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Reference Guide for Instructional Design and Development

How do I ...

1. Assess Needs?
2. Analyze Learners?
3. Write Learning Objectives?
4. Select an Instructional Strategy?
5. Develop Materials?
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Instructional design is the process through which an educator determines the best teaching methods for specific learners in a specific context, attempting to obtain a specific goal. This reference guide is designed to help you apply sound principles of design to the creation of your courses. The overview presented here is based on the model developed by **Walter Dick and Lou Carey** (to read more see *The Systematic Design of Instruction*, by Walter Dick and Lou M. Carey), which provides a systematic, step-by-step approach to designing (and then improving) effective and objectives-based instruction. Keep in mind that the content is presented here in a linear manner, but there will always be movement between and among phases. Also, remember that not all of these phases may apply to your situation. Depending on your needs, you may work through this reference guide in a linear manner, using the Back and Next buttons on the left side of the screen, or you can click the phase and section that apply only to your current interests and requirements.

Within this reference guide, each design phase consists of three sections: **Concept Outline**, **Tools**, and **Online References**. The first section, the **Concept Outline**, provides bulleted quick tips and important concepts pertaining to that particular design phase. The **Tools** section provides worksheets or job aids to assist you in working through each phase. Finally, the **Online References** section provides a list of relevant online articles, references, or Web sites.

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Assess Instructional Needs

Assessing instructional needs is the first phase of instructional design. Depending on your situation, you may not need to assess and determine an instructional need; that work may have been done for you. It may be, too, that your particular situation does not require a needs assessment. However, if you are responsible for course-creation from the ground up, conducting a needs assessment may be a necessary step.

The motivation behind conducting a *needs assessment* is not too mysterious: in order to begin designing instruction, you may need to determine whether there is a *need* for the instruction you intend to offer. In addition, depending on your instructional goal and course content, you may need to identify the gap between what *is* and what *needs to be*; that is, what do learners know now, and what do learners need to know? New educational needs or enhancements may arise because of changes in legislation, changes in a given industry, or mandates from professional organizations. For instance, a telecommunications company may realize that it's falling behind in the area of wireless technology; it may then conduct a needs assessment to determine how to remedy the lack.

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Assess Instructional Needs

To begin designing instruction . . .

Ask yourself. . .

- Who is affected by this need? Who are your potential learners?
- What prerequisite knowledge, skills, or understanding do your learners need?
- What is and what needs to be? What is the instructional goal?

Begin with the learner. . . .

- If possible, solicit input from your potential learners. Consider using email, a survey, a focus group, informal or formal observation, or discussion.
- If you use or develop CBT or WBT, what kind of access to technology do your learners have?
- Are there language considerations? Are there students who speak English as a second language?

Consider the learning environment. . . .

- If applicable, determine whether there are existing curricula or certification requirements your course must satisfy.
- If your course is media-dependent, determine the availability of required media. If you use or develop CBT or WBT, what are minimum technical requirements?
- Find out what facilities are available.

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Assess Instructional Needs

If you decide to conduct a needs assessment, the following documents may help you with the process. To view a document, click the appropriate question. For a hard copy, click the Print button that appears at the bottom of each document.

What specific types of data are important to collect?

How should I collect data?

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To get started, collect the following data. . . .

- Who is the intended audience? Who will make up your potential learners?
- How many potential learners are there?
- What specific industries, businesses, and professions will find your instructional material of particular interest?
- What are the prerequisites for the course? What should learners already know?
- Where are the potential learners geographically located? Will learners be located in a centralized classroom, or distributed throughout a geographical location?
- What is the need? Has it been determined by legislation, a change in career or job expectations? What is the gap between what is and what should be?
- What kinds of knowledge, skills, or tasks will the intended instruction include?

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- If time and resources allow, consider collecting information using more than one method.

