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Michael Allen's *Guide to* e-Learning

Building Interactive, Fun, and Effective Learning Programs for Any Company

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John Wiley & Sons, Inc.

Published by John Wiley & Sons, Inc., Hoboken, New Jersey
Published simultaneously in Canada

Library of Congress Cataloging-in-Publication Data
Allen, Michael W., 1946–
Michael Allen's guide to e-learning / Michael Allen.
p. cm.
Includes bibliographical references and index.
ISBN 0-471-20302-5 (CLOTH : alk. paper)
1. Employees—Training of. 2. Employees—Training of—Computer-assisted instruction. I. Title.
HF5549.5.T7 A4686 2003
658.3'12404'0285—dc21 2002014447

Printed in the United States of America

10 9 8

PART 2

DESIGN

The second part of this book turns to specific design principles that lead to positive learning experiences. Although the perspective imparted in Part 1 may be paramount to full success, I'm also convinced that the design principles described here will improve any e-learning design effort.

Who should read Part 2? Everyone interested in using e-learning to achieve success—to get people to do the right thing at the right time. This includes executives, business strategists, consultants, buyers, and others responsible for the success of organizations.

It may seem strange that principles seemingly of interest only to instructional designers are presented here for review by managers, buyers, and others. But, I do strongly recommend that both designers and managers read the design principles explored in Part 2, as it is important for all decision makers to be able to discriminate between weak approaches and powerful ones. Everyone needs to work together to adhere to essential values and principles. It is easy to go wrong, and there are so many false roads to success.

Background

Part 1 looked at the reasons why e-learning is so often a waste of time and money and how organizations are sometimes oblivious to both waste and lost opportunities. It also looked at what it takes to succeed with e-learning and how extraordinary the return can be when e-learning design is done well. The methods and principles that lead to highly effective e-learning seem simple and obvious when reviewed and enumerated, and yet, when you look at most e-learning applications, you find boring and ineffective presentations sprinkled with simplistic, uninteresting interactions.

The effectiveness of individuals and the power of organizations depend on their ability to perform, adapt, and change in response to shifting conditions. Learning is essential in many cases. If people find their training programs to be agonizing experiences, they will resist them and fail to complete them when allowed to quit early. Those unable to get themselves excused are likely to start the training with a negative attitude, and they'll have a boring, unproductive experience. Desired performance changes will not come easily.

Just as problematic are courses of instruction that are pleasant and entertaining, but fail in their mission to effect learning. Learners enjoy

the break from the daily routine, but return to the job no more able to perform than before the training.

No Reason for Poor e-Learning

Regardless of the reason for the ineffectiveness of an e-learning application, poor e-learning fails to build competitive organizational and individual strengths. There is no reason to waste the valuable and costly time of employees through ineffective training. And because there are decades of experience in the design of effective interactive instruction methods, there's no longer any justification for building ineffective e-learning applications.

Because so much poor e-learning has been developed and high-impact e-learning applications have been so rare, many have concluded that there must be a strong cost correlation: Weak e-learning is cheap; good e-learning is expensive. They further conclude that while weak e-learning design can be done quickly, good e-learning design takes forever.

These hasty and truly misleading conclusions are dangerous for several reasons:

- They overlook advancements made by leading design and development organizations over the last few decades; these advancements point the way to much less expensive and far faster development of high-impact e-learning applications.
- They ignore the real costs of lost business opportunities and poor performance.
- They channel resources into alternative solutions that can have even less probability of making a lasting impact.

We don't need to run from the challenge, but we do need to change our approach to it. Change in behavior doesn't come easily, either for our employees or ourselves. Unfortunately, developing powerful, engaging learning events requires change. To succeed, we have to approach the problem differently, think differently, reorder values and priorities, and, in many circumstances, do things that are contrary to both intuition and common wisdom. We may, indeed, have to do things that seem contrary to popular conclusions drawn from formal education on instructional design.

Buyer Beware

The type of e-learning design that is an effective tool to meet business challenges and opportunities is not similar to the e-learning designs typically seen today. Effective e-learning builds learner interest rather than depletes it. It actually transfers skills and knowledge rather than just describes them. It enhances learner self-esteem and confidence. It builds competitive performance and contributes meaningfully to both individuals and the bottom line. Unfortunately for the uninformed buyer, it's easy to be deluded into thinking that superficially appealing applications of instructional technology are actually effective or representative of what can be achieved. In fact, many impotent instructional designs look professional and can be defended on many grounds. When organizations stop using them because of unrealized expectations, decision makers are disappointed and baffled at best. At worst, they conclude that e-learning isn't up to the task.

There is a costly difference between e-learning that works and e-learning that merely looks like it would work but doesn't. While the measured effectiveness of a completed application is the ultimate test of a design and development process, trial and error is an expensive process to use. Discovering that a completed application doesn't deliver reveals a costly mistake. No one wants to uncover this news. Measurement is itself costly and often considered either an unaffordable luxury or simply unnecessary. So it isn't until an organization discovers it can set aside a training program without much ill effect that the weakness is finally realized. And then it appears as a cost-saving move to eliminate the program!

Give me a break!

You Don't Have to Count on Luck

Much is known about what works and what doesn't. Mistakes can be avoided. It is possible to be quite certain an application is going to be effective and yield a high return. Unfortunately, this is not widespread knowledge and does not guide enough design and development efforts. Informed leaders need to know what can be achieved and what to look for; they must become informed and demanding buyers. We can and must approach e-learning projects armed with the knowledge of what can truly be achieved within given constraints. We must insist on value so great that it is apparent even without measurement.

These, then, are the purposes of Part 2:

- To arm leaders with the knowledge they need to ensure success in each e-learning investment
- To guide designers in the application of values-based authoring that ensures success.

CHAPTER FIVE

LEARNER MOTIVATION

I am sometimes asked why I've stayed in the field of technology-based instruction for so many years. I can tell you that once you experience some successes and see what is possible, the allure of repeating those successes is very strong. Let me tell you a story of an early success with the PLATO system:

A custodian at an eastern public school was at his wit's end. After repeatedly lecturing teachers and staff about turning the building lights off when they left in the evening, lights were still being found ablaze many mornings when the building was being unlocked for the day. No one would admit leaving lights on. To the contrary, everyone assured the custodian that lights were switched off as the last person left.

In desperation, a security guard was posted. Sure enough, the lights went off as the last employee left, but sometime later in the evening the guard heard a noise outside. While he was outside checking, lights came on inside the school building!

The guard quietly reentered the building to see what was happening. To his great surprise, he found a room full of kids hard at work studying math with their PLATO computers. The noise he had heard was the kids getting into the ventilation ductwork so they could crawl through to the classroom. Once in, of course, it was very dark. The kids turned on the lights!

How often do kids break into school to study? How many situations do you know of in which school children voluntarily assemble to buckle down to schoolwork?

I have had many experiences in which I have personally seen technology-based instruction make a dramatic difference in the lives of learners. Each one of them has given me a craving for more. Each one of them has shown me how much untapped potential lies in e-learning. One area that definitely deserves more attention is the ability of e-learning to motivate learners.

Although outstanding teachers do their best to motivate learners on the first day of class and continually thereafter, many e-learning designers don't even consider the issue of learner motivation, let alone take action to raise it. They tend to focus instead on the meticulous presentation of information or *content*. Perhaps they believe the techniques teachers use to motivate learners are beyond the capabilities of e-learning. Instead of looking for alternative ways to use the strengths of e-learning technology to address motivation, they simply drop the challenge.

The e-Learning Equation

Learning is an action taken by and occurring within the learner. Instructors cannot learn their learners, and neither can e-learning technology with all its graphics, animations, effects, audio, interactivity, and so on. Learners must be active participants and, in the end, do the learning.

The learners' motivation determines, in large part, the level of their participation in the learning activity and their ability to learn. Motivation is an essential element of learning success.

With apologies to Albert Einstein, let me advance a conceptual model through a simple equation:

$$e = m^2c$$

where e = edification (or e-learning outcomes)
m = motivation
c = content presentation

The equation suggests that if there is no motivation ($m = 0$), there are no learning outcomes ($e = 0$), regardless of how perfectly structured and

presented the content may be. Of course, if the content is also inaccurate or faulty ($c = 0$), the learning outcomes will also be null. However, the equation suggests that emphasizing motivation in the course can have an exponentially greater impact than simply being comprehensive in content presentation.

No matter what the speculative value of c (content presentation) might be, when $m = 0$, $e = 0$. If you think about it, you know this is quite possible. Surely you've attended a class that went into a topic you didn't see as valuable or applicable to you. You started thinking about something else and later jerked to attention, realizing you had no idea of what had been said.

Motivation and Perception

Our selective perception allows us to filter out uninteresting, unimportant stimuli. It's very important that we have the capability of ignoring unimportant stimuli; otherwise, we would be shifting our attention constantly. Without selective perception, we wouldn't be able to attend properly to important events.

There are countless stimuli vying for our attention; however, most of these are unimportant and need to be ignored. As we sit in a lecture, for example, we can study the finish of the ceiling, note the kinds of shoes people are wearing, and check to see if our fingernails are trimmed evenly and to the desired length. The more we attend to unimportant things, the more difficult it becomes to effectively attend to those things that might actually be quite important to us.

Our motivations influence our perceptions and the process of focusing our attention. We attend to things of importance, whether they paint exciting opportunities in our minds or present dangers. When we see the possibility of winning a valued prize by correctly and quickly answering a question, for example, we focus and ready our whole body to respond. At that moment, we become completely oblivious to many other stimuli so that we can focus exclusively on the question. Conversely, if we expect little gratification from winning or have almost no possibility of winning, we might remain fully relaxed, not trying to generate an answer, or not even listening to the question. We might, instead, begin watching the behaviors of those really trying to win. If people watching provides little entertainment, that ceiling may take on a new fascination. There's a good likelihood we'll never even hear the question or the correct answer, because we'll be listening to our internal thoughts instead.

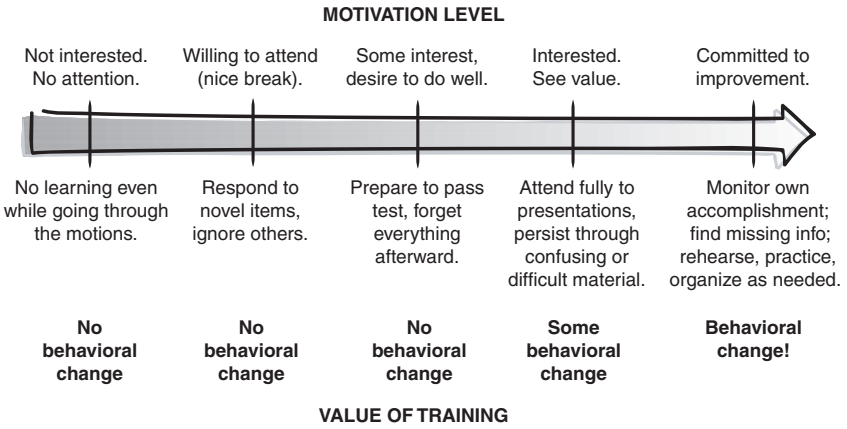

FIGURE 5.1 Effect of motivation on behavioral outcomes.

Motivation and Persistence

As the gateway to learning, motivation first helps us attend to learning events. It then determines what actions we take in response to them. Viewed from the perspective of whether we achieve the behavioral changes targeted, success correlates with motivation as shown in Figure 5.1.

When we're motivated to learn, we find needed information even if it's not so easily accessed. We make the most of available resources. We stay on track with even a disorganized or inarticulate lecturer. We ask questions, plead for examples, or even suggest activities and topics for discussion. If the lecturer proves to be a steady, untiring adversary, we turn to other learners, the library, or even other instructors for the help we need. We might switch to another class if that's an option, but somehow, if our motivation is high enough, we learn what we want to learn. And to the extent possible under our control, we refuse to waste time in unproductive activities.

Instructional Design Priorities

As we've seen, motivation controls our perception—what we see, hear, and experience. Motivation also fuels our persistence to achieve selected goals. Strong motivation, therefore, becomes critical for sustained learning.

Premise: Motivation is critical for learning. If motivation to learn is low, very little learning will occur. If motivation to learn is high, learning will occur even if instructional materials are poor.

There may be exceptions to this statement, as there are to most rules; however, many situations that appear to be exceptions are not. We learn things, for example, from simple observation. We learn from traumatic events, from surprises, and from shocking happenings. Are these exceptions? We find concurrent motivations at work even in these cases. Our motivations to belong, be safe, avoid unemployment, or win can all translate readily into motivation to learn. They cause what appears to be involuntary learning, but is, nonetheless, motivated learning.

Learning motivation is nearly always energized by other motivations, whether negative (such as avoidance of embarrassment, danger, or financial losses) or positive (such as competence, self-esteem, recognition, or financial gain).

Conclusion: It is as important, if not more important, to bolster learner motivation as it is to present content effectively.

e-Learning Design Can Heighten as Well as Stifle Motivation

In a circular fashion, e-learning can help build the motivation needed for success. Heightened motivation strengthens the effectiveness of the e-learning and therefore promotes learning. This self-energizing system is to be fostered.

An opposing, deadly cycle is the alternative. Poor e-learning saps any motivation learners have. As learners suspect their e-learning work is of little value, they attend less and participate less, thus reducing the possibility that it will be of value. With evidence that e-learning isn't working for them, learner interest and motivation continue to drop. This self-defeating system is, of course, to be avoided.

e-Learning Dropouts

Many e-learning designs tacitly assume, expect, require, and depend on high learner motivation, as evidenced by the good measure of persistence it takes just to endure them. If learner motivation wanes before the completion of instruction, learners drop out mentally, if not physically. Know

what? This is exactly what is reported: 70 percent of learners drop out of their e-learning applications without completing them (Islam 2002).

Optimists claim (or hope) that high e-learning dropout rates simply reflect the attrition of learners who have gotten all they needed. Learners quit, it is reasoned, because their needs have been satisfied and they feel ready to meet their performance expectations. This may be their excuse, but I doubt that learners feel their initial e-learning experiences were so successful that they need not complete the training.

MOVIEGOER: This movie is so good, let's leave—quick, before it ends.
READER: This book is so good, I don't think I'll read any more of it.
E-LEARNER: This e-learning application is so good, I think I'll quit.

Does this logic sound right to you? e-Learners more likely drop out because they can't take the boredom and frustration than because the instruction has served their needs so well. The time, effort, and patience required are greater than the perceived benefit.

Even Excellent Instruction Must Be Sold to the Learner

To create successful e-learning—or any successful learning program, for that matter—we need to make sure that value really is there. But perhaps just as important, we also need to make sure learners see and appreciate that value in concrete terms. Each learner must buy into the value of the learning—not just in general, but for specific, meaningful benefits. In other words, we need to *sell* learners on the *truthful* proposition that participation will provide benefits worth the time and effort. Doing so will stimulate vital motivation and give the program a chance to succeed.

I'm not talking about marketing spin meant to mask a miserable experience (although if the experience is going to be miserable, it's more important than ever to sell it successfully to the learner). Nor do I suggest cajoling learners or propositioning them: "If you struggle through this, you'll be much the better for it."

Adult learners are sensitive to manipulation. If they feel they are being manipulated, they are likely to react defensively. They may be motivated to prove the instruction was unnecessary or ineffective. Rather, everyone has much to gain if the learner sees the personal advantages of learning. Again, the value must truly exist *and* learners must be able to envision and appraise the win firsthand.

All of this is done to ensure that the m in $e = m^2c$ reaches the highest value possible.

It Isn't Bad News That Motivation Is Essential

Knowing the importance of learner motivation gives us an explanation of many e-learning failures and points the way to success. This is good news.

Actually, even better news lies in knowing that motivation levels change from situation to situation and from moment to moment. In other words, motivation levels are context-sensitive and can be influenced. We don't have to be satisfied with the levels of motivation learners carry into a learning event. If a learner's motivation is low, we can do things that are likely to raise it.

$$e = m^2c$$

You may have noted that, in contrast to Einstein's equation ($e = mc^2$), I have squared the motivation factor. This is done to emphasize not only that motivation is essential, as would be indicated simply by $e = mc$, but that the learning outcome is more likely to be affected by motivational factors than it is by the content presentation. Again, if motivation is high, learners will make the most of whatever content information is available. If motivation is low, refining presentation text and graphics may help to improve learning somewhat, but not to the same level as heightening motivation.

It's also critical that these two elements compliment each other. Content can be structured and presented in ways that are sensitive to the issue of motivation. That is, just as confusing and incomprehensible content presentation can extinguish motivation (i.e., c can be 0), selection of the right content at the right time can stimulate motivation.

Further, interactivity allows learners to act on their motivations. Seeing their efforts advance themselves toward their goals reinforces motivation. We might, therefore, extend our equation to include the value of interactivity:

$$e = m^2ci$$

where i = interactivity

The equation is not to be taken in any literal, computational sense, of course. We have no practical units of measurement applicable to content presentation nor standardized measures of motivation; however, the factors that determine learning shown here are functional and easily

observed. The equation serves as a reminder not to omit attention to each factor.

Motivation to Learn versus Motivation to Learn via e-Learning

Motivation has focus. It has a goal. We can have a varying set of multiple motivations with their individual goals simultaneously, and they are competitive with each other at all times. In certain contexts, one motive will sometimes have sufficient strength to dominate our attention. At these moments, stimuli unrelated to the dominant motivation won't even reach our consciousness.

Realizing the context sensitivity of motivations, we can also understand that e-learning events have the power to both increase and decrease learner motivation. Like every other aspect of human behavior, learner motivation is complex, but a simple view of motivation is sufficient to reveal powerful design principles for interactive instruction.

The simple view is this:

- If we want to learn, we will find a way.
- If we don't want to learn, we won't.
- If we want to learn but the e-learning application isn't working for us, we will turn to something else.

When we want the cost savings, quality control, easy access, and other advantages of e-learning, the question becomes, "How do we get learners to *want* to learn via e-learning?"

The answer: Seven Magic Keys.

Seven Magic Keys to Motivating e-Learning

Yes, I have seven (rim shot please) "magic keys" to making e-learning experiences compelling and engaging.

It's never as easy as following a recipe in e-learning. I can't emphasize enough that there is a lot to know about instructional design, and that although good e-learning design may look simple to create, it isn't. A great idea will often look obvious, and an effective implementation of it may look easy when complete, but uncovering the simple, "obvious" ideas can be a very challenging task.

TABLE 5.1 Ways to Enhance Learning Motivation—the Magic Keys

Key	Comments
1. Build on *anticipated outcomes.*	Help learners see how their involvement in the e-learning will produce outcomes they care about.
2. Put the learner at *risk.*	If learners have something to lose, they pay attention.
3. Select the right *content* for each learner.	If it's meaningless or learners already know it, it's not going to be an enjoyable learning experience.
4. Use an appealing *context*	Novelty, suspense, fascinating graphics, humor, sound, music, animation—all draw learners in when done well.
5. Have the learner perform *multistep tasks.*	Having people attempt real (or "authentic") tasks is much more interesting than having them repeat or mimic one step at a time.
6. Provide *intrinsic feedback.*	Seeing the positive consequences of good performance is better feedback than being told, "Yes, that was good."
7. Delay *judgment.*	If learners have to wait for confirmation, they will typically reevaluate for themselves while the tension mounts—essentially reviewing and rehearsing!

It is therefore important to set out in promising directions right from the start. The magic in these keys is that they are such reliable and widely applicable techniques. Their presence or absence correlates well with the likely effectiveness of an e-learning application—at least to the extent that it provides motivating and engaging experiences. Thankfully, these features are not often more difficult to implement than many less effective interactions. These are realistic, practical approaches to highly effective e-learning. Let's begin with Table 5.1, which lists seven ways to enhance motivation—the Seven Magic Keys—and then discuss them in more detail with examples.

Using the Magic Keys

You don't have to use every Magic Key in every application. You would be challenged to do it even if you were so inclined. On the other hand, the risk of failure rises dramatically if you employ none of them.

Although it's rather bold to say so, I do contend that if you fully employ just one of these motivation stimulants, your learning application

is likely to be far more effective than the average e-learning application. Everything else you'd do would become more powerful because the learner would be a more active, interested participant.

Magic Key 1: Build on Anticipated Outcomes

We have motives from the time we are born. As we mature, learned motives expand on our instinctive motives. All our learned motives can probably be traced to our instinctive motivations in some way, but the helpful observation here is that all persons have an array of motivations that can be employed to make e-learning successful (Figure 5.2). A simple and effective technique to build interest in an e-learning application is to relate its benefits to learner desires for comfort, power, self-esteem, and other prevalent motivations.

