Chapter One

How Did We Get Here?

The History of Blended Learning

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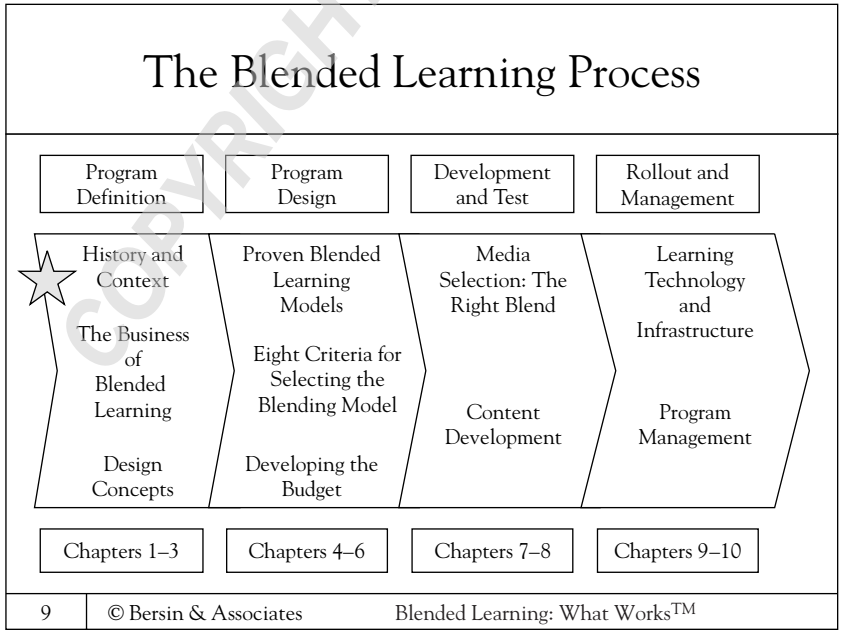
It is important to look at blended learning in perspective. This chapter looks at the history of technology-based training (see Figure 1.1). If you are itching to get into the business of blended learning, you could choose to skip this chapter, but remember to come back and read it later. We will refer to many of these principles throughout the book.

Figure 1.1. Where We Are



The Evolution of Technology-Based Training

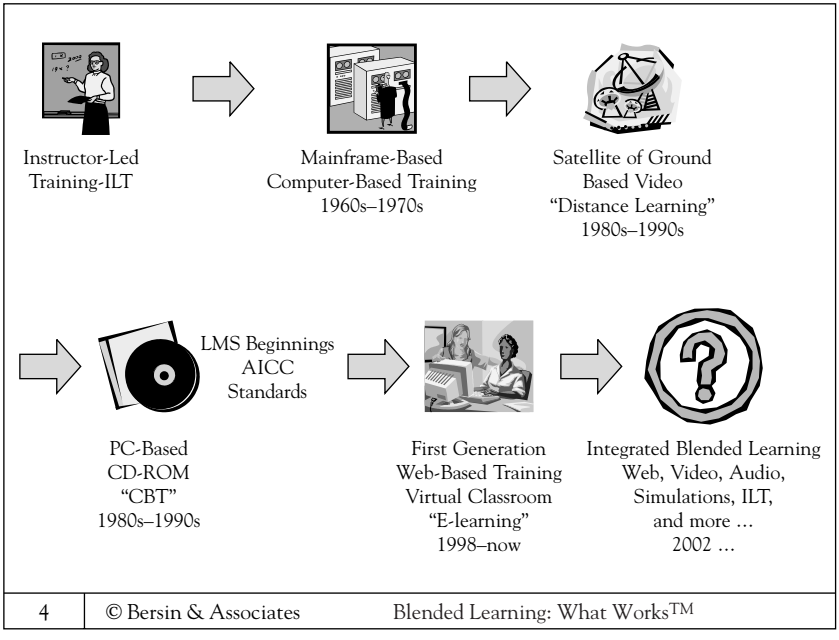
Blended learning is the latest step in a long history of technology-based training. What we describe in this book is the continuation of thirty years of experience using technology for training and education. Although this evolution is far from over, where we are today is an important place, built on several major steps and learnings in this exciting industry. This short chapter on history will prevent us from having to "relearn" what has been learned before.