Method	Advantages	Disadvantages
Questionnaire	● May yield large amount of information. ● Restricts respondents to specific areas. ● Does not require trained interviewers. ● Time effective for a large number of participants.	● Requires explicit instructions. ● Return rates tend to be low. Try building in an incentive to motivate people to completion. ● Requires a significant sample size for an acceptable confidence level.
Observation	● Establishes what people actually *do*, not what they *say* they do. ● May be accomplished via trained observers or automatic cameras. ● Helps pinpoint problem areas.	● Requires skilled observers. ● May be expensive and time-consuming. ● Data not easily quantifiable.
Face-to-Face Interview	● Yields a high response rate. ● Provides most information for time spent and most accurate detail. ● Provides opportunity to pursue responses for more detail.	● May be costly in both time and money. ● May provide extraneous information. ● Requires trained interviewers.
Telephone Interview	● Less costly than face-to-face interviews. ● Less time-consuming that face-to-face interview.	● Provides no non-verbal feedback. ● Respondent may cut interview short. ● Requires trained interviewer.
Group Data Collection 1. A panel of experts or master performers. 2. A focus group of target population.	● Yields a high response rate. ● Provides significant amount of information for time spent. ● Experts can identify *what is* and *what needs to be*.	● May be difficult to schedule. ● Requires some degree of structure. ● Dominant participant may bias group response. ● Requires a trained facilitator. ● May provide extraneous information.

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Assess Instructional Needs

If you decide to conduct a needs assessment, here are some online materials that may help you work through this phase. Two of the sites represented here are specific to distance education; however, many of these principles may be applied to different kinds of educational environments.

http://mime1.marc.gatech.edu/MM_Tools/analysis.html
This Web site includes links to tools for use in assessing instructional needs. The tools presented here are specifically written for multimedia products, but the methodologies may be adapted for all instructional assessment needs.

http://www.uidaho.edu/evo/dist3.html
Instructional Development for Distance Education. Developed by Engineering Outreach at the University of Idaho. For needs assessment, see particularly "The Need for Instructional Development" and "The Design Stage."

http://www.mtsu.edu/~itconf/proceed98/rstewart.html
Needs Assessment: *A Systematic Approach for Successful Distance Education*. Online article, outlining the needs assessment process for effectively implementing distance education.

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Analyze Learners

Although not always possible, it's good practice to spend some time thinking about and researching your potential learners or your *target population*. These are the folks who will actually be taking your class, using your computer-based training, or working through your self-paced instructional materials.

Usually, it's best to create instruction around a particular audience, rather than designing content and then searching for an audience. It's also a good idea to avoid designing instruction based on what you think learners *should* know or be like; instead, determine what learners *are* like and what they *do know*. In addition to analyzing the learners, think about the learning context - where will the instruction be offered? Will the environment adequately support the intended instruction? Remember: many of your learners are adults. Usually, adult learners take classes for a specific reason; make sure you can articulate the relevance of your course materials. How will your learners apply what you're presenting?

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Analyze Learners

What kinds of things do you need to know about your learners? Some instructional design theorists contend that "the most important factor for an instructional designer is specific prior learning" (See *Instructional Design* by Patricia L. Smith and Tillman J. Ragan). Consider how you can discover what your learners already know about your topic.Think about the prerequisite knowledge your learners must possess before they take your course or instructional unit.
It's also important to consider:

- Cognitive characteristics, such as learning aptitude, learning styles, prior knowledge of topic.
- Psychosocial characteristics, such as motivation, attitudes, socioeconomics.
- Physiological characteristics, such as age, race, ethnicity, cultural and linguistic background.

Be aware that we now live, work, and learn in environments that are increasingly culturally diverse. Remember that some cultures may not encourage classroom participation, so some learners may be hesitant to speak up or volunteer information. Nuances of body language and nonverbal communication may vary widely from culture to culture. All of these factors carry implications for selecting your instructional strategy and developing your instructional materials.

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Analyze Learners

If you have the opportunity to analyze your potential learners, the following documents may guide you through the process. To view a document, click the appropriate question. For a hard copy, click the Print button that appears at the bottom of each document.

What are some important questions to ask learners?