Instructional Objectives

Much has been made of targeted outcome statements or *instructional objectives*, perhaps beginning with Robert Mager's insightful and pragmatic how-to books on instructional design, such as *Preparing Instructional Objectives* (Mager 1997c), *Measuring Instructional Results* (Mager 1997b), and *Goal Analysis* (Mager 1997a; Atlanta, GA: Center for Effective Performance). Instructional designers are taught to prepare objectives early in

FIGURE 5.2 Prevalent motivations.

the design process and to list learning objectives at the beginning of each module of instruction. Few classically educated instructional designers would consider omitting the opening list of objectives.

Mager provides three primary reasons why objectives are important:

> Objectives . . . are useful in providing a sound basis (1) for the selection or designing of instructional content and procedures, (2) for evaluating or assessing the success of the instruction, and (3) for organizing the learners' own efforts and activities for the accomplishment of the important instructional intents. (Mager 1997c, p. 6)

There's no doubt about the first two uses. If you don't know what abilities you are helping your learners build, how can you know if you're having them do the right things? As I've emphasized before, success depends on people doing the right thing at the right time. If no declaration of the right thing is available, you can neither develop effective training nor measure the effectiveness of it—except, perhaps, by sheer luck. Objectives are a studied and effective way of declaring what the "right thing" is. As Mager says, "if you know where you are going, you have a better chance of getting there" (Mager 1997c, p. 6).

It's the third point that's of interest here—using objectives to help learners organize their learning efforts. Certainly objectives can help. When objectives are not present, learners must often guess what is important. In academic or certification contexts, learners without objectives must guess what will be included in the all-important final examination. After they have taken the final exam, learners know how they might have better organized their learning efforts. But, of course, it's too late by then.

For objectives to provide benefits to learners, learners have to read, understand, and think about them. Unfortunately, learners rarely spend the time to read objectives, much less use them as learning tools. Rather, they discover that the objectives page is, happily, a page that can be skipped over quickly. Learners think, "I'm supposed to do my best to learn whatever is here, so I might as well spend *all* my time learning it rather than reading about learning it."

Lists of Objectives Are Not Motivating!

Many designers hope objectives will not only help learners organize their study, but also motivate them to want to learn the included content. Will they? Not if learners don't read them. How readable are they? It depends, of course, on how they are written.

Accomplished writers know that objectives should have three parts:

- A description of behavior that demonstrates learning
- The criterion for determining acceptable performance
- The conditions in which the performance must be given

Writers have learned the importance of using the right vocabulary; see Table 5.2 to get the gist of it.

Measurable behavioral objectives are, indeed, critical components to guide the design of effective training applications. Designers need such objectives, and none of these components should be missing from their design plans. But the question here is about their use as motivators.

You can hardly yawn fast enough when you read a block of statements containing such "proper" objectives as:

> Given a typical business letter, you will be able to identify at least 80% of the common errors by underlining inappropriate elements or placing an "X" where essential components are missing.

Motivating? I don't think so. Objectives are certainly important, but listing such statements as this in bullet points at the start of a program is boring and ineffective. There are better ways to motivate learners.

TABLE 5.2 Behavioral Objectives—Acceptable Verbs

Not Measurable	Measurable
To know	To recall
To understand	To apply
To appreciate	To choose
To think	To solve

How about Better-Written Objectives?

You can certainly write objectives in more interesting ways and in ways more relevant to the learner. Frankly, when deciding just how much energy and involvement to commit, learners want to know what's in it for them (i.e., how it relates to their personal network of motivations). Effective objectives answer the question and give motivation a little boost; see Table 5.3.

TABLE 5.3 More Motivating Objective Statements

Instead of Saying . . .	You Could Say . . .
After you have completed this chapter, given a list of possible e-learning components, you will be able to list the essential components of high-impact e-learning.	In a very short time, say about two hours, you will learn to spot the flaws in typical designs that make e-learning deathly boring and you will know some ways to fix them. Ready?

Remember that the more fully we can sell the learner on the advantages of learning the material at hand, the more effective the material will be. But if you've come to agree on this point, you might wonder whether textual listings of objectives are really the best way to sell anyone on learning. Good thought. We can do better!

Don't List Objectives

If learners aren't going to read objectives, even valuable and well-written objectives, listing them at the beginning of each module of instruction isn't a very effective thing to do.

In e-learning, we have techniques for drawing attention to vital information. We use interactivity, graphics, animation—in short, all the powers of interactive multimedia—to help learners focus on beneficial content. Why, then, shouldn't we use these same powers to portray the objectives and sell the learning opportunity to the learner?

Instead of just listing the objectives, provide meaningful and memorable experiences.

Example 1: Put the Learner to Work

Perhaps the clearest statement of possible outcomes comes from setting the learner to work on a stated task. If learners take a try and fail, at least they'll know exactly what they are going to be able to do when they complete the learning.

In this example of an award-winning application to teach users the ins and outs of Microsoft Windows (Figures 5.3 to 5.8), individual objectives are quite clear in the presentation of the task itself. Learners are immediately put to work to see if they can select a printer. Many learning aids are available, including a complete demonstration, a demonstration of the next step, hints, and sometimes an amusing video that puts the overall utility of knowing how to perform the task in context. Learners, engaged in their task, are motivated to seek and apply help as needed.

Demo on CD

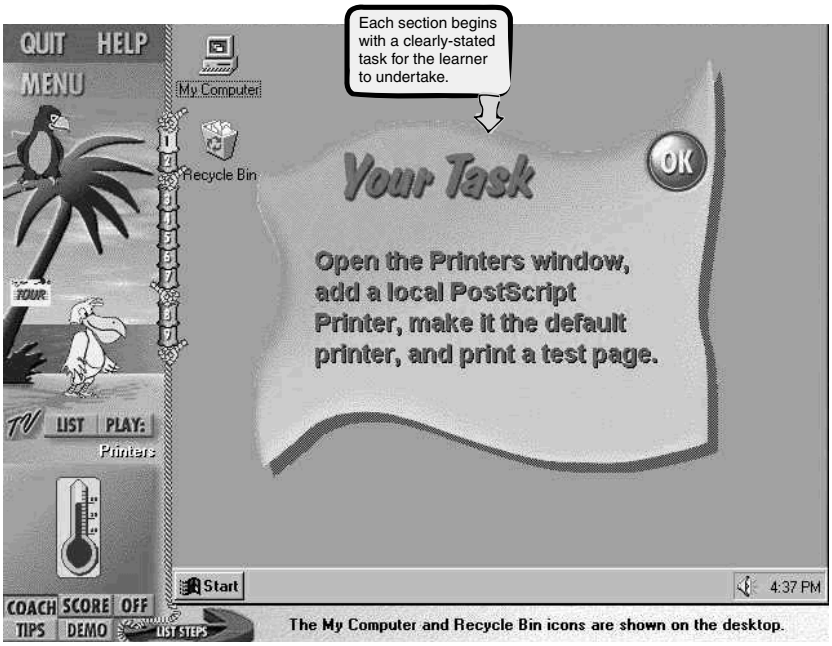

FIGURE 5.3 A meaningful task challenge takes the place of a traditional objective statement.

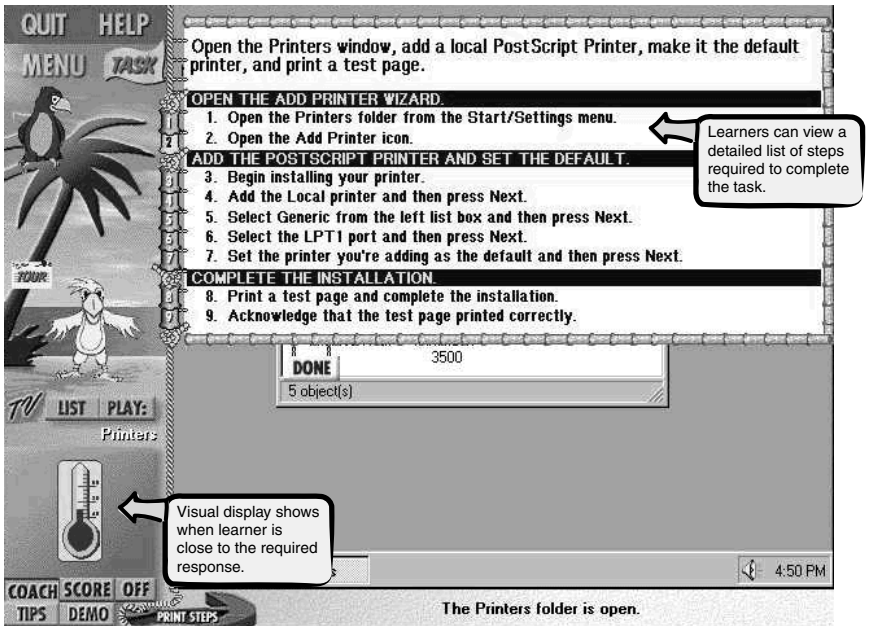

FIGURE 5.4 Various types of aids are available.

Figures 5.3 to 5.8 from Breeze Thru Windows 95 Basics. *Courtesy of Allen Interactions Inc.*

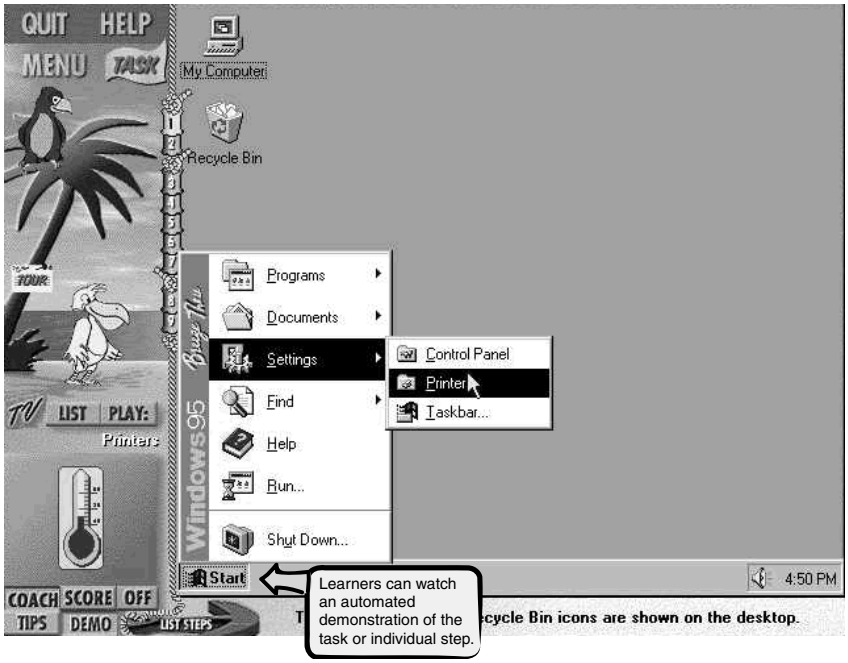

FIGURE 5.5 Learners can request a demonstration.

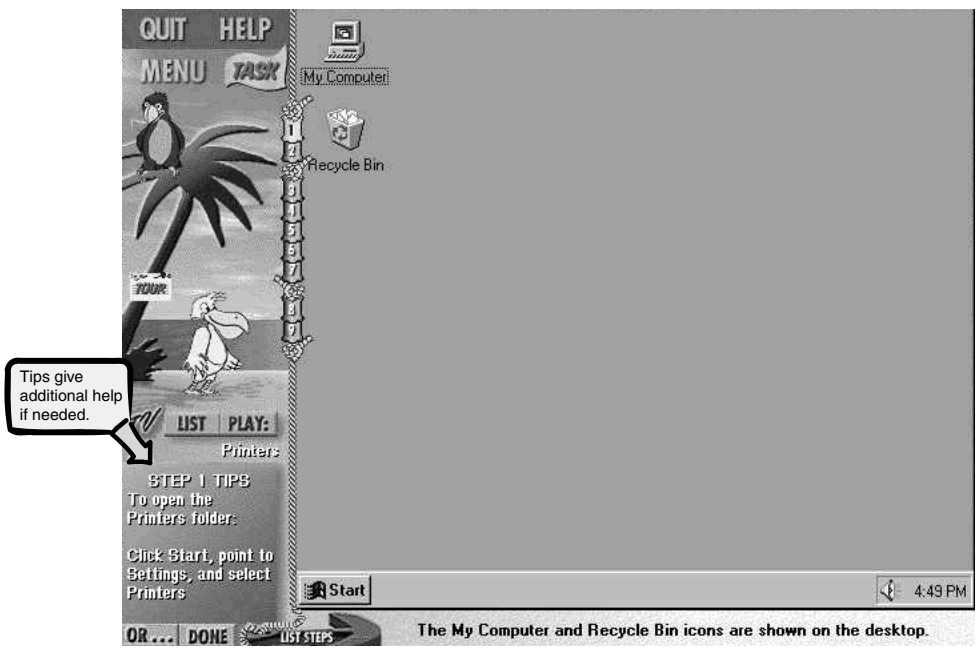

FIGURE 5.6 Tips are available to suggest alternate ways of completing the task.

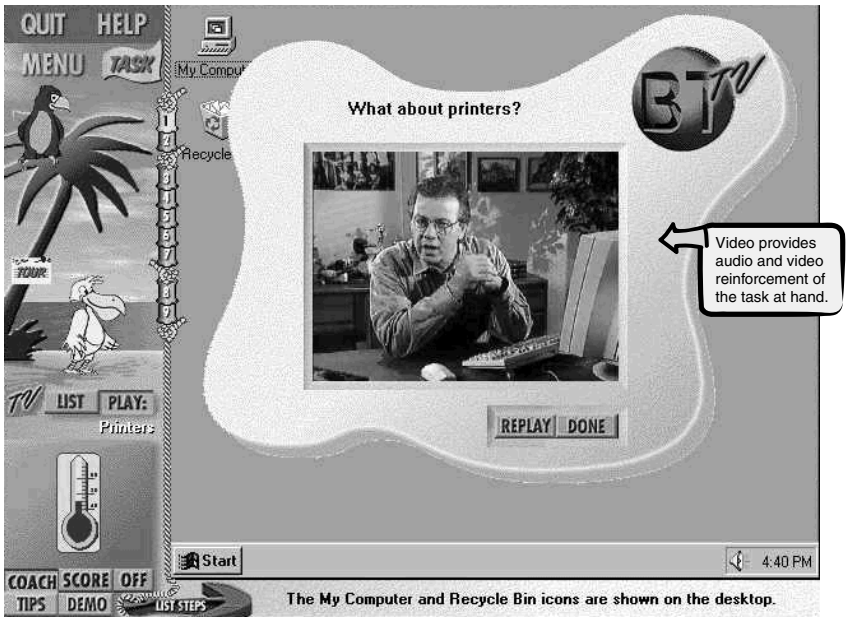

FIGURE 5.7 Videos add humor and perspective.

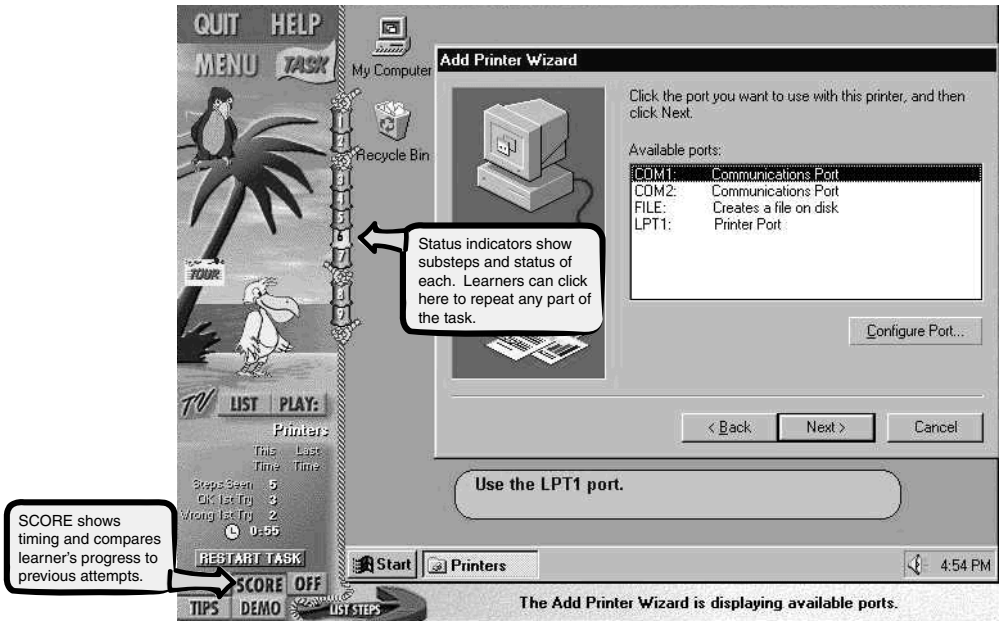

FIGURE 5.8 Scoring and progress indicators encourage learners to practice for perfection.

You might be concerned that some failures, especially early on, will frustrate or demoralize learners. This is an appropriate concern. Interactive features must be provided to help all learners work effectively with risk. Please see Magic Key 2 for a discussion of risk management.

Example 2: Drama

Motivation is not an exclusively cognitive process. Motivations involve our emotions and our physiological drives, as well. Good speakers, writers, and filmmakers are able to spirit us on to take action, to reevaluate currently held positions, and to stir emotions that stick with us and guide our future decisions.

Imagine this scenario. Airline mechanics are to be trained in the process of changing tires on an aircraft in its current position at a gate. You can easily imagine the typical first page of the training materials to read something like this:

> At the completion of this course, you will be able to:
>
> - Determine safety concerns and proper methods of addressing each.
> - Confirm and cross-check location of tire(s) to replace.
> - Obtain appropriate replacement tire.
> - Select appropriate chock or antiroll mechanisms and secure according to approved procedures for each.

Now imagine this approach. You press a key to begin your training. Your computer screen slowly fades to full black.

> Lightning sounds crash and your screen flickers bright white a few times. You see a few bolts of lightning between the tall panes of commercial windows just barely visible. Through the window, you now see an airplane at the gate. The rain is splashing off the fuselage. A gust of wind makes a familiar sound.
>
> The scene cuts to two men in yellow rain slickers shouting at each other to be heard over the background noise of the storm and airport traffic.
>
> "You'll have to change that tire in record speed. The pilot insists there's a problem, and that's all it takes to mandate the change. There's going to be a break in the storm and there are thirty-some flights hoping to get out before we'll probably have to close down again."
>
> "No problem, Bob. We're on it."

Return to the windows, where we now can see people at the gate—a young man in business attire is pacing worriedly past an elderly woman seated near the windows.

"Don't worry, young man. They won't take off if the storm presents a serious danger. Even in a storm and with all the possible risks of air travel, I still think it's the safest way for me to get around."

"Oh, thanks, ma'am. But you see, my wife is in labor with our first child. I missed an earlier flight by ten minutes, and now this is the last one out tonight. I'm so worried this flight will be delayed for hours—or worse, even cancelled due to weather. I'm not sure what my options are, but I need to get home tonight."

Back outside, Bob runs up to three mechanics as they run toward him in the rain.

"All done, Bob. A little final paperwork inside where it's dry, and she's set to fly."

"Your team must have set a record. Even under pleasant circumstances, I don't know any other employees who could have done such a good job so fast. The departure of this aircraft won't be delayed one minute because of that tire change. A lot of people will benefit from your work tonight.

"This is going into the company's newsletter!"

I hope you can see how this dramatic context can much more effectively communicate the learning objectives *and* motivate learners to pursue them. Who wouldn't want to be a hero in this circumstance? Who wouldn't begin thinking, "I'll bet I could learn to do that . . . maybe even do it better." And then, "I wonder what it takes. Hope I get a chance to find out in this learning program."

Example 3: Game Quiz

Many interactive courses start with an opening assessment. It's a sound instructional principle. In order to select appropriate experiences for our learners, we need to know which skills our learners already have and which they don't.

The problem is that taking a test isn't an eagerly sought out experience. Many learners, in fact, become terribly fearful just at the thought. They would go to great lengths to avoid being tested, and, if not able to

escape the test, may perform far below their actual abilities simply because of fright.

So, while there are good reasons to begin training activities with an assessment, there are also very good reasons not to. The challenge is how to:

- Motivate learners.
- Create a positive attitude about engaging with the e-learning application.
- Determine learner skill levels.
- Communicate what can be learned in the course.
- Set expectations in a convincing manner.

Sometimes it is not so much what you do as how you do it. One of the advantages of technology-based instruction is that learning experiences can be very private. Some of the fear of testing comes from apprehension about what others will think of a poor public performance.

There's much emotional carryover into e-learning from other experiences, even when concerns about embarrassment truly are not applicable. These concerns cannot be simply ignored, appropriate or not. Experience does show that nearly everyone can become accustomed to, and even appreciate, private testing when the results are kept private and are used to make learning experiences more fitting and enjoyable.

