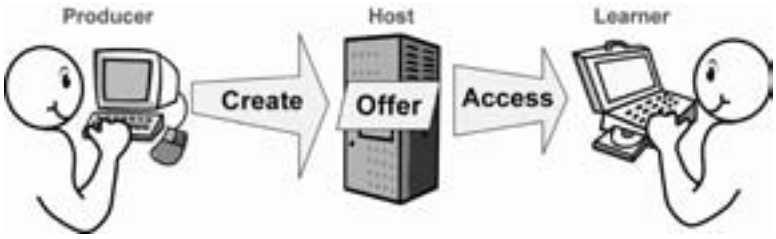
1 People first

Technology doesn't make e-learning. People do. The right starting point for any exploration of technology is the people for whom the technology is needed.

In this chapter, we introduce the cast of characters, help you find your role, and consider what each role requires. We then help you tailor your designs and strategies to the technologies learners already have. And when you're feeling completely overwhelmed, we point out groups of people who can help you.

PARTICIPANTS AND PROCESSES

To make sense of the tools and technologies needed for even a simple project, you need a framework or checklist of the major categories of technologies needed. Let's take a look at a simple way of classifying the technologies.



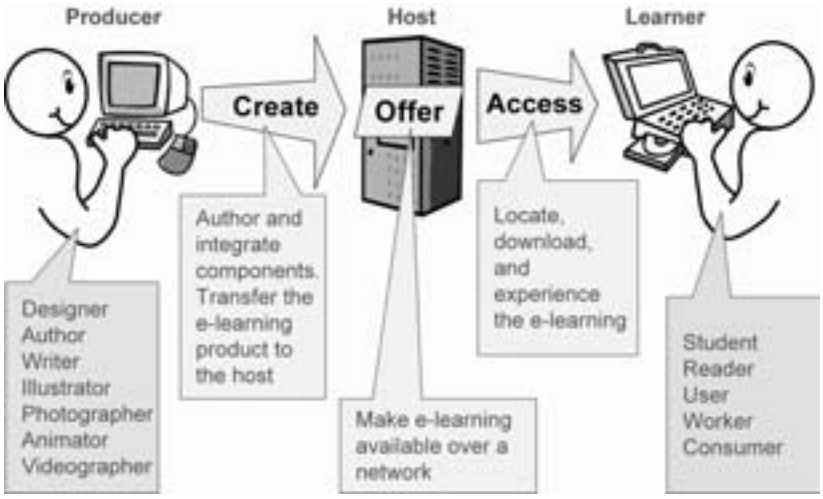
Start by looking at the groups of people involved and the technology they need for the activities they individually perform: the producers of e-learning, those who offer the course or Web site, and the learners themselves. The process of building e-learning is commonly referred to as *creating*, and it is performed by the producer. The next process is *offering*, performed by the host. The process of taking e-learning is commonly referred to as *accessing* and is performed by the learner.

Let's look at each of these participants and processes in more detail.

Producers include the designers, authors, writers, illustrators, photographers, animators, videographers, and other creative souls who collectively bring e-learning products into being.

Learners go by many names. They are typically called students. If the e-learning is designed as an online document or knowledge-management system, they are referred to as readers or users.

The **host** is the organization that makes e-learning widely available over a network, so the learning product is accessible by learners and those who must administer, maintain, and support it.



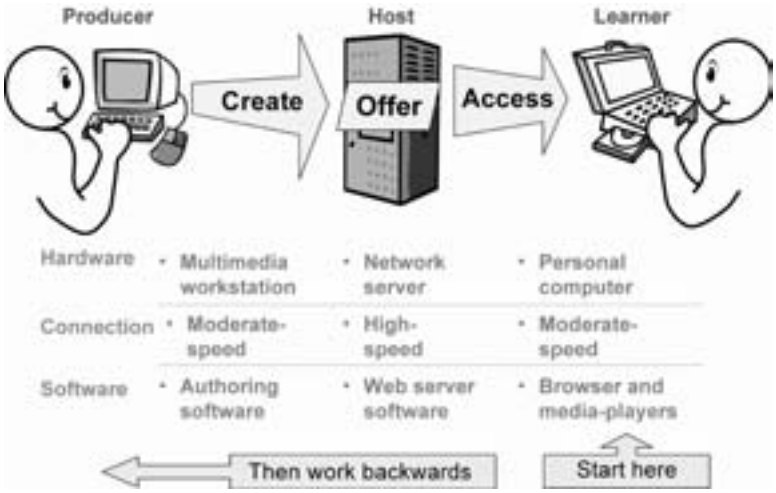
The process of *creating* covers the activities of producers as they author and integrate components into an e-learning product and transfer that it to the host, which *offers* the e-learning. Likewise, *accessing* refers to activities performed by the learner who locates, logs into, and experiences the e-learning.