What learner characteristics do I need to consider?

How do I analyze the learning context?

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Worksheet for Learner Analysis

If you have the time and opportunity to conduct a learner analysis, consider the following questions.

1. What are the required prerequisites? What knowledge do learners need to have before they take this course?

2. Have learners experienced something similar to this instruction?

3. What attitudes do the learners have about instructional content?

4. What kinds of expectations do learners have concerning instructional delivery?

5. How relevant is the instructional goal to the learners?

6. What are the job titles or functions of potential learners?

7. How confident will your learners be?

8. What are the educational and general ability levels of the learners?

9. What are the general learning preferences of the target learners?

10. How do the learners feel about the organization (IEEE) providing the instruction?

11. Are the learners heterogeneous? Homogeneous? In what ways?

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Learner Characteristics

If you have the time and opportunity to conduct a learner analysis, consider the following learner characteristics.

Note: The extent to which you focus on certain learner characteristics will depend on the nature of your instructional project.

1. Cognitive Characteristics
   - English as a second language
   - Cognitive processing styles
   - Learning strategies
   - General world knowledge
   - Specific content knowledge

2. Psychosocial Characteristics
   - Interests
   - Motivation to learn
   - Attitude toward subject matter
   - Attitude toward learning
   - Anxiety level
   - Beliefs
   - Socioeconomic background
   - Racial/ethnic background, affiliations
   - Job position, rank

3. Physiological Characteristics
   - Sensory perception (visual, auditory, tactile, acuity)
   - General health
   - Age

Condensed from Instructional Design, by Patricia L. Smith and Tillman J. Ragan.

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To analyze the context in which learning will take place, consider the following. . .

- Is the physical environment is appropriate for learning? Does the environment include appropriate light, sound, and seating?
- Does the environment allow access to facilities, equipment, learning experiences, and resource materials in compliance with the Americans with Disabilities act?
- Are educational services and technical support provided to instructors and learners?
- For online or CBT/WBT courses: Do learners and instructor(s) have access to appropriate technology and support?
- For video courses: Do learners have access to the appropriate equipment?
- Are there existing curricula or certification requirements with which the course must comply?
- Are there any community or organizational issues you need to consider?

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Analyze Learners

If you have the time and opportunity to analyze your potential learners, here are some online materials that may help you work through this phase. Two of these sites deal specifically with distance education; however, there are some overall principles you may apply to any instructional environment. Think about how to apply, for instance, the adult education "tipsheet" to developing presentations, creating course materials, or developing a series of PowerPoint slides.

http://www.ihets.org/learntech/facprinc.html
Guiding Principles for Faculty in Distance Learning. Guidelines developed by the Working Group of the Indiana Partnership for Strategic Education. Specifically, see "Principle 1: Faculty Benchmarks and Principles: Course Design."

http://members.tripod.com/~Roberta/methods.htm
Adult Education in Practice. Adult education "tipsheet" from Waycross College.

http://www.uidaho.edu/evo/dist8.html
Strategies for Learning at a Distance. Developed by Engineering Outreach at the University of Idaho. Profiles the distance education learner.

http://granite.cyg.net/~jblackmo/diglib/styl.html
Outline of different learning styles, in particular adult learning styles, Kolb's learning theory, and Gardner's multiple intelligences.

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Write Learning Objectives

A learning objective is a clear, concise, objective description of what your learners will be able to *do* at the end of a given instructional unit. Of all the activities involved in the instructional design process, developing objectives is one of the most critical.

Purpose

- Learning objectives tell learners what they will know, understand or be able to do at the end of a block of instruction (section, topic, lesson, workshop).
- Objectives should be clear, honest, complete, and correct.
- Well-written objectives should serve as the basis for test items. Well-written objectives tell learners how their performance will be assessed.

Composing

- Determine the *goal* of the learning activity (the terminal objective).
- Determine what learners must demonstrate to achieve that goal (the enabling objectives).
- Write objectives based on the above skills, task, or knowledge.

