SECOND EDITION

E-Learning
by Design

William Horton

Contents

E-Learning by Design

2nd Edition

By

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Preface
What's new in the 2ⁿᵈ edition?

I must confess that I am the kind of reader who skips over prefaces, acknowledgements, and other throat warming found at the fronts of books. If you are that kind of reader also, go ahead and jump to Chapter 1. It won't hurt my feelings as an author. There are no great revelations here or secret confessions, only a brief description of what's new in this edition and why.

What's different about e-learning?

Since the first edition of E-*learning by Design*, e-learning has evolved rapidly and fringe techniques have moved into the mainstream. Revolutionaries have become bankers.

Underlying and underwriting these changes in e-learning are advances in technology and changes in society.

For one thing, learning games and simulations have gone from being treated as noisy children at a formal dinner to being the life of the party. Proven successes have earned games and simulations serious consideration by even the most conservative designers.

Our ability to search vast information repositories has become universal and commonplace. Many e-book outsell their paper counterparts. Public and private libraries and encyclopedias have grown in number and size. More reliable search engines have made online search a part of technological culture. Google is a verb.

Mechanisms for online collaboration have advanced as well. Name a subject and there is a discussion forum, blog, podcast, or news feed dedicated to it. Global conversations, enabled by social media, arise spontaneously and carom wildly. Politicians tap into these ad hoc discussions to sample the *vox populi*.

Out of this burst of online collaboration burst social networking. Its popularity has given us new technologies, new terminology, and new modes of learning. Well, not really. The technologies and terminology are new, but learning from others is among the most ancient and thoroughly proven modes of learning.

Mobile phones have taken on the functions previously offered by separate personal digital assistants and media players. They are as powerful as many of the laptop computers used for e-learning when the first edition premiered. Today's smart phones are easy to use, rugged, and reliable. And potential learners have one with them all the time.

Some early forms of e-learning, such as virtual-classroom courses, Webinars, and software demonstrations (screencasts) have stabilized. Though they have not advanced in basic capabilities, they have become easier to produce and more predictable to take. They have entered the mainstream and are now helping to define it.

What's new in this book?

To track the changes in technology and society, several sections have been promoted to full chapters. Please congratulate "Games and simulations," "Social learning," and "Mobile learning" on their expanded coverage and much-deserved emphasis. I have tried to avoid the common tendency to trivialize these subjects. I promise you that I do not define mobile learning as dumping desktop courses onto mobile devices or suggest that social learning is nothing more than telling students to ask their social network instead of asking the teacher.

As requested by readers of the first edition, I have fleshed out the instructional design scheme in the first chapter. I was glad to do so because my experience as a consultant, since the first edition, has taught me that most failures of e-

learning projects can be traced back to flawed instructional design. I have added an appendix detailing a simple technique to determine what to teach and what to leave out.

Some chapters have moved online at horton.com/eld/. Chapters on designing lessons, strategic decisions that affect the whole course, visual design, and navigation are now online. That allows the paper portion to focus on issues of vital interest to all designers, especially first-line designers with direct responsibility for accomplishing specific learning objectives. The online chapters offer advanced skills and techniques for issues usually dealt with by senior designers and project leaders.

What else? Oh, I have put in new typos to replace the old ones, or at least to keep them company.

So, go on and start reading, skimming, scanning, or however you like to consume books. If you are reading this in a bookstore, go ahead and buy this book. Better still, buy two copies and give one to your boss.

Chapter 1

Designing e-learning

Planning the development of online learning

For tens of thousands of years, human beings have come together to learn and share knowledge. Until recently, we have had to come together at the same time and place. But today, computer and networking technologies have eliminated that requirement. Now anybody can learn anything anywhere at any time. And developers of education can deliver learning when needed, where needed, on any subject, in just the right amount, in the most effective format, and for not much money.

WHAT IS E-LEARNING?

E-learning marshals computer and network technologies to the task of education. Several definitions of e-learning are common. Some people hold that e-learning is limited to what takes place entirely within a Web browser without the need for other software or learning resources. Such a pure definition, though, leaves out many of the truly effective uses of related technologies for learning.

