

Did They Get It? Nine A Dozen Tips for Preparing Effective Online Assessments and Exercises



Saul Carliner, PhD, CTD
Associate Professor and Provost Fellow for e-Learning
Concordia University
saul.carliner@concordia.ca
Website: www.saulcarliner.com
Twitter: saulcarliner

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Agenda

- The Suggestions
 - Conceptual suggestions
 - Tactical suggestions
- Wrap-up

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Objectives

- Describe the relationship between learning objectives and test questions
- Develop test questions that really test the knowledge you intend to teach
- Develop authentic exercises that engage e-learners while remaining focused on the intended outcomes
- Describe strategies for providing meaningful feedback to e-learners

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First things first: What purposes do questions serve in e-learning programs?

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Questions serve these three purposes.

		
Provide learners with opportunities to practice working with the material presented in the lesson.	Let learners reflect on that material and the broader learning process.	Assess the extent to which learners have mastered the content.

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Writing questions that foster interaction and assess learning challenges designers of asynchronous e-learning.

Choose your response: a. Answer 1 b. Answer 2 c. Answer 3 d. Answer 4	
Limited ability of computers to process responses to questions to objective questions (multiple choice, true/false, and fill-in-the-blank).	Mechanics of questioning interfere with conceptualization of questions.

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Tip 1: Root practice and assessment questions in *learning objectives*.

- Measurable learning goals for a course
- Emerge directly from the tasks stated in needs assessment

Also called *behavioral objectives* and *content objectives*.

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Objectives manage everyone's expectations.

Instructors		
Skills that learners should master—and by doing so, benefit the sponsor in some tangible way.		▪

Objectives manage everyone's expectations.

Instructors	Learners	
Skills that learners should master—and by doing so, benefit the sponsor in some tangible way.	Skills they must master to successfully complete the learning program	

Objectives manage everyone's expectations.

Instructors	Learners	Instructional Designers
Skills that learners should master—and by doing so, benefit the sponsor in some tangible way.	Skills they must master to successfully complete the learning program	<ul style="list-style-type: none"> ▪ List of “must cover” content ▪ Only legitimate basis for test questions

Objectives have three components.

Write learning objectives	Without assistance	In 100 percent of all instances
↓	↓	↓
Behavior	Conditions	Level of acceptable performance

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Behavior states, in observable and measurable terms, what learners should be able to do.

<ul style="list-style-type: none"> ▪ Always includes an <i>action</i> verb <ul style="list-style-type: none"> – Describe – State – Explain – Choose – Install ▪ Avoids actions that a third party could not observe: <ul style="list-style-type: none"> – Know – Understand

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Conditions refer to resources available when performing the task.

- Examples:
 - Related, previous work
 - Reference material and other assistance available
- **Question:** If no conditions are stated, what is assumed?

Level of acceptable performance identifies the tolerance for error.

- Tolerance for error
- Guess-timate based on plausibility
- Might use this to distinguish minimum acceptable performance (maybe 70%) from exceptional performance

Question: If no level of acceptable performance is stated, what is assumed?

Consider the levels of acceptable performance for these tasks.

- Installing a Pacemaker
- Installing TurboTax software
- Completing a television script
- Finding John Smith in the phone book

Which of the following are objectives?

- Know the procedure for changing margins
- Understand the value of instructional design

Which of the following are objectives?

- Name 4 ways to assess the value of learning products
- With the assistance of online help, change the margins on a page
- With the assistance of online help, change the margins on a page 95% of the time

Which of the following are objectives?

- With 95 percent accuracy, the arteries to which the pacemaker connects.
- Understand the key chemicals in the workplace.

Which of the following are objectives?

- With 85 percent accuracy and the availability of an online manual, employees should correctly complete an application for tuition reimbursement.
- Customer service reps should accurately update an employee record.

Differentiate among types of objectives.

Each program has many levels of objectives

Main (Terminal)	Supporting (Enabling)	Entering
The 3 to 7 key skills learners should develop	Skills learners must master to achieve one of the main objectives	Skills that you can assume learners already have—and do not need to teach

Example of the hierarchy

Main objective Main objective

Supporting Supporting Supporting Supporting

Sub Sub

sup- sup-

por- port

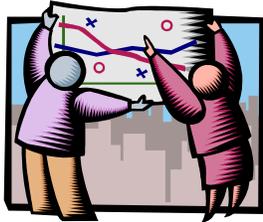
ing ing

Entry

Tip 2: Write tests immediately after writing the objectives.

