# Introduction to Instructional Design

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# I.

## History of Instructional Design

Instructional design, as a field, found its roots in the midst of World War II . Psychologists and educators, such as Robert Gagne, were recruited by the military to utilize educational and psychological research to develop training materials based upon the known principles of instruction. Assessment and evaluation, informed by psychological perspectives, were also used to identify skills and to improve training of military personnel (Reiser, 2012). After the war, the psychologists and educators continued the work of instructional problems. The development of instructional design models and theories continued over the next several decades, informing computer-based instruction and job performance. Gustafson and Branch (1997) credit the Barson model used at Michigan State University between 1961 and 1965 as being one of the first ID models. However, it was not until the 1970's that the term "instructional design" was even commonly used. However, it was not until the 1970's that the term "instructional design" was even commonly used. Instead, most "designer" called themselves educational psychologists, or media specialists, or training specialists (Dick, 1987). Dick and Carey's now-classic book, The Systematic Design of was not published until 1978. For the most part, the early ID models had a product orientation. The model was directed toward the design and development of a product, but not the implementation and maintenance of that product in a given environment. With the exception of the work of Leonard Silvern, these design projects occurred either in a higher education setting or produced instruction for elementary or secondary schools.

In the early part of the 21st century, instructional design as a field boomed with increased access to the Internet and the influx of online instruction (Reiser, 2012). A recent study on instructional design in higher education found that 13,000 IDs are working in the United States alone (Instructional Design in Higher Education, 2016). As the field has grown, so have the needs of employers and the demand for employees. However, the contexts and needs of a Fortune 500 company, a K–12 school district, and a higher education institution vary greatly, as do the skill sets of employees in these contexts (Sugar, Hoard, Brown, & Daniels, 2012). Likewise, within these different contexts, competencies are often based on organizational culture (Larson & Lockee, 2009).

# What is an Instructional Designer?

The literature offers a variety of definitions for instructional design and those who carry it out in their job roles. Some of the key definitions originate from Sims and Koszella (2008) who define instructional design as a "purposeful activity that results in a combination of strategies, activities, and resources to facilitate learning" and an ID as "a person with the competencies to design instruction" (p. 570).

Since the 1980's, the preponderance of instructional design (ID) practice has occurred within the private sector, primarily in business and industrial settings. This coincides with the steady growth of employee training as an integral part of most organizations. In the United States alone, the training industry was a $62.5 billion endeavor in 1999, up from the 1990 estimate of $45.5 billion and a 1985 estimate of $30 billion as reported by the American Society of Training and Development (Industry Report, 1999; Industry Report, 1990). Remarkably, these data are only partially descriptive, since they reflect only the direct cost of formal training in organizations with 100 or more employees. Infott, on-the-job training is not included. Training in smaller firms throughout the United States is not included. Moreover, such growth is not unique to the United States, but is duplicated to a great extent worldwide.

This growth reflects an emphasis not simply on producing a more knowledgeable workforce, but increasingly upon improving employee on-the-job performance and solving organizational problems. Correspondingly in today's market, instructional design to many is not merely an organized approach to product or course development, but is instead a generic process for analyzing human performance problems and determining appropriate solutions to such problems. In addition, designers and training managers must often predict future problems and likely organizational changes and project ways to prepare employees for these new situations (Pieters, 1997).

Not only did the setting of this new design activity change from the early years, but there were also changes in the conditions under which designers worked. No longer did designers work primarily alone, but now design teams predominate, especially in large organizations. Often designers serve as external consultants or suppliers. The new technologies have drastically changed design tools and processes. The changes have been matched by increased pressures to reduce the time required for design and development, even as designers are now expected to prove their effectiveness by demonstrating they have a positive impact on the mission and profits of the organization.

This new work environment has stimulated changes in design tools and techniques,

and correspondingly in the expansion of designer expertise. The basic 1970's skills have been supplemented by new technology skills, business acumen, and more sophisticated evaluation skills, for example. Designer career ladders are developing to match these new skills.

In today's design market, the field is no longer primarily an American endeavor. Instructional designers are working and being educated worldwide. As organizations expand beyond individual country boundaries, designers are addressing the issues of preparing and adapting instructional materials for different cultures. This is done both internationalizing the materials to make them "culture-free" and by localizing the products to make them "culturally dependent" (Richey and Morrison, 2000). Instructional designers, like others employed in the 21st century, are faced with the prospect of continual re-tooling to meet their new job demands. Even though new design paradigms have been introduced, most design practice is still dominated by systematic design procedures, but procedures that are implemented with new tools and new constraints.

## What Skills Do an Instructional Designer Need?

### Collaboration

The most frequently cited competency for instructional design and designers in the literature is collaboration. Collaboration is a complex skill that requires IDs to carefully interact
with a variety of stakeholders to accomplish a shared goal. This competency may occur with subject-matter experts (SMEs), content experts, faculty, or instructors, all of whom we refer to as SMEs in this paper. IDs must consider multiple factors when working with SMEs, such as academic freedom for faculty in higher education institutions, consensus building among multiple stakeholders, and difficult decision-making based on resources and time (Brigance, 2011; Gray et al., 2015; Kelly, 2016). Solomonson (2008) suggests that IDs act as consultants, navigating and developing relationships with SMEs. Relationship building occurs, in part, through effective communication. While the collaborative nature of the ID role is cited frequently in the literature, the tension between designer and faculty is also described. In a recent survey of faculty attitudes, under half of respondents who

teach online have worked with an ID. These faculty did not believe that IDs could help them, and some did not have an interest in working with an ID (Jashick & Lederman, 2018). The Instructional Design in Higher Education (2016) report found that IDs consider lack of buy-in as the number one barrier to success. The lack of understanding of the ID role in higher education has contributed to tension between faculty and IDs. Clarity on the ID role and its competencies can decrease the barriers to successful ID–faculty collaboration.