Definition of e-learning

There are a lot of complex definitions of e-learning, so **I**'ll offer you a simple one:

E-learning is the use of electronic technologies to create learning experiences.

This definition is deliberately open-ended, allowing complete freedom as to how these experiences are formulated, organized, and created. Notice that this definition does not mention "courses," for courses are just one way to package e-learning experiences. It also does not mention any particular authoring tool or management system.

Varieties of e-learning

E-learning comes in many forms. You may have taken one or two forms of e-learning, but have you considered them all? Here are some varieties of e-learning to consider:

▸ **Standalone courses:** Courses taken by a solo learner. They are self-paced without interaction with a teacher or classmates. There are numerous examples of standalone courses cited in this book. Search the index for *Using Gantt Charts, GALENA Slope Stability Analysis*, and *Vision and the Church*. You can also go to the Web site for this book (horton.com/eld/) to find links to live examples.

▸ **Learning games and simulations:** Learning by performing simulated activities that require exploration and lead to discoveries. We have devoted the whole of Chapter 7 to the discussion of games and simulations. Also go to horton.com/eld/ for links to live examples.

▸ **Mobile learning:** Learning from the world while moving about in the world. Aided by mobile devices, such as smart phones and tablet devices, mobile learners participate in conventional classroom courses and standalone e-learning while out and about. They may also participate in activities where they learn by interacting with objects and people they encounter along the way. Mobile learning is discussed in Chapter 9.

▶ **Social learning:** Learning through interaction with a community of experts and fellow learners. Communication among participants relies on social-networking media such as online discussions, blogging, and text-messaging. See Chapter 8 for advice on designing social learning.

▶ **Virtual-classroom courses:** Online classes structured much like a classroom course, with reading assignments, presentations, discussions via forums and other social media, and homework. They may include synchronous online meetings. Read Chapter 10 for more on designing Webinars and virtual-classroom courses.

And that is just the start. As you read this, clever designers are creating even more forms of e-learning and blending mixtures of the types listed here.

WHAT IS E-LEARNING DESIGN?

E-learning can be the best learning possible — or the worst. It all depends on design.

Creating effective e-learning requires both design and development. They are not the same thing. Design is decision; development is construction. Design governs *what* we do; development governs *how* we carry out those decisions. Design involves judgment, compromise, tradeoff, and creativity. Design is the 1001 decisions, big and small, that affect the outcome of your e-learning project. This book is about design.

Start with good instructional design

Effective e-learning starts with sound instructional design. Instructional design requires selecting, organizing, and specifying the learning experiences necessary to teach somebody something. Good instructional design is

independent of the technology or personnel used to create those learning experiences.

Apply just enough instructional design

Instructional design is a vast subject. This humble chapter cannot cover it all. What you will find in this chapter is a streamlined, rapid instructional-design method. It is simple, quick, informal, and pragmatic. Use it as your survival kit when you do not have time or money for more. Or, use it as a check on your longer, more formal process.

Before you fast-forward to another chapter with more screen snapshots and fewer diagrams, take a moment to reflect on this: Unless you get instructional design right, technology can only increase the speed and certainty of failure.

Instructional design determines everything else

Instructional design translates the high-level project goals to choices for technology, content, and everything else. The instructional design of e-learning informs decisions on what authoring tools, management systems, and other technologies to buy or license. Instructional design directs the development of content and the selection of media. It orchestrates decisions on budget, schedule, and other aspects of project development. So, design your instruction *before* buying technology or recruiting new staff members.

Good design can prevent common failures

I've done pedagogical autopsies on a lot of failed e-learning projects over the years and have seen clearly that most failures can be traced back to bad or non-existent

instructional design. Such failures are often blamed on defective technology, inadequate budget, lack of time, or insufficient management support. But these causes are really secondary. The project ran out of time, money, and management patience because of common failures of instructional design, such as:

▸ **Trying to teach too much**. Instead of being precisely targeted, objectives were a laundry list of everything every subject-matter expert and manager on the project thought any learner might someday need to know.

▸ **Failing to teach what people really need**. Too often projects try to teach disconnected knowledge when people need applicable skills. Learners do not value such objectives and put little effort into learning them.

