These programs may also offer offline activities.</td>
<td>Riverside Virtual School</td>
</tr>
</tbody>
</table>


Leadership Public Schools

Leadership Public Schools (LPS) is a network of public charter high schools headquartered in Oakland, California. It operates four public charter high schools, serving over 1,500 students total. Many of these students – from 57 to 89 percent at the four schools – are low-income, and 70 percent are Latino, a large number of which are English language learners. LPS’s primary goal is “to prepare 100 percent of our graduating students to succeed in college and beyond.” Its entire curriculum is structured around the theme of college preparedness.

LPS’s academic program is an example of a blended learning model with a face-to-face driver. Since students who arrive tend to be significantly behind grade level in reading, a text-heavy online curriculum that depends on an individual student’s independent learning ability was not a viable alternative or supplement to classroom teaching. Instead, LPS implemented an innovative product developed in partnership with the CK-12 Foundation, which specializes in the publication of open (and generally free) online-accessible textbooks in many different subjects. LPS’s “College Access Readers” consist of CK-12 textbooks that have been edited by school administrators in order to include California Content Standards and language assistance for students who struggle with English and/or reading. The Readers include, for example, text-to-speech features and translation from English to Spanish for recent immigrants.

Unfortunately, LPS currently lacks the resources to provide each student with a digital device that would allow individual access to Reader content, but teachers present the customized material using projectors in their classrooms or printouts. It is hoped that by 2012, the Readers will be fully integrated into curricula for all subjects at all student ability levels, and that eventually students will be able to use them for self-paced learning. Because this model of blended learning has only existed at LPS schools since the fall of 2010, there are not enough data on student outcomes to judge its effectiveness. However, as an institution, LPS has met with great success. According to its website, 97 percent of LPS graduates across the district’s four schools have been accepted to college. Eighty-five percent of these are first generation college students.

Chicago Public Schools – VOISE Academy

Chicago Public Schools offers online programs for students of all ages in almost all of its schools. This is a fairly recent development; in 2008, only “a handful of high schools” offered courses online, but just two years later, all of them did. One of these schools is VOISE Academy High School, formerly Austin Community High School. VOISE stands for “Virtual Opportunities Inside a School Environment,” which indicates the pedagogical emphasis of the school. VOISE has an enrollment of 550 students, approximately 70 percent of which are African American and 10 percent of which have special needs. Most students enter VOISE at a 4th-grade reading level and 5th-grade math level.

VOISE operates on the rotation model of blended learning. Students follow a curriculum designed by Apex Learning (profiled in Section 1), working alone at their laptops 80 percent of the time and participating in teacher-led instruction the other 20 percent of the time. Teachers use this face-to-face time in different ways; some prepare students for their online lessons by introducing key concepts ahead of time, and others engage their students in creative activities, such as web page design.

Although VOISE is only in its third year, some measures suggest that its educational model is delivering above-average student outcome results. For example, VOISE’s freshman on-track rate was 90 percent last year, which is more than 20 percent higher than Chicago’s average freshman on-track rate. Another indicator of success – one that is commonly used to rate charter schools – is community demand for VOISE. In 2010, the school received 650 applications for 135 seats in the 2011-12 9th grade class.

110 Ibid., p. 152.
111 Ibid., p. 152.
112 Ibid., pp. 152-153.
USC Hybrid High School

USC Hybrid High School is slated to open in Los Angeles, California with about 150 9th-graders in fall of 2012, and will, if all goes according to plan, expand until it enrolls approximately 600 students in ninth through twelfth grades. These students will be primarily ones who have been identified as at high risk of dropping out.

USC Hybrid High operates on a flex model of blended learning. Learning will primarily take place through online courses, but on-site staff will facilitate the process. Its facility, where students will have access to instructors and advisors, will be open seven days a week, 10 hours a day and 50 weeks a year in order to accommodate the schedules of its students. Many of these students have significant time commitments outside of class; work or caring for family members compete with education under normal circumstances. At USC Hybrid High, however, their schedules are much more flexible.

The curriculum content, provided by Apex Learning, will be delivered in four subject-specific learning labs (math, science, language arts, and social studies). In addition to the online master teachers included in the Apex Learning product, students will receive guidance from face-to-face teachers and mentors, with whom they will meet every seven to 10 days. Counseling and social work services, as well as college-preparatory and life-skill classes, will be offered to both students and their parents or guardians. Also, USC Hybrid High will encourage students to participate in on-site extracurricular activities, such as sports and dance, and to lead service activities in the surrounding community.

As it has yet to open its doors, the effectiveness of USC Hybrid High's innovative model has not been tested.