In the evolutionary steps which led us to where we are today, we start with traditional instructor-led training. (See Figure 1.2.)

Instructor-Led Training

There will always be a role for the teacher, professor, or subject-matter expert to teach and entertain us in a classroom. Instructors convey enthusiasm, expert knowledge, experience, and context.

Figure 1.2. Evolution of Technology-Based Training



They can answer questions and change the pace and direction of a class based on the audience. Even more importantly, as we have learned in e-learning, instructor-led training has a cultural effect: people interact and learn from one another.

The biggest challenge with instructor-led training is lack of scale. If you need to train thousands of students, there are only two options: large class sizes or lots of travel. Large class sizes greatly reduce effectiveness and travel is very expensive.

The second challenge with instructor-led training is long deployment times. Most business-critical training problems are time-driven. They must be accomplished within a tight deadline—and the number of hours available to learners is limited. We call these issues "deadline time" (time to complete the entire program) and "duration" (elapsed time for the program).

If a program relies on instructor-led training and has strict deadline times and limits on duration, you have a problem. You can schedule large classes (i.e., fly the entire organization to a convention center and sit them in a huge auditorium) or hire many instructors and send out to teach many classes at the same time. The large class approach (i.e., conference) has strong cultural benefits (it brings people together)—but makes one-on-one teaching and hands-on experience nearly impossible. Flying instructors all over the world is expensive and often impossible if you do not have a cadre of qualified instructors.

Technology is intended to solve these problems: extend the instructor model in space and time. Theoretically, if we use technology we can reach more learners in a shorter period of time—and as a bonus they can learn at their own pace and speed.

Mainframe-Based Training

The first technology-based training approach came with mainframe and mini-computers in the 1960s and 1970s. These systems had the limitation of character-based terminals but the benefit of reaching hundreds to thousands of people at their workplace. A pioneering

example of such a system was Plato, a system developed in 1963 by Control Data and the University of Illinois. Plato pioneered the use of computers in traditional educational settings and still exists today.

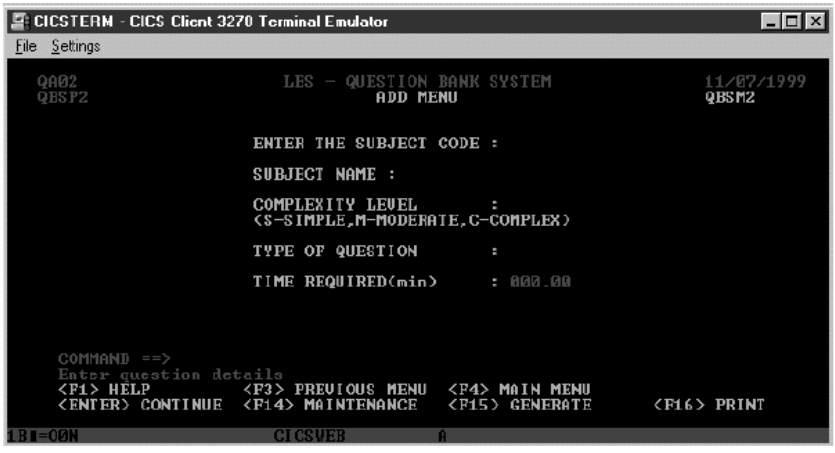
As Figure 1.3 shows, mainframes were not graphical or visually interesting. Nevertheless, they provided the first platform to extend learning to large audiences through technology.

An Example of Blended Learning

My own experience in e-learning began in the mainframe era. In the 1980s I was first hired by IBM as an entry-level sales engineer. For my first fifteen months as a "trainee" I needed to learn how to sell, implement, and support many complex mainframe hardware and software systems. IBM had developed a well-structured blended curriculum for new hires made up of online product education at the local branch office and a series of classroom and simulation exercises in Dallas, Texas.

In the branch office we used a manual (job aid) and series of online courses (self-study) to learn about the basics of online systems, networking technologies, and business principles. Every exercise we completed at the branch was scored and graded and then sent to both our manager and the sales training organization in Dallas.