▸ **Omitting supporting objectives**. Projects often concentrate on the explicit goals and forget the underlying motivation and fundamental skills necessary to propel and validate learning. Courses are jam-packed with what people should know or understand but deficient in what they must believe or feel.

▸ **Teaching what is easy to teach**. Builders of e-learning often take the easy road and teach what is easy or fun to teach rather than what learners really need. After all, learners are more likely to "like" the course if we make it easy.

▸ **Boring and frustrating learners**. Many projects waste learners' time by teaching what they already know or can easily figure out on their own.

▸ **Forcing people to learn in ways they find awkward and embarrassing**. Sometimes creators of e-learning impose their own preferred learning styles on learners for whom these styles are totally unsuited.

Avoid bad instructional design models

Instructional design is not rocket science — it's harder. And some of its failures are even more spectacular than a cartwheeling Titan IIIC missile. Here are some common methodologies of non-design:

▸ **RAPRAPRAPAWAP**, which stands for read a paper, read a paper, read a paper, and write a paper. It is a sad staple of graduate university courses and constitutes the only instructional design some tenured faculty seem capable of.

▸ **Pack 'em, yak 'em, rack 'em, and track 'em**, which is designed to economically handle large numbers of learners. In it, the institution enrolls large numbers of people ("pack 'em"), lectures to them ("yak 'em"), tests their regurgitative abilities to ensure conformity and compliance ("rack 'em"), and records extensive statistics to create the illusion of learning ("track 'em").

▸ **Warn and scorn** (AKA Cover the Corporate Assets) force marches learners through screens listing relevant laws and regulations and requires them to acknowledge each screen with at least a button click, which the course scrupulously records as proof that it warned employees against forbidden behavior. The cynical goal of such training is so the organization can say, "See, it's not our fault the employee behaved badly." The purpose of such "compliance" courses is not learning or improved behavior but mounting a legal defense.

▸ **Fill in the blanks**. Many designers start out with a template course whose slots they fill with chunks of subject-related content. This strategy is very common among low-cost content developers who use minimum-wage copy-and-paste drones to build courses.

▸ **Wouldn't it be cool if** … (AKA Fad-chasing) consists of trying to impress learners or management by using the

latest gizmo or the trendiest technique. Symptoms of this methodology include so-called designers spending more time talking about "wow factor" than about learning — and never completing a project before launching sideways into a quest of the next techno-fad.

Don't expect a guarantee of learning

Some instructional design experts claim that their methodology guarantees successful learning. They lie. We cannot guarantee any outcome involving more than a few human beings. People are simply too unpredictable, and outside factors intrude.

Like it or not, some people are going to fail regardless of what the designer and teacher do. Some cannot be motivated to learn. Some lack basic learning skills. Others struggle with learning disabilities. Intransigent bad attitudes are common. Substance abuse and mental illness are extreme cases. We cannot undo damage done over a lifetime and not already corrected by parents, friends, spouses, bosses, co-workers, psychologists, and decades of schooling.

Only by lowering standards sufficiently ("dummying down the learning") can we ensure that everyone appears to succeed. Doing so usually fails those most likely to master what you teach, apply it effectively, and teach those around them.

Don't blame yourself. Don't play the old butts-in-seats game where learning is evaluated by how many people sit through it. And, don't give up on any learners. Consider whether everyone really needs to learn what you are teaching. Can they learn by other means (p. 36)? Instead of learning the subject, can they succeed by asking or being directed by those you do educate?

