

ADDIE Explained

ADDIE EXPLAINED

An Open Educational Resource for
the Educational Technology
Community

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COVELLO

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ATTRIBUTION

The original content of this e-book was curated through [OER Commons](#) under the title *ADDIE Explained – An Open Educational Resource for the Educational Technology Community*.

The original e-book was created as part of the Fall 2014 Advanced Instructional Design Course at the University of Florida. Students in the class participated in writing each of the chapters in teams of two to three, along with the instructional activities found at the end of each chapter. Attention was placed on crafting learning objectives, aligning content to those objectives, and designing assessment activities to measure those learning objectives.

The student biographies can be found on the [Author Credits](#) page. Additionally, each chapter underwent two rounds of a peer-review process intended to improve the clarity and alignment of the writing. After all the materials were developed by the students, the instructor created a site to host the e-book using a WordPress instance. All contributors were students in the Educational Technology program at the University of Florida.

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Editing for this edition

The original content for this version of *ADDIE Explained* was edited by Steve Covello, Instructional Designer at Granite State College, to be used as an OER e-book for undergraduate Communications majors interested in an introduction to instructional design.

As such, a great deal of the original content of this e-book was changed to reflect a Communications perspective of the ID process. A significant reduction was made in the higher level theoretical and praxis content that would not be relevant for the entry level needs of the *COMM607 Communication for Training and Performance Improvement* course.

Additional content was added to this e-book to reflect the structure of the summative assignment for the course.

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KEY TERMS AND DEFINITIONS

This e-book is designed as a companion to *COMM607 Communication for Training and Performance Improvement*. It has been adapted from a textbook that was originally designed for students in an Instructional Design program for Educational Technologists.

In this revised edition, there is more emphasis on communication strategies and less emphasis on learning theories, models of evaluation, task analysis and other dimensions of instructional design (ID) as a scholarly or professional pursuit. Students in COMM607 who wish to pursue further studies in instructional design will encounter more in-depth material on cognitive science, learning theory, instructional theory, multimedia design, and more.

Students of Communications should know that communication is one of the most important skills in the ID profession. Instructional design, as a process, is facilitated through communication, both on the inquiry side in gathering information, in the presentation side in reporting to stakeholders, and in the development of instructional media.

All instructional designers need to be good communicators.

What is ID about?

Everyone at some point has taken a class, a training session, or used a how-to resource to learn something new. In each instance, there was a design process where decisions were made as to the nature of the instruction and how it would be facilitated to the enduser, student, trainee, or whichever name you can think of as a “consumer of instruction.” That design process is embodied in the ID profession and practiced in many areas: K-12 education, higher education, corporate training, military, non-profits, and enrichment programs.

So, what is instructional design, and how is it different from teaching? The teaching profession is concerned with the interplay of people in a set of learning conditions assembled toward achieving a goal. As a profession, teaching is primarily focused on the moments in time after the planning process has occurred, the instructional materials have been produced, the conditions for teaching have been determined, and the analysis and selection of students prior to teaching has been conducted.

Instructional design is concerned with structures and strategies within which teaching takes place, much like how an architect conceptualizes a building according to how it will be used. Think of ID as *systems thinking* about the conditions of learning and the scientific process of learning itself where teaching is a component of its implementation.

When approached with a need for education, training, or

performance improvement, the instructional designer, as a systems thinker, considers the following:

- What research strategies do you employ to determine whether the instructional needs are, in fact, related to a need for instruction? (In corporate training situations, there may be organizational or managerial causes for performance problems). How do you determine the exact needs for instruction, and how do you compose the Learning Outcomes so that they are measurable, feasible, and attainable?
- What do you know about learners prior to instruction that would inform the scope of the content, the context of their needs, and the level of complexity they can comprehend?
- What do you know about the subject matter that informs the optimal instructional strategies, forms of communication, and instructional media?
- What artifacts of learning are optimal for assessment? On what basis should student work be assessed?
- What are the options for a learning experience that are stimulating, personalized, emotionally motivating, socially safe, and aligned to authentic experiences in the real world?
- What are the optimal / feasible methods of instructional systems and technologies, given the circumstances? (This would be related to the methods/modes, such as face-to-

face, online, hybrid, blended, Zoom, videos, etc.).

- How do you go about formative improvement of the program of instruction before it launches? What are the criteria for summative evaluation to determine whether the program of instruction met its intended goals?

These are the fundamental questions that are addressed in the instructional design process. Some IDs are specialists in one or two areas. And not all institutions (education, military, corporate, etc.) embrace the full spectrum of ID, as a systematic endeavor.

In COMM607, however, you will touch upon the basics of each phase of the instructional design method through the ADDIE Model.

What is the ADDIE Model?

ADDIE is an acronym for Analysis, Design, Development, Implementation, and Evaluation. Each phase of the model is intended to produce information, plans, or products that affect the character, content, and experience of instruction, one deliberate step at a time.

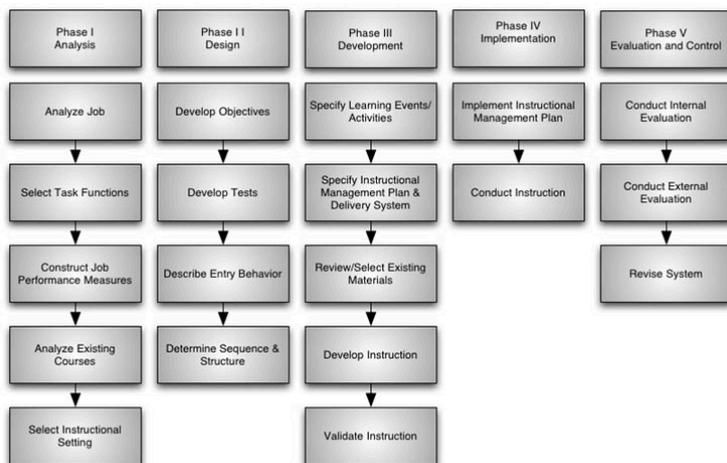
The ADDIE Model was developed at [Florida State University](#) in the mid-1970s and has been adapted into numerous variations ever since. A cursory Google search on “[ADDIE Model](#)” will reveal a wide variety of interpretations and tasks at each stage. You will also notice that there are

numerous interpretations of the ADDIE Model as both a linear and cyclical process:



ADDIE Model as a continuous process (Credit: Dave Braunschweig CC-BY via Wikimedia Commons)

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Florida State University Five Phases of ISD (1975)

ADDIE model as a linear cascading process

Every context where a program of instruction is needed draws from the ADDIE model in different ways. A training program for complex industrial safety issues would require a greater depth of tasks analysis than a program to learn how to type.

In this e-book, the ADDIE Model will encompass only the basic areas of research. Students wishing to continue their education in the instructional design field will discover more dimensions to analysis, instructional strategy, and implementation.

Key Terms and Definitions

The the following chapters, you will see certain terms used in

the description of the ID process. Some of them will already be familiar, though their precise meaning in the ID context may be slightly different from what you know.

Training vs. Education – Training is used primarily as a term for learning new skills in corporate, organizational, and military operations. The purpose of training is often highly specialized and applied in specific settings. In contrast, *education* is used to describe more holistic learning such as in K-12 (elementary school, high school) and college where learning is organized in a curriculum.

Performance improvement – Performance improvement is related to training, though *improvement* implies that the trainee is already proficient to a degree.

Gap – Instructional designers use the word “gap” as a way to refer to the area of deficit that the learners need to learn. You may hear IDs say, “What’s the gap?” as a shorthand way of asking what needs to be achieved.

Subject matter – Instructional designers use the term *subject matter* as a shorthand way to refer to whatever is the area identified as the domain of instruction. For example, “statistics” would be the subject matter in a course about statistics. Similarly, the collection of tasks in a given training scenario would also be considered the subject matter of instruction.

Learner vs. Student – In the study of instructional design and in teacher education, “learner” is the formal term used to

identify the individuals who are the subject of education or training. “Student” is used in less formal communication.

Instruction vs. Teaching – Instruction describes a specific set of directions or guidance designed to produce a particular outcome. Teaching is a broader term to describe the act or profession of teaching, in general.

Design vs. Development – Design refers to a stage of work where the elements and resources for instruction are assembled into a plan for the program of instruction, much like how a blueprint or mockup is assembled prior to actual construction of a building. The purpose of design is to be creative and collaborative with the greatest degree of flexibility. Development refers to creating the actual program of instruction based on a settled design.

Stakeholders

You will encounter the term *stakeholder* throughout this e-book. *Stakeholder* is to be interpreted similarly to the word *client* in the sense that the word can refer to either a single individual or a group of people for whom the work is being produced. A stakeholder can simultaneously include the people for whom the work is being produced (the sponsor) as well as the people who are affected or impacted by the outcome of the work (learners or customers).

At the outset of a project, it is important to determine who the stakeholders are because it informs who is affected by the

work, both in how it is constructed and who the work, when implemented, has an impact. Note that even those who may be negatively impacted should be considered a stakeholder, even if they will not be involved in the process, because this can affect the final product.

For example, in developing a computer system, a hacker would be considered a stakeholder since how well the system's security is designed affects the hacker's job. Though we may not want a hacker to be involved in the development process, it is important to keep them in mind so we can develop a robust system. Similarly, it is important to consider all stakeholders and their involvement as the social effects of someone being left out who feels they should be involved could jeopardize the success of the instruction.

Some individuals may have multiple roles to play in the ID process, especially in a smaller organization. The following list is a starting point for considering the stakeholders who should be involved.

Instructional Designers are involved in developing the instruction and will be involved in the entire ADDIE process by eliciting requirements of what the instruction must do, to designing and developing the instruction as well as the implementation of the instruction.

The **client** is the person or organization who pays for or sponsors the instructional assistance. This person or organization may or may not have been the one who saw the need for solving the instructional problem but they will

determine if the solution is acceptable and will need to agree and sign off on all decisions.

Discoverer is the person who saw the gap in actual results versus desired results and took steps to determine how to reduce the gap. This person is likely to be involved in the entire process and may be the same as the client or may be the client's proxy.

Learners are the people whose actual results should be closer to desired results. These are the workers in the organization who will undergo the training to improve their performance. It is not always possible to talk with the learners nor test the training on the learners so it may be necessary to have a proxy learner who is someone very familiar with the tasks the learners perform.

Evaluators are typically people external to the organization who will determine if the training met the need of reducing the gap between actual and expected results. It may be important for them to be involved early in the process to determine how the instructional solution will be evaluated and can provide suggestions on changes to the solution before it too much work has been invested.

Supervisor is the person who may have insight into the reasons why their workers may be underperforming or have a lack of understanding. Supervisors will be impacted by the amount of time the learners will spend on training. They may also have insight into the prior knowledge the learners have experienced in addition to their typical background.

Supervisors may not be involved in the process but may be a possible proxy for the learners.

Subject Matter Expert (SME) is the one who ensures the information in the training program is accurate according to the discipline because they are experienced with the knowledge or skills related to performing the tasks. The SME should be involved in all phases to determine the accuracy of the material contained in the instruction.

ANALYSIS

By: [James Nichols](#), [Sharon Walsh](#) and [Muhammed Yaylaci](#).

Edited by Steve Covello

About Analysis

Imagine that you have been hired by the Acme Widget Corporation in response to a situation where, according to management, staff office workers cannot accurately process the hourly payroll tasks using the new Qlu-G Payroll Management tracking system. According to the management team, a training program is needed to straighten out this problem.

How does an instructional designer (ID) respond to this discovery? Start building a training program?

Yes, perhaps, *but not quite yet*. The ID needs to investigate the claim, gather relevant information about its causes and context, and study the subject matter. In fact, the problem might not have anything to do with the need for staff to attend training. Perhaps the problem has to do with management communication, a problem with organizational structure, or a limitation within the Qlu-G software?

The Analysis phase of the ADDIE model serves as the investigative prelude that informs, first of all, whether a

program of instruction is needed, and then if so, what outcome should the program produce. In short, the Analysis stage orients the entire pathway of the instructional design process, which ultimately leads to producing a program of instruction to resolve the problem.

Analysis as inquiry

The ID uses a comprehensive set of questions and methods of inquiry to establish the foundation for subsequent phases in the ADDIE model, as seen in Table 1 below. The culmination of this work establishes the nature of the training or performance improvement problem.

Table 1. Critical questions in analysis.

Critical Questions	Answers	Report
Who is the focus of the instructional problem?	The characteristics of the people (i.e. the learners) who will be engaged in instruction.	Learner Analysis
What is the desired outcome of instruction?	A statement about the desired result or outcome of the instruction in the form of a Learning Goal.	Needs Assessment
When is the program of instruction needed by? How much time do learners have to complete it?	The amount of time available for producing a program of instruction and the amount available for the learners to proceed through it.	Context Analysis
Where must instruction take place?	The context or environment the learners will need for the instruction to be effective or relevant.	Context Analysis
Why is instruction needed?	A statement that describes the necessity for the instruction.	Needs Assessment
How will learning transfer?	A statement about how learned skills, knowledge, and attitudes will transfer to the conditions under which the learning is relevant.	Context Analysis
What is the nature of the task, knowledge, or performance?	A detailed extraction of the physical and mental tasks, decisions, operations, expressions, choices, and alternatives associated with the subject matter.	Task Analysis

Your goal in the Analysis stage is to produce the following sections:

Needs Assessment: A description of the problem and learning goal(s) to be achieved.

Learner Analysis: A description of the learners in terms relevant to instruction.

Context Assessment: A description of the conditions and timeframe under which the learned skills, knowledge, or attitude would be applicable.

Task Analysis: A an explication of a task, performance, or demonstration according to sequences, priorities, decisions, choices, and alternatives.

Communication methods for gathering information

The ID employs several forms of communication to gather information from **stakeholders** to establish the nature of the training or performance improvement problem.

Interview: Conduct interviews across all levels of stakeholders to account for multiple perspectives on the nature of the problem and the subject matter.

Survey development: Issue surveys across all levels of stakeholders to account for specific questions on the nature of the problem and the subject matter.

Extant data: If there is data available that is relevant to the problem or subject matter, the ID must gather

as much of it as feasible and relevant to identify performance trends.

Observation: The ID (and perhaps with an SME) can observe the conditions under which the problem is occurring. Focus can be on both the qualitative circumstances of performance and the means/methods by which the performance is conducted.

Focus groups: The ID convenes and facilitates groups of people to discuss relevant issues and elaborate upon their impressions.