Not all quizzes are alike. While many are threatening, it's possible to make them fun. By creating as much distance as possible between the feared, graded academic test and a game in which not knowing an answer is fully acceptable and knowing one is a happy surprise to everyone, it's possible to meet all the challenges previously mentioned. Learners get into it and are energized. They see that there will be humor about mistakes and opportunities to address weaknesses (that's what the training is all about). They see whether they are beginners, intermediate performers, or even too advanced for the course. They see what content is covered and see some of the things that are important. And finally, if the testing is done very well (perhaps even involving some simulations), they see what kinds of tasks they will be able to perform once the training has been completed.

In this example, Fallon Worldwide (an advertising agency) wanted to assess each employee's level of Internet knowledge to best provide appropriate training. The idea of a formal test was unlikely to be an attractive

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FIGURE 5.9 Opening sequence sets expectations for challenge and fun.

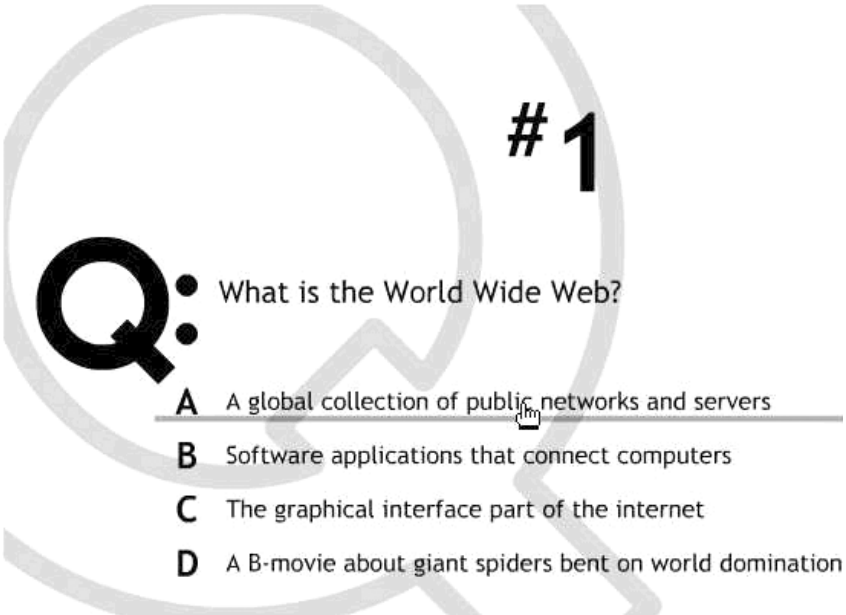

FIGURE 5.10 Presentation uses engaging and amusing animation to present questions.

Figures 5.9 to 5.11 from Internet Readiness Quiz. *Courtesy of Fallon Worldwide.*

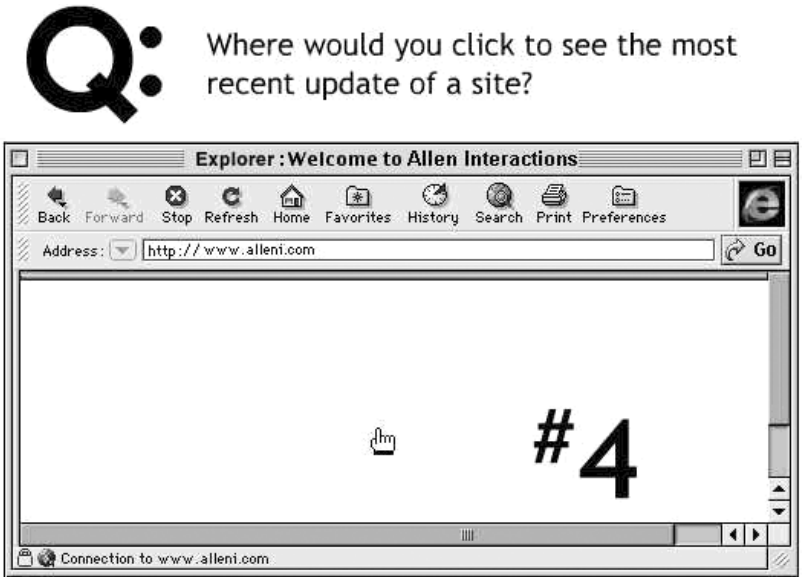

FIGURE 5.11 Question formats vary with content to give learners a preview of instructional content.

proposition and would unnecessarily prejudice learners against the effort. This engaging quiz plays more like a game than an assessment tool. It moves quickly, is entertaining in its visual and audio effects, previews and highlights important information about the Internet, and still manages to gather all the desired information (Figures 5.9 to 5.11). You'll need to check this one out on the CD to get full impact.

Magic Key 2: Put the Learner at Risk

When do our senses become most acute? When are we most alive and ready to respond? It's when we are at risk, when we sense danger (even pretended danger) and must make decisions to avert it. It's when we see an opportunity to win and the possibility of losing.

Games energize us primarily by putting us at risk and rewarding us for success. Although it's easy to point to the rewards of winning as the allure, it is also the energizing capabilities of games that make them so attractive. Risk makes games fun to play. It feels good to be active, win or lose.

Proper application of risk seems to provide optimal learning conditions. I used to think, in fact, that putting learners at some level of risk was the only effective motivator worth considering in e-learning and the most frequently omitted essential element. While I have identified other essential elements—the other Magic Keys—I continue to believe that risk is the most effective in the most situations. There are positives and negatives, however; see Table 5.4.

Problems with Risk as a Motivator

Consider instructor-led training for a moment. In the classroom, putting the learner at risk can be as simple as the instructor posing a question to an individual learner. The risk to the learner goes far beyond failing to answer correctly. Public performance can affect social status, social image, and self-confidence for better or worse. Even if we're in a class in which we know none of our classmates, being asked a question typically causes a rush of adrenaline because of what's at stake.

Competition is a risk-based device used by many classroom instructors to motivate learners. In some of my early work with PLATO, I managed an employee who considered one of PLATO's greatest strengths to be its underlying communication capabilities, which were able to pit multiple users against each other in various forms of competitive combat. Although these capabilities were often used just for gaming, he was intrigued with the idea of using them to motivate learners.

Competitive e-learning environments can certainly be created, but, unfortunately, pitting learners against each other often constructs a win/lose environment. It may be true that even the losers are gaining strengths, and they may be effectively motivated to do their best as long

TABLE 5.4 Risk as a Motivator

The Positives	The Negatives
Energizes learners, avoids boredom	May frighten learners, causing anxiety that inhibits learning and performance
Focuses learners on primary points and on performance	May rush learners to perform and not allow enough time to build a thorough understanding
Builds confidence in meeting challenges through rehearsed success	May damage confidence and self-image through a succession of failures

as they aren't overly intimidated by the situation or their competitors. But it's difficult to prevent the nonwinners from seeing themselves as losers.

Private versus Social Learning Environments

There are advantages to being in the company of others when we learn. We are motivated to keep up. We learn from watching the mistakes and successes of others. Communication with others helps round out our understanding. Successful public performance gives us confidence.

On the other hand, the risk of public humiliation is, for many, a fearful risk. While a successful public performance can easily meet our two essential criteria of being a meaningful and memorable learning event, the event may be memorable because of the fear associated with it. And although traumatic experiences may be memorable, the emotional penalty is too high. For many individuals, practice in a private environment avoids all risk of a humiliation and can bring significant learning rewards.

Interestingly, research finds that people respond to their computers as if they were people (Reeves and Nass 1999). We try to win the favor of our computers and respond to compliments extended to us by computer software. Quite surprisingly, solo learning activities undertaken with the computer have more characteristics of social learning environments than one would expect. Talented instructional designers build personality into their instructional software so as to maximize the positive social aspect of the learning environment.

Asynchronous electronic communications such as e-mail and synchronous learning events such as are now possible with various implementations of remote learning can build a sense of being together. Where resources are available to assist learning through such technologies, a stronger social learning environment can be offered, although here, just as with other forms of e-learning, design of learning events, not the mere use of technology, determines the success achieved.

For many organizations, though, one of the greatest advantages of e-learning comes from its constant availability. When there's a lull in their work, employees can be building skills rather than being simply unproductive while waiting for either more work assignments or scheduled classes to roll around. Unless you can count on the availability of appropriate colearners, it is probably best to design independent learning opportunities.

Don't Baby Your Learners

Some organizations are very concerned about frustrating learners, generating complaints, or simply losing learners because they were too strongly challenged. They are so concerned, in fact, that they make sure that learners seldom make mistakes. Learners can cruise through the training, getting frequent rewards for little accomplishment.

The organization expects to get outstanding ratings from learners on surveys, and may get them regardless of whether any significant learning occurred. But even greater ratings may be achieved by actually helping learners improve their skills. More important, both individual and organizational success might be achieved.

Break the rules and put learners at some measure of risk. Then provide structures that avoid the potential perils of doing so. Here are some suggestions:

Avoiding Risk Negatives

The positives of risk are extremely valuable, but they don't always outweigh the negatives. Fortunately, the negatives can be avoided in almost every instance, so that we're left only with the truly precious positive benefits. Effective techniques include:

- *Allowing learners to ask for the correct answer.* If learners see they aren't forced into a risk and can back out at any time, learners often warm up to taking chances, especially when they see the advantages of doing so.
- *Allowing learners to set the level of challenge.* Low challenge levels become uninteresting with repetition. Given the option, learners will usually choose successively greater challenges.
- *Complimenting learners on their attempts.* Some encouragement, even when learner attempts are unsuccessful, does a lot to keep learners trying. It is important for learners to know that a few failures here and there are helpful and respected.
- *Providing easier challenges after failures.* A few successes help ready learners to take a run at greater challenges.
- *Providing multiple levels of assistance.* Instead of all or nothing, learners can ask for and receive help ranging from general hints to high-fidelity demonstrations.

Using these techniques, it is possible to offer highly motivating e-learning experiences with almost none of the typical side effects that accompany learning risk in other environments.

Example: Stacked Challenges

Why do kids (and adults) play such video games as the classic Super Mario Bros. for hours on end? Shortly after home versions of the game became available, our son and all the children on our block knew *every* opportunity hidden throughout hundreds of screens under a multiplicity of changing variables. They stayed up too late and would have missed meals, if allowed to, in order to find every kickable brick in walls of thousands of bricks (Figure 5.12). They learned lightning-fast responses to jump and duck at exactly the right times in hundreds of situations. And for what? Toys? Money? Vacations? Prizes? Nope.

We play these games as skillfully as possible to be able to continue playing, to see how far we can get, to avoid dying and having to start over, to feel good about ourselves, and to enjoy the energy of a riskful, but not harmful, situation.

In the process of starting over (and over, and over), we practice all the skills from the basics through the recently acquired skills, overlearning them in the process and becoming ever more proficient. We take satisfaction in confirming our abilities as our adrenaline rises in anticipation of reencountering the challenges that doomed us last time.

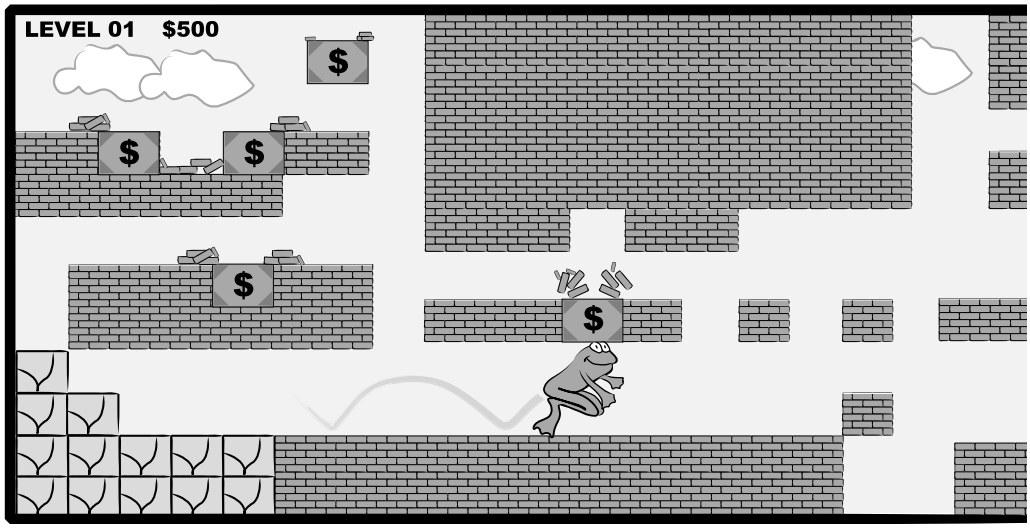

FIGURE 5.12 Computer games successfully teach hundreds of facts and procedures.

Imagine, in contrast, the typical schoolteacher setting out to teach students to identify which bricks hide award points. There would be charts of the many thousands of bricks in walls of various configurations. You can just imagine the homework assignments requiring students to memorize locations by counting over and down so many bricks and circling the correct ones. In class, students would grade each others' papers.

Students would be so bored that behavior problems would soon erupt. The teacher would remind students that someday in the future, they would be glad they could identify the bricks to kick. Great success would come to those learners who worked diligently. After several years of pushing students through these exercises, the teacher might turn to e-learning for help. With a happy thought of transferring the teaching tedium to the computer, the teacher would create an online version of the same boring instructional activities.

To me, this sounds similar to a lot of corporate training. While we might not see our trainees pulling each others' hair, making crude noises, and writing on desks, we can be sure they will be thinking about things other than the training content when learning tasks are so uninteresting.

Just teaching one task within the complex behaviors of the venerable Super Mario Bros. player would be a daunting challenge for many educators, yet millions of people have become adroit at these tasks with *no instruction*—at least with no *typical* instruction. Why aren't the obviously effective instructional techniques applied to e-learning, with all its interactive multimedia capabilities?

Good question. Why not, indeed!

In a project done for the National Food Service Management Institute (NFSMI), *Cooking with Flair: Preparing Yeast Breads*, *Quick Breads*, *Cakes*, *Pasta*, *Rice & Grains*, there were two goals: to teach specific culinary techniques and to teach concepts to give learners a deeper understanding of some of the more complicated aspects of quantity food preparation.

Food service workers must be able to adjust recipes for proper results at different altitudes. Adjustments can be made to the leavening, tougheners, tenderizers, liquids, baking temperature, pan greasing, and storage. The lesson provides details of these required adjustments, but it is unlikely that these charts will have any long-lasting effect on a learner who simply reads them (Figure 5.13).

The adjustment tasks are not complex, difficult to understand, or difficult to do: Increase leavening, reduce liquids, and so on. The problem lies in the fact that there are so many factors to be learned. In a typical training design, there would be concern about how you could keep people

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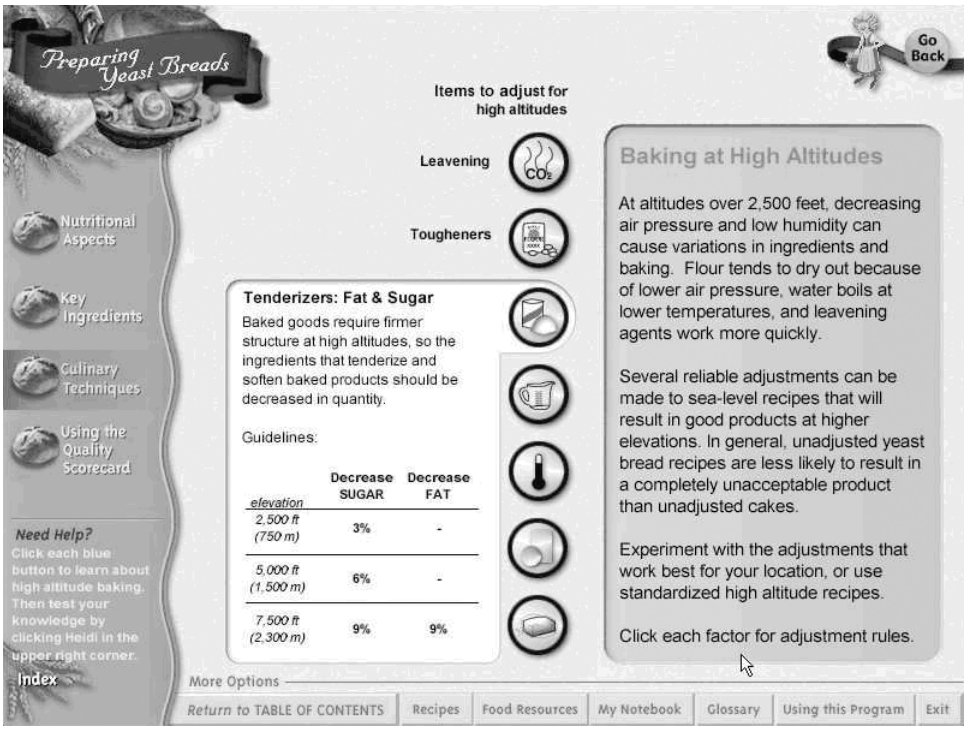


FIGURE 5.13 Explanation of high-altitude baking adjustments provides a lot to remember.

awake and focused on the task while you tried to train them on all these pieces of information.

But think about how many specific pieces of information children eagerly learn in the Super Mario Bros. games. If they can learn all of that information, then we should similarly be able to teach this information. What techniques can we borrow from the Nintendo game to make an e-learning experience successful?

Repetition and Goals

Repetition is a primary way of getting information stored in our brains (see Figure 3.17). Most theorists believe we first perceive new information, transfer it to short-term memory, and then, through repetition, eventually integrate new information with existing information already

Figures 5.13 to 5.19 from Cooking with Flair: Preparing Yeast Breads, Quick Breads, Cakes, Pasta, Rice & Grains. *Courtesy of National Food Service Management Institute, University of Mississippi.*

held in long-term memory. Whether this description of the internal process is exactly correct really doesn't matter. What is clearly observable is that repetition facilitates learning, recall, and performance.

The problem is that repetition is generally boring. So, we need a way to make repetition palatable. This is where goals come in. By establishing goals we draw attention away from the repetition itself and can focus on the results that repetition achieves. If learners fail over and over again, they will generally want to stop. However, if they fail in a more advanced place each time, they're motivated to keep working toward perfection. Visible progress keeps learners trying.

These motivators were incorporated fully into the Heidi altitude baking exercise in *Cooking with Flair*. NFSMI used the visual context of a mountain that the learner's character (in this case Heidi rather than Mario) has to climb. She wants to visit her grandfather, who lives at the top, and prepare some baked goods for him to enjoy (Figure 5.14).

Along the way, she stops to visit his neighbors, who live at different altitudes (Figure 5.15). Her task is to prepare gifts of baked goods as she

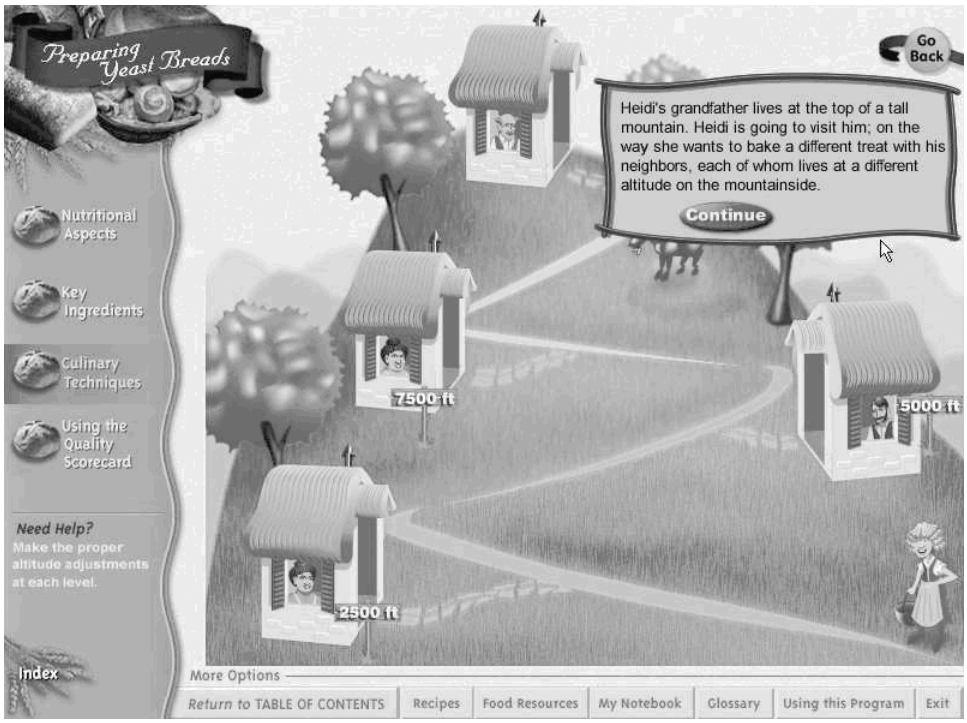


FIGURE 5.14 Learners face the challenge of helping Heidi climb a mountain to reach her grandfather.