Figure 1.3. Mainframe-Based Interface



When we traveled to Dallas for our next set of real-world experiences the instructors already knew how well we had done on our branch exercises.

The entire fifteen-month program was a long, simulated sales call on a company called Armstrong Sporting Goods. During the program we learned how to make a sales call on the IT manager, the CFO, the CEO, and the VP of Sales. We learned how to deal with sales objections by performing real sales calls (which were graded). The instructors in Dallas simulated their job roles and treated us exactly as we would be treated when we went out in the real world.

This program had all the elements of a well-designed blended learning program. It was well-structured (all steps were well-defined and scheduled in advance); it took advantage of best-in-class media of the day (mainframe computers); it saved us time (we were working in the branch while taking courses); it created a social culture (learners spent a lot of time together); and it used demonstration and experiential learning (we actually had to "make the sale" in order to pass the course).

The lesson here is that creating a blended program is not dependent on technology. Rather it is a process of problem identification, defining the blending model, and carefully managing and measuring program execution. These are all topics we cover in detail throughout this book.

Bottom line on mainframe based training: it was the beginning of an evolution, and despite its clear limitations in user interfaces, formed the basis for our thinking about blending technology with instructor-led training.

Satellite-Based Live Video

As Figure 1.2 shows, the next step in the technology evolution came in the 1970s when companies started to use video networks to extend the live instructor. Take the problems with instructor-led

training above and use TV-based technology to extend the live experience. Learners could sit in a classroom, watch the instructor on TV, chat and interact with other students, and even ask the instructor questions.

A well-run example of this approach is the Stanford University Interactive TV network, which is still used throughout Silicon Valley. Stanford invested in a community-based video network in the 1970s and 1980s that enables Stanford professors to teach courses all over the San Francisco Bay Area without leaving the campus. The students never have to leave their workplace to learn. They submit exercises and tests via courier.

I took live video courses at Stanford and also during my time at IBM. The experience is very close to a real classroom experience. The classrooms have TV cameras that enable the instructor to see the entire class. Students can push a button to ask questions. It truly extends the classroom model into a global delivery solution.

Live video continues to be an important training approach in many companies. General Motors, for example, relies heavily on video-based instruction to train dealers. If the audience is not particularly PC-literate or does not have access to computers, live video training is very appropriate. The challenge is expense: building and maintaining video networks is costly and this approach is rapidly being replaced by lower-cost digital IP-based systems like web-casting, web-based video, and conference calls. We learned from live video that the face, body language, and visual cues from the instructor are an important part of training programs.

The PC CD-ROM Era

To really understand the issues we face today with blended learning it is valuable to understand the CD-ROM era, which forms the basis for much of the web-based training we see today.

In the early 1980s when the first PCs arrived, trainers and educators rushed headlong into PC multimedia technologies. Training technologists love to work on the cutting edge. Computer

companies saw this market and started to create special PC models and features designed for multimedia training. Microsoft even went so far as to create a Multimedia PC (MPC) specification.

I call this period the CD-ROM era. Vendors and training departments realized that computers could deliver graphics, sound, video, and rich interactivity. With the extensive storage media available in CD-ROM, these programs could be distributed with ease. The learning experience was rich and perhaps could completely replace the instructor-led model.

The leader in this market was a company called CBT Systems. This company is one of the only major players that successfully made the transition from CD to the web. CBT Systems was the largest provider of CD-ROM training for software and IT professionals. As the CD market started to wane, the company adopted a new web-based approach and relaunched itself as SmartForce around 1999 and then later merged with Skillsoft in 2002. They realized that the CD-ROM era was giving way to new approaches that leverage the web.

It's important to realize that, in the 1980s and 1990s, when companies developed content for CD-ROM they did not use the web-centric approach we have today. They typically relied on high-quality video, complex animations, and professionally developed sound. These titles, often authored in Authorware[1] from Macromedia or Toolbook[2] from Click2Learn, were designed to use high bandwidth media—video, audio, and interactions—elements that do not always translate well to the web. Developers learned that there is a fundamental difference between content authored to run in a CD-ROM (which can house large amounts of video and audio locally) and content authored for the web (where the bandwidth to the PC may be 56k or less in some cases).