Exams / tests: A pre-test can be administered to determine patterns or trends of current knowledge, skills, or attitudes in the population of the targeted group. If the instructional need involves training for performance on something completely new, this method might not be needed.

The rationale for employing a range of methods is driven by the possibility that the kind of information you receive from persons on the job may conflict with the perception of the performance by others in the organization. Your goal, as an ID, is to ascertain a perspective of the problem that reflects both the *reality* of the situation based on *objective* evidence and the *perception* of the problem based on individual *subjective* perspectives. They may or may not align, which lends itself to further discussion with stakeholders to determine the precise nature of the problem, and thus, the goal of the program of instruction.

Writing in plain language

As a communications expert, the value of your communication can only be measured by how effective it is received, which is often a factor of the audience to whom you are communicating. In each of the reports you will produce, you should keep in mind that the audience to whom you are presenting are not necessarily educators or experts in the field of instructional design. If you use jargon or unfamiliar terms, your audience may feel alienated, or worse, not even bother reading your reports.

Since most of your communication in your project plan will be in written form, consider the tonality of your writing. A report for a stakeholder audience should be less formal than a scholarly research paper, yet maintain professional writing standards. Using plain language in your reports will enable your stakeholders to better understand the complexities of the situation which will ultimately produce better results for your project.

Needs Assessment

As stated in Table 1, the Needs Assessment section describes the findings that answer the questions, “What is the desired outcome of instruction?” and “Why is instruction needed?”

The first part of Needs Assessment is to interrogate the nature of the problem as it has been presented to you. This is an important step because it is possible that the problem can be resolved without an expensive program of instruction. Or it is possible that the cause of the problem is not related to the knowledge, skills, or attitudes of the target employees or staff.

For example, suppose workers at a fast food restaurant have difficulty remembering the proper layers for each of the hamburgers on the menu. Rather than spending additional financial and staff resources in a training program, the workers may only need a job aid (a handout or guide) posted where they work to use as a visual reference. The problem, as it has been discovered, may be caused by part time workers who aren't immersed in the process frequently enough to memorize the recipe for every item on the menu. They know how to do the work, but may just need a visual reminder. Additional training would not likely be as effective or feasible as providing an instructional guide.

The Needs Analysis is comprised of the following tasks.

I. Problem analysis

The ID needs to gather information from stakeholders that answers the following questions:

- **Who, or which parties, have determined that there is a problem? What is the basis for their position?**

The answers will determine whether the problem is limited to a particular person's perspective or whether it is more substantial.

- **How is the problem perceived by other stakeholders?** The answer will explain whether the situation is considered a problem by others. It might not be a problem beyond a limited set of conditions.
- **Under what conditions does the problem arise?** The answer will explain whether the problem is occurring only under certain conditions or if it is more widespread.
- **Who or what is affected by this problem?** The answer will identify the people or context that are experiencing the effects of the problem.
- **How severe or pervasive is the problem?** The answer will describe the collateral impact of the problem.

In totality, this information would determine whether the situation is substantial enough that it justifies mobilizing the resources to produce and implement a program of instruction. Assuming that the problem meets a threshold for an initiative, the next step is to determine the cause of the problem.

II. What is the cause of the problem?

The second phase of Needs Analysis involves investigating the cause of the proposed problem. Rossett (1987) describes four conditions to determine if the problem is a performance issue:

1. **Lack of skill or knowledge:** Even if the individuals want to perform the task, they do not have the ability.
2. **The environment is an impediment:** Individuals have the knowledge or skills, but other factors prevent them from performing the task (bad equipment, poor communication, organizational chaos, distractions, etc.).
3. **Lack of incentive:** The culture of work does not provide a rewarding experience for performing well.
4. **Lack of motivation:** Individuals do not recognize the value of the working effectively.

Upon investigation, you may conclude that solving the problem may have nothing to do with training or instruction.

Here are some examples related to each cause:

An environmental problem: An employee of a college is expected to enter student application data at a rate of completing 10 in an hour, but they only complete five because of interference from other duties such as answering the phone. Or perhaps the ergonomics of their work environment makes them unable to work efficiently. The employee doing data entry knows how to type and where to enter the data but there are other factors involved that impede performance. Even with a program of instruction, it will not show any performance improvement.

An organizational problem: An employee is assessed in their performance based on evidence of their

leadership in initiatives to enhance customer satisfaction. However, even with having submitted numerous proposals for new initiatives, the organizational structure does not provide a pathway for these proposals to be considered by executives for implementation. In this case, the employee is capable to fulfill the expectations of the position, but the initiatives cannot be launched due to an organizational impediment.

An incentive problem: An employee is capable of performing according to standards, but is not compensated accordingly compared to others who perform poorly but are compensated the same.

A motivation problem: An employee does excellent work but resists changing from an inefficient technique that requires cumbersome logistics. While the result of their work meets standards, it could be performed more efficiently if they used a more modern communication system, such as video chat instead of in-person office appointments. In this case, the employee is not motivated to change their method of work because of resistance to change, not due to lack of skill in the work itself.

It is possible, too, that a performance problem may include a combination of factors that involve some instruction and some organizational changes. Your investigation into causal factors informs the range of solutions required to resolve it.

III. What is the “gap”?

The third phase of Needs Analysis involves establishing the basis for the *desired status* of performance, the *actual status* of performance, and then describing the discrepancy between the two as a statement of *need*.

Determining the Desired status: The Desired status of performance may be expressed by stakeholders using concise figures like, “We need to improve output by 10%,” or it may be expressed in a more generalized way like, “We need to improve performance to meet demand.” Stakeholders may already know in advance the nature of the desired status, or it may need to be derived in some way. The ID must investigate the perception of the desired status since it will be used as a basis of setting *Learning Goals*.

There is a twofold value to setting Learning Goals. The first relates to describing the expected results of the program of instruction. The second relates to the development of an Evaluation Plan where the goals stated at the outset of the project are used as a basis for gathering data and making judgements as to whether the program of instruction was effective in achieving them. Naturally, if you have clearly defined Learning Goals, then evaluating the effect of instruction will be more easily validated and reliable.

Establishing the Desired status involves interviewing stakeholders to determine the following:

- What are the specific areas of knowledge, skill, or attitude that matter within the scope of the defined problem?
- Which areas are more important than others?
- How should the phrasing of the stated Learning Goals reflect the the capability of human activity?

Determining the Actual status: The Actual status of performance describes the performance of individuals according to the context of the problem. The ID would rely on more concrete data or observations to establish this baseline since Actual status reflects reality rather than an aspirational performance goal.

IV. Defining needs to produce a Learning Goal

Dick, Carey and Cary (1978) provide a simple equation to determine the degree of need as expressed in three parts:

$$\text{Desired status} - \text{Actual status} = \text{Need}$$

To illustrate this equation, suppose a health care facility wants staff members to administer 20 COVID-19 tests per hour but they are only able to administer 15 tests per hour. There is a

gap of 5 tests per hour (a 25% percent gap) between the desired performance and the actual performance rate. A Learning Goal to this effect would expressed the need as:

COVID-19 test administrator staff need to improve the rate of COVID-19 testing per hour by 25%.

A more context-specific statement can be made as follows:

COVID-19 test administrator staff need to improve the rate of COVID-19 testing per hour by 25% by March 31, 2021.

Note that the Learning Goal does not specify *how* the desired status will be achieved. A Learning Goal is not intended to express anything more than an objective declaration from which other strategies can be negotiated. For example, numerous strategies can be proposed to close the 25% gap, though some of them may be more or less feasible than others.

Learner Analysis

Learner analysis involves gathering relevant attributes of the learners that are relevant to the organization and the overall training goals.

Typically, the ID is interested in the following learner attributes:

- Prior/pre-requisite knowledge, skills, or sub-skills related to the nature of knowledge or performance.
- Attitude/motivation (affective) characteristics that are relevant to the perception of the performance, subject matter, and the training itself.
- Demographic characteristics that are relevant to the context of performance.
- Cultural or social characteristics that are relevant to the context of communication.
- Disabilities or language barriers that are relevant to cognitive engagement or participatory needs.
- Audience characteristics that are relevant to the tonality of communication.
- Similarities/commonalities among learners that may inform optimal metaphors or examples used in communication.

The most important characteristic, among all the items listed, is the degree of prior/pre-requisite knowledge the learner already knows before attempting the course or training. This includes previous work experience as well as educational levels (Morrison, Ross, Kalman, Kemp, 2011, Dick, Carey, & Carey, 2005).

It is also important to know about the attitudes each learner brings into the course or training. Beyond the basic knowledge and skills to get started, knowing what type of previous experience the learner has had with this subject matter is

important in determining their attitude and motivation. Will they participate with an open mind or will they resist training? Are they motivated to learn or is there little interest in the topic (Morrison, Ross, Kalman, Kemp, 2011; Dick, Carey, & Carey, 2005)?

A basic learner analysis is presented below in Table 2. It pertains to trainees working for a commercial/industrial roofing company. Note that some of the Information Categories in this sample analysis reflect the unique conditions of the roofing trade and the culture of training within it. The ID has discretion to identify unique Learner Characteristics according to emerging needs.

Table 2. Information categories, data sources, and learner characteristics.

Information Categories	Information Sources	Learner Characteristics
Entry behaviors	Interviews: Foremen, human resource manager	Learners have adequate physical skills to begin instructions.
Prior fall protection knowledge	Interviews: Foremen, human resource manager	Limited roofing experience, including lack of fall protection training.
Attitudes toward fall protection	Interviews: Target learners, current roofers	The current roofers are aware of the need for fall protection even though they complain about how the harnesses infringe on freedom of movement. The targeted learners are unaware of the need for the equipment.
Attitudes toward potential delivery system	Interviews: Target learners, current roofers, human resource manager	Learners preferred a hands-on demonstration type program.
Motivation for instruction	Interviews: Target learners, current roofers, human resource manager	Learners are motivated by the need for a job and are willing to do the training for pay.

Information Categories	Information Sources	Learner Characteristics
Educational and ability levels	Interviews: Target learners, current roofers, human resource manager	Education: Learners typically have a high school diploma or the general equivalent. Ability: Learners may have roofing experience but are novices in fall protection.
General learning preferences	Interviews: Target learners with preference quiz	100% of the new roofers prefer hands-on learning to reading or watching.
Attitudes toward training organization	Interviews: Target learners	Learners have no prior experiences with roofing company but do have prior educational experiences. Attitudes are mostly ambivalent with a “wait and see” attitude.
General group characteristics	Interviews: Target learners, current roofers, human resource manager	Interviews: Target learners, current roofers, human resource manager

As you can see in the findings of this Learner Analysis, the results inform the approach you would take in the design of the instruction itself. The results of this analysis also inform the approach to the Context Analysis.

Context Analysis

As described in Table 1, the Context Analysis answers the following questions:

- **Timeliness:** When is the program of instruction needed by? How much time do learners have to complete it?
- **Facilities:** Where must instruction take place?
- **Transfer:** How will learning transfer to authentic practice?

Each program of instruction operates in a context that informs or constrains its design and implementation. For example, an emergency situation that requires immediate training for medical staff will not have the luxury of taking place over several weeks. A training program that requires access to proprietary equipment cannot take place in a separate classroom. A training program that takes place during a peak season of production would be counterproductive to meeting customer demand.

Timeliness: Your work with stakeholders in planning a program of instruction must include consideration of the time that is available to produce the program of instruction as well as the time that is available for participants to complete it. Stakeholders will rely on your expertise to describe what is possible to produce and implement given the available time frames.

Part of your work, as a professional, is to provide reliable and feasible expectations for the work and its outcomes. Your Context Analysis must state the timeframe for both producing the instructional program and the time that is available to conduct it.

Facilities: In some cases, the choices for conducting instruction must be based on their compatibility with the nature of the subject matter and the facilities required for the proposed program. Your investigation into the nature of the subject matter will determine whether the program is constrained to a specific venue, a separate location, a remote (virtual) arrangement, or a combination. For example, some instruction can take place in a classroom, but other parts may require an on-site venue. Your Context Analysis must state the factors that constrain the learning environment.

Transfer: Your analysis of the training or performance problem needs to consider the how learners will transfer or apply their new skills, knowledge, and attitudes into the authentic situations where they are relevant. Consider what type of follow-up support learners will need to successfully transfer learning beyond the classroom. Given the facilities factors, determine whether learners will have an opportunity to practice the skills or demonstrate the knowledge under authentic conditions. Your Context Analysis must state what learners will need in order for

them to transfer their new knowledge and skills to the authentic conditions where they will be applied.

Social context

Beyond the mechanical and practical conditions of a training or performance improvement situation, the analysis of an instructional need must also take into consideration the social context within which the problem has emerged as well as the conditions under which instruction will occur. The ID needs to work closely with stakeholders to gather information about the social environment that might guide how participants feel about

Optional reading: Advanced areas of Analysis

The Analysis stage of the ADDIE Model extends more deeply into the details related to the subject matter itself. Often, an ID will collaborate with a Subject Matter Expert (SME) who can explain the unique details related to the tasks, topics, methods, and performances related to the proposed program of instruction.

Subject matter/Content analysis

IDs frequently collaborate with an SME to learn more about the subject matter that will be the focus of the program of instruction. An SME can explain what is important to know about the subject matter or what would be required for a learner to demonstrate proficiency (Jonassen, Tessmer, & Hannum, 1998). It is as important to determine what *should not* be covered in the program of instruction as much as it is important to determine what will.

Once the scope of a topic has been established, the ID must investigate the nature of the subject matter itself: What are its characteristics, relationships, and foundations? When instruction is presented to learners, the nature of instruction may influence how the subject matter is perceived. A program of instruction about a procedure would be presented to learners, optimally, in a procedural narrative of instruction. Instruction related to concept knowledge should be presented in a way that is optimal for learning about the structure of a conceptual scheme, the criteria for inclusion or exclusion from the scheme, and the relationships within the components of the scheme. Subject matter analysis informs the organization of instruction itself.

Praxis analysis

Praxis refers to how knowledge, skills, and attitudes are

expressed in the professional field or area of interest. The ID does not need to be an expert in the conventions of praxis for the subject matter, but should have an understanding of the nature of it.

For example, the nursing profession relies upon scientific evidence-based practice published in scholarly journals. A program of instruction for nursing professionals would be mindful of the need for instructional media, resources, and assessments to align to the evidence-based standards. For training related to the workplace safety, the ID should be able to collaborate with an SME with an understanding of how [OSHA](#) regulations play a part in performing tasks.