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Write Learning Objectives

Parts of

- Begin with a statement such as "Upon the completion of this course/lesson/presentation/CBT, you will be able to . . ." Phrase the objective in terms of what the user will be able to do, not what you are presenting.
- Write objectives that include the following criteria:
  - *Performance Statement:* List the skill or knowledge the user needs to achieve. Ask yourself, "What will the user be able to know or do?"
  - *Criteria Statement:* Continue by stating how well the user should be able to perform. (Not always required.)
  - *Condition Statement:* Describe the conditions that need to exist for the learner to perform the task. (Not always required.)

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Write Learning Objectives

As you develop your objectives, the following documents may help you through this phase. To view a document, click the appropriate question. For a hard copy, click the Print button that appears at the bottom of each document.

What are appropriate verbs for learning objectives?

What are some examples of performance objectives?

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Phrases to Avoid

These verbs are subject to multiple interpretations.

- *Comprehend; fully understand; know; remember; contemplate; perceive; enjoy; consider; recognize; experience.*

Phrases to Use

Categories with Outcome-Illustrating Verbs

1. Use the following verbs when the objective is to remember and recall previously learned information:

   Define, describe, identify, match, name, record

2. Use the following verbs when the objective is to understand the meaning of informational materials:

   Classify, describe, estimate, summarize, understand

3. Use the following verbs when the objective is to use previously learned information to solve problems:

   Assess, compute, determine, develop, implement, prepare, produce, provide, report, utilize

4. Use the following verbs when the objective is to break down informational material into component parts:

   Diagram, differentiate, discriminate, illustrate, recognize, separate, subdivide

5. Use the following verbs when the objective is to apply prior knowledge and skills to produce a new or original whole:

   Compare, compile, contrast, design, devise, facilitate, formulate, generate, incorporate, integrate, plan, revise, structure

6. Use the following verbs when the objective is to judge the value of information:

   Compare & contrast, conclude, critique interpret, justify, support

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Objectives: Performance Component
Performance Statements

Learning Objectives

Use this list as a resource when you develop your own objectives.
Note the specific action verbs used in each performance statement.

- Student teams will *design* new automation modules.
- Learners will *define* the protocols and systems that implement the Internet.
- Learners will *write* simulations.
- Learner will *define* error-correction coding.
- You will be able to *identify* and *define* the correct name for the components that make up the network provisioning system.
- Learner will *analyze* the design trade-off in ADC and DAC design.
- Learner will *develop* strategies and analytical methods for evaluation of capital projects.
- Learners will *outline* key concepts and principles of effective human resource management.
- Learner will *compose* a complete and accurate technical document.
- Learner will *compose* and *customize* a presentation for a specific audience.
- Learner will *identify* basics of Telecommunication Traffic Engineering.
- Learner will perform information processing in IS-95 uplink and downlink.

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Write Learning Objectives

The following online materials offer assistance and tools that may help you work through the *Learning Objectives phase.*

http://ag.arizona.edu/aed/aed695a/writing.htm
This links to a quote from theorist Robert Mager. This site provides a rationale for developing objectives, as well as links to a definition of "objective," and a list of verbs for varying cognitive levels.

http://www.adprima.com/objectives.htm
Although this Web site anticipates an audience of secondary school teachers, this high-level overview works for all educators.

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Select an Instructional Strategy

As you begin to formulate your instructional strategy, it may be helpful to use R. Gagne's (For more information see R. Gagne, *The Conditions of Learning.* New York: Holt, Rinehart, and Winston, 1987) "nine events of instruction" as an organizational tool. Gagne outlined a process of learning that includes the following nine events:

- **Gain attention**
  In order to focus your learners on the task at hand, begin your instructional unit in a way that will pique their interest and gain their attention. You can, for instance, begin with a thought-provoking question. Or, depending on the media available you may use graphics, audio, or video material.
- **Inform learners of objectives**
  After gaining learners' attention, establish the purpose of the instruction. Informing learners of objectives early in the instructional process helps to facilitate learning; knowing the instructional goal helps learners direct their focus. Remember, objectives should form the basis of assessment.
- **Stimulate recall of prior learning**
  In order to make instruction relevant and meaningful, try to link your topics to prior knowledge. This is particularly important for adult learners. To maintain and stimulate interest, ask questions concerning personal experience.
- **Present the content**
  "Present content" doesn't necessarily mean only lecture. When possible, it's best to use a variety of media, including text, graphics, audio narration, and video. If you are developing computer-based or Web-based training, remember to chunk content sensibly and organize it meaningfully.