To recap:

- Producers create e-learning.
- Hosts offer e-learning.
- Learners access e-learning.

WHAT DO THEY NEED?

Each of the participants—producer, host, and learner—requires three forms of technology: hardware, a network connection, and software. The learner probably requires a personal computer to access the learning product and a network connection of at least moderate speed. In addition to the basic operating system of the personal computer, the learner requires add-ons such as a Web browser and media players.



The host requires a network server. You can think of it as an ultra-powerful personal computer optimized for delivering information over a network. The host also needs a high-speed network connection so it can deliver information to many simultaneous learners. And the host requires Web-server software, perhaps including special collaboration tools and media servers.

Typically, a workstation for creating e-learning costs twice as much as the personal computer needed to access the e-learning.

The producer uses multimedia workstations for preparing the graphics, animations, icons, video clips, sounds, and other media needed. The producer also needs a moderate speed network connection. In fact, it may be best if the producer's connection is no faster than that of the learner's so the producer experiences the learning product at the same speed as the learner. The producer also needs specialized software to create and edit the various media needed.

In putting together your technology plan, be sure to start at the right side of this diagram. Always start with the technology used by the learner, and then work backwards. On some projects you may have no control over the learners' choices for technology. And, even if you can choose technology for learners, there will be far more learners than hosts and producers. So the costs of technology for learners may dominate the budget. Let's take a closer look at how learners' technology influences your technology plan.

TARGET LEARNERS' TECHNOLOGY

The starting point for any technology plan is a quick survey of the technology that learners will use to access e-learning. It is the learners' technologies you must target. You can start by asking a few key questions.

What hardware do learners have?

Confused by bits, bytes, Ks and other measures of digital data? See appendix A.

Learners must be able to access a computer to take advantage of your offerings. The exact capabilities of that computer will determine what media they can view and play. Knowing these capabilities, you can design learning products that work with the computers learners already have; or, at least, minimize the extent of upgrades they need. Let's consider some of the components of the learner's computer system, see some typical configurations, and think about how these components will affect your e-learning design.

Accessing

Processor:	Pentium III 400 MHz
Memory:	64 MB
Display size:	800 x 600 pixels
Colors:	16-bit
Hard disk:	2 Gigabytes available
CD or DVD:	6X speed CD-ROM
Audio:	16-bit, 44 KHz stereo
Video input:	(not required)

Here you see a portion of a technology specification from a recent project showing learners' current computer hardware.

If you would like to see a form for such specifications, it is available at the Web site for this book (horton.com/tools).

The computer's *processor* determines the speed with which it can perform common operations. You may, for example, discover that your learners' computers have Pentium III processors running at a speed of 400 megahertz. E-learning that uses lots of sound, animation, and especially video, requires a very fast, late-generation processor.

The amount of *memory* in the computer, say 64 megabytes (MB), determines how many programs and how much data the computer can effectively manipulate at once. If your e-learning uses large graphics or multimedia, or requires loading several programs at once, a generous helping of memory is necessary.

The *display* determines how much the learner can see at once. For display, you should be concerned with the size of the display, measured in pixels, and in the color depth, which determines the number of colors that can be displayed at once. Screen size restricts how large your pages and other displays can be. It also determines how many tasks learners can attend to without having to scroll or flip back and forth among several windows. Color depth affects color fidelity and the smoothness of gradations. A color depth of 8 bits is sufficient to display 256 colors. This may be enough for graphics with large areas of the same color. However, if the graphic contains gradations of color, learners will see large distracting bands of solid colors rather than the subtle, continuous tones you intended. A depth of 16 bits is enough to display thousands of colors and smooth gradations of color.

If your e-learning requires installing software or storing data on the learner's computer, you need to be concerned with available space on the learner's hard disk. Even though computers today come with disks considered enormous by yesterday's standards, these disks are soon filled with scanned pictures, downloaded music, and what not. Make sure that your e-learning does not require more space than the learner has available or is willing to part with.