Procedural/Task analysis

Procedural/task analysis involves gathering information about how tasks are performed according to sequences, priorities, decisions, choices, and alternatives (Morrison, Ross, Kalman, Kemp, 2011).

The goal of a task analysis is to break down the main topic into a flow of increments so that each node of the task or procedure can be isolated into a discrete unit of attention. Some aspects of a task are overt (observable) while others are covert (cognitive). AN ID inquiring about how a task is performed would ask:

- What physical or mental actions must a practitioner do

- to complete the task?
- What knowledge does the practitioner need to complete the task?
 - What cues inform the practitioner of errors along the way?

The ID, with an SME, will conduct an analysis to develop documentation of an optimal, or benchmark, performance of the task, then create a flowchart from which instruction will be designed to scaffold learners to achieve it.

Information processing analysis

Procedural task analysis is mainly focused on the analysis of observable tasks. However, many tasks involve complicated cognitive components. Information processing analysis is intended to elicit the mental processes required to perform a task or performance (Jonassen et al., 1998). Similar to procedure/task analysis, the outcome of an information processing analysis would be a flowchart of operations and decisions.

There are several models for deconstructing a task for the purpose of instructional analysis. The GOMS Model is composed of the hierarchical flow of goals, operators, methods, and selection as observed and elicited from an expert (Card, Moran & Newell, 1983). This method focuses on

adding goals of why the task is important to the learning outcome.

Another is the Applied Cognitive Task Analysis (ACTA) model which asks the SME to identify three to six broad tasks that must be performed to complete the goal. The SME and the designer then determine the knowledge necessary to complete the task and the goal while simultaneously looking for errors novices may make in the process (Morrison, Ross, Kalman, Kemp, 2011).

Below is an example of an analysis that describes the results of research conducted by an ID. The example pertains to a situation at a fictitious family medical facility that is experiencing a problem due to lack of knowledge about maintaining privacy of client health information according to federal guidelines.

HIPAA Training Program: Analysis

The Acme Family Medical Center PLC operates

with a staff of 20 frontline professionals who have direct contact with client medical records. In compliance with the Health Insurance Portability and Accountability Act of 1996 (HIPAA), the Company is responsible for maintaining performance standards to safeguard client privacy.

In response to sustaining this performance standard, Dr. Joyce Jones, Executive Director of Acme Family Medical Center PLC, has initiated an inquiry into reports of staff unintentionally mishandling client medical data in ways which may be in violation of HIPAA privacy rules. The following analysis presents the outcome of an investigation into this situation.

Needs Assessment

Problem: The problem has been reported by Dr. Joyce Jones and affirmed in interviews by supervisory management who conduct periodic departmental conferences. Internal assessment of operations has indicated a pattern of low level improper handling of client Protected Health Information (PHI) mostly in instances of note

taking during client intake, but also in other situations where PHI can be heard in oral communication over the phone and in sharing information with family members who have not been designated as an authorized recipient of client medical information.

Interviews and surveys of staff workers indicates a high degree of motivation to comply with HIPAA standards, though the evidence suggests that there is confusion about what kind of information constitutes PHI and which circumstances are applicable to HIPAA privacy. Staff also indicate that the staff handbook mentions HIPAA rules, but doesn't elaborate enough about how they apply to the specific work conditions at Acme Family Medical Center.

The consequences of this problem may have legal ramifications if a major violation occurred where the Company was subject to a fine or an accreditation risk. Our assessment of the problem has determined that a training course is needed for all staff who are responsible for maintaining PHI privacy.

Goal: The desired performance is 100%

compliance with HIPAA rules in all instances where staff are involved in tasks related to creating, inputting, reporting, and transferring PHI.

Needs: To achieve the proposed goal, staff will need to demonstrate the ability to perform the following:

1. Recognize all instances of information that is considered PHI according to HIPAA rules.
2. Perform their assigned tasks at the Acme Family Medical Center in compliance with PHI privacy requirements according to HIPAA Privacy Rules.
3. Recognize situations where the appropriate actions are unclear and ask for help before taking further action.

Staff analysis

In interviews, surveys, and group discussions with Acme Family Medical Center staff and executives, we have ascertained the following characteristics of staff members who would be assigned to HIPAA compliance training:

Prior knowledge/experience: Staff experience varies between 15+ years of experience in the medical field to just over a year, post graduation from accredited education. While all staff are familiar with HIPAA rules, none have expressed 100% confidence in their ability to recognize all situations where PHI is a factor in their work, nor which courses of action they should take to be HIPAA compliant.

Social/cultural factors: All staff interviewed are highly motivated to improve their performance and feel strongly that their work should be reflect well on the Company. Staff feel a sense of organizational community, as practitioners, that lends itself to a social desire to help each other to be successful in their work.

Other factors: A few staff members are bilingual which would enable the Company to consider designating employing them in situations where PHI and client encounters are in languages other than English.

Context analysis

The Company seeks to achieve the training goal as soon as possible since the risk of a violation is evident in every business day where staff handle PHI. However, there is no emergency condition that would require a wholesale stoppage of business operations. The timeframe for the proposed training should coordinate with the typical seasonal peaks in healthcare services, staff vacations, and other holidays. According to Company staff, a timeframe around September would be the most practical time to consider. This would enable the training program to be fully developed and refined in time to meet this launch date. Further discussions with staff and management is needed to agree upon a precise date.

Since the subject matter in the proposed training involves a combination of knowledge and application in practice, we propose that the training venue include some use of the Company facilities, perhaps during off-business hours.

Some training for basic knowledge can be conducted outside of the facility or online. The use of Company facilities would be critical to transferring learned skills and knowledge to daily operations and would save considerable expense in renting a training facility.

Social context: Our research has indicated that the positive feelings of organizational community lends itself to leveraging it as an integral design of the instruction. The ability to share differential of experience among a diverse group of participants is advantageous to sustaining high level performance in the long term.

Task analysis

A complete task analysis is provided in Appendix A. It describes an action/decision breakdown of the following tasks:

- Intake of PHI from clients into the EHR system.
- Interaction with family members regarding client PHI.

References

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DESIGN

About Design

Based on the information gathered from the Analysis stage, the next step is the **Design** stage. Design, in the semantics of instructional design, refers to planning the specific needs of the instruction according to the nature of the subject matter and the conditions for instruction. For example, learning how to memorize the components of a gearbox would be approached differently than learning how to be successful in a job interview.

Your goal in this stage is to produce the following sections:

Learning Goals: Produce statements that describe (or prescribe) the outcome of instruction.

Sequence of instruction: Determine an appropriate sequence of instruction based on the Learning Goals.

Subject matter analysis: Determine the type of learning needed based on the needs defined in the Analysis stage.

Instructional strategies: Determine the appropriate methods and mode for instruction given the conditions.

At the conclusion of this chapter, you will be able to write

a Learning Goal, deconstruct it into its sub-components (sub-skills, knowledge, and attitudes), determine which type of learning is evident in each of them, and then propose a form of communication to facilitate the instructional needs for each. The end product of the Design stage will be a blueprint for the media you will produce in the Development stage.

Backwards design

The techniques employed in this chapter are sometimes referred to, collectively, as *backwards design*. As the words imply, it refers to the process of establishing a Learning Goal and then “thinking backwards” from the outcome to determine what learners need to know, practice, and demonstrate prior to achieving the level of desired proficiency.

Writing Learning Goals

A Learning Goal sounds self-explanatory. It is a statement about the goal (outcome) of instruction. It is, however, more than just a statement. Learning Goals need to be written in a very specific way so that learners can be assessed according to the context in which the learned skills or knowledge will be applied.

In this section you will examine the written structure of

a Learning Goal and then how to indicate the level of proficiency the learner will demonstrate.

The structure of Learning Goals

A well-written Learning Goal needs to state four critical elements: an observable action, the subject content, the degree of achievement, and under what conditions the learned skill, knowledge, or attitude will be demonstrated. Let's look at an example:

Medical staff need to perform their assigned tasks at the Acme Family Medical Center in compliance with PHI privacy requirements according to HIPAA Privacy Rules.

Observable action: In the example above, the observable action in this case is *perform their assigned tasks*, which is an action that involves following the rules for a given task. The person who will assess this behavior should be able to observe the stated behavior (or its indicators) to determine whether mastery has occurred.

Subject content: The subject content, in this example, refers to working *in compliance with PHI privacy requirements*. The combination of the action verb and subject content must be observable.

Degree of achievement (criteria): The degree of achievement describes the basis of judgement according to a standard. The standard can refer to an existing set

of competencies, such as the standards for a particular profession like Project Management, or it can be derived according to what will satisfy the Needs Assessment (a stated frequency or degree of accuracy). In the example above, the criterion is indicated as *according to HIPAA Privacy Rules*. The degree of achievement is also used as a basis of assessment. In this case, the learner's performance and submitted work would be assessed according to the standards outlined in the HIPAA statutes and best practices for a given context. (This is why a well-written Learning Goal is critically important!).

Conditions: The conditions refer to the situation in which the learned skill is to be demonstrated. In this example, the condition refers to their work *at the Acme Family Medical Center*. The conditions could also refer to a specific scenario, such as in a face-to-face performance evaluation setting or within a computerized personnel tracking system.

The above example uses the verb *develop*, which as explained, is an action that involves creating something from scratch. When a learner is asked to demonstrate their ability to create something from scratch, they are being asked to do something at a very high level. In the next sections, you will review how to select the appropriate action verb that aligns with the level of performance the learner is expected to demonstrate.

For example, if this were an executive training session for CEOs of medical service operations, perhaps the Learning Goal could be set much higher, such as:

*Facility executives need to evaluate the effect of HIPAA
Privacy Rules
on delivering effective services for each population in their
community.*

The action verb *evaluate* is a higher level of mental acuity than simply following the rules of a given compliance standard, and would require a different approach to instruction and assessment.

In the next section, you will review how to select the appropriate action verb that aligns to the level of performance the learner is expected to demonstrate in a given situation.

Selecting an Action Verb: Bloom's Taxonomy

In the prior section, we presented Learning Goals as a culmination of defined behaviors, conditions, and criteria. However, there is an additional factor to consider that describes the degree of complexity (or “level of thinking”) the learner is expected to demonstrate. Bloom et al. (1956) proposed a hierarchical model classifying Learning Goals into six tiers, each increasing in complexity as they align upward in the model (see Figure 1). Bloom’s Taxonomy has since been revised and expanded several times to encompass separate

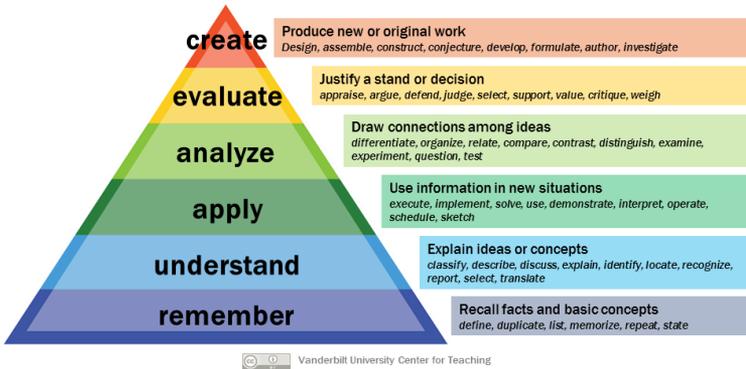
taxonomies for cognitive, affective, and sensory domains. For simplicity, this chapter will refer only to the cognitive taxonomy.

In a practical sense, Bloom's Taxonomy helps the ID to determine the appropriate language to use when composing a Learning Goal. The model also helps the ID to determine potentially important prerequisite skills to the primary instructional interest. For example, in order for an industrial safety worker to demonstrate the ability to differentiate between one state of danger and another (a form of analysis), they would need to have mastered the ability to identify (remember) indicators of danger, explain (understand) what these indicators means, apply this knowledge to a set of conditions, and practice executing strategies related to industrial safety.

It is also important to know that Bloom's Taxonomy does not necessarily imply that learning occurs in a strictly linear fashion, from the bottom up, according the model. The real life experience of learning may dabble back and forth across different levels of the model.

Figure 1. Bloom's cognitive taxonomy.

Bloom's Taxonomy



As you can see in Figure 1, action verbs are different according to the level of thinking, performance, or ability on Bloom's Taxonomy. Let's return to the prior example.

Medical staff need to perform their assigned tasks at the Acme Family Medical Center in compliance with PHI privacy requirements according to HIPAA Privacy Rules.

The Learning Goal indicates that the degree of learning for this task operates on the **Apply** level of learned skills. The action verb for a Learning Goal related to this instruction is indicated as follows:

*Medical staff need to **perform** their assigned tasks at the Acme Family Medical Center in compliance with PHI privacy requirements according to HIPAA Privacy Rules.*

If the Learning Goal only needed to account for the learner's ability to recognize situations where HIPAA rules are

applicable (instead of performing duties in compliance with them), it might be written as follows:

*Medical staff at the Acme Family Medical Center need to
recognize situations
where privacy of PHI requires compliance with HIPAA rules.*

Table 1 provides a list of the most common action verbs used in writing Learning Goals, though you are not limited to these options.

Table 1. Action verbs for each level of Bloom's Taxonomy.

Knowledge	Comprehension	Application	Analysis	Evaluation	Creation
Arrange	Classify	Apply	Analyze	Appraise	Combine
Choose	Convert	Change	Appraise	Argue	Construct
Define	Defend	Choose	Breakdown	Assess	Design
Describe	Demonstrate	Compute	Calculate	Attach	Develop
Duplicate	Describe	Demonstrate	Categorize	Choose	Execute
Identify	Discuss	Discover	Classify	Compare	Imagine
Label	Distinguish	Dramatize	Compare	Conclude	Plan
List	Estimate	Employ	Contrast	Contrast	Produce
Locate	Explain	Explain	Criticize	Criticize	Refine
Match	Express	Generalize	Diagram	Defend	Revise
Memorize	Extend	Illustrate	Differentiate	Describe	Test
Name	Generalized	Interpret	Discriminate	Discriminate	Use
omit	Give example	Judge	Distinguish	Estimate	Write
Order	Identify	Manipulate	Examine	Evaluate	
Outline	Illustrate	Modify	Experiment	Explain	
Recite	Indicate	Operate	Identify	Judge	
Recognize	Infer	Organize	Illustrate	Justify	
Relate	Interrelate	Paint	Infer	Interpret	
Recall	Interpret	Perform	Model	Relate	
Repeat	Judge	Practice	Outline	Predict	
Reproduce	Locate	Predict	Point out	Rate	
Select	Match	Prepare	Question	Select	
State	Paraphrase	Produce	Relate	Summarize	
	Predict	Relate	Select	Support	
	Recognize	Schedule	Separate	Value	
	Represent	Select	Subdivide		
	Restate	Show	Survey		
	Rewrite	Sketch	Test		
	Review	Solve			
	Select	Use			
	Show	Write			
	Summarize				
	Tell				
	Translate				

Badly written Learning Goals

The most important qualitative factor in how Learning Goals are written is the ability of the instructor to observably assess the performance or product learners present as a demonstration of proficiency. If a Learning Goal uses vague words or phrases, it would not be possible to assess the work.