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[1]Authorware® from Macromedia is one of the widest used tools for development of CD-ROM courseware.

[2]Toolbook® from Click2Learn is one of the original and most widely used tools for CD-ROM and now web-based courseware. In 2004 Click2Learn merged with Docent and is now called Sum Total Systems.

Development of Learning Management Systems and AICC

The limitations of CD-ROM technology formed the basis for e-learning as we know it today. The first problem people faced with CD-ROMs was how to manage all the distributed copies of courseware. Who was using it? What were they doing? How could we tell if they were completing? This problem created the need for a "learning management system" (LMS)—a piece of software somewhere on the network that could track and manage all the CD-ROM courses people were taking.

One of the biggest users of CD-ROM technology was the airline industry. Boeing, for example, developed thousands of hours of content devoted to the support and maintenance of aircraft. If the content was distributed to hundreds of PCs, how could Boeing track who was taking these courses and what levels of completion and compliance they were achieving? The answer was the first network-based LMS.

The first LMS systems were developed primarily to manage the enrollment, tracking, and completion of CD-ROM-based content across a network. For this to work, however, the industry needed some standard way for courseware to communicate with the LMS about what the learner was doing. The LMS needs to know when you start a course, what scores you achieve in certain assessments, where you leave off when you are interrupted, and how much time you spend in the course.

To solve this problem, a group of airlines developed a new standard. The Aviation Industry CBT Committee (AICC) developed the most useful and widely implemented approach to enrollment, tracking, reporting, and book-marking electronic content. AICC standards are built into almost every course and every LMS available in the marketplace today.

Today, SCORM (Sharable Content Object Reference Model), a superset of AICC, is slowly becoming the new standard for content packaging and interoperability. SCORM builds on AICC and

adds concepts such as reusability, sequencing, and searchable metadata.[3]

"More Experience" Is Not Necessarily an "Effective Experience"

One of the learning experiences from the CD-ROM era is that "more experience" does not necessarily result in an "effective experience." When developers realized that they could deliver audio, video, animation, and interactivity through the computer, they rushed into complex and expensive content production.

Learning requires a combination of **content** plus **context**. Content is meaningless unless it is fit into the context of the business challenge, the learner's abilities and background, the work environment, and the specific learning objectives. Today, this design "truth" continues to drive Internet-based media. We will discuss these issues in detail and give you guidelines to avoid building "the most wonderful course that no one takes" or "the most interesting course that teaches you nothing."

Cost of Maintenance and Deployment Emerge as Major Issues

One of the big issues we discovered in the CD-ROM era was the enormous problems of content deployment and content maintenance. It has been estimated that over the lifetime of a course (and lifetime is a measure of "content stability," which is discussed later), maintenance can become many times more expensive than the initial development. In the CD-ROM model, maintenance became a nightmare. With thousands of CD-ROMs distributed throughout

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[3]Reusability refers to the ability to use a chapter or "sharable content object" (SCO) in multiple courses. Sequencing refers to making it easy for the learner to branch from chapter to chapter without coding this logic into every course. Searchable Metadata refers to "tagging" content so it can be searched easily with tools like Google.

an organization, it was nearly impossible to replace them with new versions.

Learnings from the CD-ROM Era

Table 1.1 summarizes the lessons learned from the CD-ROM era.

Although the CD-ROM industry grew, it never reached a size greater than $400M or so, largely due to technology limitations shown in the table. Many vendors found that high costs of developing and maintaining CD-ROMs would not sustain a profitable business. Many companies built CD-ROM programs that cost far more than their instructor-led equivalents. The trick was (and still is) to develop a highly interactive experience without going "overboard" on expensive video, authoring, and graphics that were not justified for a given application.

The industry learned extensively from this experience, and the ubiquity of the Internet—coupled with standardized PC software (Windows®)—has given us a whole new set of options. Already the web-based e-learning market is five times larger than the CD-ROM market ever was.

Enter Web-Based Training: The First Generation

In the last few years some important changes have taken place. Web browsers (Internet Explorer® primarily) are ubiquitous. Network access is now relatively common. Computers are fast enough to display sound, broad ranges of color, and video.