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http://uscnews.usc.edu/university/introducing_a_high_school_like_no_other.html

114 Ibid.
116 Ibid.
ACCESS Distance Learning

ACCESS Distance Learning is a distance learning program operated by the Alabama State Department of Education. It was launched in 2004 in the hopes of providing “equal access to high quality instruction; an infrastructure that delivers quality learning opportunities; and greater equity for all Alabama public high school students through 21st century technology.”117 It is available to all Alabama public high school students, approximately 9,000 of whom have participated in the program annually in 174 different high schools since the program’s inception. The total enrollment in ACCESS online courses, counting students in 8th through 12th grades, is over 41,000.118 These students participate in ACCESS for a variety of reasons; some participate in credit recovery classes, while others take advantage of the College Board-approved Advanced Placement classes.

ACCESS’s content is in-part original (25 of its courses are self-created) and in-part purchased from the Florida Virtual School and Aventa Learning, which provided 32 and 13 courses, respectively. In addition to designing and delivering the curriculum, the state has trained over 600 teachers in online course delivery.119 Training and general network support are managed by three Support Centers based in Madison City Schools, the University of Alabama, and Troy University.120

ACCESS courses are delivered either in an online lab in the school building or at students’ homes. The online labs are referred to by the program as “21st Century Classrooms,” many of which were funded in part by state grants ranging from $50,000 to $85,000.121 A 21st Century Classroom comprises:

- a codec (which compresses and decompresses data);
- cameras;
- monitors and/or projectors;
- interactive whiteboards;
- a minimum of 25 tablet computers; and
- a wireless port or router.

One of the main goals of ACCESS is to install a 21st Century Classroom in every high school in the state. Most students participating in the ACCESS program do so as a supplement to traditional, face-to-face courses; indeed, most ACCESS online teaching staff, which must be both Alabama certified and “highly qualified” by

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120 “Resources.” ACCESS Distance Learning. http://accessdl.state.al.us/Resources.html
federal standards, work as regular teachers during the day. They receive $150 per student per half-credit.122

The ACCESS program has met with great success; by 2010, it was the third-largest virtual school in the country and was responsible for doubling the number of AP test takers in Alabama public schools from 2004.123 It continues to expand its services, and one of its primary goals for the near future is to have the capacity to serve 45,000 students.124

**Riverside Virtual School**

Based in Southern California, Riverside Virtual School (RVS) offers online courses to students in 6th through 12th grades within the five-county Southern California area as an extension of the instructional program of the Riverside Unified School District. These students may participate in the program full- or part-time; neither status precludes the possibility of taking classes at a traditional school. In the 2009-10 school year, RVS saw over 3,661 course enrollments, though only about 10 percent of the students that take RVS courses are enrolled full-time.125

Riverside Virtual School is based entirely on an online curriculum and online delivery. The content was purchased from Aventa Learning and other providers, but then reconfigured to meet state and district standards. Students take courses from their home computers, but are required to connect with teachers throughout the week, either face-to-face at the Educational Options Center (a physical base for the program) or via e-mail or videoconferencing.126 Both students and parents have the option to drop in at help desk hours held at either the Center or a computer lab in one of the district’s high schools; this kind of in-person support is available five days a week for two hours.127

The total impact of RVS is as yet unclear. Its full-time students have the highest Academic Proficiency Index scores (which are based in large part on California standardized tests) in the district, but data on part-time students are incomplete. It is likely, however, that many students are taking advantage of RVS to take higher-level courses that would otherwise be inaccessible to them.128

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122 Ibid.
126 Ibid.
Broward County Public Schools BRITE System

Broward County Public Schools uses its BRITE system for the purposes of professional development. Specifically, the district had to train approximately 40,000 employees in the new SAP 6.0 system within a limited period of time. In order to do so, it made available a number of interlinked web-based tools that provided employees with a comprehensive support network. Among these were:129

- Online courses delivered through the Blackboard Academic Suite platform in preparation for face-to-face courses in a training lab.
- “Just-in-time” training offered to individuals via the electronic tool Elluminate Live!, which allows instructors to provide live remote training to large numbers of students.
- An online training library, which employees could reference after face-to-face or Elluminate Live! sessions.
- A training blog maintained by the trainers and accessible to all employees, which was used to publish important information instantaneously.
- Videos created in Camtasia Studio showing processes SAP conducted on a computer screen. These could be edited and synchronized with videos of presenters to create a more human connection.
- A support team consisting of approximately 275 “go to” people distributed among the school zones and major department areas.

The multifaceted approach to blended learning was aimed to help develop a “sense of community for our SAP 6.0 district end users” and “promote each community member to be responsible for contributing information to the rest of the users.”130

This case study from Broward suggests that blended learning programs hold promise for professional development and networking opportunities, as well as for instruction.

130 Ibid.
Project Evaluation Form

Hanover Research is committed to providing a work product that meets or exceeds member expectations. In keeping with that goal, we would like to hear your opinions regarding our reports. Feedback is critically important and serves as the strongest mechanism by which we tailor our research to your organization. When you have had a chance to evaluate this report, please take a moment to fill out the following questionnaire.


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