Apply design to all units of e-learning

Design must be applied at all levels of e-learning from whole curricula down to individual media components. It is important to understand these units because they influence what design techniques we use. Before proceeding, let's get our terminology straight.
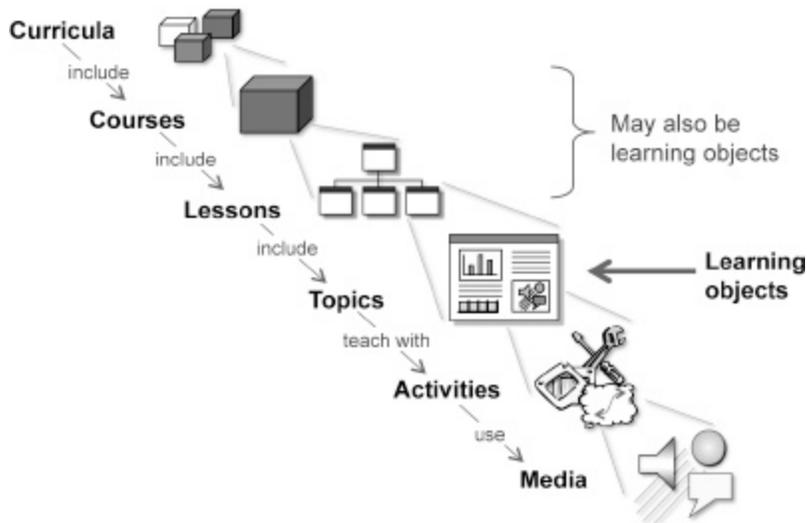
At the top of the pyramid are *curricula*, programs that include related courses that lead to a degree or certificate in a subject area.

A curriculum is typically composed of *courses*, each of which teaches a broad but specific area of a subject. We might also call such units *books* or *knowledge products*. Course-level design issues are discussed in online Chapter 13, *Strategic decisions*, at horton.com/eld/.

Courses are composed of clusters of smaller components called *lessons*. Each lesson is organized to accomplish one of the broad objectives of the course or a cluster of related objectives. Online Chapter 12, *Lessons*, at horton.com/eld/ will help you design lessons.

At a lower level are the individual *topics;* each designed to accomplish a single low-level learning objective. Topics are often designed as self-contained learning objects. For help designing topics, turn to Chapter 6.

Near the bottom level are *learning activities;* each designed to provoke a specific learning experience. Each activity may answer a specific question or make a point, but no single learning activity is sufficient to accomplish a learning objective. Activities are the subject of Chapters 2 through 4. Activities used to measure learning are called tests and are the subject of Chapter 5.

Finally there are the media elements: the words, pictures, voice, music, sound effects, animation, and video that present activities to learners. These are not covered directly in this book.

Courses and lessons may sometimes be designed as learning objects; however, this term is most commonly applied to topics.

Recognize various names for levels

The hierarchy of curriculum, course, lesson, topic, activities, and media is common but not universal. You may encounter a variety of other names for these levels. Let's see some alternatives:

	Quick ID	SCORM	Other names
	Curriculum		Library Program Portfolio
	Course	Content aggregation	Document Book Path
	Lesson	Content aggregation	Chapter Module
	Topic	Sharable content object	Page Learning object Event
	Activities	Asset	Block Teaching point
	Media	Asset	Information object Asset

The SCORM standard (www.adlnet.gov) refers to courses and lessons as *content aggregations*. Topics are called *sharable content objects*, or *SCOs*, for short. Any content below the level of a topic is called an *asset*.

Other names for units are common in specific universities, corporations, tools, and methodologies. For instance, a curriculum might be called a *library, program*, or *portfolio*. Instead of course, we might use the term *document, book*, or *path*. Lessons are sometimes called *chapters* or *modules*. A topic may be called a page or a *reusable learning object (RLO* for short). In virtual-classroom learning, topics equate to events. Activities are roughly equivalent to what some call *blocks* or *teaching points*. Media elements may be called *information objects* or *assets*. If these terms do not match the ones at your organization, do not fret. Just write in your own names for these units.

Time for a real example

Let's see how to apply these levels in the real world. Here is a slice down through a single subject area:

Curriculum:	Master's of Business Administration program.
Course:	"Accounting 101."
Lesson:	"Assets and Liabilities."
Topic:	"Evaluating assets."
Activity:	Using a spreadsheet to calculate the values of assets.

Media Voice-over animation explaining the concept. Live spreadsheet used in an activity.

DESIGN QUICKLY AND RELIABLY

Earlier in the chapter I promised you a tried and true approach to e-learning design. Well, here it is.

E-learning benefits most from a rapid, cyclical design process. In this section you will find a minimalist, waste-no-time, results-focused approach to specifying e-learning that actually works. This process omits unnecessary steps and concentrates on the design tasks that *really* matter.