These new technologies create a platform that solves many of the problems that plagued the CD-ROM era. Now courseware can be published in one place and easily distributed to thousands of people. The pioneers of web-based training tried to take CD-ROM content and publish it to the web. This approach did not work. CD-ROM-developed content is designed with large video and audio files and "takes over the screen" with its own user interface. When published to the web, it generally results in a slow and sluggish

Table 1.1. Learnings from the CD-ROM Era

Content can be very expensive to produce.	CD-ROMs were built on the concept of high interactivity, branching, and often video, and therefore took many months and often hundreds of thousands of dollars to build. *Often web-based courseware still suffers from this challenge.*
Content may be difficult to update.	Once cut, a CD-ROM becomes a published work, like a book. Updating it is a laborious process, so content rapidly became out-of-date. *Web-based courseware solves much of this problem, but still requires a maintenance strategy. Some courses are "disposable" and we call these "Rapid e-Learning."*
Technology was difficult to deploy.	CD-ROMs required a "player"—a piece of software that ran in your PC and displayed the content. If you did not have the player, it had to be included on the CD-ROM, which made running the content more prone to errors. Your PC had to have the right sound card, video card, and screen resolution. *Early Internet-based programs suffered from this problem as well, and many programs still do. PCs must have the right plug-ins, bandwidth, and hardware and software configuration.*
Multimedia was not standardized.	Because early PCs did not have standard graphics, sound, or video technology, many CD-ROMs did not run correctly. *In e-learning this problem has largely been resolved by Flash,* but continues to plague programs with video and some simulations.*
Tracking was difficult or impossible.	Some CD-ROMs had tracking, but many did not, so they were essentially books you perused at your own pace. Technology for tracking and reporting was not standardized until very recently (AICC**). *Today, thanks largely to this standard, it is fairly easy to track electronic content. However, we always recommend testing this interoperability, because the "standards" are simply reference guides and are often implemented differently among different vendors.*

*Flash, from Macromedia, is one of the widest used technologies for deployment of highly interactive content.
**AICC, the Aviation Industry CBT Committee, developed one of the most widely used standards for tracking and launching electronic courseware today. It is still the most used learning management system to launch and track learning courseware.

experience. The tools used for CD-ROM content (Authorware, as an example) were not designed to edit HTML and other technologies used on the web.

We now know that web-based training is new and different. It uses HTML and browser-based technologies like Flash®. It usually runs within a portal or an online learning environment. It leverages the power of search and linking, which is unique to the Internet.

Today: A Wide Range of Options

This brings us to where we are today. Today training organizations have a wide range of options for blended learning. Self-study (asynchronous) options include web-based courseware, simulations, EPSS systems, books, and job aids. Live (synchronous) options include webcasting, live video, conference calls, and instructor-led training. The key issues we discuss in this book are deciding which to use when and how to blend them together to solve a particular business problem.

Lessons Learned in This Chapter

1. Blended learning is not a new concept, but the tools available to us today are new.
2. The origins of blended learning are the simple but powerful desire to extend the classroom "people-centric" experience in space and time.
3. Blended learning can be accomplished through any variety of media, whether it is mainframe-based, video-based, or web-based. The key issue is not making the technology exciting but fitting technology seamlessly into a program appropriate for the problem at hand.
4. CD-ROM-developed media, while important in today's world, is authored differently from web-based media. It is

difficult if not impossible to use the same content for both delivery technologies. Web content can be distributed on a CD-ROM, but content authored for CD-ROM rarely works well in web delivery.

5. The web as a delivery and learning platform is new. It uses new tools and approaches which build from the CD-ROM world but are also dramatically different.
6. The history of technology-based training teaches us that problems such as appropriate content development, content maintenance, deployment, and distribution are critical in any program.
7. Standards like AICC provide excellent ways of tracking student progress. They were developed to track content usage and completion and are now embedded into most commercial LMS systems. SCORM, the latest specifications for tracking and content structure, builds on the principles of AICC.
8. Today's blended learning approaches build on years of experience but apply new technologies and delivery options that will continue to change.