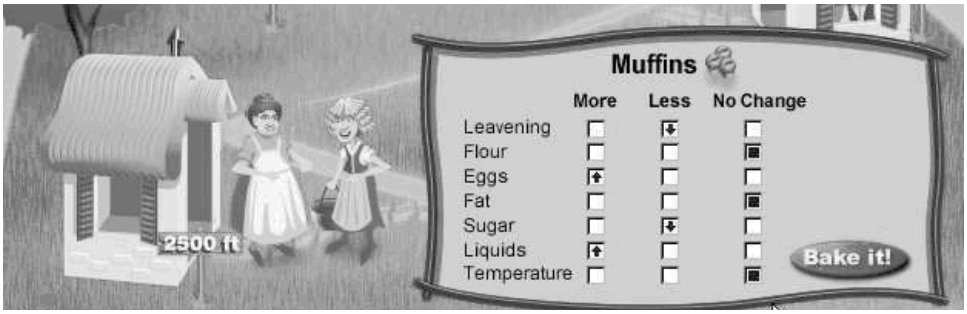


FIGURE 5.15 Learners attempt to adjust recipes for each altitude.

travels along (Figure 5.16). The problem is that all her recipes expect preparation at sea level. If she doesn't adapt them properly, her baked gifts will be terrible (Figure 5.17), and the mountain's goat will knock Heidi down to the base of the mountain (Figure 5.18). She rolls down giggling—no injuries or violence here (Figure 5.19). The learner must start all over again.

Learners don't need to remember all the detail. Instead, they respond at the generalization level. "At this altitude, do I put in more or less

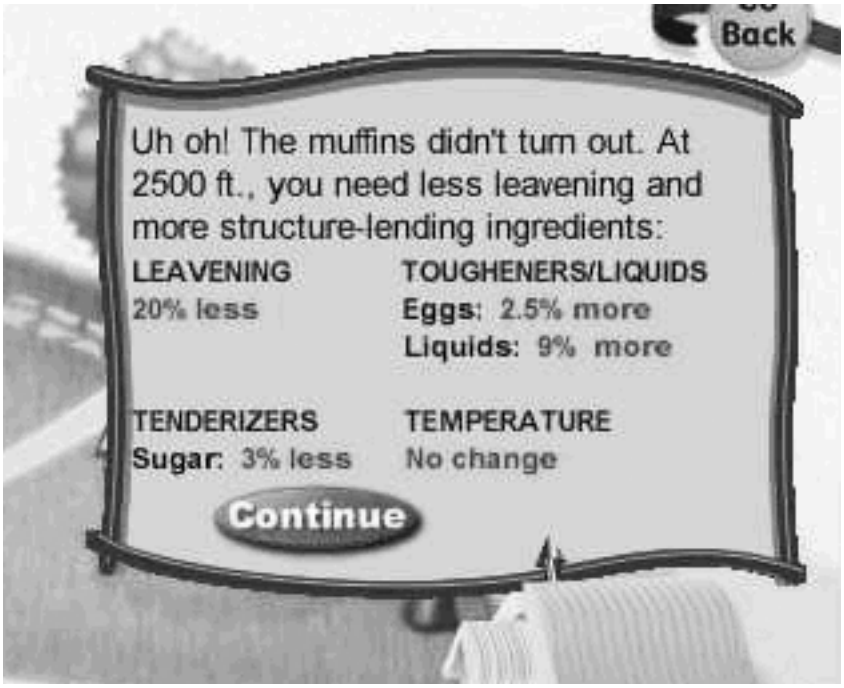


FIGURE 5.16 When learners fail to adjust recipes properly, detailed information supports the learning opportunity.

FIGURE 5.17 When recipe adjustments fail, Heidi meets the goat.

flour?" Decisions the learner must make to adapt recipes for each altitude are simple check boxes, but the challenge is a considerable one, given all the possibilities. Feedback is both specific and dramatic.

Specific information is provided in response to the learner's choices.

Because learners must start over each time they fall, they get the most practice making adjustments at the 2,500-ft level. The extra practice at 2,500 ft is especially important because, on the job, more learners will have to make adjustments for this sea level than any other.

Intense learner involvement builds quickly in this exercise. Learners feel great satisfaction when they finally get Heidi all the way up the mountain to her grandfather (Figure 5.19).

Memory and interest continue to build as Heidi moves up the mountain and *closer to her goal.*

FIGURE 5.18 Heidi rolls down the hill to start all over again.

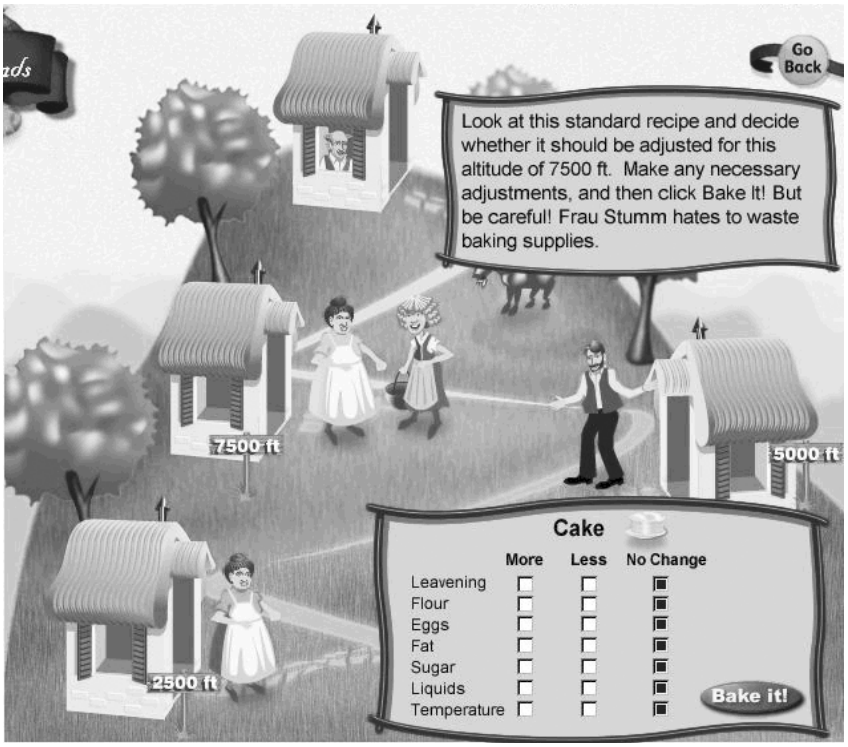


FIGURE 5.19 After succeeding with several altitude adjustments, learners put extra effort into their final challenges.

Magic Key 3: Select the Right Content for Each Learner

What's boring? Presentations of information you already know, find irrelevant, or can't understand.

What's interesting?

- Learning how your knowledge can be put to new and valuable uses
- Understanding something that has always been puzzling (such as how those magicians switch places with tigers)
- Seeing new possibilities for success
- Discovering talents and capabilities you didn't know you had
- Doing something successfully that you've always failed at before

Moral? It's not enough for learners to *believe* there is value in prospective instruction (so that they have sufficient initial motivation to get involved). There must also be *real value* for them as learners. The content must fit with what they are ready to learn and capable of learning.

Individualization

From some of the earliest work with computers in education, there has been an alluring vision: a vision that someday technology would make practical the adaptation of instruction to the different needs of individual learners. Some learners grasp concepts easily, whereas others need more time, more examples, more analogies, or more counterexamples. Some can concentrate for long periods of time; others need frequent breaks. Some learn quickly from verbal explanations, others from graphics, others from hands-on manipulation. The vision saw that, while instructors must generally provide information appropriate to the needs of the average learner, technology-delivered instruction could vary the pacing and selection of content as dictated by the needs of each learner.

Not only could appropriate content be selected for each learner's goals, interests, and abilities, instruction could also be adapted to learning styles, cultural backgrounds, and even personal lifestyles and interests. Perhaps no instructional path would ever be exactly the same for two learners. It would be possible for some learners to take cross-discipline paths, while others might pursue a single topic in great depth before turning to another. Some learners would need to keep diversions to a minimum while working on basic skills; others would benefit from putting basic skills into real-life contexts almost from the beginning. Areas of potential individualization seemed almost endless, but possible. And given enough learners across which to amortize the cost of development, the individualization could be quite practical.

Many classroom instructors do their best to address individual needs, but they know there are severe limits to what they can do specifically for individual learners, especially when there are high levels of variation among learners in a class. The pragmatic issues of determining each learner's needs, constructing an individual road map, and communicating the plan to the learner are insurmountable even without considering the mainstay of the typical instructor's day: presenting information. It's impossible to handle more than a small number of learners in a highly individualized program without the aid of technology.

With e-learning, we do have the technology necessary for truly exciting programs that can adapt effectively to the needs of individual learners.

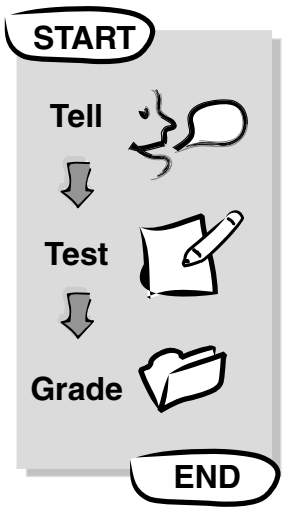
Through technology, the delivery and support of a highly individualized process of instruction is quite practical, and there are actually many ways instruction can be fitted to individual needs.

Fortunately, it's not necessary to get esoteric in the approach. The simplest approaches contribute great advantages over nonindividualized approaches and probably have the greatest return on investment. It may require an expanded up-front investment, of course, as there's hardly anything cheaper than delivering one form of the curriculum in the same manner to many learners at the same time. But there are some practical tactics that result in far more individualized instruction than is often provided.

Let's look at some alternative paradigms to see how instruction can be individualized. Our emphasis here will be on just one parameter—content matching. Efforts to match learning style, psychological profiles, and other learner characteristics are technically possible. But where we haven't begun to match content to individual needs, we'll hardly be ready for the more refined subtleties of matching instructional characteristics to learners.

Common Instruction

The most prevalent form of instruction makes no attempt to adapt content to learners. Learners show up. The presentations and activities commence. After a while, a test is given and grades are issued. Done. Next class, please.



This form of instruction has been perpetrated on learners almost since the concept of organized group instruction originated. It's as simple and inexpensive as you can get, and it's credible today due not to its effectiveness but to its ubiquity.

It's unfortunate that so many use common instruction as a model for education and training. This tell-and-test paradigm is truly content-centric. With honorable intentions and dedication, designers frequently put great effort into the organization and presentation of the content and sometimes also into the preparation of test questions, but they do nothing to determine the readiness of learners or the viability of planned presentations for specific individuals. Although the application easily handles any number of

learners and has almost no administrative or management problems, it doesn't motivate the learner.

The effectiveness of common instruction ranges widely, depending on many factors that are usually not considered, such as motivation of the learners, their expectations, their listening or reading skills, their study habits, and their content-specific entry skills. It is often thought that the testing event and grading provide sufficient motivation, so the issue of motivation is moot. Besides, motivation is really the learners' problem, right? If they don't learn, they'll have to pay the consequences—and hopefully will know better next time.

Wrong thinking, at least in the business world. It's the employer and the organization as a whole who will pay the consequences—consequences that are far greater than most organizations contemplate (as discussed in Chapter 1).

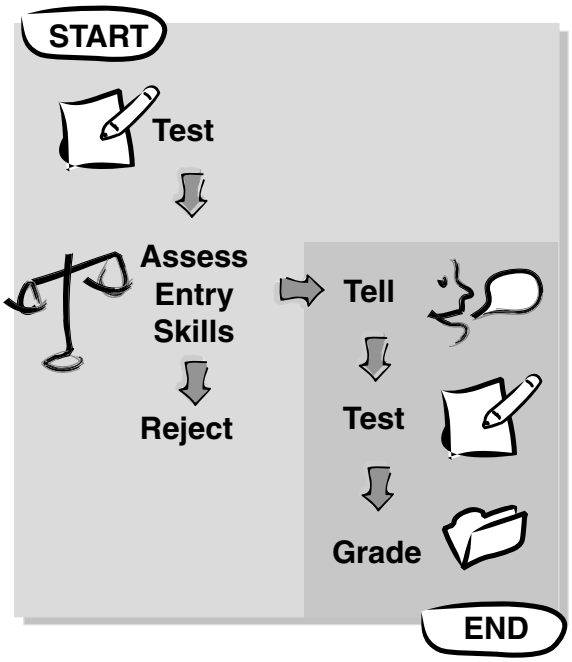
Individualization rating for common instruction:

Selective Instruction

A front end is added to common instruction in the creation of selective instruction. The front end is designed to improve effectiveness of the inevitable common instruction by narrowing the range of learners to be taught. Clever, huh? Change the target audience rather than offer better instruction.

Most American colleges and universities employ selective instruction at an institutional level; that is, they select and prepare to teach only those learners who meet minimum standards. Students are chosen through use of entry examinations, measures of intellectual abilities, academic accomplishments, and so on. The higher those standards can be, the better (well, the easier) the teaching task will be, anyway.

It makes sense that learners who have been highly successful in previous common instruction activities will be likely to again deal effectively with common instruction's unfortunate limitations. Organizations of higher learning will, therefore, find their instructional tasks simplified. They need to do little in the way of motivating learners and adapting instruction to individual needs. They can just find bright, capable, energetic learners, and then do whatever they want for instruction. The learners will find a way to make the best of it and learn.



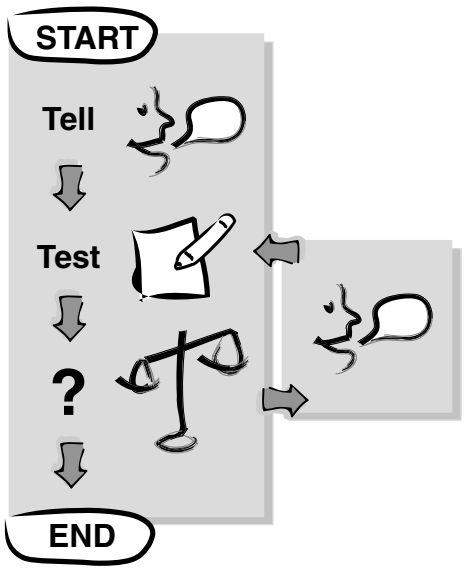
It dismays me that our most prestigious institutions boast of the entrance examination scores achieved by their entering learners. What they know, but aren't saying, is that they will have minimal instructional challenges, and their learners will continue to be outstanding performers. By turning away learners with lower scores, they will have far less challenging instructional tasks and will be able, if they wish, to devote more of their time to research and publishing. They actually could, if they wished (and I don't mean to suggest that they do), provide the weakest instructional experience and still anticipate impressive learning outcomes.

We do need organizations that can take our best learners and move them to ever higher levels of achievement. But perhaps the more significant instructional challenges lie in working with more typical learners who require greater instructional support for learning. Here, common instruction probably has been less effective than desired and should be supplanted by instruction that is based more on our knowledge of human learning than on tradition.

Individualization rating for selective instruction:

Remedial Instruction

Recognizing that issuing grades is not the purpose of training, some have tried modifying common instruction to actually help failing learners. In this remedial approach, when testing indicates that a learner has not reached an acceptable level of proficiency, alternate instructional events are provided to remedy the situation.



These added events, it is hoped, will bring failing learners to an acceptable level of performance.

Remediation is something of an advance toward purposeful instruction, because, rather than simply issuing grades, it attempts to help all learners achieve needed performance levels.

If learners fail on retesting, it is possible to continue the remediation, perhaps by providing alternate activities and support, until they achieve the required performance levels.

One has to ask, if the remediation is more likely to produce acceptable performance, why isn't it provided initially? The answer could be that it requires more instructor time or more expensive resources. If many learners can succeed without it, they can move on while special attention is given to the remedial learners.

The unfortunate thing about remedial instruction is that its individualization is based on failure. Until all the telling is done, instructors may not discover that some learners are not adequately prepared for the course, or don't have adequate language skills, or aren't sufficiently motivated. Although more appropriate learning events can be arranged after the testing reveals individual problems, precious time may have been wasted. The instructor and many learners (including those for whom the instruction is truly appropriate) may have been grievously frustrated, and remedial learners may be more confused and difficult to teach.

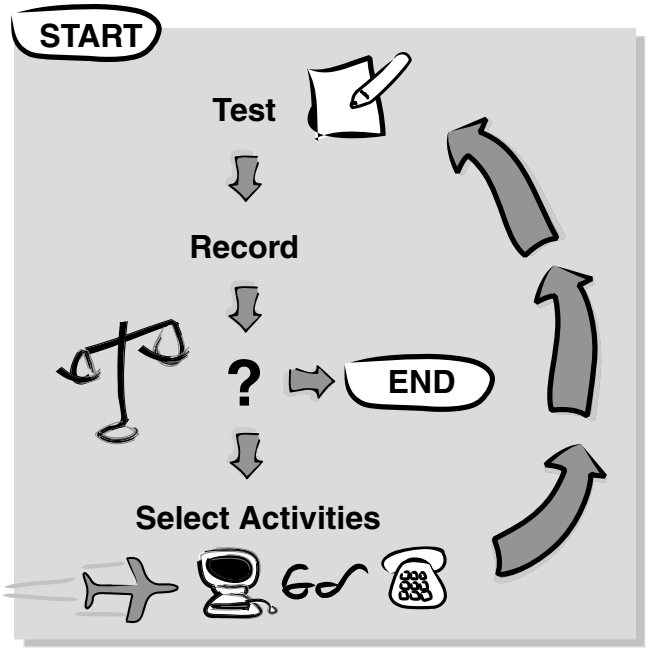
All in all, remediation represents better recognition of the true goals of instruction but employs a very poor process of reaching them.

Individualization Rating for remedial instruction:

Individualized Instruction

The same components of telling, testing, and deciding what to do next can be resequenced to achieve a remarkably different instructional process. As with so many instructional designs, a seemingly small difference can create a dramatically different experience with consequential differences.

A basic individualized system begins with assessment. The intent of the assessment is to determine the readiness of learners for learning with the instructional support available. Learners are not ready if, on one hand, they already possess the competencies that are the goal of the program, or, on the other hand, they do not meet the necessary entry requirements to understand and work with the instructional program. Unless assumptions can be made accurately, as is rarely the case despite a common willingness to make assumptions regarding learner competencies, it's very important to test for both entry readiness and prior mastery.



Record keeping is essential for individualized programs to work, because progress and needs are frequently reassessed to be sure the program is responding to the learner's evolving competencies. Specific results of each testing event must be kept, not just as an overall performance score, but as a measurement of progress and achievement for every instructional objective each learner is pursuing.

As progress is made and records are updated, the questions of readiness and needs are asserted. If there are (or remain) areas of weakness in which the training program can assist, learning activities are selected for the individual learner. Any conceivable type of learning activity that can be offered to the learner can be included, electronically delivered or not, including workbook exercises, group activities, field trips, computer-based training, videos, and so on.

The learning system is greatly empowered if alternate activities are available for each objective or set of objectives. Note that it is not necessary to have separate learning activities available for each objective, although it helps to have some that are limited to single objectives wherever possible. An arrangement suggested by Table 5.5 would be advantageous and perhaps typical. However, great variations are workable; it is often possible to set up an individualized learning program based on a variety of existing support materials.

Looking at the Table 5.5, you can see how an individualized learning system works. If a learner's assessment indicated needed instruction on all four objectives, what would you suggest the learner do? You'd probably select resources A and D, because we don't happen to have one resource that covers all four and because together A and D provide complete coverage of the four objectives.

TABLE 5.5 Learning Resource Selection

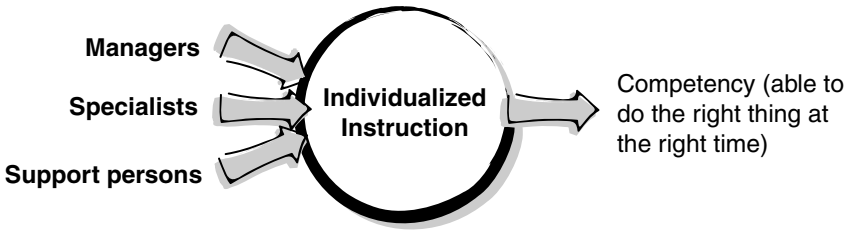
	Learning Resources					
Objective Number	A Basics Manual Text, Chapter 1	B Basics Manual Exercises, Chapter 1	C Intro Videotape	D CD-ROM on Recent Discoveries	E Tutorial on Problem Solving	F Group Discussion on Science
1	X		X			
2	X	X				
3			X	X	X	
4				X		X

Further, to their benefit, these two resources cover more than one objective each. When resources cover multiple objectives, it is more likely that they will discuss how various concepts relate to each other. Such discussions provide bridges and a supportive context for deeper understanding. Some supportive context, particularly important for a novice, is likely to be there in the selection of A and D in the preceding example, whereas it would be less likely in the combination of C, B, and F.