Tests assess the extent to which courses met their objectives.

Why Should You Write Tests Now?



Write test questions now so you can teach to the test.

- The objectives state 'where you are going.'
- The test states 'what it looks like when you've arrived.'

Bob Mager



You only need to test the *main* objectives.

To achieve main objectives, learners must master the supporting objectives related to them.



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Write questions for supporting objectives to generate activities and mid-course assessments.

These exercises assess:

- Progress towards achieving the main objective
- Assurance that learners have mastered an interim goal before moving to the next one.
- If learners have not mastered the interim goal, the questions help you pinpoint the problem, because you know at which supporting objective the problem occurred.

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Tip 3: Write several test questions at the same time.

Questions for Assessment	
Measure the extent to which learners have mastered the objectives.	
Determine whether students successfully completed the course.	

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Tip 3: Write several test questions at the same time.

Questions for Assessment	Questions for Practice
Measure the extent to which learners have mastered the objectives. Determine whether students successfully completed the course.	Provide opportunities for learners to master the objectives with and without guidance.

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How many test questions should you write?

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The exact number of questions depends on your situation.

Situation	Number of test questions you should write:
Practice only	
Practice and quiz	
Practice, practice exam, and test	
Practice and test (with several versions of test, or the objective is tested in several units)	
Practice, test with several versions, and practice exam	

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The exact number of questions depends on your situation.

Situation	Number of test questions you should write:
Practice only	2 to 4 for each main objective
Practice and quiz	
Practice, practice exam, and test	
Practice and test (with several versions of test, or the objective is tested in several units)	
Practice, test with several versions, and practice exam	

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The exact number of questions depends on your situation.

Situation	Number of test questions you should write:
Practice only	2 to 4 for each main objective
Practice and quiz	3 to 5 for each main objective
Practice, practice exam, and test	3 to 7 for each main objective
Practice and test (with several versions of test, or the objective is tested in several units)	
Practice, test with several versions, and practice exam	

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The exact number of questions depends on your situation.

Situation	Number of test questions you should write:
Practice only	2 to 4 for each main objective
Practice and quiz	3 to 5 for each main objective
Practice, practice exam, and test	3 to 7 for each main objective
Practice and test (with several versions of test, or the objective is tested in several units)	5 to 10 for each main objective
Practice, test with several versions, and practice exam	

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The exact number of questions depends on your situation.

Situation	Number of test questions you should write:
Practice only	2 to 4 for each main objective
Practice and quiz	3 to 5 for each main objective
Practice, practice exam, and test	3 to 7 for each main objective
Practice and test (with several versions of test, or the objective is tested in several units)	5 to 10 for each main objective
Practice, test with several versions, and practice exam	7 to 15 for each main objective

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Situation	Number of test questions you should write:
Practice only	2 to 4 for each main objective
Practice and quiz	3 to 5 for each main objective
Practice, practice exam, and test	3 to 7 for each main objective
Practice and test (with several versions of test, or the objective is tested in several units)	5 to 10 for each main objective
Practice, test with several versions, and practice exam	7 to 15 for each main objective

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Tip 4: Use the behavior in the objective to generate questions.

Objective	Test question
Match the countries with their capitals.	Match the country with its capital a. France 1. Yaounde b. Cameroon 2. Brasilia c. Japan 3. Paris d. Thailand 4. Bangkok e. Brazil 5. Tokyo

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Consider this second example.

Objective	Test question
Using effectiveness criteria provided in class, recognize an effectively written performance plan.	Evaluate the effectiveness of the following performance plan for an instructional designer. Explain how you reached your conclusions.

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Consider this third example.

Objective	Test question
Using only the wordless instructions, install the desktop PC within 15 minutes and without errors.	Install the desktop PC in the box provided. You may use the instructions included in the box.

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Consider one more example.

Objective	Test question
Given a business case, evaluate the potential opportunity for e-commerce.	Read the following case. Afterwards, evaluate the potential opportunity for e-commerce. Specifically name the criteria used in the evaluation.