  Remember, there are different challenges if your material is only media-based; if you are designing an online course, consider how you can present content without simply building an online page-turner. In addition, remember that, with Web-based courses, there are technological issues to keep in mind: there may be bandwidth issues, for instance, if you want to integrate online video. Consider your learners' technological access.
- **Provide learner guidance**
  To provide learner guidance, advise learners of resources available and guide them through some effective learning strategies.
- **Elicit learning/practice**
  During this event, learners are provided with the opportunity to practice what they have learned. This is one way to assess whether learners are prepared for the next part of the lesson; it also provides a chance for learners to actively participate in their learning. Employ simulations, role-playing, or hands-on laboratory work, depending on the nature of the instruction. This provides opportunities for learners to confirm their understanding.
- **Provide feedback**
  As students practice and otherwise participate in the learning process, it is vital to provide useful and immediate feedback. This does not mean only acknowledgement of a correct or incorrect response; constructive feedback provides useful information. If a learner makes an error, discuss the consequences of it; or, if you notice that learners' errors form a consisten pattern, use that as a basis for a discussion and, possibly , a revision of your approach. This kind of feedback is not used for final assessment, but rather as a formative means of understanding the specific needs of your learners.
- **Assess learning**
  Assessing learners may not happen as a discreet instructional event. In all likelihood, you assess your learners' comprehension during the entire instructional process. Traditionally,

formal, summative assessment occurs at the end of an instructional unit; however, you may also choose to employ formative assessment, testing students' comprehension as you work through the instructional unit. This kind of assessment where learners need work allows you to adapt your instruction accordingly.

- **Enhance retention and transfer**
  Reviewing and summarizing is an effective way of reinforcing new material; review and summary also helps learners retain what they have just learned. As you review and summarize, paraphrase information, use metaphors and analogies, and connect new information to career, work, or life experiences.

Although you may not need or choose to incorporate each discreet event presented here in your own instruction, you may want to refer to this hierarchy as you develop your course or instructional materials. Remember that, depending on your course delivery, integrating these instructional events may present challenges. For instance, if you are developing a distance education or self-study course via electronic or paper-based materials, your instructional materials need to gain learners' attention, as well as provide feedback and guidance.

For more information on each event, as well as instructional strategies and tips, place your mouse over each phrase.

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Depending on your instructional goal and course content, you may need to test your learners' knowledge. So, as part of your instructional strategy, you may need to think about creating tests or other *assessment* tools. How will you - and your learners - know when the required objectives have been achieved?

It may seem unusual to suggest that you begin to create assessment instruments in the middle of the design process, rather than at the end. However, the best time to develop test items is after developing learning objectives. Your assessment instruments, then, will be more likely to actually measure what you want your learners to accomplish.

Remember, too, that assessment doesn't only occur at the end of an instructional unit. Think about how to integrate formative assessment during instruction. Check in with your students by frequently asking questions and soliciting feedback.

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Select an Instructional Strategy

Use the following documents to guide you through the Instructional Strategy phase. To view a document, click the appropriate question. For a hard copy, click the Print button that appears at the bottom of each document.

How can I use Gagne's "nine events" to organize my instruction?

How do I apply instructional strategies to online material?

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Lesson Plan Format

Name:

Topic:

Attention Grabber
How can you gain learners' attention? How can you establish the relevance of your material and pique their curiosity?

Objective
Upfront, tell learners what the objective is. Establish expectancy.