Just as with remedial instruction, if a prescribed course of study proves unsuccessful, it's better to have an alternative available than to simply send the learner back to repeat an unsuccessful experience. If the learner assigned to A and D were reassessed and still showed insufficient mastery of Objective 3, it would probably be more effective to assign Learning Resource E at this point than to suggest repetition of D.

The closed loop of individualized instruction systems returns learners to assessment following learning activities, where readiness and needs are again determined. Once the learner has mastered all the targeted objectives that the learning system supports, the accomplishment is documented, and the learner is ready to move on.

The framework of individualized instruction is very powerful, yet, happily, very simple in concept. Its implementation can be extraordinarily sophisticated, as is the case with some learning management systems (LMSs) or learning content management systems (LCMSs), whether custom-built or off the shelf. However, it can also be built rather simply within an instructional application and have great success.



Note that this structure does not require all learners to pursue exactly the same set or the same order of objectives. Very different programs of study are easily managed. Learners who require advanced work in some areas or reduced immersion in others are easily accommodated.

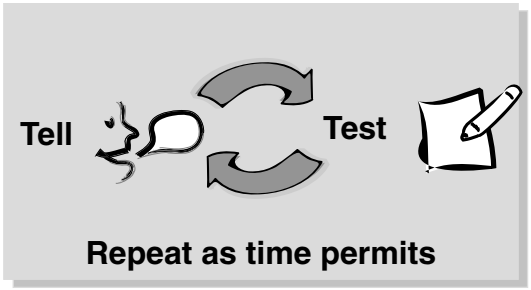
Individualization Rating for individualized instruction:

Examples

As we have noted, there is a continuum of individualization. Some individualization is more valuable than none, even if the full possibilities of individualized instruction are beyond reach for a particular project. One of the most practical ways of achieving a valuable measure of individualization is to simply reverse the paradigm of tell and test in common instruction.

Fixed Time, Variable Learning

With the almost-never-appropriate tell-and-test approach, exemplified by prevalent instructor-led practices, learners are initially told everything they need to know through classroom presentations, textbooks, videotapes, and other available means. Learners are then tested to see what they have learned (more likely, what they can recall). After the test, if time permits (since instructor-led programs almost always work within a preset, fixed time period, such as a week, quarter, or semester), more telling will be followed by more testing until the time is exhausted. The program appears well-planned if a final test closely follows the final content presentation and occurs just before the time period expires.



When e-learning follows this ancient plan, many of its archaic weaknesses are preserved.

Fixed Content, Variable Learning

Instead of a predetermined time period, content coverage can be the controlling factor. The process of alternately telling and testing is repeated until all the content has been exhausted. The program then ends.

To emphasize the major weakness of this design (among its many flaws), the tell-and-test approach is often characterized as *fixed time, variable learning*—or, in the case of e-learning implementations, *fixed content, variable learning.* In other words, the approach does not ensure sufficient learning to meet any standards. It simply ensures that the time slot will be filled or that all the content will be presented.

Fixed Learning, Variable Time and Content

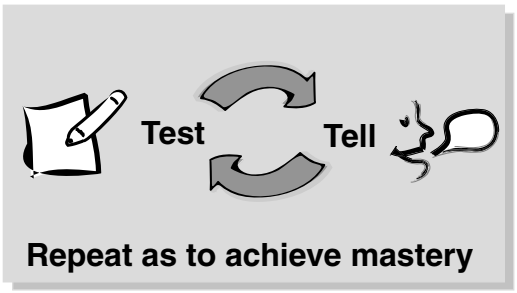
To achieve success through enabling people to do the right thing at the right time, we are clearly most interested in helping all learners master

skills. It is not our objective to simply cover all the content or fill the time period. To get everyone on the job and performing as desired as quickly as possible, we would most appropriately choose to let time vary, cover only needed content, and ensure that all learners had achieved competency.

Put the Test First

Many instructional designers embark on a path that results in tell-and-test applications. They may disguise the underlying approach rather effectively, perhaps by the clever use of technomedia, but the tell-and-test method nevertheless retains all the weaknesses of common instruction and none of the advantages of individualized instruction.

Let's compare the tell-and-test and test-and-tell methods (see Table 5.6). The advantages gained by simply putting the test first and allowing learners to ask for content assistance as they need it are amazing. As previously noted, just a slight alteration of an instructional approach often makes a dramatic difference. This is one of those cases. There is very little expense or effort difference between tell and test on the one hand and test and tell on the other, but the learning experiences are almost fundamentally different.



Getting novice designers to break the tendency to begin their applications with a lot of telling is not simple. Indeed, almost everyone seems to have the tendency to launch into content presentation as the natural, appropriate, and most essential thing to do. I have been frustrated over the years as my learners and employees, especially novices to instructional design, have found themselves drawn almost magnetically to this fundamental error. I have, however, discovered a practical remedy: After designers complete their first prototype, I simply ask them to switch it around in the next iteration. This makes content presentations available on demand and subject to learner needs.

Another example drawn from e-learning initiatives at NFSMI illustrates the power of the test-and-tell technique. A companion CD to the Breads and Grains module illustrated earlier, *Cooking with Flair: Preparing Fruits, Salads, and Vegetables*, teaches a range of facts and procedural information regarding the preparation of fruits and vegetables. The target

TABLE 5.6 Selecting Content to Match Learner Needs

Tell and Test	Test and Tell
Because they have to wait for the test to reveal what is *really* important to learn (or it wouldn't be on the test), learners may have to guess at what is important during the extended tell time. They may discover too late that they have misunderstood as they stare at unexpected questions on the test that will determine their grades.	Learners are immediately confronted with challenges that the course will enable them to meet. Learners witness instantly what they need to be learning.
All learners receive the same content presentations.	Learners can skip over content they already know as evidenced by their initial performance.
Learners are passive, but they try to absorb the content slung at them, which they hope will prove to be empowering at some point.	Learners in well-designed test-and-tell environments become active learners; they are encouraged to ask for help when they cannot handle test items. The presentation material (which can be much the same as that used in tell and test) is presented in pieces relevant to specific skills. Learners see the need for it and put it to use.
It's boring.	Not likely to be boring.

learners usually have some general but incomplete knowledge of the topics to be covered, but the gaps in their knowledge vary greatly. A typical strategy in such a context is to tell everybody everything, regardless of whether they need it. This is rarely helpful, as learners tend to stop paying attention when forced to read information that they already know. This is exactly the situation in which test and tell is most powerful.

We'll look at a content area called "Do the Dip," in which learners are to master information about how to keep freshly cut fruit from turning brown (Figure 5.20). The principle at hand is that fruits that tend to darken should be dipped in a dilute solution of citrus juice; some other fruits do not need to be treated in this way. The learner is to learn which common fruits this rule applies to. The setup here is very simple. Learners are given a very brief statement that sets the context. Then they are immediately tasked with the job of preparing a fruit tray. They can place the cut fruit directly on the serving tray, or they can first dip the fruit in a dilute solution of lemon juice.

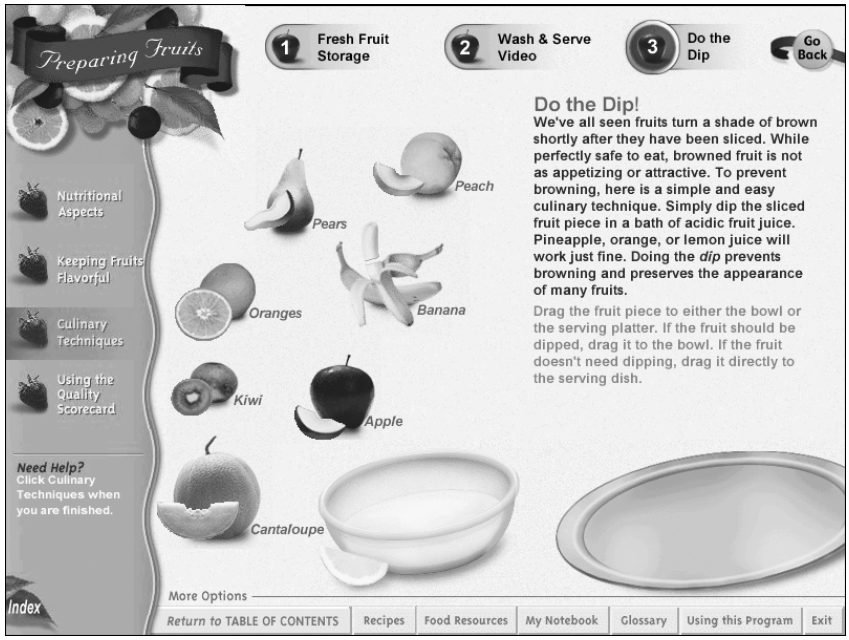


FIGURE 5.20 Learner must decide whether it is appropriate to dip fruit in preparing fresh fruit tray.

If the user correctly dips a fruit, the information regarding that choice is confirmed with a message and a *Do the Dip!* flag on the fruit (Figure 5.21). Whether the learner already knew the concept or guessed correctly, the "tell" part of the instruction is contained in the feedback—presented after the learner's attention has been focused by the challenge.

How about when the learner is wrong? When a fruit is not dipped when it should be, the fruit turns brown and unappealing, while instructional text specific to the error is presented on the screen (Figure 5.22).

After the exercise is complete, the learner is left with a summary screen: a complete and attractive fruit platter and screen elements that further reinforce the lesson of which fruits require a citrus treatment (Figure 5.23).

This is a small and straightforward application of the test-and-tell principle. You should notice this magic key in action in more sophisticated ways in nearly every other example described in this book. It's

Figures 5.20 to 5.23 from Cooking with Flair: Preparing Fruits, Salads, and Vegetables. *Courtesy of National Food Service Management Institute, University of Mississippi.*

FIGURE 5.21 Correct response is reinforced with *Do the Dip!* stamp on selected fruit.

engaging, efficient, and effective. Nonetheless, a common response from instructional designers is, "Isn't it unfair to ask learners to do a task for which you haven't prepared them?" (Interestingly, we rarely if ever hear this complaint from actual students!) But it really isn't unfair at all. Quite the reverse: The challenge focuses learning attention to the task at hand, allows learners with experience with the content to succeed quickly (saving time and frustration), provides learning content to the right people at the right time, and motivates all learners to engage in critical thinking about a task instead of simply being passive recipients of training. When the "tell" information is presented in the context of a learner action (i.e., right after a mistake), learners are in an optimal

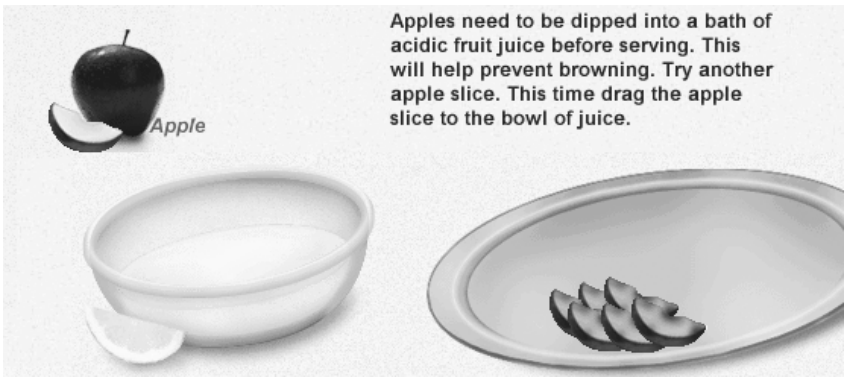


FIGURE 5.22 Incorrect response results in brown, unappealing fruit; user must repeat this fruit correctly.

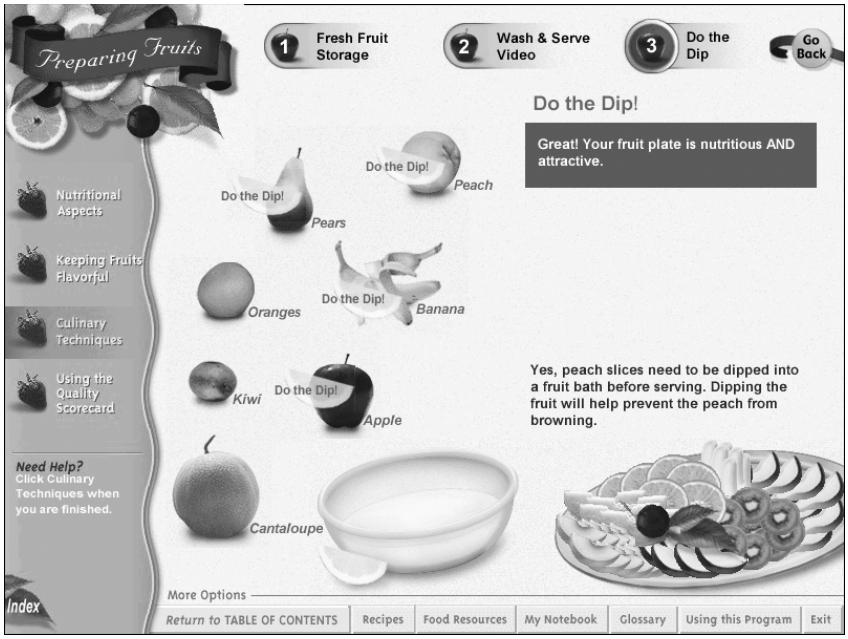


FIGURE 5.23 Success results in completed tray and review of learned content through markers on fruit.

position to assimilate the new information meaningfully into their existing understanding of the topic.

Magic Key 4: Use an Appealing Context

Learning contexts have many attributes. The delivery system is one very visible attribute, as is the graphic design or aesthetics of an e-learning application. More important than these, however, are the role the learner might be asked to play, the relevance and strength of the situational context, and the dramatic presentation of contextual content.

It's easy to confuse needed attributes of the learning context with other contextual issues. Unfortunately, such confusion can lead to much weaker applications than intended. However, strong learning context can amplify the unique learning capabilities of e-learning technologies. Let's first look at some mistakes that have continued since the early days of e-learning.

The Typing Ball Syndrome

When I did my first major project with computer-based instruction, it was with computer terminals connected to a remote IBM 360 central computer. The terminals were IBM 3270s, which had no display screen but were more like typewriters, employing an IBM Selectric typewriter ball (Figure 5.24).

Continuous sheets of fanfold paper were threaded into the machine. A ball spun and tilted almost magically to align each character to be typed. With thin flat wires manipulating the ball's mechanism, the ball, like a mesmerized marionette, hammered the typewriter ribbon to produce crisp, perfectly aligned text.

Selectric typewriters were something of an engineering fascination. They so quickly produced a clean, sharp character in response to a tap on the keyboard, it was hard to see the movement. And yet, since a perfect character appeared on the paper, you knew the ball had spun to precisely the correct place and had tapped against the ribbon with exactly the right force.

If the Selectric typewriter was fascinating, the IBM 3270 Terminal was enthralling. Its Selectric ball typed by itself like a player piano! Looking very much like the Selectric typewriter with a floor stand, the terminal was able to receive output from a remote computer and could type faster than any human. The keys on the keyboard didn't move. The ball just did its dance while letters appeared on the paper.

The computer could type out information and learners could type their answers to be evaluated by the computer. The technology was fascinating. There was much talk about this being the future of education. Classroom delivery of instruction was clearly near the end of its life span, and, despite fears of lost teaching jobs, there was great excitement that

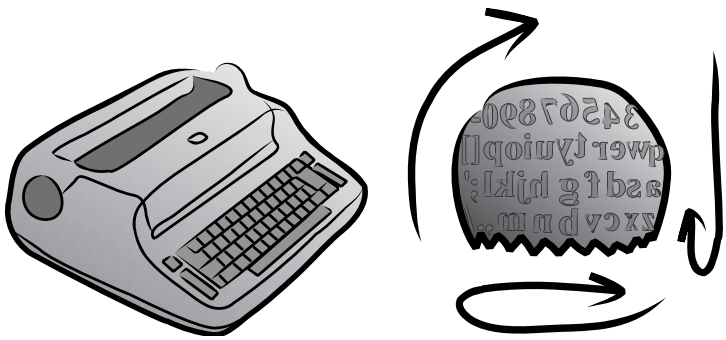


FIGURE 5.24 IBM Selectric typewriter and ball.

private, personalized learning supported by amazingly intelligent computers would truly make learning fun and easy.

Novelty versus Reality

There were some very positive signs that technology-led instruction would indeed be a reality in the near future. Learners eagerly signed up for courses taught with the use of computer terminals. Seats filled up rapidly, requiring dawdling learners to sign up for traditionally taught classes or wait another term to see if they would be lucky enough to get into one of the computer-assisted classes.

But some disturbing realities crept in, realities that countered initial perceptions and rosy predictions. For one thing, it took a lot longer for information to be typed out than to find it in a book. While you didn't get to watch them being typed, books were pretty fast at presenting information—and they were portable, too. They didn't make any noise, either—so they could be used in libraries and other quiet places that are conducive to study. They often included graphics and visual aids—things our Selectric typewriters couldn't provide. You could earmark a page and easily review. You could skim ahead to get some orientation and get a preview of what was to come.

Learners, the harsh but insightful critics that they often are, did the most unexpected thing. Instead of sitting at the terminals waiting for the typing ball to spit out text, they simply took their "borrowed" copies of printouts to a comfortable location and studied them. Sometimes they'd work together in pairs or groups: One learner would read the computer's questions, and another learner would answer. The first learner would look up and read the feedback for that particular answer, and together, they would have a pleasant, effective experience learning. They were executing, in effect, the programmed instructional logic. It was much better than sitting at a typing machine.

Why bring up this "ancient" history? We're not dealing with typing balls anymore. Isn't this irrelevant?

Not at all. Each time a new technology comes on the scene, we expect too much of it and require too little of ourselves to use it effectively. We are ready to think each new technology solves everything. For learning, the Internet has repeated the typing ball scenario—almost to the letter!

The typing ball was not essential to learning in any way. Learners quickly dispensed with it and created a more effective context in which they could freely discuss the content not only in a more *convenient* manner, but in a more *meaningful* manner, as well. In fact, the typing ball context was not really an *instructional* context at all; it was simply a new technology for instructional delivery. This seems like an obvious confusion to us today, but this mistake has been made time and again as new technologies have arrived to save the future of education. It is happening now, with the Internet.

Novelty Is Short-Lived

Any attribute of the learning context can be made novel. The reaction to the novelty, almost by definition, will be one of instant interest and enthusiasm. Novelty draws attention and energizes exploration.

After the initial novelty-based interest, however, the next level of evaluation sets in. Newness doesn't last very long. Once we see something, experience it, and put it in its place among other familiar notions, it is no longer new. If a novelty doesn't introduce something of real value, it quickly sinks to neutral buoyancy.

In other words, novelty has a single, short life—too short to sustain much learning and involvement.

Much e-Learning Depends on Novelty

A terrible mistake many have made in e-learning is assuming that because new technology is employed, it must provide better instruction. Because it comes in a new form and has such incredible attributes as worldwide access and 24/7 availability, it appears that its instructional effectiveness is better. Inexplicably, many even assume instructional development will be faster and easier: "We can put our PowerPoint slides on the Web. They'll be fantastic for training."

Wrong on all counts.

Actually, e-learning tends to expose instructional deficiencies and exacerbate their weaknesses.

Weak instructional design applied on a small scale, perhaps in just one class, doesn't do much damage. When parts of a book are poorly structured, for example, an instructor can likely overcome the problem through use of supplemental materials, class activities, or in-class presentations.

However, when a poor instructional design is broadcast to hundreds or thousands of learners, it can wreak havoc that is not as easily corrected. As

I've noted, organizations tend to look the other way and avoid questioning instructional effectiveness, even though the damage in lost opportunities, wasted time, severe mistakes, and accumulated minor mistakes can be astronomical.

Much early Web-delivered e-learning repeated the history of computer-assisted instruction (CAI). Actually, in many ways, contemporary e-learning has been more unguided than early CAI systems, which in many cases did conscientiously attempt to develop and apply instructional theory. Almost from their introduction, Web-delivered e-learning applications have bet on the novelty of computer presentation. e-Learning proponents often base their enthusiasm on the novelty of using computers for new purposes, rather than on a true appreciation of the potential computers offer.

Anticipated Benefits of e-Learning

- Quick, easy, fun learning
- Quickly developed training programs
- Access to current information 24/7
- Learning on personal time rather than during work time
- Access to reference material as needed
- Unrestricted time to review, answer questions, and so on
- Personalized programs
- Lower training costs

The pioneering applications drew attention because they painted a picture of people happily learning whenever and wherever it might be convenient. Easy, fast, cheap. But novelty, with its fleeting contributions, left exposed many weakly designed applications and put the effectiveness of e-learning in question.

Questions about what it takes to be effective are slowly—surprisingly slowly—coming to the front. Technoblindness, fueled by euphoric views of potentialities, neglects the truth. Many have charged into e-learning investments, empowered by not much more than a fascination with its novelty and some fanciful dreams. They need to carefully consider the learning context.