In the interest of speedy learning, we'll start with a preview, overview, summary, and job aid all rolled into one. An Adobe PDF version is available at horton.com/eld/. Download it, print it out, and pin it to your wall, where you can refer to it throughout your projects.
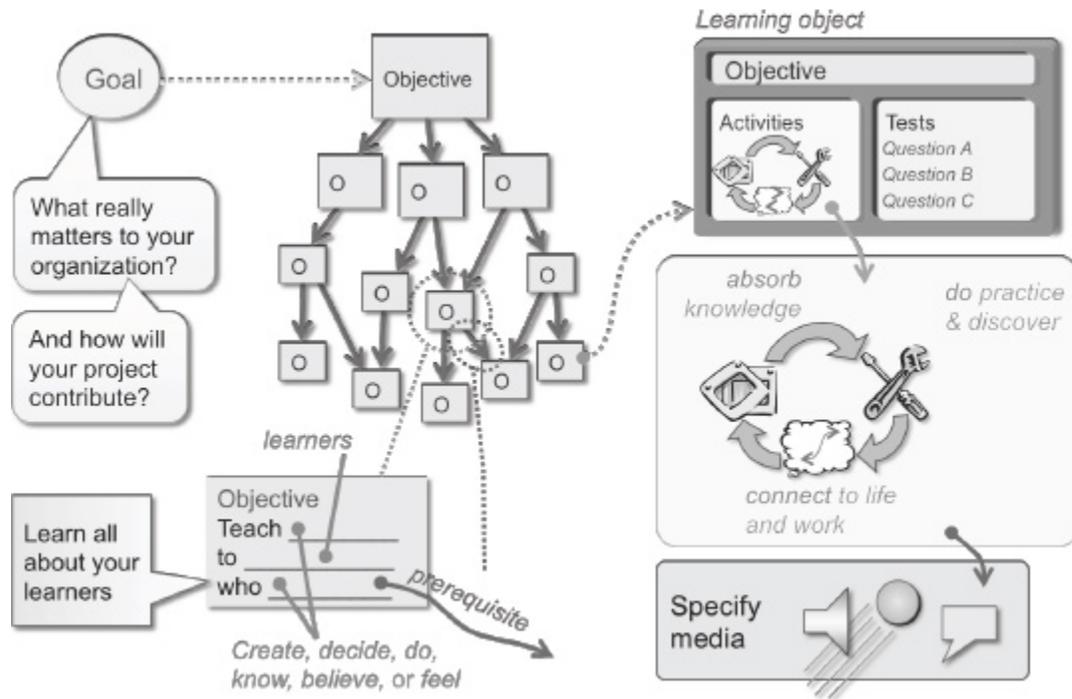
The first step in quick instructional design is to clarify the goal of your project. This is a simple two-step procedure. First you nail down what matters to your organization — the one sponsoring development of learning. Is it profit or public service? Return on investment or reputation?

Next you describe how your project will contribute directly to that organizational goal. If you draw a blank at this point, cancel the project now before wasting resources. Once you do define how your project contributes, you have a solid basis to ask for funding and other support.

The next step is to write the overall learning objective. This objective states how your e-learning changes the learner. It describes the end result of learning. That objective, however, may have prerequisite objectives. And those second-level objectives may have prerequisites as well. You

keep identifying prerequisite objectives until you reach the starting abilities of intended learners.

I use a simple formula to state objectives: Teach *blank* to *blank* who *blank*. Typically it takes the form: teach a *subject* to a *group of people* who *know certain things* already. The first slot records what we intend to teach. It is what we want them to create, decide, do, know, believe, or feel. The second slot names the group of learners who must accomplish this objective. It describes a group of learners. The third slot records prerequisites for the objective; for example, what aspects of the subject the learners must already know or what they must be able to do. It may point to other objectives that satisfy these prerequisites.

Each learning objective requires us to design a learning object to accomplish that objective. That object requires two types of content: learning activities and tests.

Tests are questions or other actions to verify that learning occurred and the objective was accomplished.

