

I-TECH Approach to Curriculum Development: The ADDIE Framework



I-TECH utilizes the ADDIE model of instructional design as the guiding framework for its training program and curriculum development process. “ADDIE” stands for **A**ssess, **D**esign, **D**evelop, **I**mplement, and **E**valuate, and is a generic model for instructional design.¹

This document provides a general overview and description of I-TECH’s approach to each of the five phases of the ADDIE framework. It does not provide a description of how to manage the curriculum development process, or the human, financial, and other resources needed for curriculum development. This management component of curriculum development is vital to its success, and is addressed in several companion documents.

Assessment

The purpose of the assessment phase is to determine if a training need exists, and, if it does, what type of training program is required to address the need. A training-needs assessment typically includes the following steps²:

- Determine whether training is needed (see below, “Conducting a Performance Needs Assessment”):
 - What is the problem, issue, or performance gap?
 - What is the cause of the problem, issue, or performance gap?
 - Is training the solution?
- Identify the target audience for the training.
- Determine the desired outcomes of the training.
- Determine the content and scope of the training.

A training-needs assessment should answer the following questions:

- Who needs to be trained? What are the learners’ current roles and responsibilities?
- What are the learners’ job-related needs?
- What are the required competencies learners need in order to perform their jobs?
- What existing knowledge and skills do they have?
- What previous trainings have they had?

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¹ The ADDIE framework “seems not to have a single author, but rather to have evolved informally through oral tradition. There is no original, fully elaborated model, just an umbrella term that refers to a family of models that share a common underlying structure.” (Molenda M, Indiana University, Performance Improvement, May/June 2003.)

² Adapted from: “Training Needs Assessment,” October 2004, Consultative Group to Assist the Poor (CGAP) Direct.

Conducting a Performance-Needs Assessment

A performance-needs assessment is conducted to determine the cause of a gap in performance and whether or not it should be addressed through training or some other intervention.

Steps:

1. Define the desired performance: What should the target audience be doing? Describe it in as much detail as possible.
2. Describe the actual performance.
3. Conduct a root cause analysis: A root cause analysis seeks to determine the reason why there is a performance gap (see “Causes of Performance Gaps” below) between what the audience is actually doing and what they should be doing.
 - Articulate the questions to be answered, and select appropriate data-collection methods.
 - Collect and analyze the data.
4. Select the appropriate intervention to “close the gap” (i.e., improve performance). Note that the appropriate intervention may or may not be training.

Causes of Performance Gaps

Training is generally conducted to address a gap in performance of expected tasks or competencies. Before determining that training is the solution, the cause of the performance gap needs to be identified.

Possible causes of performance gap:

- Cognitive/psychomotor discrepancy—lack of knowledge and/or skills necessary to perform tasks.
- Affective—motivation, religious or cultural beliefs, values and/or attitudes.
- Systems—resources (space, human resources, drugs, supervision and support, laboratory equipment) and/or lack of clarity in roles.

Training is the answer when:

- A new program, skill, or practice guideline is being introduced. Example: Rapid testing is introduced into a country where previously only Elisa testing has been used.

- Performance gap is related to cognitive, affective, or psychomotor domains. Examples: Target audience lacks clinical decision-making skills around when to switch treatment regimens (cognitive); target audience is not motivated to deliver compassionate post-test counseling for certain HIV-infected clients because they believe that some behaviors that result in HIV transmission are immoral (affective); laboratory testing is performed incorrectly (psychomotor).
- Performance is related to cognitive or affective domain within the context of a systems issue. Example: Health care providers are not aware of newly established referral systems.



Training is not the answer when:

- Resource issues (inadequate human resources, drugs, equipment, space) exist. Examples: A facility lacks space to ensure confidentiality during counseling; supportive supervision is needed to continue to build staff members' skills and capacities but does not occur because of a lack of human and/or financial resources to support such visits.
- Systems issues exist. Examples: Patients are not receiving good care because the medical records system is months behind on its filing and the provider doesn't have access to previous medical and laboratory records.
- Political will to enable performance of tasks is lacking. Example: Nurses currently administer antiretroviral drugs (ARVs) but never received training on how to do it because the ministry of health has not officially approved this competency as part of their scope of practice.
- Logistical systems don't support service delivery adequately. Examples: Stockouts of ARV drugs occur; laboratories are not able to perform CD4 testing because they lack reagents or other necessary equipment; no personal protective equipment is available to ensure universal precautions are maintained.