Context Elements to Consider

There are many types of context decisions to make. Remember that we are vitally concerned about motivational aspects of everything we do in

e-learning. We should make context choices first to stimulate learning motivation and second to assist learners in transferring their newly learned knowledge and skills to real-world tasks.

As David Jonassen observes:

> The most effective learning contexts are those which are problem- or case-based and activity-oriented, that immerse the learner in the situation requiring him or her to acquire skills or knowledge in order to solve the problem or manipulate the situation. Most information that is taught in schools, however, is stripped of its contextual relevance and presented as truth or reality. Our youth are daily subjected to acquiring countless facts and rules that have no importance, relevance, or meaning to them because they are not related to anything the learners are interested in or need to know. [Jonassen 1991, p. 36]

Although many consider content presentation to be most important and others dwell on user interface, neither of these orientations is likely to produce optimal or even excellent learning opportunities if a well-conceived context isn't used to make the experience meaningful and memorable. Jonassen reiterates, "Instruction needs to be couched in a context that provides meaning for the learners, a context that activates relevant schemata, that engages learners in meaningful problem solving" (p. 36).

Table 5.7 presents some contextual ideas to heighten motivation and facilitate meaningful transfer of learned skills.

Learning Sequences and Learning Contexts

Breaking complex tasks apart and teaching components separately can be an effective instructional practice. *Part-task* training is effective and efficient because it allows learners to focus on component behaviors and master them before having to deal with the interrelationships among sequences of behaviors to be performed.

Risk of Part-Task Training

One has to be careful here, however. Breaking instruction into pieces for reduced complexity and easier learning can have exactly the opposite consequences: increased complexity and learner frustration.

How many piano learners, for example, have given up the instrument entirely because they could not sit for hours and practice finger exercises and arpeggios? Fingering skills are certainly important, but such drills are

TABLE 5.7 Motivating Contexts

Suggestion	Comments
To Stimulate Learning	
Require the learner to solve problems and do things.	It is more interesting to assemble or operate simulated equipment or software, diagnose system faults, or find an accounting error, for example, than to simply answer a bunch of questions.
Use a timer for learners to beat.	A simple mechanism such as a countdown timer stimulates learner attentiveness.
Use suspense.	You can set up consequences for errors that accumulate. The learner must not make too many errors or a tower will topple, a company will lose a contract, or a chemical solution will explode.
Set a maximum number of allowed errors.	If the learner makes one too many errors, he or she has to begin all over again, as in many video games.
Dramatically demonstrate the impact of poor performance.	Drama gets our emotions involved and makes experiences more real and personal.
Dramatically demonstrate the impact good performance can have.	A positive impact on the organization or on the learner personally is a goal of interest. A dramatic revelation of what is possible can be very motivating.
To Transfer Skills	
Provide feedback from a simulated supervisor or coworker.	Feedback might stress how the consequences of the good or poor performance effect them personally, their team, and the organization as a whole.
Ask learners how they think what they are learning applies to their actual jobs.	Address the question head-on. Encourage learners to develop their own examples of realistic ways to apply what they've learned. They might even work out a personal agenda or timeline for fully implementing their new skills.
Create an unreal world.	It is sometimes more effective to invent a completely new world for the examples and situations that learners will be working with. This may help learners avoid getting caught up in the details of their own specific processes and see opportunities for improvement more easily.
Use job tasks as the basis for lesson design, case studies and examples, or follow-up projects.	Designing job-based training maximizes the probability that learners will be able to retrieve their new knowledge and skills when they are back at work. In other words, let the practical tasks that learners need to perform drive the content and sequence of the training.

TABLE 5.7 ***(Continued)***

To Transfer Skills	
Use guided discovery or cognitive apprenticeship.	The learning is inherently contextual or situated in the job.
Incorporate case studies and examples that reflect best practices of proficient employees.	It helps to set standards of excellence against which learners can evaluate their own performance abilities.
Provide a variety of examples and problems based on documented events.	To ensure that learners will be able to apply their new skills appropriately in work situations, ensure that the problems and situations presented during training reflect the richness and diversity of what they will encounter in their everyday tasks.
Use a high-fidelity simulation while training procedural tasks.	It's worth the effort to make the simulation as much like the real thing as possible, because transfer is enhanced to the extent that actual tasks share common elements with rehearsal tasks.
Assign projects to be completed during or after the class.	Learners may not always see how what they have learned can be applied. Immediately applying new skills outside the training context can be very helpful.
Space out the review periods over time.	Rather than giving learners one shot at learning a new skill and massing all practice activities into one episode, spread out the intervals of practice over time to facilitate retention of new skills.
Give practice identifying the key features of new situations in which learners might apply their new skills appropriately.	If learners begin analyzing where and when new skills are applicable, they may begin setting expectations of where and when they will personally begin to apply them.
Provide skill-based training at a time when learners actually need it (just-in-time training).	The smaller the separation in time between the learning episode and the application of that learning, the greater the likelihood that the learner will transfer skills to that situation.
Embed the physical and psychological cues of the job into the instruction.	This helps to guarantee that learners will retrieve the relevant knowledge and skills when they sense those same cues back in the work environment.

far from the music learners want to play. They want to learn music that is enjoyable to play. If the finger exercises don't demotivate them, the simplistic nursery school songs strung one after another are enough to devastate many potential musicians. Every music learner wants to play cool songs as soon as possible. The songs don't have to be overwhelmingly complex or difficult to play, they just need to represent an accomplishment that is meaningful to the learner.

Maintaining Context

Critical elements of a meaningful context can easily be lost when instruction is broken into pieces. Context can be maintained if instruction begins with a clearly defined and learner-appreciated goal. Then subtasks can be defined and learned. Removing some context momentarily can be helpful, as long as enough context exists for the learning to be meaningful, or the relationship of the content to the ultimate goal is clear. The importance and relevance of the subtasks must be clear to the learner and often revisited. It is easy to assume that learners see this relationship, when, in fact, they may not. There are some easy techniques that help considerably, although they again fly in the face of traditional instructional design practice.

Don't Start at the Bottom of the Skills Hierarchy

A valued tool of instructional designers is the skills hierarchy. Desired skills are broken down into their constituent parts, then ordered in a prerequisite sequence or hierarchy. The target skill resides at the top, while the most basic, elementary skills sit at the bottom, with intermediary skills building the tree (Figure 5.25).

If the hierarchy is accurately constructed, tasks in the tree cannot be learned or performed before the skills below them have been learned. The hierarchy therefore prescribes a useful sequence for teaching. You start at the bottom, where all learners can be assumed able to learn the

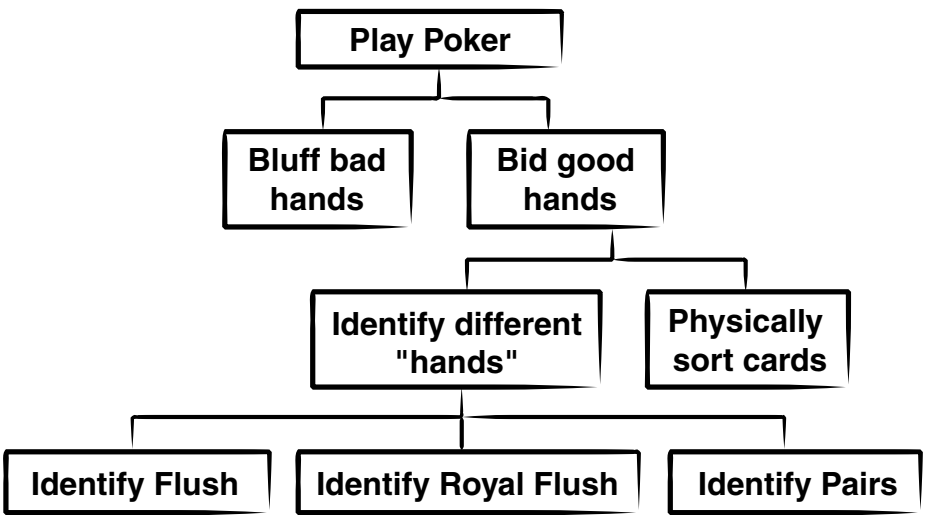


FIGURE 5.25 Partial skills hierarchy for playing poker.

skills. Once these prerequisite skills have been mastered, you can move up a level.

Break the rules! Instead of beginning with the tedious task of explaining flush, royal flush, pairs, and so on to teach poker, deal the cards and play the game. Maybe you have all participants organize their cards and lay them face up. An experienced poker aficionado might announce who has the best hand and ask the learners to figure out why it's so strong. Of course, the *best* way to put the learners at risk is to give them a pile of chips and have them begin betting. Once students are in danger of losing chips (or gaining the whole multicolored pile), they ask good questions, learn winning combinations faster, and pay greater attention to explanations. There's no better way to learn about bluffing than to lose your chips to someone who wins the hand with two jacks!

Boring!

QUESTION: Where do the *least* interesting tasks probably lie?
ANSWER: At the bottom of the hierarchy.

QUESTION: Where do the most interesting tasks probably lie?
ANSWER: Higher up the tree, probably near the top.

QUESTION: If you start at the bottom, is it clear to learners why they are learning these skills?
ANSWER: No, but we tell them these skills will be important. They'll see it later.

QUESTION: If you start at the bottom, are you starting with the most boring elements of the content with little contextual support?
ANSWER: Yes.

SUGGESTION: *Don't start at the bottom.*

Keep Your Eye on the Target

If you want to be a lawyer, chemist, or romance novel writer, you probably have an expectation of what your life will be like in those occupations. It is this vision that motivates the necessary dedication of considerable time and effort to learn the many essential facts, concepts, and skills. Although we may well have misconceptions about what is involved in appealing professions, we often set out on major journeys with considerable optimism and enthusiasm, only to have that optimism and enthusiasm severely challenged by boring introductory courses. Many learners

have told me that they gave up their interest in a profession because they couldn't imagine taking many more courses like the introductory course.

A Great Learning Journey Starts . . . in the Middle!

Good e-learning designs do a lot to keep activities relevant and interesting. They don't work on the all-too-common instructor admonishment, "Trust me. Someday you'll be glad you know this." How do they do this? They start somewhere in the middle of the skills hierarchy, if not at the top, and let learners participate in leading the charge to fill in the missing pieces as necessary.

As you look at a skills hierarchy (and, by the way, you should construct one), scan up from the bottom in search of a point where a collection of prerequisites comes together in support of a skill or concept. Look at that skill or concept and see if it is a powerful or useful one. Points of convergence on a skills hierarchy often identify a capability that new learners can see as meaningful and desirable.

Sometimes It Starts at the End

As presented in the discussion of Magic Key 3, a test-and-tell sequence is a useful strategy. I don't literally mean a test as a typical academic test, of course. You should build a context in which the learner has the opportunity and need to apply the skills resident at this selected point in the hierarchy.

The learner may or may not be able to perform well, but either outcome is helpful. If the learner does well, you might decide to jump up to the next point of convergence in the hierarchy and repeat the process. If the learner does not do well, you will be ready to respond to the learner's requests for help by supplying appropriate instructional experiences for all the prerequisite content. If the learner accurately identifies a need, you would respond to it, reinforcing the learner's perception of the need's relevance.

As you generate a contextual understanding, learners are learning much more than just a collection of skills. They are preparing personal perspectives, a set of values, and a cognitive map to guide performance and continuing learning.

In other words, context doesn't have to just sit in the background. It can be an important component of the interaction with learners to provide a structure for understanding, learning, and intelligent performance.

Novelty Can Be a Valuable Tool

We earlier debunked novelty as an instructional context; however, it does have value. Novelty is powerful for only a short time, but it can be useful when applied thoughtfully and purposefully. Although it is not a substitute for effective learning interactions, novelty does have two important uses in effective e-learning:

- Novelty draws attention and energizes curiosity.
- Novelty can help make an experience memorable.

Drawing Attention

As previously discussed, the most important thing designers must accomplish is motivating learners to learn. This is done by connecting with their needs and creating interest. And this means first getting their attention and helping them build positive expectations, curiosity, and a willingness to try (Figure 5.26).

Because novelty loses its value quickly, its use is well suited to attracting attention. It increases learner receptivity to messages that market the value of learning the content and skills at hand.

Memorable Experiences

An unexpected quip, a fascinating morph, an amusing sound, or a simulated explosion could provide an element of appeal or surprise that learners will remember for some time. It's important, of course, that these elements be closely tied to important learning points. We don't want to end up with the effect of a clever TV commercial that viewers can remember in great detail, except for one minor point—the product or company being promoted.

As we know, to be effective, e-learning experiences must be *both* meaningful and memorable. A novel context can help tremendously to attract

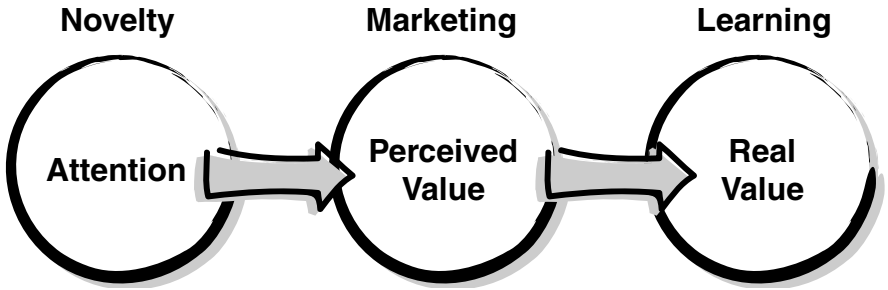


FIGURE 5.26 Learning begins by drawing the learner's attention.

attention, but it can also hinder good interactive designs and disguise bad ones. It is potent stuff. It must be applied carefully, with clear purpose and intent, or it may easily destroy the learning opportunity by diverting attention from what is really important and of long-term value. One has to be careful in this arena to avoid self-delusion—mistaking ineffective novel experiences for effective novel experiences. Novelty is not the goal. It is a tool and means to better learning.

An example will help:

KTCA-TV and 3M Company, Inc., in association with ICONOS, Inc., created a series of outstanding CD-ROMs to accompany the public television program *Newton's Apple*. The intent was to provide highly interactive and educational experiences as companions to the television series. The "Why Does Glue Stick?" segment is a masterful example of how context—in this case novelty, sequencing, and skills transfer—can impact motivation.

The novelty in the challenge is apparent immediately (Figure 5.27). The learner needs to build a bridge to help an elephant cross a chasm. The tricky part is that the bridge must be built by gluing together such

Demo on CD

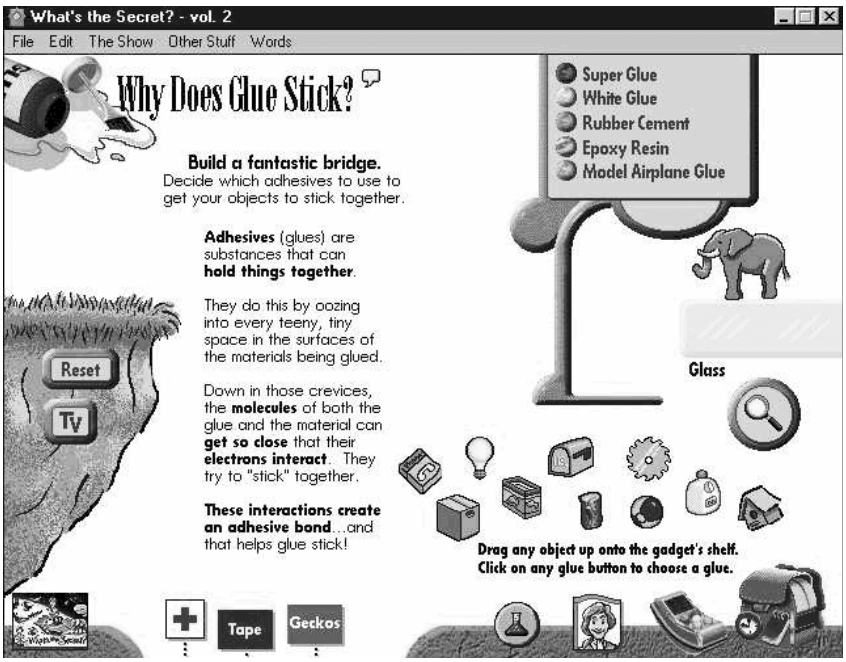


FIGURE 5.27 The learner can choose objects and glues to build a bridge.

Figures 5.27 to 5.31 from What's the Secret?, *Vol. 2. Courtesy of KCTA-TV, St. Paul, MN.*

diverse objects as a circular saw blade, a birdhouse, or an aquarium. Luckily, there are five adhesives available for use in solving this puzzle.

Again, the learner is thrown somewhat into the middle of the content. No boring discussions of glue characteristics here. While the context is unusual, it shines the spotlight fully on the content at hand: What are the characteristics of various adhesives that make them work with some surfaces but not with others? To build the bridge, the learner chooses an adhesive. If it is a successful combination, the elephant takes one step closer to its destination (Figure 5.28). If the adhesive does not hold, the learner gets a surprising but quite humorous result (Figure 5.29).

Now, critics might suggest that this is just unfair to the learner. How is the learner to know how to combine these unusual items into a bridge? Well, if this were all there was to the piece, the criticism might be justified. As it turns out, the background information necessary to make informed decisions is easily available to the learner. Clicking on the magnifying glass initiates an investigation mode, through which the learner can read about the adhesives and the surfaces, even to the detail of seeing electron-microscope images (Figure 5.30).

Learners can research adhesives and make informal decisions, or they can experiment with materials and adhesives to see what will work. Ulti-

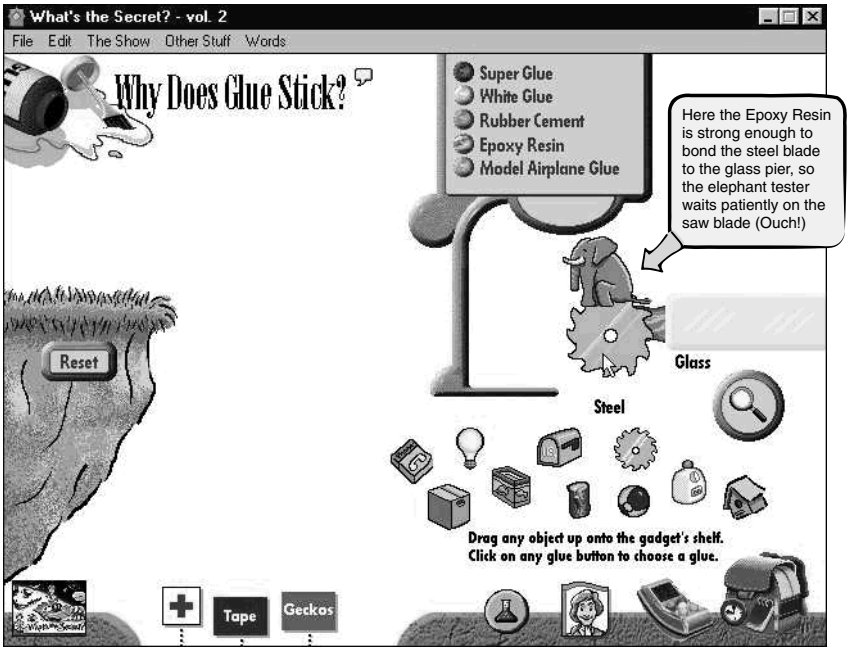


FIGURE 5.28 A successful combination.

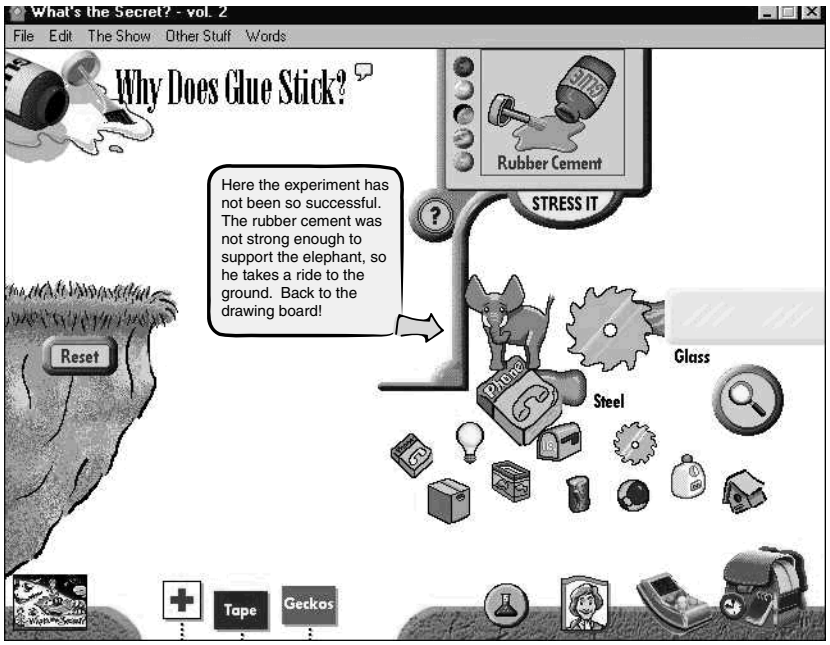


FIGURE 5.29 An unsuccessful combination.