For example, the Learning Goals below cannot be assessed effectively according to the way they are written:

- *Gain an understanding of the importance of citation in academic research writing.* The phrase “gain an understanding” cannot be measured because it is vague and relative rather than specific and absolute. “Understanding the importance” is a condition that cannot be assessed effectively (how does one measure whether a student understands the importance of something other than that they do or they don’t?).
- *Show consideration of the validity of a resource in developing a research question.* The phrase “show consideration” does not indicate a degree of achievement.
- *Become familiar with assessment tools and procedures used to identify special needs.* The phrase “become familiar with” cannot be assessed because it does not have a degree of achievement. It does not indicate a set of conditions where this skill would be demonstrated.

Special: Goals in the Affective Domain

Writing Learning Goals for learning that involves attitude/affective behaviors tend to be more challenging than in other learning domains. This is because it is difficult to measure the change in a person's beliefs as a result of instruction. When trying to measure beliefs or ideals, an indirect approach is often the most feasible technique. For example, observing a learner's behaviors or what the learner self-reports might provide insight to their beliefs, though it is difficult to verify. The observer will often have to rely on generalizations to assess to the learner's attitudes.

Sequence of Instruction (scaffolding)

Once you have established a Learning Goal that address the Needs Assessment, you must “unpack” the Learning Goal into the sub-skills or knowledge that would be required to achieve the desired outcome. In the vernacular of education and instructional design, the term *scaffolding* is used to describe the process of incremental learning where each step in the learning sequence enables the learner to take on the next step of the learning process. An example would be a child learning the alphabet before they learn to sound out words.

Your challenge at this point is to determine all of the sub-skills, prerequisite knowledge, and attitudinal factors that contribute to the learner being able to achieve the Learning Goal. This process, in formal ID practice, is often conducted with an **SME** and may also involve extensive task analysis.

Deconstructing a Learning Goal into a sequence of objectives

Let's use a relatively simple example of a Learning Goal related to frying an egg:

Given a set of standard kitchen appliances and tools, the learner will be able to fry an egg according to the “over easy” recipe.

While this goal appears to be fairly straight forward, you will find that it is surprisingly more complex than you'd imagine, once deconstructed. For example, a learner with no prior experience would need to be scaffolded in the following sub-skills:

1. Ability to turn on the stove. (Some stoves are more complex to start than others).
2. Ability to determine the proper setting of flame or heat to fry an egg “over easy.”
3. Ability to select the proper skillet and utensils.
4. Ability to crack an egg without egg shell fragments in the yolk or skillet.

5. Ability to read a recipe.
6. Ability to interpret cooking instructions as concrete acts.
7. Ability to interpret the changes in the egg's appearance as a factor of readiness.
8. Ability to manipulate the spatula to flip the egg over.
9. Ability to remove the egg from the skillet and serving it without dropping it on the floor.

In the example above, the sequence of instruction would account for the necessity to master certain skills before advancing to the next. However, in some cases, there may be a need for establishing prerequisite skills before other skills. In the example above, it may be important to establish the ability to read and learn some safety tips prior to learning how to turn on a gas stove. Part of your work as an ID will be to negotiate with an **SME** on which aspects of the learning experience are more important to know in advance than others simply because of the context of the skill as it will be demonstrated.

Posner and Strike (1976) and English and Reigeluth (1996) provide several approaches for sequencing instruction for effective learning.

Prior knowledge: In deconstructing a given Learning Goal into its components, you will need to know how the sequence of instruction relates to the learners' prior knowledge (which you would have determined as part of your Analysis). This information

can tell you the degree to which instruction is needed at each step. For example, if the learners in the over-easy egg frying lesson already know how to turn on a stove, then you would not need to produce instruction for it. You would only need to refer to their prior knowledge of turning on a stove as an element in the step describing at what level to set the flame or heat.

Familiarity: The familiarity technique for learning-related sequencing focuses on what is most familiar to the learner, and then uses this as a reference point while progressing the instruction to cover the lesser known knowledge or skills. A lesson could begin with something that the learner is already interested in or something the learner could easily perceive as engaging.

Progression of difficulty: Beginning with the least difficult skills and progressing to the most difficult can be an effective way to design instruction since the easier tasks will build confidence toward taking on more difficult tasks later on.

Concept-related sequencing: In concept-related sequencing, instruction is sequenced according to how people naturally organize information in their memory, such as from general concepts to specifics. An example would be to teach the concept of a professional e-portfolio as a representation of a person's work history, and then focus on how to produce elements that

comprise the portfolio itself according to a thematic pattern.

Subject matter analysis

In the previous step, you deconstructed a Learning Goal into its component skills and knowledge and then sequenced them into individual objectives. Now you must classify the subject matter in each step of the sequence to determine the type of learning to which they align. For example:

- If employees need to learn how to use a piece of machinery, the type of learning will involve the physical ability to operate the controls according to a set of conditions.
- If social service providers need to learn to provide counseling services to victims of trauma, the type of learning will involve the intellectual ability to identify indications of trauma in different people and apply evidence-based strategies to address human needs.
- If an organization's staff needs to eliminate sexist behavior or attitudes, the type of learning would involve the cognitive ability to self-assess one's attitudes and reproduce positive responses according to a model of behavior.

Types of learning

There are six basic forms of knowledge, skill, and affect, as shown in Table 2.

Table 2. Definition of Types of Learning.

Type of learning	Definition	Example
Factual	Declarative knowledge; “knowing that...”; recall-based information; ability to recognize an instance of.	Memorizing a multiplication table.
Conceptual	A collection of information where its coherence is determined by a defining set of attributes.	The ability to discriminate which style of art a given painting belongs to.
Principles / Rules	Information organized as relationships; rule sets that explain the relationship of a given state;	The scientific theory related to the expansion and contraction of matter under changing temperatures.
Procedural	The ability to take steps in a given order to achieve a goal; to know how to do something in an applied setting.	How to repair a broken auto transmission.
Interpersonal	Skills that pertain to goal-seeking behavior in human interaction.	The ability to de-escalate conflict.
Attitude	A perception about the outer world and oneself that guides decisions and actions.	Overcoming the taboo that prevents talking about suicidal feelings.

Psychomotor	Motor skills that are contingent on a procedural rule.	The ability to impart life saving procedures in various emergency situations.
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Let's bring back the example of frying an egg over-easy to review which type of learning applies to each part of the instructional sequence:

1. **Ability to turn on the stove.** This is a *procedural* skill.
2. **Ability to determine the proper setting of flame or heat to fry an egg “over easy.”** This knowledge involves understanding *principles* of cooking.
3. **Ability to select the proper skillet and utensils.** This skill involves *concept* knowledge.
4. **Ability to crack an egg without egg shell fragments in the yolk or skillet.** This is a *procedural* skill.
5. **Ability to read a recipe.** This a cognitive skill related to *factual* knowledge.
6. **Ability to interpret cooking instructions as concrete acts.** This is a *psychomotor* skill.
7. **Ability to interpret the changes in the egg's appearance as a factor of readiness.** This skill involves *concept* knowledge.
8. **Ability to manipulate the spatula to flip the egg over.** This is a *procedural* skill.
9. **Ability to remove the egg from the skillet and**

servicing it without dropping it on the floor. This is a *procedural* skill.

As you can see, the general skill of frying an egg over-easy is procedural, but the sub-skills involved in scaffolding achievement of the Learning Goal can be a mixture of several types of learning.

Your Subject Matter Analysis report should show each aspect of the instructional sequence and an indication of which form of knowledge, skill, or affect applies to that specific part of the instruction.

Instructional Strategies

At this point in your design work, you have:

1. Determined the Learning Goal for the instruction.
2. Deconstructed it into a sequence of sub-skill, knowledge, and attitude objectives.
3. Identified the type of learning that applies to each objective in the instructional sequence.

Your next task will be to examine the appropriate instructional strategies that align with the types of learning that will occur in your design. In short, an instructional strategy, like all

strategies in general, is a *method for achieving a particular goal*. This is to say that each type of subject matter lends itself to employing a certain instructional strategy.

In the egg frying example, the ability to turn on the stove is a procedural skill. A typical instructional strategy for learning this procedure may involve an expert explaining how a gas stove works, modeling how to turn on a gas stove safely, supervising each learner as they practiced the task, offering corrective feedback, and answering questions as they go.

Table 3 describes typical instructional strategies associated with each type of learning.

Table 3. Matrix of instructional strategies.

Type of learning	Definition	Instructional strategies
Factual	Declarative knowledge; “knowing that...”; recall-based information; ability to recognize an instance of.	<ul style="list-style-type: none">• Exercises linking prior knowledge to new knowledge• Exercises organizing or classifying new information to simplify it.• Exercises involving metaphors, elaboration, mnemonic devices, highlighting, rehearsal, memorizing.• Exercises involving the use of new knowledge in its appropriate context.
Conceptual	A collection of information where its coherence is determined by a defining set of attributes.	<ul style="list-style-type: none">• Practice recognizing/identifying instances based on definitions.• Review of examples and non-examples of members of a concept group.• Apply concepts in context.• Identify key examples, emphasize connections, elaborate concepts, summarize, paraphrase.

**Principles /
Rule**

Information organized as relationships; rule sets that explain the relationship of a given state.

- Practice recognizing/ identifying underlying concepts of a principle or rule based on definitions.
- Practice applying the principle or rule in context.

Procedural

The ability to take steps in a given order to achieve a goal; to know how to do something in an applied setting.

- Modeling of the task that explains the rules for executing it.
- Practice identifying instances where the procedure or decision applies (pattern recognition).
- Practice in authentic situations.
- Self-assessment; feedback.
- Revised practice patterning.

Interpersonal skill	Skills that pertain to goal-seeking behavior in human interaction.	<ul style="list-style-type: none">• Practice metacognition skills to develop the ability to self-assess.• Identify instances of behavior to build awareness.• Develop goals for behavior based on desired outcomes.• Explain how these behaviors achieve the desired outcome.• Practice desired behavior.• Evaluate feedback; self-assess.• Revise goals.
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Attitude	Perception about the outer world and oneself that guides decisions and actions.	<ul style="list-style-type: none">• Practice metacognition skills to develop the ability to self-assess.• Identify instances of various attitudes to build awareness.• Develop goals for behavior based on desired outcomes.• Explain how these behaviors achieve the desired outcome.• Practice desired behavior.• Evaluate feedback; self-assess.• Revise goals.
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Psychomotor	Motor skills that are contingent on procedural rules.	<ul style="list-style-type: none">• Modeling of the task that explains the rules for executing it.• Identify skills and sub-skills that contribute to the execution of the task.• Identify the patterns of motion and interaction that are relevant to apprehending the task.• Practice in authentic situations.• Self-assessment; feedback.• Revised practice patterning.
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Selecting a mode of communication

In the prior section, you examined which instructional strategies would be appropriate for the types of learning indicated in the instructional sequence. However, it does not describe *how* these learning strategies can be facilitated as a *mode of communication*.

For example, in the egg frying example, one of the required sub-skills includes *the ability to turn on the stove*. As a procedural skill, the mode of communication for the instruction could be conducted in any of the following ways:

- A visual diagram with images that show how to turn on

- the stove; the learner follows the diagram on their own.
- A video that demonstrates how to turn on the stove; the learner follows the video on their own.
 - A live in-person studio environment where an expert demonstrates how to turn on a stove; the learner takes a turn turning on the stove under supervision.
 - A live two-way virtual video streaming setup so that an expert can demonstrate how to turn on a stove; the learner practices turning on the stove under supervision.
 - No instruction whatsoever; the learner seeks information and discovers the process on their own as a problem-solving exercise.

The process of selecting appropriate mode of communication is dependent upon the following factors:

The characteristics of the learner: If the learners in the egg frying example were experienced adults, a visual guide or video might be sufficient because the learners already have enough prior experience to apply to the new task. If the learners were teenagers who had never used a gas stove before, it might be more appropriate to conduct instruction in-person.

The nature of the subject matter: If a person in a sales professional course was learning how to engage in conversation with prospective customers, an optimal instructional strategy would be for the learner to practice conversation in role play activities. The use of

a role play strategy, in this case, is based on the premise that the form of practice conducted during instruction should be analogous to the performance of the learned skill in an authentic situation.

The character of the information: If the subject matter involved a lot of references to visual information, elements in motion, or objects in a cause and effect scenario, the mode of communication should support the learner's need to see the elements that are relevant to the instruction, such as video or illustrations. Likewise, if the character of the information involved interpreting and annotating written material, the mode of communication should accommodate the learner's need to read the content under optimal conditions.

The affordances of the learning environment: Given multiple options to consider as a mode of communication, you may find that only one or two of them are capable of operating feasibly under the conditions of instruction, such as a classroom or in an online course.

Next, let's review the most common modes of instructional communication, their strengths, and weaknesses.

Communication to facilitate instructional strategies

Historically, training and education has been a face-to-face

(F2F) endeavor. However, in the modern age of ubiquitous tools for communication, the perception of F2F instruction as the only “real” instructional mode of communication has been challenged. The following list describes a range of communication options for facilitating instructional strategies.

In-person: In-person instructional engagement is optimal when the nature of the subject matter lends itself to immediate interplay (the flow of observation, questions, answers, practice, feedback, etc.). In-person instruction is ideal in most cases, but it isn’t always feasible if learners are geographically dispersed, and it is also very expensive. Sometimes, there are no other options but F2F because of the focus on subject matter that exists in only one location, like archaeology, laboratory education, or training on specific machinery.