Recall of Prior Learning
How can you convey the relevance of your material? How can you link your instructional material to learners' prior experiences or knowledge?

Present the Content
How can you accommodate for different learning styles? How can you engage different presentation methods? (Video, Graphics, Audio)

Performance/Practice
How can you engage learners? How can learners demonstrate what they know?

Feedback
How can you provide helpful, constructive feedback on learner activities?

Assess Performance
How can you assess whether learners are ready to proceed? What kinds of formative and summative assessment will you employ?

Enhance Retention and Transfer
How can you review, summarize, and connect your instructional material to learners' life experience and prior knowledge?

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Information Presentation for Online Materials
Know the Ropes

Retrieval	● Keep topics small and self-contained. Chunk in groups of 3 to 5 units of information. ● Label topics clearly. ● Use a template for consistency. ● Disclose information in progressive layers.
Orientation	● Online material has no physical representation of its organization; there are no covers, chapters, or pages. Provide visual cues through metaphor or color. ● Provide a site map, easy backtracking and exit, and a default path.
Presentation	● Consider readability and layout. ● Reduce clutter; aim for 50% white space. ● Distinguish important information. ● Use color and graphics appropriately. Be consistent and conservative; use color and graphics for clarification, not for explanation or decoration.
Encoding	● When designing the structure, consider the purpose. ❍ For instructional units, design sequentially. ❍ For browsing or reference, design hierarchically or associatively. ● Structure each topic to answer one question.
Sequence	● Provide several access techniques: menu, index, table of contents, hypertext links, keyword searches. ● Provide multiple entry points and paths to address a variety of learner needs.

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Select an Instructional Strategy

Take a look at some online materials that offer assistance and tools that will help you work through the *Instructional Strategy* stage.

http://lrs.stcloudstate.edu/cim/courses/pine/strategy.html
This site, part of St. Cloud State University, provides a slightly different perspective on Gagne's events of instruction.

http://www.uidaho.edu/evo/dist2.html
Strategies for Teaching at a Distance. This guide, part of Idaho State University, discusses instructional strategies specifically related to distance education.

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Develop Materials

Instructional materials are any tools you use during the instructional process. An instructional package usually consists of a student manual, instructional materials, pre- and post-tests, and an instructor's manual. You may choose to employ worksheets, handouts, job aids, computer-based training, the Internet, laboratory work, learning objects, learning portals, or audio/video material.

Prior to developing your instructional materials, consider your intended development and delivery mode. Will your delivery mode be self-paced and instructor-independent, such as online learning? Will your delivery be a combination of instructor presentation and use of materials? Think about how you will cover all required instructional events (R. Gagne outlined a process of systematic learning that includes the following nine instructional events: gain attention, inform learners of objectives, stimulate recall of prior learning, present content, provide learner guidance, elicit learning/practice, provide feedback, assess learning, and enhance retention and transfer). Consider, too, the resources and budget you have available.

Also, consider whether you wish to create your own instructional materials or whether you want to use materials that already exist. Remember, though, to avoid using material just because it's available; make sure the material is appropriate for your instructional goals.

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Develop Materials

When developing your instructional material, think about using the following steps (This is a condensed list. For more information, see *The Systematic Design of Instruction*, by Walter Dick and Lou Carey.):

1. Review your instructional strategy.
2. Research existing literature or fellow subject matter experts; determine what material is available.
3. Consider how you can adapt existing material.
4. Determine whether you need to design new materials.
5. Consider the best media for presentation. How can you best monitor practice and feedback, evaluate learner learning, and guide student learning?
6. Based on your instructional strategy, build your instructional material.
7. Review each completed instructional unit for flow, clarity, and information-chunking. Keep your learner analysis in mind.
8. Develop a student manual or student instructions; provide a syllabus or outline that informs learners of objectives and assignments.

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Develop Materials

As you develop your instructional materials, the following documents may help you work through this phase. To view a document, click the appropriate question or statement. For a hard copy, click the Print button that appears at the bottom of each document.