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How do you determine what the behavior should be?		
Level of Bloom's Taxonomy	Description	Behaviors to Test
Recall	"of terminology; specific facts; ...conventions, trends and sequences, classifications and categories, criteria, methodology; principles and generalizations, theories and structures"	"define; describe; identify; label; list; match; name; read; record; reproduce; select; state."
Comprehension	"Grasp...the meaning of informational material."	"classify; cite; convert; describe; discuss; estimate; explain; generalize; give examples of; illustrate; paraphrase; restate (in own words); summarize; trace"
Application	"Use ... previously learned information in new and concrete situations to solve problems that have single or best answers."	"act; administer; apply; articulate; chart; collect; compute; construct; contribute; control; demonstrate; determine; develop; discover; implement; inform; instruct; operationalize; participate; predict; prepare; preserve; produce; provide; report; show; solve; teach; transfer; use."

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And for the higher levels of Bloom's taxonomy		
Level of Bloom's Taxonomy	Description	Behaviors to Test
Analysis	"Break... down ...[concepts] into their component parts" to make "inferences" or "find... evidence to support generalizations"	"analyze; break down; categorize; compare; contrast; correlate; diagram; differentiate; discriminate; distinguish; focus; illustrate; infer; outline; prioritize; separate; subdivide."
Synthesis	"Applying prior knowledge and skills...produce a new or original whole"	"adapt; anticipate; combine; compile; compose; create; design; develop; devise; facilitate; formulate; generate; hypothesize; incorporate; individualize; integrate; invent; model; modify; negotiate; plan; reorganize; revise; structure; substitute; validate."
Evaluation	Providing and justifying an assessment or recommendation (no real correct answer, but a correct path of reasoning might exist)	"assess; critique; decide; defend; justify; support your decision."

Krumme, (2010.) Major Categories in the Taxonomy of Educational Objectives (Bloom 1956). <http://krummefamily.org/guides/bloom.html>. Visited February 13, 2011.

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What should you do if the behavior cannot be tested online?
<ul style="list-style-type: none"> ▪ Write a test question that most closely matches the behavior. ▪ Examples <ul style="list-style-type: none"> – Drag and drop (matches installation of hardware) – Choose from a simulation of a menu

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What should you do if the behavior in the test question does not match the objective?



Change either the test question or the objective so the two match.

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Choose an appropriate type of question.

- True/false, yes/no
- Match
- Multiple choice, one correct answer
- Multiple choice, several correct answers
- Fill-in-the-blank
- Drag and drop

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Try it now! Write test questions for these objectives.

- Recall the correct procedure for installing a drainage pump.
- Install a drainage pump.
- State the acceptable tolerances for errors on a telecommunications line.
- Determine whether a person is eligible to receive tuition reimbursement for a university course.

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Tip 5: Write *serious* objective questions.

Serious—questions that are:

- Rooted in the objectives
- Use distractors that emerge from logical or likely errors

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Consider the anatomy of a multiple choice question.

<p>STC stands for: <i>stem</i> <i>options</i>↓</p> <p>a. <i>Society for Technical Communication</i> <i>key</i></p> <p>b. <i>Society for Technical Communications</i> <i>distracter</i></p> <p>c. <i>Society for Technical Communicators</i> <i>distracter</i></p> <p>d. <i>Society for Technology Communicators</i> <i>distracter</i></p>	<table border="0" style="width: 100%;"> <tr> <td style="width: 15%;">Stem</td> <td>Question</td> </tr> <tr> <td>Options</td> <td>Choices of responses</td> </tr> <tr> <td>Key</td> <td>Correct answer as it appears on the list</td> </tr> <tr> <td>Distracters</td> <td>Other possibilities on the list</td> </tr> </table>	Stem	Question	Options	Choices of responses	Key	Correct answer as it appears on the list	Distracters	Other possibilities on the list
Stem	Question								
Options	Choices of responses								
Key	Correct answer as it appears on the list								
Distracters	Other possibilities on the list								

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List choices in alphabetical or numerical order (or their reverse).

STC stands for:

- a. Society for Technical Communication
- b. Society for Technical Communications
- c. Society for Technical Communicators
- d. Society for Technology Communicators

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Choose *meaningful* distractors.

<p>STC stands for:</p> <ul style="list-style-type: none"> a. Society for Technical Communication b. Society for Technical Communications c. Society for Technical Communicators d. Society for Technology Communicators 	<p><i>Meaningful distractors</i> are ones that represent a likely error someone might make, resulting from arithmetic error, error in judgment, or confusion about a name.</p>
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Tips for choosing *meaningful* distractors.