Understanding training needs also requires an understanding of the various contextual factors—social, cultural, political, economic and educational—that might enhance or restrict access to or benefit from training. For example, what is the English proficiency of the learners? If it is limited, how can the materials be designed to accommodate this? Another example might be the

- What social, educational, and/or cultural characteristics of the learners will affect the design and implementation of the training?
- What other factors (political, environmental, technological) might affect the training?
- What training modality will best meet the learners' needs (classroom-based training, onsite training, blended distance learning program)?
- What is the level of expertise of the trainers with regard to training delivery and content area?
- What resource materials are available for developing the training (national guidelines, existing curricula, standard operation procedures)?

Answering these questions will enable the training-program designers and curriculum developers to determine what training is needed and in what content areas. Assessment helps to identify the audience, training topic, language of materials, and overall goal of the training.

power dynamics and hierarchy in relationships among the potential cadres of trainees; a training could be appropriate for both doctors and nurses, but nurses might feel inhibited participating in this type of group setting. In this situation, the training could be designed so that nurses and doctors are separated in break-out groups.

The more that is known about training needs and the environments in which they exist, the more likely the training event will be designed to be relevant and applicable to the target audience.

A needs assessment can be carried out at an individual, organizational, community, regional, or national level. A variety of methodologies may be used for collecting information, including direct observation; questionnaires; key informant interviews; focus group discussions; desk reviews of national guidelines, standard operating procedures, relevant literature, and existing trainings and resources; interviews with health care workers; testing basic knowledge; or looking at an organization's records.

Design of Materials

The design phase of the ADDIE process involves using the data or findings from the assessment phase to construct the plan for the curriculum or training materials. The design phase requires defining and articulating the following:

- Goal(s) and objectives of the training, which could include the core competencies learners will obtain from the training.
- Target audience for the training and description of its unique characteristics that need to be considered in designing the training (language, cultural background, educational level, familiarity with the training topic, previous training, and specific training needs).
- Length of the training, including illustrative course timetable and schedule.
- Format or modality of training (e.g., classroom-based, practicum, onsite mentoring, distance learning, self-study).
- Format and type of materials to be developed (e.g., facilitator's guide, participant's handbook, resource guides, workbook, videos).
- Outline of key content to be covered (i.e., topics, subtopics) and how content should be organized.
- Training methods, learning activities, and exercises that will be used to present the material.
- Resources and references to be used for developing the content and learning materials (e.g., national guidelines, standard operating procedures, existing curricula to be adapted, texts, laws governing health care worker practice, current scientific literature).

- Final deliverables (e.g., CD-ROM, printed copies of materials) and what they will look like (e.g., graphic design elements, logos).
- How to measure the effectiveness of the training program, both to inform curriculum revisions and to guide follow-up with recent trainees (e.g., targeted mentorship, subsequent advanced training).

Note that the actual course content is not developed in this phase. The output of the design phase is a basic plan for the curriculum that includes the modality of training; its length, structure, and session titles; and logical order for the sessions.

Development of Materials

The development phase involves creating the content and materials for the curriculum. The process of content development may look somewhat different depending on the specific purpose, design, and format of the curriculum, but it generally includes the following steps:

1. Develop learning objectives, key content, and estimated time for each session.
2. Develop detailed content, learning activities, facilitator instructions, handouts, and worksheets for each session—may involve creating PowerPoint slides, case studies, role plays or other exercises, narratives, lectures, or learning activities.
3. Review content to ensure logical flow, clarity of instructions, consistency of tone and voice, comprehensiveness in meeting learning objectives, proper references and citations, and contradictory or duplicative information.
4. Edit materials to incorporate feedback and unify voice, format, and flow.

5. Conduct a clinical review for technical accuracy.
6. Develop evaluation tools to evaluate the curriculum (pre- and post-test, daily evaluation, final course evaluation).
7. Prepare materials for pilot testing (copy/print, bind).
8. Develop training-of-trainers and other materials to prepare trainers.
9. Following the pilot, revise the curriculum based on evaluation findings; conduct a final content review; and copy edit for grammar, flow, readability, and formatting.