I am considering using educational technology in my course. What factors do I need to consider?

How can I assess my own instructional materials?

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If you are considering implementing educational technology, consider the following:

Access

- Is the technology accessible to all learners?
- Is the technology flexible? Will there be language barriers?
- Is the technology difficult to learn or to use?

Cost

- How much will developing the technology cost?

Learning and Instructional Strategy

- What instructional approaches will best meet your learning objectives?
- What technologies are best for supporting this kind of learning?
- Can any existing content be adapted to the technology?
- What skills or knowledge does the technology support?

Feedback and Interactivity

- Does the technology encourage any interaction? What kind?

Institutional Issues

- Are there any institutional barriers to using this technology?
- What kind of support is needed for this technology? Does it exist?
- Do any organizational or institutional changes need to be made to incorporate the technology?

Flexibility

- How quickly can you create and distribute materials?
- How much flexibility does the technology allow? How quickly can you change the materials?

SCORM Compliance

- More and more, online materials are being developed for digital libraries. Do you need to ensure that your materials are built and tagged consistently and appropriately for inclusion in a digital library?

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Self-Check for Materials Assessment

Do your materials include the following elements?

- Explanation/presentation of instructional content
- Appropriate opportunity for practice
- Assessment of progress

Do your written or online materials follow these general guidelines?

- Effective writing
  - Phrasing and terminology are simplified
  - Materials are concise
  - Materials use active, not passive, voice
- Readability
  - Text is formatted with ragged right margin
  - Appropriate line-length (5.5 inches) and font size (11 - 13) are used
  - Use of varying fonts is minimized.
- Graphics
  - Graphics are placed close to text that describes them.
  - Graphics are consistently laid out.
  - Graphics are used to explain visual conventions.
- Information organization
  - Overviews or pre-questions are included.
  - Tables or lists are used for clarification.
  - Information is chunked into meaningful groups (5 - 9 items).
- Learning Theory
  - Material contains an introduction that provides background.
  - Material presents topics that create a basis for understanding and procedures to enable performance.
  - Material allows learners to practice and perform required procedures.

Materials were developed with sufficient attention to . . .

- Learner characteristics
- Resources and/or constraints of facilities
- Content analysis
- Learning objectives
- Instructional strategies

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Develop Materials

Take a look at some online materials that may help you work through the *Develop Materials* stage.

http://lrs.stcloudstate.edu/cim/courses/pine/develop.html
Provides an overview of support materials and delivery strategy. Includes links to handouts, guidelines, and an overview of self-paced instruction.

http://www.fbe.unsw.edu.au/learning/instructionaldesign/materials.htm
Instructional Design of Learning Materials. Outline of the instructional design process, describing how all stages impact the development of instructional materials.

http://www.fgcu.edu/onlinedesign/mediadev.html
Increasingly, instructors are turning to the Web as an educational method. Here are some quick tips to keep in mind when developing Web-based instructional materials.

http://www.adlnet.org/
This link, part of the Advanced Distributed Learning initiative, provides information on SCORM, or Shareable Object Reference Model. If you are using the Internet to develop your materials, this is useful information.

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Evaluate Instruction

How can you make sure that your instruction is effective? If your particular situation allows, the best way to test your instruction is by employing a system of evaluation. Of course, your learners are your best test audience; however, it's also a good idea to ask available fellow subject matter experts to provide a peer review of your instructional materials and strategy.

Don't confuse *evaluation* with *assessment*. Usually, assessment methods concentrate on learner learning; evaluation, on the other hand, has a wider scope. *Evaluation* implies an examination of the entire instructional unit you have been developing. A peer review from your colleagues is one way of evaluating the effectiveness of your class, presentation, or self-study materials.

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Evaluate Instruction

To some extent, you may be evaluating your instruction throughout the development and delivery process. Considering the needs of your target audience, for instance, is one way you evaluate what strategies or materials are appropriate. *Formative* evaluation, evaluating instruction as you develop and deliver instruction, enables you to make critical decisions on how to revise and thereby improve your instruction. This will help you more effectively meet the needs of your learners. *Summative* evaluation comes after delivery or after full development of the instructional unit.