For numbers	Common mathematical errors
For terms	Synonyms
For multiple choice explanations	Slightly alter the “logic”
For drag and drop	Commonly confused parts

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Avoid humorous distractors; they tell learners that you don't take the content seriously.

(Plus, they give away the answer.)

STC stands for:

- a. Society for Technical Comics
- b. Society for Technical Communication
- c. Society for Technical Critics
- d. Society for Technology Crazies

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Avoid using None of the Above and All of the Above as choices.

They make you look lazy.

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Try It Now! Write distracters for this question.

If the price tag of an item is marked \$25—and the price tag does not include sales tax—how much would the consumer actually pay if:

- Federal tax is 5%
- Provincial tax is 8.5 %
- To calculate provincial sales tax, add the price on the tag and the federal sales tax

Correct answer: 28.45 ($\$25 \times 1.05$) $\times 1.085$

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Try It Again! Write distracters for this question.

The second largest city by population in the United States.

Correct answer: Los Angeles.

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Tip 6: Situate the question in a scenario that learners are likely to encounter in their daily lives.

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Rather than ask for learners to recall information, ask how learners would respond to a work-related problem.



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Tip 7: Develop versions of the questions for near and far transfer.

Near transfer	Far transfer
Ability to address situations on the test that are nearly identical to those taught and practiced in the e-lesson.	Ability to address situations on the test that significantly differ from those taught and practiced in the e-lesson.

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Example	
Situation	Question
Exercise in Class	You are trying to paste text in a Windows program. Cut a paragraph from this letter and paste it into that memo.
Near transfer	You are trying to paste text in a Windows program. Cut a paragraph from this memo and paste it into that letter.
Far transfer	You are trying to paste text in a Windows program. Cut a paragraph from this letter and paste it into that Excel spreadsheet.

Tips for choosing questions for near and far transfer.	
Near transfer	Questions, cases, problems, and situations similar to ones covered in class and the text.
Far transfer	Ones that apply the same concepts covered in the course, but that sufficiently differ in context so learners first need to ask, "Does this concept apply here?"

Try It Now! Write questions for near and far transfer.	
Objective: Recognize an effective definition.	
Practice examples in the instructional sequence:	
Several 1-word terms including:	
▪	Table
▪	Chair
▪	Run

Tip 8: Formally identify the correct answer and related logic at the same time you write test questions.

- For objective questions, indicate the answer.
- For complex questions, prepare a *rubric*.
 - States preferred method of answer
 - In e-learning, rubrics assist with clarifying questions and possible responses as well as preparing activities
 - Also helps identify likely errors

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Example of a rubric (in this case a checklist to observe a demonstration.)

You have just received the package with the new desk top computer. Install it.

- Unpack the box.
- Identify components.
- Attach keyboard to system unit.

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Tip 9: Provide effective feedback to practice activities.

- Practice provides a safe space to develop skills.
- Feedback helps learners in that process:

Indicates whether the response is correct	Tells them whether or not they're "getting it"
Explanation	For incorrect responses, tells learners how to adjust their behavior so that it's correct For correct responses, tells learners why the response is correct so they can apply the same reasoning in the future
Hint	Provided before a response to help learners respond.

Consider the structure of feedback.

Not correct.	Although many people use the plural form of the word <i>communication</i> , STC only uses the singular version of the term, <i>Communication</i> , in its name.	Click Next to continue.
↓	↓	↓
Response.	Explanation	What learners should do next

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Consider these tips for writing feedback statements.

Avoid:

- Superlatives, like Terrific, Excellent, and Wrong as they evoke more emotion than is appropriate.
- Personal pronouns, especially you, to prevent learners from personalizing the issue.

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How would you handle feedback in these situations?

- Learners incorrectly respond to a multiple choice question.
- In a simulation, learners choose the correct options.
- Learners are taking a test or self-assessment.

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Limit the number of tries to multiple choice questions.



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Note that feedback is implied in some situations.

Moving to the next action in a simulation implies that learners correctly handled the previous one.

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Feedback demotivates in some situations.

- The fourth attempt of a 4-choice multiple choice, matching, or drag-and-drop question.
- During a test (but not afterwards)

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Try It Now! Write feedback for one of the incorrect responses.

If an item is marked \$25, how much would the consumer actually pay if the 5% federal 8.5 % provincial sales taxes were not included? (Note—provincial sales tax calculations *include* the amount paid for federal taxes.)