The development stage is typically an iterative process, with a high degree of communication, document exchange, collaboration, and constructive discussion among the development team about approaches that may be taken to shape the material for each module so that learning objectives are met and effective learning takes place.

Implementation

The implementation phase includes all activities related to delivering the training course:

- Identify, prepare, and orient trainers.
- Select and invite participants.
- Make logistical arrangements (e.g., venue, materials, transportation, equipment, lodging, meals).
- Conduct the training, including any evaluation activities that can be implemented during the the training.
- Plan for the roll out or scale-up of the training program.

A “training-of-trainers” course (TOT) is often conducted at this stage to ensure that the trainers are prepared to deliver the course. The

TOT might include background information on the purpose of the training, an orientation to the training materials, a “refresher” or update on the course content, information on adult learning theory, skills-building activities about training delivery and use of interactive training methodologies, and so on, depending upon the skills, background, and expertise of the trainers.

Evaluation

The evaluation phase is designed to assess the effectiveness of the training materials and/or training program. In this phase, strategies are developed to answer questions such as:

- Was the training relevant to participants?
How did participants react to the training?
- Were the training objectives achieved?
Did participants’ skills and knowledge increase?
- Were the training materials and methods effective?
- Are participants applying their new skills and knowledge in their workplaces? Has the identified performance gap been adequately addressed?
- Did the training have an impact on organizational and/or systems issues?

Most training programs routinely measure participant reaction to the training and whether the training resulted in an increase in knowledge and skills. These can be assessed relatively simply at the training event itself. Assessing transfer of learning—that is, determining whether participants have changed their behavior as a result of the training—is more challenging and generally requires a greater investment of financial and human resources. Given the amount of resources invested in training programs, though, it is important to



improve the course content, materials, and delivery strategies so that changes can be made before the curriculum is distributed or offered widely. The pilot evaluation does not get at transfer of learning, as described above.

The evaluation of a pilot curriculum should assess teaching methods, content, materials, structure, and effectiveness. Questions to ask might include:

try to determine whether the training program is achieving its intended outcomes. If participants are not applying their newly acquired skills, the next step is to analyze whether the problem is in the design and/or delivery of the curriculum, or whether systems issues are preventing participants' application of new skills and knowledge. At this point, the ADDIE process begins again with the assessment phase.

Pilot testing

For certain curricula—such as those that will be adopted as a national course or will be delivered repeatedly—I-TECH conducts an in-depth pilot evaluation during their initial delivery. This pilot evaluation is a systematic and thorough approach to assessing a curriculum's effectiveness that includes obtaining feedback from participants, facilitators, and observers. Pilot testing helps curriculum developers to identify which sections of the curriculum work and which sections need strengthening. The data gathered during pilot testing is used to

- **Teaching methods:** Were the teaching methods used successful at increasing participants' knowledge and understanding of the content?
- **Content:** Was the content at the appropriate depth and breadth for the audience?
- **Materials:** Were the materials user-friendly for trainers and participants?
- **Structure:** Was there too little or too much time allocated for specific activities and the workshop as a whole?
- **Effectiveness:** Did participants acquire the intended skills and knowledge from the training? If not, what were the weak areas?

Data-gathering methods used in the pilot evaluation include daily and final evaluation forms completed by participants and facilitators, observation by an evaluator, focus group discussions with participants, pre- and post-tests, facilitator debriefing meetings, and written feedback from facilitators. An extensive description of this process is included in I-

TECH's Technical Implementation Guide (TIG), "Piloting a Curriculum: Evaluating the Effectiveness of a New Training." An overview on developing pre- and post-tests can be found in the TIG, "Guidelines for Pre- and Post-Testing."

Some of the evaluation data collected during the pilot is used to monitor the delivery of the training and adjust and improve the training as it is being delivered. Feedback from participants' daily evaluations, for example, might identify content that has not been understood; if the facilitators review these evaluation forms in their daily debriefing meetings, they can plan to address these issues the following day.

After conducting the pilot evaluation, the evaluation data is used to revise the curriculum. This may include:

- Modifying materials (rewriting sections, simplifying the level of language used, adding more in-depth information).
- Enhancing and expanding facilitator's notes.
- Developing new activities or methodologies, such as case studies.
- Adding, deleting, or reordering content.
- Adjusting the length of time allocated for specific activities or sessions.

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