It may help to use tables or questionnaires to gather valuable data from your test audience, whether your audience consists of potential learners, fellow subject matter experts, or learning specialists. Use the documents and Web sites referenced in the *Tools* and *Online References* section to adapt and create your own tables and questionnaires.

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Evaluate Instruction

If you have the time and opportunity to evaluate your instruction, the following documents may help you work through this phase. To view a document, click the appropriate question or statement. For a hard copy, click the Print button that appears at the bottom of each document.

Consider giving this checklist to your test audience or peers.

For reference, I'd like a quick outline of evaluation strategies and tips.

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Checklist for Evaluating Instructional Materials

To be completed by learners, instructional designer, learning specialist, or fellow subject matter experts

- Materials are appropriate for defined performance objectives.
- Materials include adequate instruction for required skills.
- Material is sequenced logically and chunked meaningfully.
- Materials are clear and understandable.
- Materials are relevant to learners' needs.
- Media employed encourages efficient management.
- Materials allow adequate opportunity for practice and constructive feedback.
- Assessment items are relevant to performance objectives; test items test required behaviors.

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Evaluation Overview

Consider employing formative evaluation, summative evaluation, or combining the two efforts.

Formative Evaluation

- Is an on-going process.
- Facilitates course and content adaptation.
- Enables the instructor to improve instruction on an ongoing basis.

Consider using. . . .

- Electronic mail
- Telephone
- Surveys
- Questionnaires

Summative Evaluation

- Assesses overall effectiveness of the completed instructional unit.
- Allows instructor to develop a revision plan, in order to improve next instructional delivery.
- Can provide information for designing a new plan, program, or course.

Summative data may include items such as . . .

- List three to five weaknesses of this instructional unit.
- List three to five strengths of this instructional unit.
- What would you recommend to a friend planning to take this course?
- What did you think would be covered in this course but was not?
- Would you recommend this course to a friend? Why or why not?

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Evaluate Instruction

If you have the time and opportunity to evaluate your instruction, the following online materials may help you work through this phase.

http://mime1.marc.gatech.edu/MM_Tools/evaluation.html
This site provides a number of useful evaluation tools; although they are specifically designed for multimedia projects, the tools may be adapted for use in any instructional design project.

http://www.ieee.org/organizations/eab/ceus/index.htm
This site, part of IEEE, provides guidelines for Continuing Education Units.

http://www.iacet.org/distance/distance.htm
This site, part of the International Association for Continuing Education and Training, provides guidelines for maintaining quality in distance education offerings.

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Instructional Design Resources

Print

- *Instructional Design*. By Patricia L. Smith and Tillman J. Ragan. Macmillan, 1993.
- *Instructional Design: Implications from Cognitive Science*. Charles K. West, et. al. Allyn and Bacon, 1991.
- *The Systematic Design of Instruction*. Walter Dick and Lou Carey. Harper Collins, 1990.
- *Multimedia-Based Instructional Design: Computer-Based Training, Web-based Training, and Distance Education*. By William W. Lee and Diana L. Owens. Jossey-Bass, 2000.
- *The Conditions of Learning.* R. Gagne. New York: Holt, Rinehart, and Winston, 1987.

Distance Education Resources

Online

http://www.btinternet.com/~iberry/html/wd.htm#wdp
Web-based and Distance Education - Prime Sites. A selection of some of the best supersites and directories.

http://www.btinternet.com/~iberry/html/et.htm#etp
Educational Technology - Prime Sites. A selection of some of the best supersites and directories.

http://www.uwex.edu/disted/home.html
Distance Education Clearinghouse. From the University of Wisconsin Extension.

http://www.ihets.org/learntech/distance_ed/resources/index.html#onlinepubs
Part of the Indiana Higher Education Telecommunication System. Many valuable links.

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