FIGURE 5.30 The learner can choose the investigation mode for more detail.

mately, a successful effort is rewarded appropriately: A whole herd of elephants charges across the learner's bridge (Figure 5.31).

It should be obvious how novelty and learner sequencing work well to distinguish this example. But skills transfer was also included as one of the strong features of this design. How can that be? It hardly seems possible to imagine a less useful task than building a bridge out of a preposterous combination of items so that elephants can cross a gap. Actually, it's the preposterousness of the setting that enhances the transferability of this content. Imagine if the task were something more like gluing a metal number to a doorframe. Because the task is so reasonable, it is easy to focus too tightly on the details of the metal number and the doorframe, which are really irrelevant to the higher-level concept. Because it is nonsensical to even attempt to build a bridge from an aquarium and a saw blade, the learner naturally generalizes the learning to the underlying, more important concept of surface types. The learner is figuring out in general how one might bond paper to metal or glass to wood, and that is really the point of the exercise.

Carefully selecting the right context made all this possible. Brilliant.

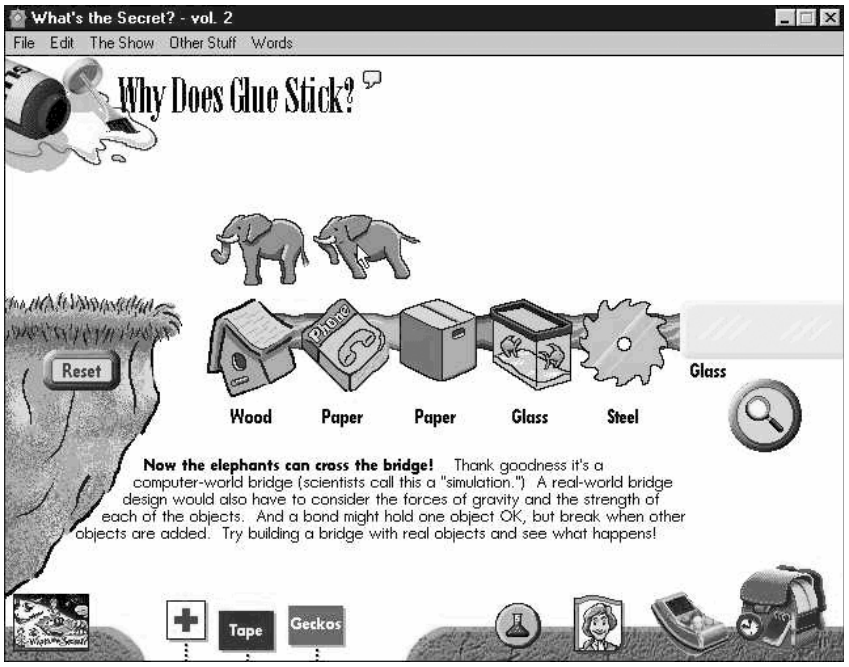


FIGURE 5.31 The task is completed successfully.

Magic Key 5: Have the Learner Perform Multistep Tasks

Everyone likes doing things that are rewarding—things that have specific personal value. Most things of value require more than just recalling an answer, or even a bunch of answers; they require the performance of many small tasks, with multiple decisions to be made along the way. They frequently require execution of a multistepped plan that must be adapted to fit a specific situation.

In other words, life and job performance aren't very much like a school test. They are much more complex. They involve simultaneous or integrated performance of different types of behaviors, judgments, and often interpersonal skills. Judgments typically include setting priorities, sequencing steps (planning), deciding the degree of perfection necessary, and deciding how to use time and perhaps other resources most effectively. Contingencies often have to be considered in case things don't go as expected. New plans may be needed as more information becomes available.

Have Learners Perform Authentic Tasks

Much has been made of standardized question forms, such as multiple choice, true/false, matching, and fill-in-the-blank structures. While they have their uses, they do not create engaging learning activities. Because they look at isolated points of knowledge, they frequently provide little of the critical performance context.

Learning tasks must be *authentic*—they must relate directly to the effective performance of tasks on the job. Authentic tasks are far more appealing than almost any rhetorical or academic task. They heighten our propensity to get involved. And that's what we are after: *involvement*, *engagement*, and *learning*—the kind of learning that leads to success.

Example

The DaimlerChrysler *Electrical Diagnosis II* (*EDII*) e-learning piece is a rich example of the power of multistep tasks. The learner, placed in a problem-solving environment, given access to accurate simulated tools, and provided with a working representation of a faulty automotive electrical system, must determine the cause of the fault and make the necessary repairs without wasting time or resources.

The learner goes through a logical progression of context-setting steps prior to entering the actual problem-solving environment, in which the reported problem is analyzed at a conceptual level—systems relevant to the problem are selected and possible causes are identified. With this groundwork, the learner then is allowed to go about identifying the fault. When placed in the full simulation, the learner has access to a number of options: manually testing the operation of the physical components to verify the faulty behavior, using the provided diagnostic tools (such as a digital volt-ohm meter) and probing tool to take readings within the system, disconnecting the harnesses that connect the various components to each other, reading the original work order, repairing any of the parts, or simply reviewing the possible causes identified in the preparatory sequence (Figures 5.32 to 5.36).

In the real world, this analysis is a multistep process in which each test or decision point is based on what other information the technician has already discovered. Any single test cannot be measured as right or wrong without the context of the entire process. A step that may at first appear

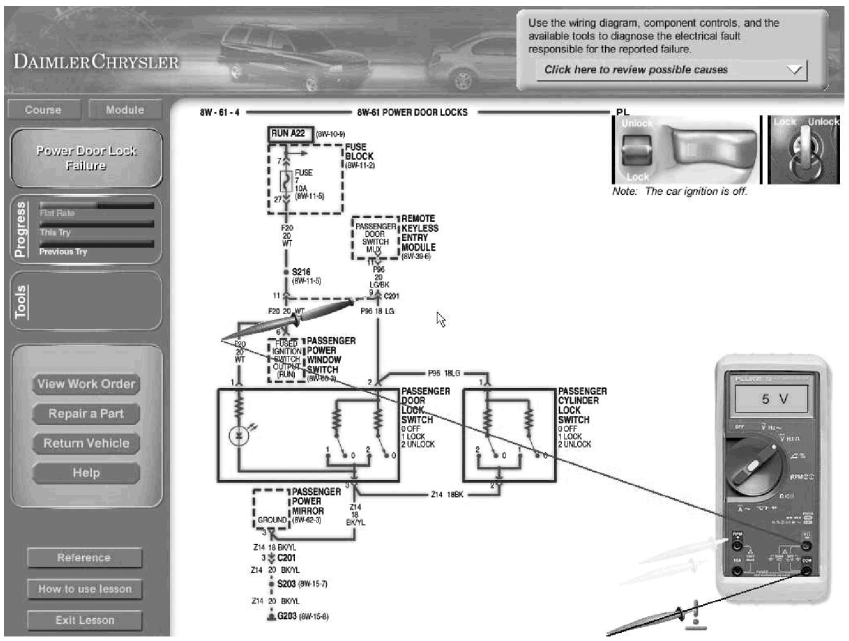


FIGURE 5.32 *Electrical Diagnosis II* is centered around a rich, multistep problem-solving model.

Figures 5.32 to 5.38 from Electrical Diagnosis II. *Courtesy of DaimlerChrysler Corporation.*

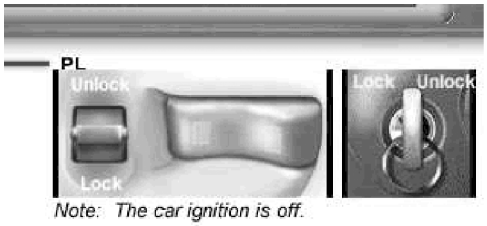


FIGURE 5.33 The learner can test the system using simulated controls.

unrelated may actually be a critical step in an unexpected but powerful strategy for solving the problem at hand. The real measure is whether the tests and measures considered *as a group* lead to a solution of reasonable efficiency. There are often multiple paths to the same conclusion, a characteristic attested to by the fact that even expert technicians will not always use the exact same procedure, but will often rely on experience and intuition to determine the best approach.

An e-learning solution that eliminates the multistep strategizing from the learner's behavior will never be able to provide the practice necessary to develop these skills. It is important to note, however, that multistep tasks do not require that learners proceed blindly. The success of a multistep approach emanates from meaningful feedback—not traditional "right" and "wrong" messages but useful intrinsic clues regarding the decisions made by the learner and the appropriateness of the information

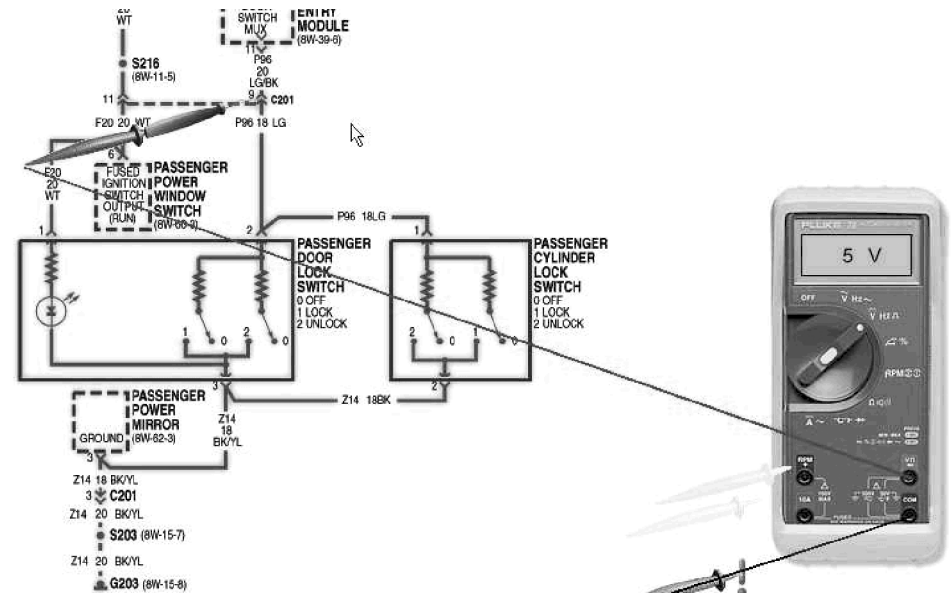


FIGURE 5.34 Accurate simulated diagnostic tools facilitate multiple divergent strategies for each problem.

FIGURE 5.35 Progress is shown only in terms of how this attempt compares to "flat-rate" or minimally acceptable efficiency.

FIGURE 5.36 The learner determines when a solution is found by first repairing one or more parts and then returning the vehicle.

gained with each step. If the feedback indicates a fruitful course of action, then the learner proceeds; if not, it's time to back up or try a different strategy. It is this metaprocessing of the learner's own strategy made possible with multistep tasks that fosters the richest and most memorable understanding of a body of content.

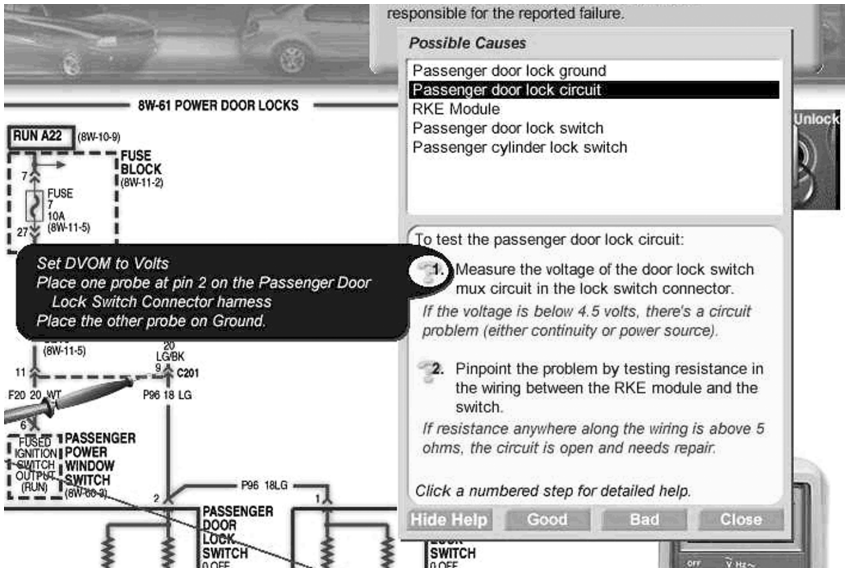


FIGURE 5.37 Help screens provide clues at multiple levels; they suggest strategies and specific actions to guide learners who need some intermediate assistance.

Another important aspect of building multistep e-learning pieces is that a safety net must be provided in case a particular learner is stymied in a way that will prevent ever reaching the end point. In *EDII*, a help system provides this support (Figure 5.37). It can suggest the best strategies for testing the possible causes the learner identifies.

When the task is complete, it is important to give feedback on the specific steps the learner chose to do. This requires an advanced level of record keeping in the lesson to provide delayed feedback on specific steps the user should have taken, given the problem and the suggested strategy (Figure 5.38).

The final feedback provides general information about the sufficiency of the solution (here the learner solved the problem correctly) and also gives specific information about particular steps (here the learner neglected to test the system to verify the fault.)

Building instructional interactions incorporating multistep tasks usually requires abandoning traditional questioning. After all, answering a question but not getting any information about whether you were right is just frustrating. If the tasks are naturally built into an extended problem, the reverse becomes true. Arbitrary feedback statements seem intrusive; learners are much more attuned to gathering clues from the environment and self-assessing their actions when those actions all build cumulatively to arrive at a complete solution for a meaningful challenge.

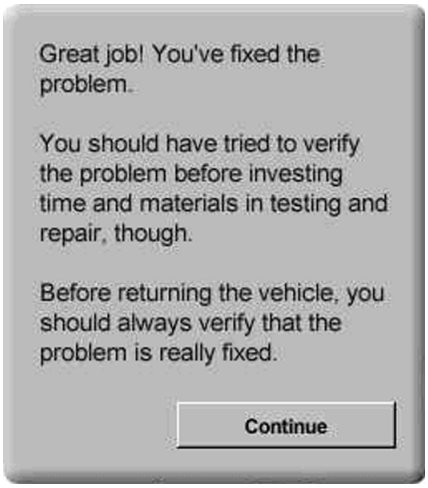


FIGURE 5.38 Final feedback reinforces the lesson.

Magic Key 6: Provide Intrinsic Feedback

Intrinsic feedback allows learners to see for themselves that their performance was good and effective or incorrect and ineffective. It doesn't rely on the usual instructor assessment and didactic comment. It doesn't misdirect learners' efforts toward pleasing the instructor, rather than learning essential skills. It doesn't suggest that learning is about getting a good grade or passing a test.

Intrinsic feedback allows learners to see how their correct performance is empowering to them and how, step by step, they are becoming more capable, powerful, valuable persons. As a result, learners are usually quite eager to learn more.

How does this work in e-learning? It requires a learning context in which learners can try different approaches and solutions and see the results. The concept is quite simple, but important and powerful. To make it more concrete, consider the contrasting feedback designs described in Table 5.8.

Don't Tell Learners If They Are Right or Wrong

Let learners see for themselves whether or not their performance works as well as it needs to. Some aspects of a simulation are needed, although not necessarily a complex or even visual one. The familiar story problem often used in mathematics, for example, provides the needed improvement over bare arithmatic problems. Intrinsic feedback responds within context, such as reporting where the train stopped, whether the apples overflowed the pie pan, or the corporation was fined for tax underpayment.

The feedback can be entirely visual to demonstrate outcomes of student performance. This is often best, but you need to be sure learners fully grasp the quality of their performance and in what way it needs to be improved. In fact, it may be wise to *ask learners* to rate their own performance and to state their plans for improvement. But *don't* give feedback, even if their plans will fail. Let learners try their plans and see the results. Provide hints if their next plans repeat previous errors.

Intrinsic feedback in e-learning typically causes a positive domino effect. Consider these likelihoods:

TABLE 5.8 Examples of Extrinsic and Intrinsic Feedback

Learning Behavior	Typical Extrinsic Feedback	Intrinsic Feedback
When learning structured management techniques, a learner provides clear objectives to employees.	"That's correct."	Key business indicators show increased profit margins and reduced employee complaints. Your boss compliments you on your work.
When learning subtraction, a learner deducts 166 from 1000 and gets 44.	"Not so good. Let's go through the rules of borrowing again."	Shopkeeper says, "This must be my lucky day. From your $1,000 you only want $44 in change after buying that $166 watch. Is that right?"
When learning electronics, a learner mistakenly connects a 400-volt lead to a 12-volt circuit.	"No, that's not the correct power source. What voltage do you need for the 12-volt circuit?"	Circuit graphically melts down with animation and sound.
When learning music composition, a learner puts only three quarter notes in a common time measure.	"No, that's not correct. Think how many quarter you need in 4/4 notes time and try again."	Music plays with unexpected consequences.

- The design will probably speak to learning outcomes the learner will value.
- The context will relate strongly to actual work or performance conditions.
- Tasks are likely to be multistepped.

It's actually possible that all seven of the Magic Keys to motivating e-learning will be incorporated as a result of working toward intrinsic feedback. If you specify intrinsic feedback as a design requirement, you're likely to build very effective e-learning—and it won't be boring.

Example

Another sequence from *What's the Secret?* provides an outstanding example of intrinsic feedback in action. This instructional sequence is intended to teach how honeybees communicate with each other about the location

of pollen. It turns out that these seemingly simple creatures "talk" to each other through a dance; the shape of the dance, the direction of the dance, the degree and speed of waggling, and the length of the dance all communicate vital pieces of information about where the bee's coworkers might go to gather nectar.

We've been down this road before. You can imagine a typical tell-and-test presentation of this material. The rules for this communication could be presented and then the learner could answer factual questions regarding the content, earning typical feedback messages in response to errors. Boring and ineffective.

In "Do Bees Talk to Each Other?" the learner can study two experiments. In Experiment 1, the learner positions the beehive, the flower, and the sun and can manipulate attractiveness of the flowers to observe the bee dance that matches that situation (Figures 5.39 and 5.40).

In Experiment 2, the roles are reversed: The learner is presented with an arrangement of hive, sun, and flowers and must tell the bee how to

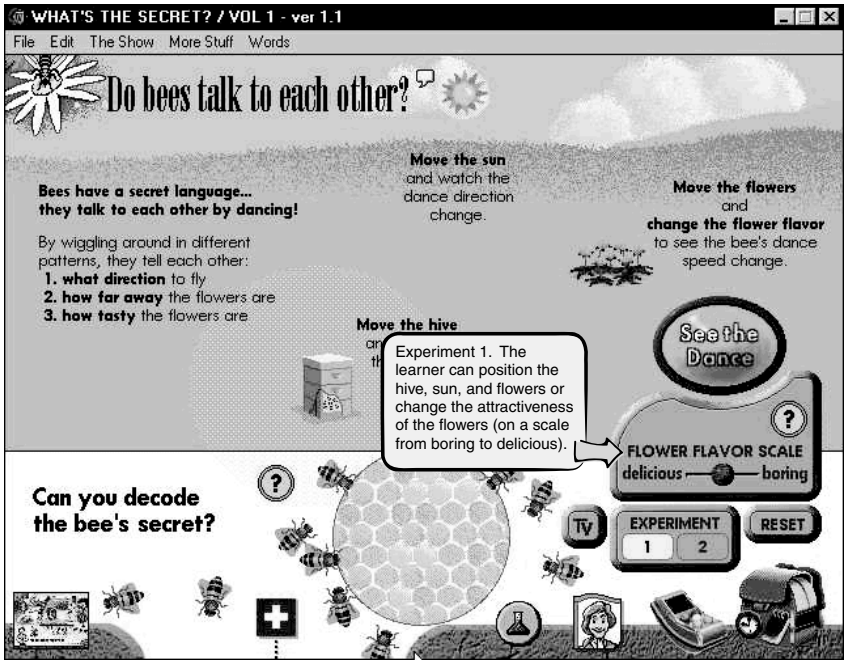


FIGURE 5.39 Experiment 1.