Reading and writing: Reading and writing are advantageous when the nature of learning involves internal deliberation and intervals of revision, especially when the subject matter involves an individualized product. Writing is also easy to share, edit, and annotate. Writing is not optimal if the nature of subject matter has nothing to do with writing, as a medium. For example, a student in a sales professional course would not gain as much in writing their proposed engagement with a prospective customer as they would practicing it verbally in realtime in role play.

Quizzes: Quizzes are simple question and answer instruments used primarily for self-checking declarative knowledge (recall). Quizzes are a good method for measuring surface level knowledge recall but are not good indicators of applied knowledge. For example, a quiz on the translation of Spanish nouns will indicate a learner's ability to remember the English meaning of Spanish nouns, but it is not a good indicator of whether the learner can actually speak Spanish.

Role play: Role play involves realtime interaction between individuals where the conditions are controlled according to a scenario. Role play is optimal for demonstrating interpersonal communication, participating as a form of practice, and observing as a form of vicarious learning and for contributing feedback. However, it requires pairing with other participants and the extra logistics of gathering people together. Role play can occur between the learner and instructor or student-to-student.

Interactive multimedia/Gamification: There are many interpretations of multimedia, though we will define it here in the most modern context of online communication. Interactive multimedia are objects containing audio, video, and graphical elements with an added ability for the viewer to interact with the media according to a purposeful design. Examples can include:

- Video media with a foreground layer of

clickable objects.

- Narrated slideshow visuals with clickable elements to review more information or to complete a task.
- Data visualizations where the user can manipulate objects or data to observe a corresponding output.
- Visual media where the system produces a feedback output according to the random input of the user.
- Video media with threaded comments in specific areas placed by viewers.

Gamification is a form of interactive multimedia where the engagement is designed around completing sections of instruction for completion badges or points.

Multimedia is strong in showing cause and effect, time based phenomena, audio based information, and visual relationships. Interactive multimedia also enables learners to progress through the information at their own pace and repeat sections if necessary. Multimedia, however, is time consuming to create and requires a lot of resources, such as software and specialist authoring skills, depending on how complex the multimedia needs happened to be.

Visual imagery/graphics: Visual imagery is strong in showing visual relationships, diagrams for the flow of information or material, authentic representations

of real phenomena, and rhetorical meaning. Visual imagery is typically used when the instructional needs require a visual reference accompanied by narrative text. Visual imagery, however, can only convey information one way. This limits the degree to which you can communicate information with certainty that the reader will interpret the information as the author intended. If the subject matter has complexity that lends itself to conversation and collaboration, visual imagery may be useful in some way, but not necessarily as the only form of communication.

Simulations: Simulations can be relatively simple recorded screencasts with embedded interactivity, or simulations can refer to high resolution immersive 3D virtual reality systems. An example of a simple simulation would be an interactive recording on how to use an application or software system. An example of an immersive simulation would be a training facility for law enforcement or military readiness training with full sensory affordances.

Recording/Presenting: Using tools to record and present oneself is a strong method for learners to demonstrate their ability to convey information verbally and with the use of accompanying visual imagery. The process of writing a script, organizing a narrative, and rehearsing intensifies the learners personalized engagement with the subject matter. If the subject

matter is related to the learner's ability to communicate verbally with visual information, recording and presenting provides excellent practice. However, using tools for recording and presenting requires the availability of computers or other devices to record digital media, software to edit and prepare it, and skills for uploading/publishing the video. Some learners may need to learn how to use computer devices and software first before they can produce a recording for a given instructional activity.

Video conferencing: Video conferencing is the digital equivalent of an in-person instructional classroom or studio. Video conferencing is strong in facilitating the presence of many people simultaneously for the purpose of conducting a discussion or lesson much as you would expect in a F2F context. However, F2F engagement includes an element of personal tension that is lost in a video conference. It is more difficult for participants to sustain their attention longer than a certain duration unless there are forms of engagement. The host of a video conference needs skills in maintaining the flow of engagement and participation in ways that are similar to but different from F2F instruction. Video conferencing also requires participants to have a computer device, software, and a strong internet connection. Video conferencing tools include [Google Hangouts](#), Microsoft Teams, and [Zoom](#)

Curating: Curating, as the general definition implies, is about collecting information according to a theme or an organizing principle. In the modern sense of it, curating refers to collecting references to information on the Internet. As a whole, curating describes the learner's ability to locate appropriate information, evaluate its credibility, organize it, and perhaps tag items according to a set of principles or concepts. When a learner shares their curated material, it demonstrates their personal perspective on the meaning of their interest or goals. Curating is also strong as a collaborative activity where groups of learners interact in the process of deciding which resources are better than others. However, curating, on its own, does not necessarily demonstrate learned knowledge or skills unless there is a way for learners explain the basis of their curating decisions. Curating also requires learners to have a computer or internet-enabled device, an internet connection, information literacy skills to locate credible information, and access to Software to collect curated information. Curating platforms include [Diigo](#) and [Evernote](#).

Discussion: Discussion about knowledge, skills and attitudes is as old as human existence. Naturally, when the subject matter lends itself to a rhetorical exchange to arrive at a conclusion, discussion is a strong method of communication. Discussion can occur as an in-person

activity, in a video conference, or as a text-based asynchronous discussion such as a discussion forum in an online course. Live discussion is strong in its ability to sustain immediate interaction and feedback. However, it does not permit much time for participants to deliberate in preparation for speaking or conduct research. A text-based discussion in an online discussion loses the immediacy of live interaction, but it enables all participants to contribute to the conversation whenever they are available, and provides lots of time for participants to craft what they want to say in their discussion post, including links to information on the internet, visual media, and perhaps even video.

Annotation: Annotation refers to adding information to an existing artifact, such as referring to some other piece of relevant information, adding a hyperlink, asking a question, or responding to another person's question. The value of annotation is the ability to provide multiple perspectives on the interpretation of information so that viewers can consider a range of possible meanings for the information. A typical example is YouTube commenters adding or explaining new information about the subject matter that would enable other viewers to know more about what was originally presented. In a text environment, annotation is sometimes used in the evaluation of original historical documents. However, annotation, as a digital activity,

requires learners to have a computer and the capability to annotate a document online using software or a browser plugin. The instructor needs to plan an annotation activity in advance and assist students who have never done this type of activity before. Annotation systems include [Hypothes.is](#), [VidGrid](#), [Voicethread](#), and [GoReact](#).

Online collaboration: Several online platforms exist that facilitate multiple participants collaborating in a singular online workspace, similar to a collaborative online whiteboard. These systems can accommodate live (synchronous) participation or as others choose to participate (asynchronous). Online collaboration is strong in its ability to visualize information and organize it according to a particular theme or template. Using an online platform, however, may cost a fee or it may be a barrier to participation if learners do not have a computer or Internet connection. [Miro](#), [Mural](#), and [Padlet](#) are examples of online collaborative tools.

The selection of instructional strategies is *fundamentally a communications challenge*. This means that the ID, as an expert in instructional communication, must be well-versed in the various means by which individuals can be situated in a communications environment for the purpose of instruction.

The Design example below refers to a training program for staff at a family medical facility who need to learn how to recognize instances where medical information privacy rules are applicable, perform their tasks in accordance with federal privacy guidelines, and recognize situations where they should stop what they are doing and ask for help.

HIPAA Training Program: Design

Our analysis of the training needs for Acme Family Medical Center has produced the following training goals:

Staff will need to demonstrate the ability to perform the following:

1. Recognize all instances of information that are considered PHI according to HIPAA rules.
2. Perform their assigned tasks at the Acme Family Medical Center in compliance with PHI privacy requirements according to HIPAA Privacy Rules.
3. Recognize situations where the

appropriate actions are unclear and ask for help before taking further action.

Training participants are functioning in the Company as the executors of tasks as a matter of prescribed operations. They do not make strategic or operational decisions. Therefore, the level of training proposed in this design will be limited to the needs encompassed in field based tasks.

Training Design

There are three goals proposed in the training program. Each goal is deconstructed into its component knowledge, skills, and attitudes and then posted in a matrix of proposed instructional strategies.

Training Goal 1: *Staff will be able to recognize all instances of information that are considered PHI according to HIPAA rules.*

This goal involves learning about the HIPAA guidelines and then relating those guidelines to situations that arise during work operations. The

design of the training module for this goal will involve the following:

Pre-test quiz: An interactive quiz that presents situations and terminology related the scope of subject matter. This will measure trainees' prior knowledge and reveal patterns where instruction may be needed in great focus.

Readings and media: Trainees will be provided with a combination of media that explains HIPAA rules, terminology, and situations according to the needs as described in the Acme Family Medical Center context.

Group discussion: Trainees will participate in group discussion where they can describe their in-service experiences related to HIPAA rules and reflect on how to address them in the future.

Multimedia assessment: Trainees will access an online examination where they will respond to situation prompts.

Training Goal 2: *Staff will be able to perform*

their assigned tasks at the Acme Family Medical Center that sustain privacy of PHI according to HIPAA rules.

This goal involves applying what they have learned in Training Goal #1 to their everyday work. Since staff workers operate in different areas of the operation, trainees will be grouped together according to commonalities in their routine. Cumulatively, the breakdown of tasks involved in the ability to achieve this goal include:

- Recording information taken from client intake into the EHR system.
- Printing examination reports, referrals, and medical advisories.
- Filing printed material in hardcopy filing systems.
- Completing insurance coding information.
- Verbal interaction with clients, caretakers, and medical providers.

The design of the training module for this goal will involve the following:

Hands-on group work simulation:

Trainees will be grouped according to their

work classification and then demonstrate how HIPAA rules apply to their specific work tasks in simulated situations.

Gamification: Trainees will participate in a group activity to “spot the violation.” A designated staff member is provided with a list of intentionally flawed actions and decisions to follow while others observe in a game to spot all of the violations, explain how they are non-compliant, and propose an alternative action or decision.

In-person assessment: Trainees will be assessed by the trainer according to trainees’ accurate adherence to HIPAA rules in the performance of their typical workplace tasks.

Training Goal 3: *Staff will be able to recognize situations where the appropriate actions are unclear and ask for help before taking further action.*

This goal involves applying what they have learned in Training Goals #1 and #2 into unfamiliar situations so that they are able to recognize situations where they should take no further

action until they consult with a supervisor. The purpose of this goal is to reinforce the importance of taking actions or making decisions only when it is in compliance.

The design of the training module for this goal will involve the following:

Group discussion: Trainees will participate in small group discussions led by a trainee expert that will provide case study situations. Participants will write their responses individually and then share in a discussion about appropriate actions to take.

Multimedia assessment: Trainees will complete an interactive e-learning program that presents them with situations that are unfamiliar to their area of experience or expertise and respond according to HIPAA rules.

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DEVELOPMENT

By: [William Wildberger](#) and [Brenda R. Lee](#), edited by Steve Covello

About Development

Historically, the terms *design* and *development* have been used interchangeably in common vernacular. However, in the profession of instructional design, we make the distinction that Design is a planning phase and Development is the production of what has been planned in the Design stage (Richey, Klein, & Nelson, 2004).

Your goal in this stage is to produce the following sections:

Selection of tools and systems: The Design stage is where you conceived which modes of communication are optimal for instruction. The Development stage is where you will select and employ the tools and systems that will produce or host the modes of communication you intend to use in instruction.

Production of actual instructional content: The production of instructional content can range from plain text content to elaborate interactive multimedia. Your decisions in the Design stage inform which

instructional content you need to produce and in what mode of communication. In some cases, the SME produces the instructional content in collaboration with the ID.

Production of assessment material: The production of instructional content includes media to be used for assessment such as quizzes, examinations, and other forms of media that are used for testing learners' skills, knowledge, and attitudes.

Selection of tools and systems

There are two decisions IDs make when they go about producing instructional media: Which tools can be used to develop instructional media? Which systems will be needed to host, stream, playback, or distribute instructional media?

Tools

Your decisions about which tools to use may be driven by your personal preferences, the tools you are most confident using, the tools which produce the best media, or the tools that happen to be available. For example, a small software company might use Adobe Captivate exclusively, while a large university might use tools like Articulate Storyline, Photoshop, or

Audacity. In fact, in a 2008 survey conducted by the E-learning Guild, more than 70 percent of developers surveyed used more than one authoring tool, and nearly 40 percent used four or more tools.

Many of these tools require specialized training to use and can sometimes take months to become proficient enough to take on the demands of producing an instructional program. There are dozens of authoring tools with varying costs ranging from no-cost opensource programs to expensive programs costing thousands of dollars.

Certain types of authoring tools may be designed for specific platforms, types of learning, and types of files. Your selection of a tool (or tools) depends upon the following factors:

- **Type of training:** Instructor-led, **synchronous**, **asynchronous**.
- **Media required:** Audio, visual, animations.
- **Interactivity level:** No interactivity, low interactivity, high interactivity.
- **Skill of design staff:** SMEs, advanced designer, junior designer.
- **Cost:** The limitations of a program budget may preclude using certain tools.
- **Complexity:** Some tools may be prohibitively complex to learn for a given project if the time and effort to learn them is not available.

Below is a list of various development tools:

Multimedia authoring: These tools are specifically designed to create interactive web-based learning content. Examples of multimedia authoring systems include [H5P](#), [Camtasia](#), [Snagit](#), [Articulate Storyline](#), [Adobe Captivate](#), [Lectora Online](#), and [Elucidate](#).

Simulation: These tools are designed to mimic how a user would interact with an actual software system through screencapture and coding for controlled interaction. Example of this type of tool are Adobe Captivate and Articulate Storyline. There are other more complex simulation tools designed to reproduce a real 3D environment for such things as training scenarios. Examples include [FlexSim](#), [Heartwood](#), and [ForgeFx](#).

Presentation recording: These tools are for recording yourself producing a narrated slideshow with a webcam: [VidGrid](#), [Zoom](#), [Visme](#), [Adobe Spark](#), [Animoto](#), [Prezi](#),

Image editing: Some image editing tools are for creating objects from scratch while others are designed to edit existing images. [Snagit](#) is designed to edit and annotate existing images. Adobe Photoshop, [Pixlr](#), [PicMonkey](#),

Mobile learning tools: While many types of tools can deliver content to mobile devices, certain tools exist

that are specifically designed for mobile devices. Some examples include [LearnCast](#) and [AppInventor](#).

Social learning tools: Development tools designed to create learner-generated content capture learner-to-learner communications and facilitate group collaborations. Some examples of these types of tools include Twitter, Facebook, Wikipedia, and Blogger.