Correct answer: 28.45 ($\$25 \times 1.05$) $\times 1.085$

Distracters:

- 26.25 (just federal tax)
- 28.36 (25×1.135 (which equals .05%+.085%)

Try It Again! Write feedback for one of the incorrect responses.

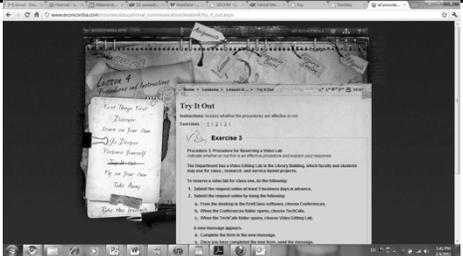
The second largest city in the United States.

Correct answer: Los Angeles.

Distracters:

- Atlanta
- Chicago
- San Francisco

Tip 10: Use open questions to provide learners with practice opportunities.



The screenshot shows a video player interface. On the left, there is a thumbnail of a presentation slide titled "Try It Out" with handwritten notes. The main video area shows a slide with the following text:

Try It Out

Instructions: Answer each question. Your responses are visible to all.

Question: 1 1 1 1 1

Exercise 3

Directions: Read the following questions and answer them. You may use the following resources:

- 1. Search the Internet for information about the following topics.
- 2. Search the Internet for information about the following topics.
- 3. Search the Internet for information about the following topics.
- 4. Search the Internet for information about the following topics.
- 5. Search the Internet for information about the following topics.
- 6. Search the Internet for information about the following topics.

7. Complete the tasks in the next assignment.

8. Complete the tasks in the next assignment.

Example

The passage is not effective.

On the one hand, the passage is effective in that it stays on-topic (that is, focuses only on installing decks), and provides an introductory definition of decking.

On the other hand, it does not address all of the key parts of the opening. It does not make a special effort to motivate learners or provide an overview of the materials. Although some of the on-screen material suggests the structure of the course, the specific topics to be addressed are not clearly identified, so the expectations of the learner are not set regarding the content. Nor does the site tell readers how much time is needed to go through this material. As a result, readers might start it but not have sufficient time to finish.

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Debrief open questions as follows.

- Identify 3 to 5 possible responses.
- Start with least correct response.
 - Explain why learners might have chosen it.
 - Then explain why it is a weak choice.
- Continue with the next least correct response.
- Conclude with the most correct response.
 - Explain why learners might *not* have chosen it.
 - Explain why it is the best choice.

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Also use open questions to let learners reflect on their learning.

What do you need to apply this troubleshooting procedure in your work situation?

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Tip 11: Validate exercises, quizzes, and tests before so the results have meaning.

- Validation involves ensuring that:
 - Learners can follow the instructions
 - Learners accurately *read* questions
 - A sufficient percentage of learners can successfully answer a given question
- Validating tests ensure that:
 - Students perceive that the test questions ask the same thing that the instructional designer does
 - The instruction adequately prepares students
- Occurs during *formative* evaluation

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Note that learners can legally challenge tests that are not validated.



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Also to truly measure learning, conduct pre- and post tests.

- *Pre-tests* assess incoming knowledge and skills
- *Post-tests* assess outgoing knowledge and skills
- *Learning* is the difference between pre-test and post-test scores

Note: Although true assessment of learning requires pre-testing, the pre-test process could affect a learners' sense of *self-efficacy*.

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Tip 12: Secure tests if you need to avoid the temptation to cheat.

- Do not provide learners with an opportunity to learn one another's identities.
- Offer several versions of the same test to limit opportunities for cheating.
- Require identify verification (biometrics, photo ID) for final testing.

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Take-Aways



What one or two tips, insights or ideas about writing questions for tests and activities will you apply in a current or future e-learning program?

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Learn more about writing questions.

- Carliner, S. (2003.) *Training Design Basics*. Alexandria, VA: ASTD Press. (See chapter 4.)
- Driscoll, M. & Carliner, S. (2005.) *Advanced Web-Based Training*. San Francisco: Pfeiffer. (See chapters on interactivity, simulations, and e-mentoring.)
- Hale, J. (2000.) *Performance-Based Certification*. San Francisco, CA: Pfeiffer.
- Westgaard, O. (1999.) *Tests That Work*. San Francisco, CA: Pfeiffer.

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