The entertainment world spells it disc while the computer world spells it disk. Since CD-ROMs and DVDs evolved from audio CDs, the disc spelling stuck.

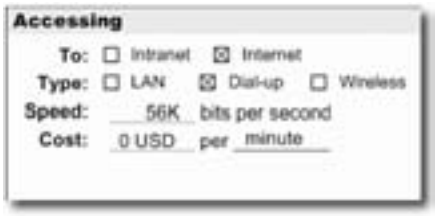
Many computers come with a CD-ROM (Compact Disc, Read-Only-Memory) or DVD (Digital Versatile Disc) drive. You could deliver complete learning products or just their multimedia components using such drives. However, you need to know the type (CD or DVD), the speed (e.g., 6X normal speed), and whether the drive can write as well as read these discs. Such drives provide an alternative to network connections for transferring programs and content to and from the learner.

Today, most personal computers come with circuitry built in to play and even record sound. The quality of the sound circuitry determines how well you can use sound. You may also need to consider whether learners have headphones so they can listen to voice, music, and other sounds without disturbing those around them.

Video input is yet another capability to consider. The ability of learners to record video into their computers makes it possible for them to participate in video conferencing as well as to submit recordings of themselves performing required activities.

How do learners connect to the network?

To access remote information over a network, the learner must have a connection to the network. This connection consists of circuitry in, or attached to, the learner's machine as well as cabling and other hardware joining that computer to the network proper. The details are complicated. Fortunately you need to know only a few characteristics about that connection.



This portion of the technology specification shows information about learners' network connections.

First you need to know whether the learner is connected to the organization's intranet (that is the organization's local area network), to the Internet, or to both. Most office computers are connected to an intranet; most home computers are connected to the Internet directly. The nature of this connection determines what the learner can access, the need for security, and where you should host your e-learning.

If this network terminology is a bit hard to follow, come back to this segment after reading chapter 5.

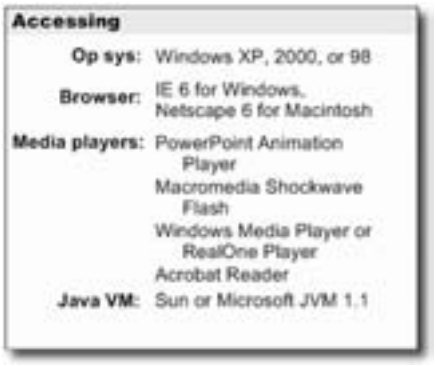
A second consideration is the type of connection. The connection may be through a local area network, a dial-up modem connection, a broadband connection, or a wireless connection. Each of these possibilities can add wrinkles to your plan. If learners have to dial in to establish a connection, their usage will be less spontaneous than that of learners whose connection is always active. Typically, learners connected to a local area network have more reliable service than those dialing in from home or from laptop computers on the road.

A third concern is the speed of the connection, for example, 56 kilobits per second (Kbps). Keep in mind that rated speeds are seldom achieved in practice. For planning purposes, you may want to use a speed of half the rated speed of the connection.

A fourth concern is the cost of the connection. That is, does the learner have to pay for the time they are connected? Flat-rate charges are common in the United States but not everywhere. If learners pay a high fee for each minute of connection, your design should minimize the time they are connected.

What software do learners have?

The learner's hardware is important, but so is the software that runs on that hardware. Let's look at some of the main categories of software that you should be concerned with.



This portion of the technology specification shows what software learners currently have installed on their computers.

The first is the operating system. It might be a version of Microsoft Windows or a Macintosh operating system. The operating system determines what other software can run on that machine. So, knowing the operating system is crucial for designers. Not all tools are available for all operating systems.

The next important software component is the Web browser, typically Internet Explorer or Netscape Navigator. (Browsers are covered in detail in chapter 6.) The browser not only displays Web pages but other media as well. Some media and file formats are displayed right in the browser and are referred to as *browser-native* file formats. Other content may require a variety of media players, browser plug-ins, controls, and other components. Some of these components play a single proprietary file format, while others can play a range of media. (Media players are covered in chapter 7.)