Video production tools: These tools are designed to specifically create or edit video content. Some examples include [Adobe Premiere](#), [Apple iMovie](#), [OpenShot](#), [Camtasia](#), [Moovly](#), and [Snagit](#).

Audio production tools: These tools are designed specifically to create or edit audio content. An example of this type of tool is [Audacity](#).

Other tools: Besides specific authoring tools, a number of other programs can be used to create learning content. For example, common tools like Microsoft Word, Microsoft PowerPoint, and Adobe Acrobat can be used to create an entire training course or just a learning artifact like a help document.

Systems

Whatever media you produce, it will need to be placed somewhere learners can access. For example, once you have produced a video for use in instruction, where can you place it so that multiple people can access it simultaneously without

a disruption in video playback? Which system is most compatible with the means by which learners access media?

Examples of media systems include:

- **Content Management System (CMS)** – An online system for uploading files and documents and then organizing them according to various needs. CMS typically include the ability to manage who is allowed access to certain media. Some areas may only be accessible to the Administrator or owner of the media. Some media can be designated for specific people to access, or for anyone to access. Generally, a CMS is a plain repository – not a streaming media system. Examples of common CMS include [SharePoint](#), [Dropbox](#), [Google Drive](#), and [Box](#).
- **Streaming media system** – Streaming media refers to media that plays back as a stream of data, like video, audio, or interactive multimedia. Streaming media systems are designed to sustain heavy bandwidth usage because video and audio media use more data space than plain documents. Examples of streaming media systems include YouTube, [Kaltura](#), [Vimeo](#), [Mediasite](#), [Ensemble Video](#), and [VidGrid](#).
- **Interactive e-Learning hosting:** Interactive online media requires serving a combination of video, images, audio, and interactive programming on a system that is able to interpret the interactive code in the media object.

Most LMS (see below) are capable of hosting interactive e-learning media, but there are a few systems for hosting interactive e-learning content without an LMS, like [Rise.com](#), [WordPress](#), and [SCORMCloud](#).

- **Learning Management System (LMS)** – An LMS is a platform designed to accommodate both the media and structure of an instructional program. There are many LMS available to subscribe to, but the most common are [Canvas](#), [Blackboard](#), [Desire2Learn](#), [Moodle](#), [Schoology](#), and [Bluevolt](#). Typical LMS are able to provide the following (more details about LMS will be reviewed in the next chapter on Implementation):
 - Plain text pages for direct typing and publishing.
 - Embedded images, video and multimedia content from external sources.
 - External links to outside resources.
 - File upload/hosting for learners to download.

The decision to use one system or another depends on how you have designed the instructional engagement. For example, consider:

- If learners will participate in in-person training with no other media than in-person instruction, you may only need a CMS to host documents. Learners can be sent an email with links for downloading important documents to bring with them to the training or to use for

homework.

- If individual learners will access a fully online training program using e-learning multimedia (without classmates), then you may only need a simple website that can host interactive multimedia or a simple LMS.
- If learners will participate in fully online or hybrid interactive learning, then you may need an LMS where all participants can be gathered into a single class (or cohort).

Production of assessment material

In the Design stage, you established a Learning Goal that contained four elements: an observable action, the subject content, the degree of achievement, and under what conditions the learned skill, knowledge, or attitude will be demonstrated. Let's review the prior example:

Medical staff need to perform their assigned tasks at the Acme Family Medical Center in compliance with PHI privacy requirements according to HIPAA Privacy Rules.

In the example above, the basis of learners' degree of achievement will be *according to HIPAA Privacy Rules*. The value of this statement is that it informs several aspects of the Development stage:

- The criteria for assessing a trainee's performance of their tasks will be according to HIPAA Privacy Rules.
- The basis of pre-testing learners to determine how much they already know about HIPAA Privacy Rules.
- The basis of instructor providing feedback to learners.

From a development standpoint, the ID may need to produce several **assessment instruments** to provide evidence of the learners' knowledge, skills, and attitudes. *It is critically important that the basis of assessment align to the Learning Goals.*

For example, let's say that a Learning Goal calls for pre-service social workers to demonstrate the ability to draft a referral for a child with a disability. If the final exam only assessed their ability to use a particular diagnostic tool, then the assessment and the Learning Goals are not in alignment.

The following are typical assessment instruments used for gathering evidence or information about learner proficiency.

Entry skills

Entry skills tests are given before instruction and test for prerequisite skills. They are used to ensure that learners are adequately prepared for the planned instruction or for using the tools or systems required to participate. If learners are not prepared to begin instruction, remedial instruction may need to occur before beginning the planned instructional modules.

Pretests

Pretests provide a profile of learners prior to engaging in the primary area of instruction. They can also be used to determine if learners have mastered all or some of the skills included in the planned instruction. If learners have already mastered skills, they may be able to skip some of the instruction or bypass the instruction altogether. Pretests can also be used to customize instruction for a particular group.

Practice tests

Practice enable learners to evaluate progress and allow instructors to monitor the pace of instruction. Practice tests are usually focused on a lesson rather than a unit or course level.

Post tests

Post-tests are administered following instruction. They measure the degree to which learners have mastered the objectives stated in the Learning Goal.

Test item criteria

A test item refers to a test question or prompt to which learners must respond. When creating test items, items should

align with the performance objective or goal, take into account learner and context needs, and are designed appropriately for the assessment mechanism. The following are the guidelines for developing appropriate and valid test items:

Goal-centered: Test items should pertain to the objective in the Learning Goal.

Learner-centered: Test items and assessment tasks should be tailored to the needs of the learner. Items should use vocabulary and language that is familiar to the learner. Reading level should be appropriate.

Context-centered: Test items or tasks should be realistic or authentic to the actual performance setting as possible.

Assessment-centered: Test items or assessment tasks should be well constructed and clearly written, and learners should be provided with adequate information to successfully complete the assessments. Time should be spent writing good questions that are not meant to trick the learner.

Alternative assessments

Alternative assessments are effective for evaluating performances, products, or attitudes. When developing alternative assessments, the instructional designer is not writing an assessment or developing test items, but rather developing instructions for the assessment. Instructions

should be clear and should include all information the learner will need to effectively complete the assessment. Grading rubrics or checklists will help the learner understand how evaluation will be performed and will provide a standard of measurement for instructors.

Portfolio assessments

Portfolio assessment is defined as the process of meta-evaluating the collection of work samples for observable change or development (Dick, Carey, & Carey, 2009, p. 146).

Below is a sample Development plan for a fictitious family medical center.

HIPAA Training Program: Development plan

Each of the Training Goals and their respective

activities are described below along with recommendations for the means by which to produce or curate them. We propose hosting the content of the training program on the [Canvas LMS](#) which can support plain text course content, quizzes, videos, multimedia, and downloadable files. Canvas is also capable of tracking trainee progress and assessment scores.

The use of Canvas strengthens the ability to control the training program but it will require some training for Acme executives to access the data and other progress information. The trainer/expert may need some similar training to monitor trainee progress.

Training Goal 1: *Staff will be able to recognize all instances of information that are considered PHI according to HIPAA rules.*

Pre-test quiz: The pre-test quiz will be composed within the quiz feature in Canvas since it is both the easiest system to develop a quiz and track learner progress..

Readings and media: Readings will be curated at no cost from the [National](#)

[Center for Biotechnology Information](#), from the [American Medical Association](#), and other open resources. Other video media will be provided from [YouTube resources](#) published by the Office for Civil Rights of the U.S. Department of Health and Human Services (HHS). Readings and media will be hosted on the Canvas platform which can accommodate external links and embedded video resources, with completion tracking.

Group discussion: Groups discussion will be conducted in-person. Handouts for topics and notes will need to be produced in collaboration with the trainer/expert.

Multimedia assessment: Production of the this multimedia object will be authored in Articulate Storyline and will be composed of a combination of text-based multiple choice items, drag-drop items, and video-based situations that will require a correct response before proceeding. Articulate provides the high level of authoring capability required to produce

this object given its controlled programming, tracking, scoring, and reporting capabilities. The rendered media will be hosted within the Canvas LMS.

Training Goal 2: *Staff will be able to perform their assigned tasks at the Acme Family Medical Center in compliance with PHI privacy requirements according to HIPAA Privacy Rules.*

Hands-on group work simulation: As a hands-on activity, no media production will be required.

Gamification: The “spot the violation” game will be authored in Articulate Storyline as an interactive multimedia object composed of video content and interactions asking the trainee to identify all of the HIPAA violations. Correct answer award completion awards and points which must be attained to earn a completion certificate. Articulate Storyline is best suited for this type of activity given its controlled programming, tracking, scoring, and reporting capabilities. The rendered media will be hosted within the

Canvas LMS, with a downloadable completion certificate available upon completion.

In-person assessment: The trainer/expert will need a checklist document for observation and assessment of trainee performance.

Training Goal 3: *Staff will be able to recognize situations where the appropriate actions are unclear and ask for help before taking further action.*

Group discussion: The trainer/expert will need to produce a slideshow presentation composed of images and videos to use as a focal point of discussion with trainees. Video may be curated from open sources depending on the case study needs or developed internally. Further discussion with the trainer/expert will determine production needs for this activity.

Multimedia assessment: Interactive online media will be produced on Articulate Storyline and hosted within the Canvas LMS. It will be composed of text-based,

video, and interactive assessment content that will require a 90% score or higher to pass. Articulate Storyline is best suited for this type of activity given its controlled programming, tracking, scoring, and reporting capabilities. The rendered media will be hosted within the Canvas LMS.

HIPAA Training Program: Development Example

The following infographic PDF offers an example of a downloadable reference document suitable for use in Learning Goal #1.

[Your Health Information, Your Rights](#)

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IMPLEMENTATION

By: [Brittany Eichler](#) and [Owen Beatty](#). Edited by Steve Covello.

About Implementation

All purposeful instructional activity is embodied, or contained, in some form (Smith & Ragan, 2005).

The Implementation stage in the ADDIE Model is where decisions are made about the context, conditions, and timeframe of an instructional program. These include decisions about the orientation/grouping of learners, access to instructional material, and the participation of the instructor as a coherent “instructional unit” that makes sense to the learner. Once configured, the program is put into effect, or launched.

Implementation, in instructional design literature, may refer to it as simply “the teaching part,” which is true to an extent. But the structural aspects of teaching play an important role in how a given program can be successful. For example, a training program for social workers on suicide prevention may work well enough as an e-learning program where individual learners navigate through online

instructional media to earn a certificate. However, as a cohort group in a classroom setting, social workers may have a lot of work experience to share with each other that elaborates beyond the instructional content itself. The ID needs to recognize the qualitative effect on the learners' experience with each form of instructional configuration.

As you already saw in the Development phase, considerations about implementation begin before the actual implementation phase begins, such as the means by which instructional media is accessed. This chapter will provide more details about the various methods of instructional delivery, their strengths, and limitations.

Your goal in this stage is to produce the following sections:

Method of delivery: There are several methods of delivery to consider for a program of instruction such as individual self-directed learning, learning in a group, in-person instruction, virtual live (**synchronous**) instruction, fully **asynchronous** online, or a hybrid mixture of both online and in-person. The ID must select the method that best accounts for several critical conditions.

Structure of learning: Instruction can occur in a variety of configurations including dedicated all-day events, scheduled weekly increments, or unscheduled self-directed learning. The ID must consider the conditions that are optimal for the nature of the instructional experience given the subject matter, the

costs related to travel, the need for a facility, the cost of downtime, and the science of cognitive processing that supports the greatest advantage for learners to remember what they have learned.

Method of delivery

“Delivery” sounds as though a package with “instruction” in it is transported in some way from the instructor to the learner, but it shouldn’t be thought of in that way. Think of *method of delivery* as an execution of an instructional program through a process of communication.

As mentioned before, *instruction is fundamentally a communications challenge*. Each of the methods of delivery below are reliant upon a variety of ways that humans communicate. As you will see, each method of communication has strengths and limitations. You may find that your decisions in selecting a method of delivery may include a combination of methods that are optimal for the specific needs of the instructional program you are proposing.

Face-to-face (F2F)

The F2F method of delivery encompasses several variations, each with their advantages and limitations.

">**Lecture:** Lecture, also known as group presentation, is the most commonly used form of

instruction. "Lecture is when the instructor delivers information to the learners through words, visuals, demonstrations, or dramatizations. This delivery method can be employed with both large and small groups (Morrison, Ross, Kalman, & Kemp, 2011).

"Lecture is convenient when it is necessary to present information to a fairly large group of learners. The number of learners that can be instructed using lecture is limited only by the size of the facility instruction is taking place in (Briggs, Gagne', Wager, 1992).

There are some limitations to using the lecture method. The instances where learners can actively participate might be limited by the circumstances of the environment. The group of learners might be too large to allow for the opportunity for the instructor to ask and receive questions during the presentation (Morrison, et al., 2011). A lecture does not provide many opportunities for learners to practice and experiment.

Since the instructor controls the material and is disseminating it to a group, there is little opportunity for individualized instruction. The instructor sets both the pace and the content of the lesson. Lectures covering the same topic(s) presented by different instructors might contain different material. Learners who do not learn at the same pace that the material is being

presented may struggle or become bored during a lecture (Morrison, et al. 2011). Depending on the number of learners, the instructor provided feedback may be impossible.

Small Groups: A sub-set of F2F classroom instruction is small group instruction where learners are grouped together in pairs or in groups of up to ten to work together to pursue learning. The size of the group depends on the purpose of instruction. Small groups can pursue various learning activities such as tutoring, discussion, role play, and recitation (Gagne', Briggs, Wager, 1992).

In addition to promoting active learning and developing social skills, small group instruction allows students the opportunity to think about and express their ideas regarding the material. It also gives learners the opportunity to receive feedback from both the instructor and their peers. Working in small groups can encourage the development of intrapersonal and communication skills. Also, by monitoring the groups, instructors can receive feedback from the learners regarding their understanding of the material (Richey, Rita C.; Klein, James D.; Tracey, Monica W, 2011).

A drawback of using small group instruction is that it requires, as the name suggests, the use of small groups. This might be impossible given the number of a particular group of learners. Also, in order to form

groups to be able to have a meaningful experience, it is usually necessary for prior readings or instruction to occur. If any or all of the group members lack any essential prerequisite instruction or knowledge on the subject, the "small group instruction may be ineffective.

Fully online (**asynchronous**)

Course instruction occurs completely online with no requirement to participate live, in realtime, at a certain time or place with other learners nor the instructor. Typical fully online instruction involves self-directed activities that do not require participants to interact in realtime. Fully online instruction is usually facilitated through a **LMS**.