Learners complete learning activities in order to learn. There are usually three types of learning activities required: the learner *absorbs* knowledge by reading or watching; the learner *does* practice or discovery activities to deepen learning; and learners complete activities designed to *connect* what they are learning to their lives and work.

Only after specifying the activities can we make choices of what media to employ: words, pictures, sounds, and so forth. At this point, we must also keep an open mind. Perhaps the best way to implement the activity is not with electronic media, but with paper and pen. The best way to provoke the needed learning experience may require activities performed away from the computer. Our decisions here may lead us to blend conventional and electronic learning or to use non-learning solutions as well.

Don't worry if this process is not crystal clear or does not seem to cover every possible situation. I will explain each of

these steps in more detail and suggest how you can vary it to meet any need.

Identify your underlying goal

Design starts with a goal. You may be designing an office building or a monumental sculpture. You may be designing a rocket or an automobile. You may be designing e-learning. Before you can design any of these things, you must know what it is your design must accomplish.

Rather than start listing the things you will accomplish for learners, think about what you will do for your employer, your sponsor, or your financial backers. What does your organization hope to accomplish? Your goal might look like one of these:

▸ Recertify 150 nuclear power plant operators.
▸ Cut costs of education by 50% over the next year.
▸ Reduce bullying among students in our middle schools.
▸ Quickly prepare a global marketing plan to sell a new line of products.
▸ Cut misdiagnoses of battery failures by 90%.
▸ Earn $200,000 by selling courses.

Keep the organizational goal in mind as you make other decisions. Write this goal on a note card and tack it to your wall. Every day, ask yourself: "How am I helping achieve that goal?"

Ask what matters

Your overall goal tells you what really matters. To clarify this goal, you need to answer two questions.

The first question is "What matters to your organization?" We might phrase the question this way: "For your company, university, department, government, or institution, what is the single most important measure of success?" Try to answer in three words or fewer. That restriction focuses your

goal. The goal might be bottom-line profit or return on investment. Or it might be public service or first-rate reputation. On one of our projects, the Gantt Group, a consulting firm specializing in teaching project management, identified their goal as:

> For your organization, what is the single most important measure of success? [3 words maximum]
>
> **More clients**

They figured if they attracted enough clients, revenues and profits would follow.

The second question asks how your project will help accomplish that goal. I am not saying your e-learning will accomplish the goal by itself, but you certainly should be able to state how it will contribute. If you cannot convincingly and honestly argue that your project contributes to the goal, consider canceling the project now. Without such alignment with organizational goals, your project may run out of money, time, and management support. Better to stop now before antagonizing the management of your organization by wasting resources on an endeavor that does not matter to the organization.

Let's look at how this question was answered for the Gantt Group:

> How will your project help accomplish that goal?
>
> Convince potential clients that understanding Gantt charts can make them more successful project managers (and that the Gantt Group is the source for that understanding).

The proposed project was aimed at garnering more clients by convincing potential clients that understanding Gantt charts, which are a common tool of project management, could make them more successful and that the Gantt Group was the source for that understanding.

Consider a wide range of goals

Organizational goals are not limited to profit or return-on-investment. Observe what your leaders emphasize as the values and goal of the organization. Here are some possibilities.

Type goal	Description	Measures
Financial	Monetary success of a for-profit or not-for-profit enterprise.	▶ Profit amount and margin. ▶ Cash flow. ▶ Stock price. ▶ Venture capital. ▶ Fundraising.
Intellectual capital	Knowledge the organization controls.	▶ Education level of staff. ▶ Professional experience of staff. ▶ Rates of attracting and retaining talent. ▶ Patents, inventions, and trade secrets.
Customers	Consumers of the organization's services or products.	▶ Accounts, clients, sponsors. ▶ Students. ▶ Market share.
Employees	Staff of the organization.	▶ Retention of essential employees. ▶ Employee morale. ▶ Creativity and positive attitudes.
Operations	Efficiency and speed with which the organization performs its mission.	▶ Time to market. ▶ Cost per unit. ▶ Agility in changing business processes.
Reputation	Public image of an organization.	▶ Industry awards. ▶ Rankings and ratings. ▶ Community-service awards.