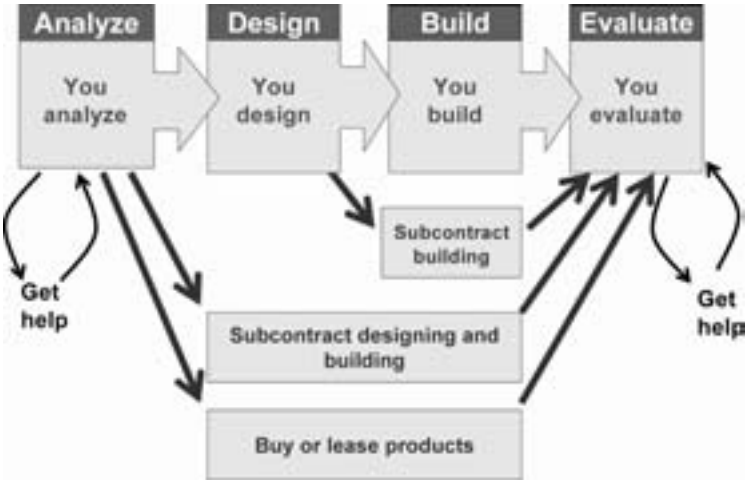
Your Information Technology department may be able to help gather this information. Use this as an excuse to begin talking about your e-learning plan.

A final software component is a bit obscure but equally important. That is the Java virtual machine. This is the component that enables the computer to run programs written in the Java programming language. The idea is that programmers write the program once and it can then be played on any computer with a Java virtual machine installed, regardless of the operating system. Sounds simple, but both Sun and Microsoft offer Java virtual machines, and they frequently update them to fix bugs and add capabilities. Therefore, some Java applications and applets require a specific version of Java virtual machine.

WHAT CAN YOU LET OTHERS DO?

Developing learning products is a complex and expensive business. Keep in mind that you and your immediate organization need not deal with all these issues. You can choose to farm out some of the work. The same tools and technologies are needed, but someone else may provide or operate them as a service. You will still need to understand the basic technical capabilities required but you will not have to purchase, install, maintain, and operate the tools.

Some organizations choose to do it all themselves. They analyze, design, build, and evaluate their e-learning. Many other organizations, especially smaller companies and departments, find they can be more effective by hiring others to do parts of the development. Although all development could be outsourced, some phases are more commonly outsourced than other phases. These decisions profoundly affect your technology plan.



Alternative production processes for implementing e-learning.

Whichever approach you take—doing it yourself or subcontracting some or all development tasks—you will almost certainly need to be involved in the analysis phase, which sets the objectives for your project, and the evaluation phase, which determines whether those objectives were met. These two phases concern the intimate needs of your organization and are not efficiently performed by outsiders. You may want to get assistance for these phases from your IT (Information Technology) department or from external consultants.

Subcontract production

One common option is to subcontract the building of the course to a firm specializing in e-learning, multimedia, or Web-site construction. This relieves you of having to maintain a staff of technical specialists and the associated hardware and software producers require. It also lets you pick the firm whose capabilities match precisely the design you have created.

Even so, you will most likely have to *specify* which technologies and file formats the subcontractors should use. For instance, you may tell them that they cannot use Macromedia Flash to create animations because your Information Technology department does not allow Flash files through the firewall.

Subcontract design and production

Another common approach is to subcontract both the design and build phases. In this approach, you turn to a systems integrator or consultant to deliver a complete solution. By subcontracting both these phases, you save maintaining a production staff and the associated technology, thereby keeping your focus entirely on results and away from the details of how those results are to be achieved. This approach, however, comes at a cost: a loss of control over the details of the result.

Buy or lease e-learning

Instead of subcontracting the design and build phases, you may choose to buy or lease existing courses or other learning products from an application service provider (ASP) or a portal. This approach works well when your training needs can be met by courses with generic content.

Essentially, the ASP maintains an e-learning library on its server. With this approach, almost all of the producer and hosting technology is handled for you. You merely rent access on behalf of the learners. The ASP maintains, supports, and updates tools as needed. Your only concern is that learners have the technology required to access the e-learning.

NOW WHAT?

Remember, people come first. Identify the people involved in your project and let them guide you in selecting tools and technologies. Here are some steps you can take to get started.

1. **List all participants in you e-learning project**. Don't stop with those directly involved—include all stakeholders, such as those whose support is required and those whose cooperation you will need.
2. **Identify what each participant contributes and what each requires**. Some contribute labor to create media while others may just approve progress reports.
3. **Catalog the tools and technologies possessed by intended learners**. While you are at it, investigate their technology skills and attitudes toward using technology to learn.
4. **Think about what you want to do in-house and what to outsource**. Consider your mission, your schedule, budget, and management style. Make some provisional decisions.