As described in the Development chapter, an LMS is a platform designed to accommodate both the media and structure of an instructional program. The most common LMS are [Canvas](#), [Blackboard](#), [Desire2Learn](#), [Moodle](#), [Schoology](#), and [Bluevolt](#). Typical LMS are able to provide the following:

- Manage student membership and course access.
- Options for structuring a course into module or units.
- Grading and assessment records.
- Completion reporting and badging.

- Plain text pages for direct typing and publishing.
- Embedded images, video and multimedia content from external sources.
- External links to outside resources.
- File upload/hosting for learners to download.
- Structured units or module spaces within a given course that correspond to the modular structure of the instruction.

The benefits of a fully online asynchronous course is that it enables geographically dispersed participants to manage their time to complete their work when it is convenient for them. Some participants enjoy the privacy of learning outside of the classroom environment, especially if they have had bad experiences in the past or have experienced frustration with live F2F classroom discourse because of a disability. When online instructors are appropriately engaged, there is no “back of the classroom” dynamic that is unfavorable to certain students.

The disadvantages of fully online learning include the limitation of subject matter that can be studied online (such as certain kinds of training with machinery or authentic conditions), the reliance on learners’ computer skills to participate effectively, and overall unfamiliarity with fully online learning if they have never done it before.

Virtual online (synchronous)

Virtual online instruction occurs through a form of remote communication, like video conferencing. Structurally, virtual online instruction is similar to F2F instruction in the sense that the instructor and students are present together at the same time. The benefits of this method are similar to F2F in that the realtime discourse is conducive to instructional interplay.

However, like fully online instruction, there are similar limitations: some subject matter (like hands-on training needs) would not work well, students will be reliant on computers and an Internet connection, and some students may find this form of engagement lacks the motivating environmental factors found in F2F. Students (and instructors) sometimes report “Zoom fatigue” from sitting in front of a computer for hours each day.

Blended F2F/online

Blended F2F/online is a combination of F2F and online engagement. In some educational institutions, blended F2F/online is defined as weekly scheduled F2F instruction with additional engagement in between each F2F session conducted online. This method would be useful if learners were able to effectively work independently on certain aspects of the instruction and then convene in-person for the weekly

instructional engagement that required the use of a facility or the oversight/feedback of the instructor and other learners.

Blended F2F/online, since it is a combination of both F2F and fully online, is also hampered by the limitations of both. A F2F components requires learners to be in the physical proximity of the facility; fully online instruction relies on computer, Internet, and learners' ability to work independently to be effective.

An alternative version of blended F2F/online is blended virtual synchronous (via live video conferencing) with asynchronous online.

Hybrid F2F/online

Hybrid F2F/online is similar to blended F2F/online with the exception of F2F sessions taking place only at specified times (not necessarily every week). Its benefits and limitations would apply similarly to blended online.

Field based

“Field” in field based instruction refers to the authentic context in which the instruction is relevant. One of the most common forms of field based instruction is teacher education where a teacher-in-training is placed in a school under the supervision of an in-service teacher. From a training perspective, field based instruction would operate in a similar

fashion. The benefit of field based instruction is, of course, the ability to apply learned skills in an authentic environment where there is immediate feedback.

Naturally, field based instruction is limited to the availability of placements for trainees and the learners' geographical proximity to them.

A sibling to field based instruction is journeyman apprentice instruction where trainees split their time between classroom instruction and field based instruction. This is a method of delivery that is popular in Germany.

Structure of learning

The structure of a program of learning can be selected independently from a method of delivery. An example might be a management training program that is conducted online in small groups (a delivery method) experienced as a one-day intensive (a structure of learning). Or the same management training program can be conducted in-person over several weeks, in half-day sessions. The following are some common structures of learning.

Scheduled intervals

Most of our typical school education experiences have

occurred over a prescribed period of time with scheduled intervals set each day for instruction, i.e. a three month course that meets two or three times a week for 90 minutes per class. Generally, training experiences occur over a prescribed period of time, though the overall length of time, the frequency of engagement, and the duration of each engagement is determined according to the needs, conditions, and subject matter.

Intensives

An intensive program emphasizes longer class time but the course takes place over a shorter time period. The benefit to this format is the learner's immersion in the subject matter, though the density of the subject matter may impede learners' ability to absorb it all.

Self-directed

Self-directed learning refers to any form of instruction where the learner engages with the instructional program on their own at their own pace. There may be a form of interaction with the instructor as-needed.

HIPAA Training Program: Implementation Plan

The nature of the training program lends itself to a combination of approaches for the instruction. All hosted instructional media, quizzes, and assessments will be hosted online in the dedicated Canvas course. Canvas is optimal for hosting various file-based and multimedia content and for managing trainee access, tracking, and reporting completion data.

The following are proposals for implementation for each learning goal.

Learning Goal #1: *Staff will be able to recognize all instances of information that is considered PHI according to HIPAA rules.*

Pre-test quiz: Since the subject matter is primarily about remembering HIPAA rules, this form of instruction can take place with each trainee accessing text and video-based instructional media and then accessing online pre-test multimedia independently. As proposed in the

Development plan, the e-learning media would be accessed through an online Canvas LMS course that streams interactive media and records learner progress and completion. It is estimated that the time of engagement with this instructional media would be no more than two hours. Learners will be able to engage in the media in increments without losing their progress. Pre-test must be completed prior to the Group Discussion.

Readings and media: Trainees will be provided with reading material and resources through the Canvas LMS for accessing online video content. The amount of time required to read/watch instructional content will not exceed three hours.

Group discussion: Trainees will convene at the Company facility after business hours in one large group of 20 participants or in two 10-person groups, according to scheduling and work coverage needs. Session will be conducted as a single two

hour discussion led by the trainer/expert. This session topics will be informed by the results of the pre-test.

Multimedia assessment: Trainees will access the exam for this learning goal through an online Canvas LMS course that streams interactive media and records learner progress and completion. Learners must complete the exam with a passing score of 85% prior to participating in module 2.

The timeframe for this module will be one week, and must be completed prior to beginning module two.

Learning Goal #2: *Staff will be able to perform their assigned tasks at the Acme Family Medical Center in compliance with PHI privacy requirements according to HIPAA Privacy Rules.*

This module of training requires access to the medical facility so that the trainer/expert can oversee participants carrying out their duties according to their learned skills and knowledge. We recommend participants conduct training in-person at

the facility after business hours over the course of one week.

Hands-on group work simulation:

Since there are 20 staff members scheduled to participate, some general discussion activities can be conducted in a single large group while specific activities related to actual performance of tasks will be done in small groups according to the commonality of tasks and responsibilities. It is also possible to conduct training in two separate 10-person groups so that scheduling conflicts or staff coverage needs can be accommodated. Each session will take no longer than two hours each session, with two sessions required to cover all situations.

In-person assessment: The assessment of trainee performance would also occur on-site at the facility at the conclusion of the hands-on simulation session(s). The timeframe for assessment can be set so that all trainees are examined the day after hands-on training or by appointment

according to trainer/expert availability. Each examination session should take no longer than 15 minutes each.

Gamification: The “Spot the violation” interactive game can be accessed the online Canvas LMS course. Trainees will be required to complete each of the examples in the game with a score of 85% or higher to earn completion. Completion must be achieved within one week of the beginning of module two.

Learning Goal #3: *Staff will be able to recognize situations where the appropriate actions are unclear and ask for help before taking further action.*

Group discussion: Training sessions will take place on-site in one large group or two 10-person groups, according to scheduling accommodations. Case study examples will be presented by the trainer/expert followed by small group problem solving. Each group will report their conclusions. This session should take no

longer than two hours during one evening session.

Multimedia assessment: Trainees will complete an interactive e-learning program on their own by accessing it in the online Canvas LMS course.

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EVALUATION

By: [Matthew Wilson](#), [Shilpa Sahay](#) and [Cheryl Calhoun](#),
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About evaluation

Creating a program of instruction, as scientific as it intends to be, is an exercise in prediction. IDs are skilled at gathering information, making design decisions, and assembling a program of instruction into a coherent form, but there are no guarantees that learners will experience the instruction as expected, nor is there a guarantee that all learners will achieve the Learning Goals. Many confounding factors may impede the success of a given program such as unexpected technical problems, poor teaching engagement, or flaws in the design.

To account for these uncertainties, the ADDIE model includes a built-in self-evaluation phase. Whereas, an instructional program intends to assess learners, the Evaluation phase assesses the program itself:

- Were learners adequately prepared prior to the instructional program?
- Have learners achieved the Learning Goals, in whole or

in part?

- Was the instruction effective for the requirements of the instructional program?
- Are learners able to transfer their learning into the desired contextual setting?
- Do the lesson plans, instructional materials, media, assessments, etc. meet the learning needs?
- Were the methods of implementation effective?
- What was the return on investment (ROI) for the cost of instruction?

The answers to these questions help determine whether the program of instruction needs to be improved (formative evaluation), and whether it has met its goals (a summative evaluation).

In the professional ID field, evaluation is a highly complex discipline with a wide range of approaches to consider for each project. This chapter will describe some of the foundation principles of evaluation which are relevant to students of Communications.

Your goal in this stage is to produce the following sections:

Evaluation goal and audience: A statement that describes the goals and purpose of the evaluation based on stakeholders' needs and interests; a description of the audiences for whom the evaluation would be of interest.

Formative evaluation plan: A description of how

the program of instruction will be reviewed, tested, and revised prior to official launch.

Summative evaluation plan: A matrix of questions and analysis plans designed to produce data from which you can determine whether the program of instruction was successful.

Determining goals and audiences

All evaluation plans must have a clearly defined goal, just as a program of instruction must have a goal. The ID works with stakeholders to establish the goals for an evaluation so that the methods of inquiry are appropriately aligned to them.

For example, stakeholders may be interested in the time it takes to complete a program of instruction given the cost of trainees' absence from production to attend training. In such a case, return on investment (ROI) would factor into evaluating a training program.

Goals: In determining the goal of an evaluation plan, the ID conducts an evaluation needs assessment with their stakeholders:

- What are the organization's goals and strategic interests?
- How does the program of instruction fit into those goals and strategic interests?
- What decisions do stakeholders need to make?

- How will the evaluation inform those decisions?
- What will be the critical areas of focus in the program of instruction?

The answers to these questions will inform the orientation of your evaluation questions and the basis of your interpretation of the data.

Audiences: The evaluation plan and its outcome is intended to serve the needs of individuals and groups, to one degree or another. Each of these audiences must be identified since it informs how you craft the questions and interpret the findings. A typical list of audiences includes the following:

- Entities that have sponsored or funded the evaluation.
- Executives who have requested the evaluation to be conducted.
- Management staff affected by the outcome of employee training and performance.
- Staff/trainees that are the subject of the program of instruction.
- Customers/constituencies that are affected by the performance of staff.

Forms of evaluation

There are two basic forms of evaluation conducted by IDs. Formative evaluation is intended to refine the program of

instruction itself before it is launched. Summative evaluation is conducted after several sessions of instruction have been implemented to determine whether the program was effective.

Formative evaluation

Formative evaluation is a process for testing the program of instruction prior to full implementation. The purpose for conducting formative evaluation is mainly because the design decisions, media, and manner of implementation may seem ideal on paper, but in reality, the best intended plans for instruction may not play out as expected. Formative evaluation is the process of gathering feedback information to determine whether any of the work up to this point needs to be reviewed or revised.

Formative evaluation is conducted iteratively in at least three phases. It begins with one-to-one evaluation, then small group evaluation, and finally a field trial, as seen in Figure 1. Results from each phase of evaluation are fed back to the instructional designers to be used in the process of improving design.

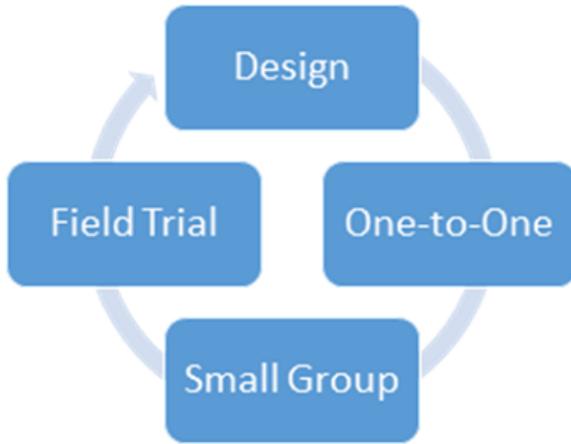


Figure 1. The cycle of formative evaluation.

Each of the phases in the cycle of formative evaluation are described below.

One-to-one: The purpose of the one-to-one evaluation is to identify and remove the most obvious errors and to obtain initial feedback on the effectiveness of the instruction. During this evaluation IDs should be looking for clarity, impact and feasibility (Dick, Carey, & Carey, 2009, p. 262). Results from one-to-one evaluation can be used to improve instructional components and materials before a pilot ">implementation.

A one-to-one evaluation is much like a usability study that evaluates the instruction and instructional materials, not the learner. The learner should be presented with the instructional materials that will be provided during the instruction. Encourage the learner to discuss what they see, write on materials as

appropriate, note any errors, etc. The ID can engage the learner in dialog to elicit feedback on the materials and clarity of instruction.

Small group: Small group evaluation is used to determine the effectiveness of changes made to the instruction following the one-to-one evaluation and to identify any additional problems learners may be experiencing.

In the small group evaluation, the instructor administers the instruction and materials in the manner in which they are designed. The small-group participants complete the lessons as described. The instructional designer observes but does not intervene. After the instructional lesson is complete, participants are asked to complete a post-assessment designed to provide feedback about the instruction.

Field trial: After the recommendations from the small group evaluation have been implemented, it is time for a field trial. A field trial is conducted exactly as you would conduct the program of instruction. The selected instruction should be delivered as close as possible to the way it is designed to be implemented in the final instructional setting. Instruction should occur in a setting as close to the intended setting as possible. Learners should be selected that closely match the characteristics of the intended learners. All instructional materials for the selected instructional section,

including the instructor's manual, should be complete and ready to use.

Data should be gathered on learner performance, attitudes, the time required to use the materials in the instructional context, and the effectiveness of the instructional management plan. During the field trial, the ID does not participate in delivery of instruction. The ID and the review team will observe the process and record data about their observations.

After each phase, the ID considers the results of the evaluation and meets with project stakeholders to make design decisions.