Figures 5.39 to 5.43 from What's the Secret?, *Vol. 1. Courtesy of KCTA-TV, St. Paul, MN.*

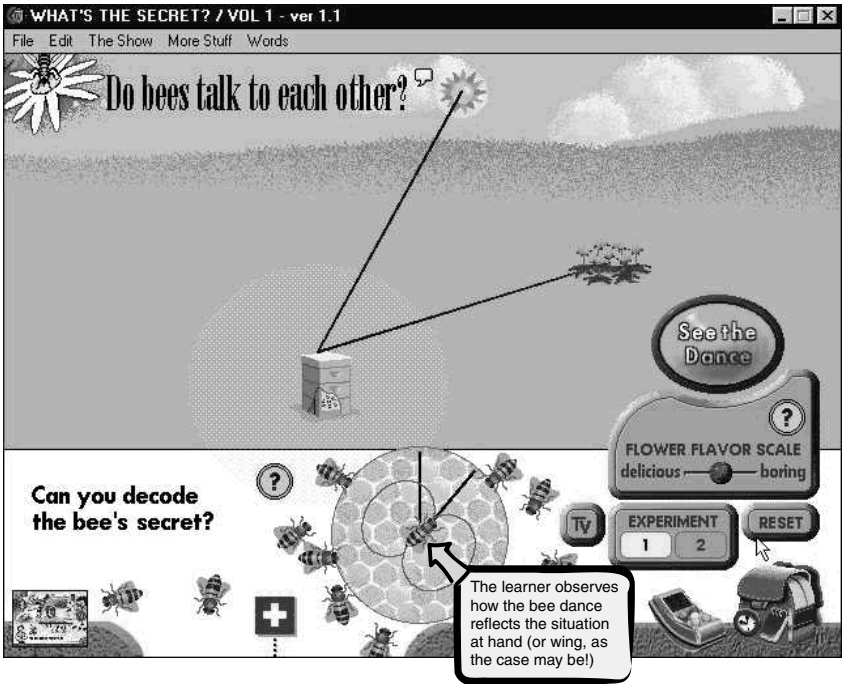


FIGURE 5.40 Decoding the bees' dance.

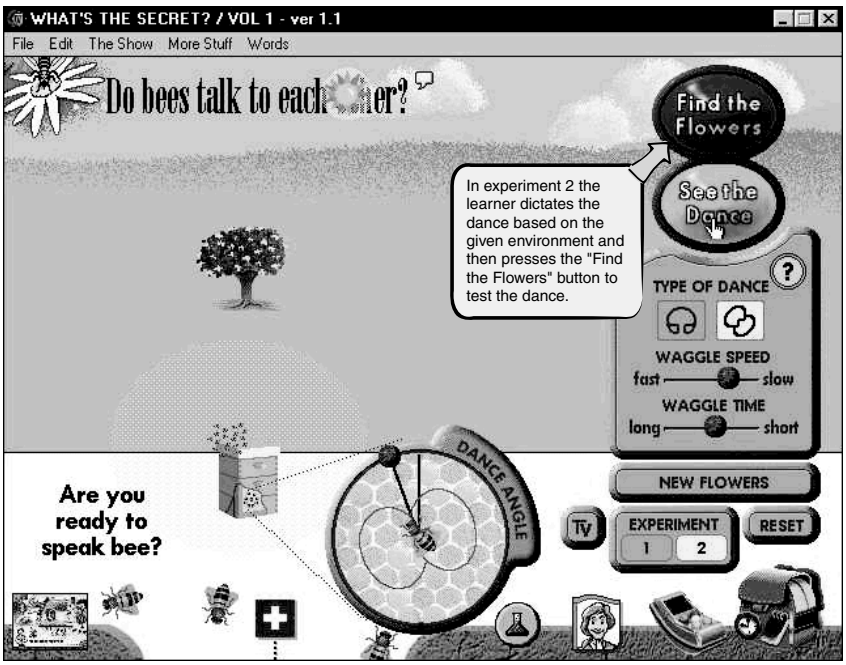


FIGURE 5.41 Experiment 2.

dance by choosing a dance pattern, the dance angle, the waggle speed, and the waggle time (Figure 5.41). Careful observation in Experiment 1 should have given the learner several theories about how the dance works. At any time, the learner can return to Experiment 1 to investigate some more.

What can we say about this learning environment? The learner is quickly made aware of the anticipated outcomes, accepts a level of game-like risk, sees the most interesting content immediately, works in an entertaining yet informative novel context, and must execute several steps in succession to achieve success. Wow! This already has all five of the Magic Keys previously discussed. How does intrinsic feedback come into play?

The power of intrinsic feedback is clear in Experiment 2 when the learner puts his or her theory to the test by sending the swarm of bees off in search of flowers (Figure 5.42). The only feedback the learner gets (or needs) is to see the bees head off to exactly the point indicated by the dance.

What makes this feedback intrinsic? The correctness of the learner's choices is made obvious without the need for any sort of external "No, that is incorrect" statement. The learner knows immediately that an error has been made because he or she sees the bee swarm move to the wrong place. There's nothing to distract the learner, even momentarily, from this engaging learning environment. Even more important, this intrinsic feedback provides richer clues about *how* the learner's response is wrong more quickly and fully than any extrinsic feedback statements could ever do. The learner sees immediately without extra words that the bees went too far, went in the wrong direction, or even found the flowers but had been misled regarding their flavor.

The learner then can make adjustments based on this feedback and continue to refine his or her understanding of this fascinating insect behavior (Figure 5.43).

Intrinsic feedback lends itself naturally to discovery environments; a process can be simulated and the results of the learner's actions can be demonstrated naturally. However, the principle is an extremely important one, even in situations in which it may not be possible to implement it as fully as in this example. Extrinsic feedback messages are rarely as helpful as we'd like in conveying useful information. Intrinsic feedback gives the learner both a clear message regarding the correctness of a response and also more meaningful information about how the response should be adjusted to be more correct.

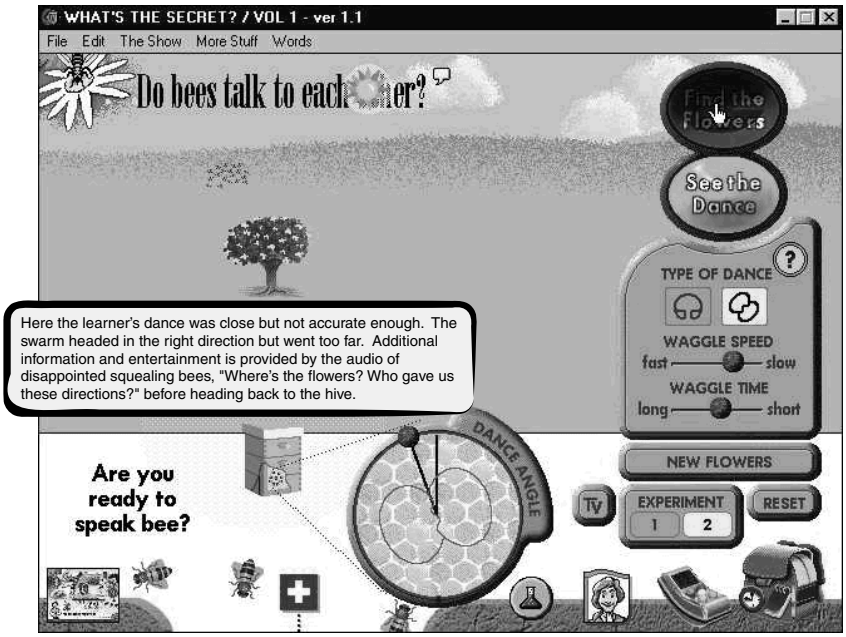


FIGURE 5.42 The power of intrinsic feedback.

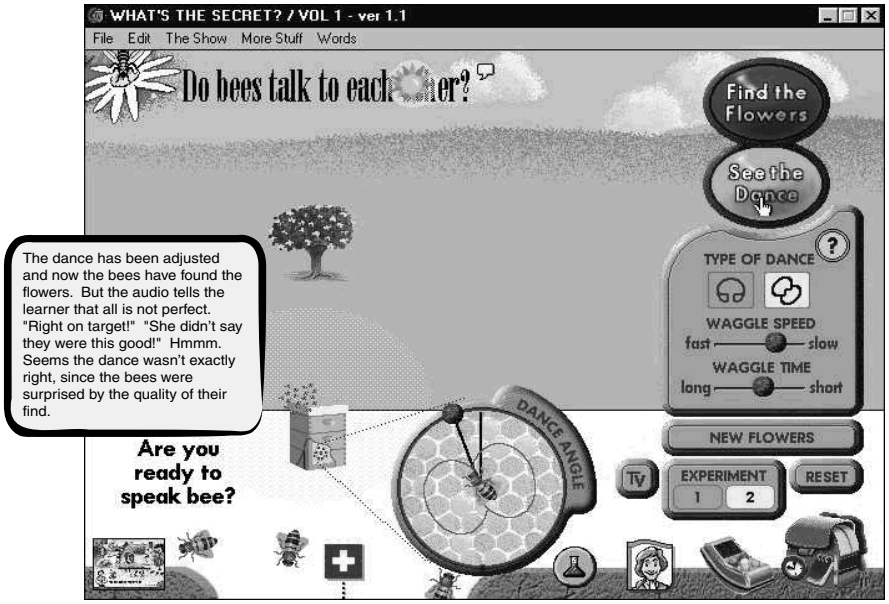


FIGURE 5.43 Further learning is encouraged through intrinsic feedback.

Magic Key 7: Delay Judgment

In e-learning, it's possible to assess each gesture a learner makes and communicate its appropriateness to the learner. This capability is, in fact, one great advantage of computer-delivered instruction. Unfortunately, judgment of every step transfers responsibility for monitoring the validity of a course of action from the learner to the instructor or instructional application. Sometimes it's appropriate to give immediate feedback, but often it isn't.

Many e-learning designs that try to go beyond presentation of information use personal mentoring as a model of instruction. We feel greatly privileged to have an accomplished individual attend only to us and assist us in a course of learning, so it would seem that good emulation would create a welcome learning opportunity. Unfortunately, assumptions about what good mentors do are often faulty.

A good mentor allows learners to make mistakes and then helps them understand why the mistakes occurred and also their consequences. A good mentor knows when to keep quiet, when to present information, and when to ask questions. In many cases, it is much better to allow learners to evaluate their own performance than to immediately evaluate it for them. If judgment is immediately imposed on learners, they are robbed of a very beneficial activity, however grateful they may be. Discerning between good performance and poor performance is an important component of learning.

A-ha!

When I ask instructional designers what constitutes good instructional design, I receive a wide range of answers. One frequent fascinating response is that good instructional applications invoke a steady stream of "A-ha!" experiences. Everyone agrees. Epiphany is a wondrous thing!

Great satisfaction comes from meeting a challenge successfully, even if the competency demonstrated is relatively useless. When the competency really means something, when it actually empowers us to do things we care about, the success—the "A-hah!"—can be prodigious. It is, in fact, this quality that we seek and should perhaps expect from a technology that has so few boundaries.

Too bad we so often get "Oh no!" instead of "A-ha!"

Valuable U-Turns

If an assessment is given following each response, it's harder for learners to focus on the bigger context; they tend to focus only on the singular response at hand. There are occasions when what we are trying to teach is an isolated, single response, but most education and training challenges are far more complex. For these types of learning, delayed judgment is appropriate.

Suppose learners were working the following subtraction problem.

$$\begin{array}{r} 20 \\ -108 \\ \hline \end{array}$$

It wouldn't be surprising if a learner began by subtracting 8 from 20, getting 2:

$$\begin{array}{r} 20 \\ -108 \\ \hline 2 \end{array}$$

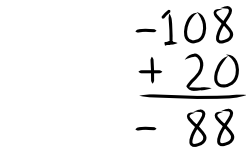
Buzz! You could make the e-learning application respond instantly, indicating that an error was made. You could tell the learner to reverse the numbers—to subtract 20 from 108, then use the sign of the larger number. But what if you waited? The learner might proceed with:

$$\begin{array}{r} 20 \\ -108 \\ \hline 12 \end{array}$$

And *then* realize that the approach wasn't working. The number 12 really doesn't describe any relationship between 108 and 20, regardless of sign. If the learner held the bigger concept of negative numbers and positive numbers lying on a continuum

-30 -20 -10 0 +10 +20 +30

and therefore understood that the positive number (20) would push the negative number (108) back 20 notches toward 0, the learner might, *on his or her own*, decide to try an alternative approach, quite possibly constructing the correct one along the way:



Of course, there are other things learners might do as well, such as getting +88. They might also get –128 or +128. Having time to evaluate is precious, important learning time. The software should not interrupt and intrude into it. It could silently monitor the learners' various attempts, respond to questions, and provide reminders when asked, but otherwise stay silent until the learners concluded they had reached the correct answer. A wonderful opportunity exists for an "A-ha!" realization at this point, and learners will need only the slightest confirming feedback to feel truly rewarded.

Resist Telling Learners If They Are Right or Wrong

Immediate feedback deprives learners of the opportunity to make U-turns—that is, the opportunity to correct themselves, to go back a few steps or start over to see if they are right or what might be going wrong. By evaluating a specific response within a meaningful context, learners begin to take responsibility for evaluating their behaviors. Just as important as having the basic skills is the ability to properly and habitually assess one's own work. It contributes greatly to success in real-world performance. Providing opportunities to build and rehearse these work habits, supported by e-learning software, provides a vastly more interesting, valuable, and effective learning experience. It's not boring, either.

It's important to remember that the appreciation and understanding of context may well be more important than any one skill and that developing each related skill will be much easier if the learner has a firm grasp of the big picture—of the context. Delayed judgment is an extremely helpful technique for keeping a proper orientation and avoiding the acquisition of detached skills and facts that tend to have value only for answering multiple-choice questions. Interestingly, e-learning is uniquely capable of giving both instantaneous judgment and delayed judgment. We need to use these capabilities wisely.

Why, You Ask?

We can't see what learners are thinking, and neither can e-learning software, unless the learners communicate each step as they work toward an answer. Although one can consider requiring learners to declare each

intermediate step, it sometimes makes more sense to ask afterward. In doing so, we might actually facilitate learning epiphanies.

The technique is reasonably simple. After learners have responded (answered a question, solved a problem, made a decision, etc.), you ask them, "Why is this the right thing to do?" "Why is this the correct answer?" (Figure 5.44).

There are then four possibilities—two when learners give the correct answer and two when they don't.

Even when giving the correct answer, learners may or may not be able to justify it—such as in the case of a lucky guess.

With an incorrect answer, learners may cite valid attributes about the answer given, but these attributes would not relate sufficiently to the problem and therefore wouldn't justify the answer. Alternatively, learners may give points that would actually justify another answer, perhaps even the correct answer, but not the one given.

Delayed Judgment

Critical to the full effectiveness of this approach is the delay of judgment. Feedback is not given until learners have submitted justification for their answers (i.e., learners are not told whether they are correct immediately

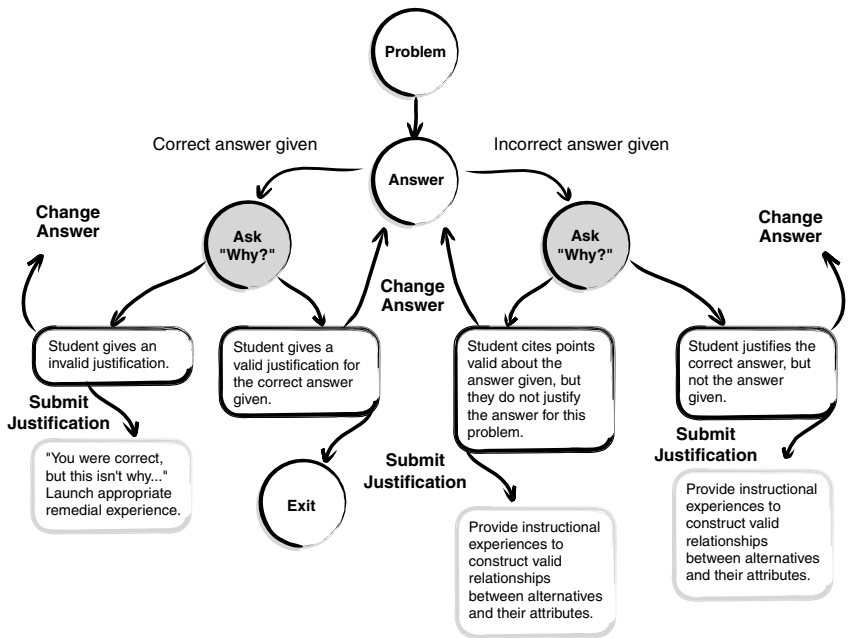


FIGURE 5.44 Why is an answer correct?

after they answer). Further, they are not given such feedback until after they have submitted a justification for their answers. This delay is crucial, because while learners are working on justifying their answers, there is a high probability they will realize they have given the wrong answers. We therefore allow learners to back up and change their answers and to do so as many times as they desire until they have both answered correctly *and* justified their answers.

It's very rewarding for instructional designers to observe learners working through an implementation of this paradigm. Many learners cannot help muttering out loud as they realize they cannot justify their answers and that they were wrong. Learners can feel privileged by the ability to correct themselves. Combined with multistep tasks and opportunities to back up, delayed judgment can provide fascinating and effective learning experiences.

Many permutations of this design are possible. The approach can be articulated into sophisticated paradigms, including those effectively incorporating artificial intelligence. But the use of this design is quite practical once the basics have been implemented. The structure can be used over and over again with different content for cost-effective, rapidly implemented learning solutions.

Example

We've already discussed a clear example of the strength of delayed judgment in the *Electrical Diagnosis II* program used as an example of Magic Key 5, multistep tasks. In that example, learners can explore, test, gather information, and suggest answers any number of times in trying to identify the fault in an electrical system. As each clue is discovered, the learner constantly reassesses the validity of early hypotheses and adjusts the strategy to arrive at the best solution. It isn't until the learner chooses to return the car to the user that any judgment occurs. The rich self-assessment that this promotes is vastly more meaningful than immediate feedback messages could possibly be.

It's straightforward to take a multistep task and delay feedback until many of the steps have been accomplished. Some situations do not fall as naturally into a delayed judgment environment, but can be just as powerful when the magic key is applied.

One module in a training program for a major insurance company was intended to teach new employees the uses and value of the different policies offered. One approach, of course, would be to treat this as a trivia contest: Provide the information to be read, then ask questions to assess

how many details the learner can remember. Our example applied a delayed judgment scheme that forces the learner to continually assess the importance of various policies in a meaningful context.

The learner begins with a set level of wealth (indicated by the diamonds in reserve in the upper right corner of the display) and can spend those resources as life events are outlined (Figure 5.45).

For example, an early event might be a car purchase, at which time the learner can choose the best type of policy for the need and situation. Learners can quickly read the reference materials for each type of form to help them make the best decisions.

Learning interactions occur throughout an extended sequence of similar challenges over which the user has control. There is very little offered in the way of feedback, but as time passes and policies are purchased, events occur (some catastrophic) that will illustrate the adequacy of the chosen insurance portfolio (Figure 5.46).

The delayed judgment is especially effective here, because one is encouraged to make insurance decisions in a longer time frame than as a one-time decision. The events and the judgment of the learner's response

Demo on CD

FIGURE 5.45 Opening page of delayed judgment training module.

Figures 5.45 and 5.46 from Herman's House. *Courtesy of American Family Institute.*

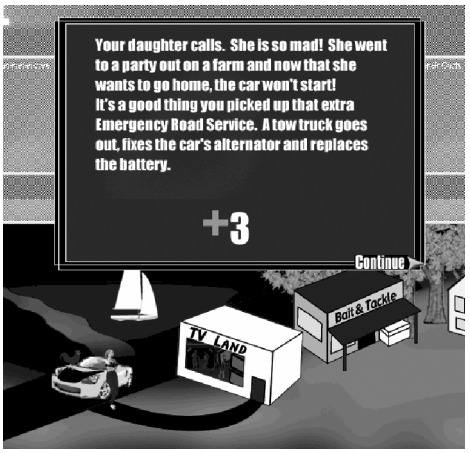


FIGURE 5.46 Delayed event illuminates consequences of learner's selection.

to the events happen at points seemingly unrelated to the triggering activity. This is very powerful in encouraging the learners to verify their assumptions and, if necessary, to modify earlier decisions based on changing circumstances. This self-review is possible only in a supportive lesson structure that provides delayed rather than immediate feedback.

Summary

I can't stress strongly enough the importance of considering motivational factors in instructional design. In many of my presentations, I do my best to make the following case: If you do nothing other than address learner motivation, you may have done the best and most important thing you can do. In a recent presentation to one of America's most prestigious corporations, I explained why this is so important and the effects of doing it well. I listed some specific ways you can do it, as are described in this chapter. I demonstrated examples.

The response?

"This was very interesting, but we really need practical help and direction on how to design e-learning applications. We have a lot of content and not a very big budget. What's the most cost-effective way to present a lot of content?" Sigh. Just shoot me.

Presenting a lot of content that has no chance of affecting behavior (or even of being recalled a few days after training) can never be cost-effective, *period*. It's a waste of money and a lot of time. With all apologies, no matter how politically correct and popular it may be, it remains a stupid thing to do.

Look: Dealing with motivation to learn *is* practical help. It is what you need to do. It will turn heads and engender questions—possibly skepticism. But you do it anyway. It's right, and it works—big time.