Identify the real goals

Don't just read lofty mission statements and listen to flowery speeches by your president. These are often too abstract and usually designed for external consumption only. Instead, do your own research. Here are some techniques to try:

▶ Ask your leaders how they expect you to contribute to the success of your organization. Often we fail to ask for fear of seeming out of touch or feeling we should already know. Most real leaders are delighted with such questions.

▶ Identify what is crucial to survival of your organization or accomplishment of its mission. Do a Web search using keywords of "survival" and "crisis" along with the name of your organization or its market segment.

▶ Observe what areas are being cut back and what areas are expanding within your organization and your industry.

▶ Research what is important to organizations like yours. Consider competing organizations and those in analogous fields.

▶ Consult legally binding statements, such as financial reports and Securities and Exchange Commission reports. Read carefully sections on planned growth and related risks.

Link learning objectives to organizational goals

Create a bridge connecting a high-priority goal of your organization and the learning objectives of your e-learning so both business managers and instructional designers see the value of e-learning to the organization. Notice how this statement provides just such a bridge:

> Misdiagnosing battery failures costs AnCaBattery Company millions of dollars per year in replacement costs and customer good will. Most misdiagnoses occur because customer service technicians (CSTs) cannot identify the underlying problem from the symptoms described by customers. By teaching CSTs to identify the cause of failure, we can reduce misdiagnoses by 90%.

Sad to say, many instructional designers stubbornly refuse to consider the underlying organizational goal when

designing instruction. They do not feel that organizational goals are their responsibility. As a result they design courses that accomplish little or else die for lack of organizational support. This is tragic because it only takes two questions to align learning objectives to organizational goals.

Analyze learners' needs and abilities

Whose skills, knowledge, and attitudes are you trying to alter? Before you can design e-learning for people, you must know enough about them to choose the types of learning experience to best teach them. You must assess learners' capabilities, not merely demographics and related stereotypes. Remember, abilities and attitudes matter more than just age, gender, nationality, and economic class.

What capabilities and traits are most important?

▶ **Motivation for learning**. Why would learners devote the time and effort necessary? Is it to accomplish their current job? Or to qualify for a new job? Also consider who pays for the learning: the learner or the learner's employer.

▶ **Psychomotor skills**. What is the level of the learner's perceptual acuity, working memory capacity, and speed and precision of eye-hand coordination? These abilities determine how learners can get information and interact with devices.

▶ **Attitude and mindset**. What are learners' attitudes toward learning and toward authority? Are they introverted or extroverted? Social or solitary?

▶ **Mental discipline**. Do learners have a short or long attention span? Are they easily distracted? Are they self-motivated and self-disciplined? Do they prefer to work alone or with others? Can they skip quickly among simultaneous tasks or do they need to complete one task before moving on to another?

▶ **Communication skills**. How well can they read, listen, speak, and write in the planned language for the course?

▶ **Social skills**. How well do learners work with others? Are they open to criticism? Can they motivate others? Can they offer empathy and support?

▶ **Talents and intelligences**. What basic abilities do learners possess: verbal, visual, logical, mathematical, musical, performance, athletic, intrapersonal, or interpersonal?

▶ **Media preferences**. Which media do learners attend to first: video, graphics, voice, music, or text? Which do they consider primary and which secondary? Which do they treat as more authoritative?

▶ **Background knowledge and experience**. What do potential learners already know about the subject? Do they know the basic principles, vocabulary, and taxonomy of the field? Or are they only familiar with detailed facts and rote procedures without understanding the bigger picture?

▶ **Learning conditions**. Where and when will they learn? How much time do they have available for learning? Do they have to learn in short spurts between other activities? Is the environment noisy and distracting?

▶ **Locus of control**. What do learners have power over? Can they change their learning environment and conditions? Do they have the ability to apply what they learn in their day-to-day work?

▶ **Style of prior education**. What kinds of learning have learners participated in? Which will they find familiar? Which trigger negative associations?

▶ **Digital fluency**. Is the potential learner digitally naïve or a digital native? To get a handle on how learners use technology in their lives ask some questions:

- How do they get their news: through newspapers, television, or newsfeed on a mobile device?