Summative Evaluation

Summative evaluation is called *summative* because it is intended to summarize the results of an instructional program after it has been run several times. There are many reasons for conducting a summative evaluation, but it is primarily to determine whether the problem that precipitated the need for instruction has been resolved. Summative evaluation, as a process, also establishes the basis for judging whether the program of instruction has met its intended goals according to an agreed upon standard.

For example, if a program of instruction seeks to prevent workplace personal injury or death, it would be expected that 100% achievement of this objective would be the only

acceptable outcome. Likewise, it would be reasonable to expect that a benchmark 90% pass rate of students taking a college Statistics course for the first time would be considered a successful outcome. The evaluator negotiates with stakeholders to establish both the criteria for success and the mark at which the outcome is considered successful.

IDs conducting a summative evaluation are tasked with constructing an inquiry strategy that will produce data from which a summative interpretation can be made. The inquiry strategy includes the following elements:

Audiences: An evaluation report is intended to convey meaningful information to stakeholders about what transpired in the instructional program. The ID must establish who comprises the audience for the evaluation report since the outcome of the evaluation should take into consideration who is affected by its conclusions.

Evaluation questions: The evaluator must formulate questions that produce answers relevant to determining the effectiveness of instruction. Naturally, the design of the questions must be taken with great care so that they produce useful responses. Questions can include a range of interests such as learner expectations, how learned skills/knowledge have been used in authentic conditions, areas of subject matter that were not addressed, etc.

Data collection procedure: The evaluator will

determine who needs to be queried about the outcome of instruction, which systems to extract data from, and the means by which this data will be obtained. This part of the plan may also include listing specific individuals or groups to interview or survey.

Analysis procedure: Once data has been gathered, the evaluator will develop a method of analysis to interpret the findings. Analysis methods may include comparing data prior to instruction against data after instruction, or qualitative analysis that looks for indicators in the data that fit a particular theme, such as satisfaction, meeting expectations, comfort level, readiness, etc.

Evaluation criteria and judgement: The evaluator needs to establish the basis of judging the performance of the program of instruction and then setting a mark that determines whether the program has met the mark. For example, if a program of instruction is intended to improve workers' ability to produce an assembly in a production line over a period of six hours, the evaluation criteria (informed by the Learning Goals) would be stated as, "Assembly workers should be able to produce 10 assemblies in six hours." The mark for success to judge the success of this training program might be set to 90%, meaning that 90% of workers who have completed the training should be able to produce 10 assemblies in six hours. The mark for success can

be any reasonable threshold established by the ID and stakeholders under typical conditions.

Below is an example of an Analysis and Interpretation Plan for a summative evaluation that includes the elements described above. The scenario relates to a program of training related to HIPAA medical information privacy compliance.

HIPAA Training Program: Formative Evaluation Plan

The training program will be developed in time to conduct a formative test prior to launch as follows:

One-to-one: The ID and trainer/expert will convene to review all course material and activities and conduct a mock walkthrough of the training program to determine whether any additional resources will be needed. The multimedia content will be tested with a selected volunteer from the Acme Family Medical Center staff to obtain user experience responses, programming accuracy, and any other questions or concerns about the content. Results from

these formative activities will be applied into program and content revisions.

Small group: Upon completion of revisions, a small group will be convened to retest the program. The group will be comprised of one member of Acme Family Medical Center supervisory staff, one member of the working staff, and the trainer/expert. A walkthrough of the program will occur, except for the discussions. Feedback and revisions will be applied to program and content revisions.

Field trial: Given the relatively small group of trainees and the timeframe for completion, we recommend bypassing field trial and moving on to full launch, with a planned debrief of staff participants following completion of the program to offer feedback and improvements for a possible future HIPAA training program, if needed.

HIPAA Training Program: Evaluation Analysis and

Interpretation Plan

Goal: The goal for this summative evaluation is to determine whether the HIPAA training program was effective in reducing instances of HIPAA violation among medical staff involved in the handling of client records. The primary focus of this study is to determine whether the training program caused the reduction of HIPAA violations among trainees who participated. The secondary focus is to determine whether the training program was perceived as well-designed and supported with appropriate resources.

By evaluating the factors that contribute to these outcomes, stakeholders will be able to determine whether the program should be formatively improved and whether additional HIPAA training programs should be implemented.

The client for this evaluation is Dr. Joyce Jones, Executive Director of Acme Family Medical Center PLC whose responsibility is to oversee company operations.

Audiences: The audiences for this report also include:

- Management executives for the Acme Family Medical Center PLC
- Supervising staff
- Trainees

Interested stakeholders for this report include:

- Legal council for Acme Family Medical Center PLC
- Clients and caretakers of Acme Family Medical Center PLC

Research Matrix for the Analysis and Interpretation Plan

Evaluation Questions	Importance	Collection Procedure	Analysis Procedure	Evaluation Criteria	Pro M Jud
Did the HIPAA training program achieve its goal?	This question addresses whether the training program was effective.	Data collection of HIPAA violation reports.	Compare number of HIPAA violation reports before and after training.	Research should indicate a reduction of HIPAA violations.	Th sho an red of vio
Do trainees feel confident about managing client medical records according to HIPAA rules?	This question addresses whether trainees feel they are able to apply their learning in the workplace context.	Interviews with trainees.	Code references in training interviews for feelings about the training.	Research should indicate improvement in trainee confidence in managing medical data according to HIPAA rules.	90% tra sho exp cor in ma me dat acc to rul

Evaluation Questions	Importance	Collection Procedure	Analysis Procedure	Evaluation Criteria	Pro M Jud
Was the instructional media sufficient?	This question addresses whether the instructional media was useful for the instructor and learners according to their needs.	Interview with instructors. Interview with trainees.	Code references to feelings about the instructional media.	Research should indicate that instructors and trainees felt the instructional media was useful for their learning needs.	90% resp sho ind tha me in t pro was suff for lear
Was the HIPAA training instructor engaged and helpful?	This question addresses whether the teacher-trainer was effective in their instructional engagement	Interviews with trainees.	Code references to feelings about the instructor and learning experience.	Research should indicate that trainees felt the instructor was a positive factor in their learning experience.	80% tra sho exp pos feel abo inst

The sample Analysis and Interpretation Plan includes both quantitative (numeric data) and qualitative methods (participants' feelings) for evaluating the outcome of the training program, though each project may emphasize one

method more than another, depending on the goals of the evaluation.

For example, stakeholders may be more interested in the reduction of HIPAA violations as an outcome than they are with how many trainees passed the training. If all trainees passed the course but HIPAA violations remained unchanged, then the scores of the training wouldn't mean much since the trainees did not transfer their learning to job performance. It is also possible that, in such an instance, the means of assessing trainees' learned skills was flawed in a way that falsely indicated proficiency.

Constructing meaningful evaluation questions

The construction of an evaluation question requires unpacking the stakeholders' goals for the evaluation so that the research questions you propose will produce answers that are meaningful. As you will see, assembling the right combination of questions is a bit of an art form.

In the HIPAA training example, the goal is to determine whether the HIPAA training program was effective in reducing instances of HIPAA violation among medical staff involved in the handling of client records. The line of questioning, therefore, should address the following:

- Did the training cause a change in the post-training

- performance outcome? If not, why not?
- What evidence can be used to support a claim one way or the other?
 - What evidence can be gathered to affirm or validate your findings?

Let's review the first evaluation question: **Did the HIPAA training program achieve its goal?**

What evidence would support a claim that it did? In this case, the data related to HIPAA violations before training in comparison to violations after training may correlate to this claim.

The second question is related to the first question in a more qualitative orientation: **Do trainees feel confident about managing client medical records according to HIPAA rules?**

While the data collected in the first question supports a claim of causation, the answers to the second question suggest that, if trainees felt well-prepared to manage client records according to HIPAA compliance, then the data is more reliable. It also suggests that the improved level of performance is likely to be sustained.

However, if trainees *do not* feel that they are well-prepared despite the training, then it calls into question the validity of the claim made in the first question. Perhaps there were other factors that contributed to the improvement of performance shown in the data? In anticipation of this possibility, the

evaluator would want to gather information to explain why trainees felt they were insufficiently prepared.

The third question, relates to the second: **Was the instructional media sufficient?**

If trainees indicated that they *did not feel confident* in their abilities and they indicated that the instructional media was *insufficient* in some way, it suggests to the ID and stakeholders that a cause of their deficit may be in the media selected as part of the instructional material. If trainees felt the instructional media was sufficient, but they still did not feel well prepared, then perhaps there was another factor.

The fourth question relates to the third: **Was the HIPAA training instructor engaged and helpful?**

If trainees did not feel confident in their abilities but felt that the instructional media was sufficient, then perhaps the cause of their deficit was in the way the course was taught.

As you can see, the lines of questioning are interrelated so that the evaluator is able to triangulate the data to explain the results, whatever they happen to be.

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Robert Davis (Contributor)

Robert Davis is a doctoral student in Educational Technology in the School of Teaching and Learning at the University of Florida. Before coming to the University of Florida, Robert

spent eleven and a half years overseas holding various positions in education. Six months of this time was spent in China as an educational consultant and trainer for and educational company. The other eleven years were spent in Korea working with multiple age groups, instructing inservice teachers in a TESOL certification program, instructing preservice teachers at Kwandong University, and working with the local government training volunteers for the 2018 Winter Olympics.

Brittany E. Eichler (Contributor)

Brittany E. Eichler is a graduate student in the Mathematics department at the University of Florida. She is a teaching assistant at the University of Florida for courses such as Pre-Calculus, Pre-Calculus with Trigonometry, and Calculus I. She has a Bachelor's of Science from Florida State University in Mathematics and Mathematics Education. Miss Eichler was an 8th-grade mathematics teacher at Westview K-8 in Jacksonville, FL where she taught Algebra I, Pre-Algebra, Intensive Algebra, Intensive Geometry, and Geometry Honors.

Brenda R. Lee (Contributor)

Brenda R. Lee is a Ph.D. Student of Educational Technology

and Course Instructor in the School of Teaching and Learning at the University of Florida. Her research interests include online collaboration in virtual learning environments (especially for K-12 English language learners) and societal issues related to the use of technology. Additionally, Lee is an instructional designer for Shadow Health, an educational software developer that has developed the Digital Clinical Experience in which students communicate and interact with digital standardized patients.

James Nichols (Contributor)

James Nichols received his BS in Computer Science from UNC-Pembroke in 2002 and then earned a master of computer engineering from the University of Florida in 2008. While in graduate school, he was a teaching assistant for graduate courses in Software Engineering, Software Specification, Software Testing & Verification and Human-Computer Interaction. He has also taught online courses for Walden University including, but not limited to, networking, security and systems analysis and design. He began as an instructor at Santa Fe College in Gainesville, FL in the Spring semester of 2010 and currently teaches the CCNA-Routing and Switching and A+ certification classes. In 2009 he went to India as a lab instructor for a course in Software Engineering. He is A+ certified and earned his CCNA-Routing and Switching certification and is currently working to achieve a

PhD in Curriculum and Instruction with a concentration in Educational Technology at UF.

Shilpa Sahay (Contributor)

Shilpa Sahay is a second-year doctoral student in Educational Technology and an undergraduate instructor at the University of Florida. She is currently researching impact of iPads in learning elementary education math and English amongst 1st grader girls in an afterschool program. She is also developing a collaborative platform for mentor-mentee interaction and teaching and learning outcomes. She did her Masters in International Education at New York University. Prior to that, she did a Masters in Social Work and Bachelors in Political Science at Delhi University, India. She has over 4 years working experience with grass root NGOs, UN bodies, research group at universities, and multinational organizations. She has done a 4 month internship at UN Headquarters and aspires to work on educational projects that can solve real-world problem of illiteracy and lack of education. She wants to explore potentialities of distance digital learning narrowing the traditional North-South global divide.

Christine D. Salama (Contributor)

Christine D. Salama is pursuing a Master of Arts degree in

the educational technology program in the School of Teaching and Learning through the College of Education at the University of Florida. Christine earned a bachelor's degree in psychology from the University of Florida in 2011 with a focus on educational psychology. Christine developed a love for education at an early age while growing up in the Middle East and attending international schools. She focused on effective instruction and educational systems throughout her career as a student; her concentration on coursework in educational tools and instructional design will help her stay at the forefront of the field as curricula evolve to adapt to new technology developments. Christine also has a background in counseling, psychoeducational assessment, data-based decision making, and implementing blended learning environments at both a high school and collegiate level.

Sharon Walsh (Contributor)

Sharon Walsh is an educational technology Ph.D. student at the University of Florida as well as a reading coach for Clay County Schools. Ms. Walsh has nearly 16 years K-12 experience which includes private, parochial, and public education and utilizes her master's degree in instructional systems from Florida State University to enhance instruction in her current coaching position.

William Wildberger (Contributor)

William (a.k.a. Billy) Wildberger is currently pursuing his Master's Degree in Educational Technology at the University of Florida. He has over a decade of instructional design experience in multiple contexts including higher education, non-profit, and corporations.

Matthew Wilson (Contributor)

Matthew Wilson is a doctoral student and teaching assistant in the School of Teaching & Learning at the University of Florida. Matthew is pursuing a degree in Curriculum and Instruction with a focus on Educational Technology. Matthew earned his Master of Arts in Teaching for Early Childhood and Elementary Education from Willamette University's School of Education and his BA from the University of Oregon. Matthew has over a decade of international teaching experience ranging from pre-kindergarten to adult students and has presented both locally and internationally on the topic of practical technology integration for elementary educators. Matthew currently works alongside pre-service elementary teachers in the theory and practice of technology integration within the elementary classroom. His research interests include learning analytics and games and simulations in education.

Muhammed Yaylaci (Contributor)

Muhammed Emre YAYLACI is an international student from Turkey. He was born in Meram, KONYA, in 1989. He attended elementary school at the same district and graduated from Basak College (high school) in 2006. Following, he started undergraduate education under Educational Technologies department at Selcuk University, Konya. He graduated from that department in June 2011 as a “Computer Teacher.” After graduation, he took the teacher examination test (Called KPSS) and started working as a teacher at a small town elementary school in Eastern Turkey. He taught everything except computer courses because school’s priority was on the mathematics and science. Four months later, he took another nationwide exam like GRE and placed himself among the top ten. Ministry of national education awarded him with a scholarship for Master’s and doctorate degrees as a prize. Currently, he is pursuing his Master’s degree at the University of Florida.