## Communication

Communication is widely cited as imperative to successful instructional design since the primary goal of an ID is to work with others to facilitate learning. Communication includes written and verbal communication, as well as asynchronous (i.e., email) and synchronous (i.e., web conference) interactions. Kenny, Zhang, Schwier, and Campbell (2005) rate communication as one of the four main competencies for IDs. The International Board of Standards for Training, Performance and Instruction (ibstpi) rates communication as an essential competency (Instructional Design Competencies, 2012). Yet Sims and Koszalka (2008) state that the designer's communication skills must extend to combinations of asynchronous and synchronous interactions, and their ability to present instructional information must integrate key factors pertinent to the virtual environment. Even more frequently, instructional designers will have to rely on podcasts, wikis, and mobile phones to receive and respond to information; the traditional modes will be superseded by those underpinned by these emerging digital technologies. (p. 572) Thus, IDs must be comfortable communicating with others as well as adapting to new ways of communicating. Additionally, good communication skills facilitate the explanation of instructional design frameworks, models, and/or theories to key stakeholders.

## Theoretical Knowledge

The literature cites knowledge and application of instructional design theory and models as necessary to the ID role. Instructional design theories and models include, but are not limited to, the Analyze, Design, Develop, Implement, and Evaluate (ADDIE) model, adult

learning models based on adult learning theory (i.e., andragogy), teaching theory, and learning theory. IDs may use theoretical knowledge to assist in decisions about projects and instructional problems (Sugar & Luterbach, 2015). While recognized as important to the ID role, it is interesting to note that there is some debate on how often and how effectively theory is applied in practice, such as in day-to-day activities like course design and development that require IDs to constantly engage in problem-solving (Thompson-Sellers & Calandra, 2012).

### Problem-Solving

Many of the authors describe the instructional design process as one of problem-solving. Ertmer and Stepich (2005) define an ID as someone who can solve ill-defined problems. The design process requires an ID to find solutions to multiple instructional problems (Kenny et al., 2005). IDs make multiple, complex judgements based on situational factors when collaborating with SMEs and designing instruction and courses (Gray et al., 2015).

### Course Design

IDs spend time designing instruction to facilitate learning. This is a key focus for the ID role. Course design may include crafting learning objectives, developing instructional strategies,
developing assessment strategies, and finding resources for SMEs to use in instruction. Course development may include creating multimedia objects and other instructional activities. Other frequently cited ID competencies that were commonly cited, but not as frequently as the previous five, include project management, research and analysis, and technical expertise.

## Definitions

It is important to understand specific terms used in the instructional design field. Often

times, they are used interchangeably yet they are distinct. Smith and Ragan (2005) define **education** as "experiences which people learn" (p.2). Education is the overarching terms that encompasses instruction, training, and teaching. **Instruction** is narrowed as "the conduct of activities that are focused on learners learning specific things" (Smith and Ragan, 2005, p. 2). **Training** is the act of "instructional experiences that are focused upon individuals acquiring very specific skills that they will normally apply almost immediately" (Smith and Ragan, 2005, p. 3). While **teaching** is generally restricted to learning experiences that facilitated by a human being (Smith and Ragan, 2005). An important distinction is that teaching can overlap with training, instruction, and education while training can be considerate teaching or instruction.

One of the most confusing concepts in instructional design is the difference between a **model** and a **process**. For instructional design purposes, a **process** is defined as a series of steps necessary to reach an end result. Similarly, a **model** is defined as a specific instance of a process that can be imitated or emulated. In other words, a model seeks to personalize the generic into distinct functions for a specific context. Thus, when discussing the instructional design process, it is often referred to ADDIE as the overarching paradigm or framework by which we can explain individual models. See more information about model and process in the next section.

Another term within the realm of instructional design that is used inconsistently and further adds to the confusion of communication is **system**. The term **system i**s used in at least three different ways. However, some authors describe the outcomes or products of the development effort using the term **system.** Based on the second perspective the actual learner environment and its related management and support components together comprise an instructional system. A third, less common use of the term **system** is in the context of general systems theory (GST). Numerous general systems theory concepts, such as open and closed systems, entropy, and interdependence, are applied during discussions of the instructional development process. Reiser (2001), in providing a history of instructional design, noted:

> Over the past four decades, a variety of sets of systematic instructional design procedures (or models) have been developed, and have been referred to by such terms as the systems approach, instructional systems design (ISD), instructional development, and instructional design. Although the specific combination of procedures often varies from one instructional design model to the next, most of the models include design, development, implementation and evaluation of instructional procedures and materials intended to solve those problems. (p. 58)

# An Instructional Design Process


Figure 1. The ADDIE Process

The most popular instructional design process is ADDIE. The five activities above have often been referred to as ADDIE and labeled as a generic instructional design paradigm. The ADDIE paradigm provides a useful set of criteria for determining whether a model is inclusive of the entire ID process or only one or more of its elements. The progression of analyzing, designing, developing, implementing, and evaluating (ADDIE) forms the basic underlying process (illustrated in Figure 1) that is a distinct component of instructional design regardless of which model is used (Gustafson & Branch, 1997). Branch (2009) said it well when he conceptualized the phases of the ADDIE process as follows:

1. **Analyze** – identify the probable causes for a performance gap,
2. **Design** –verify the desired performances and appropriate testing methods,
3. **Develop** – generate and validate the learning resources,
4. **Implement** – prepare the learning environment and engage the students,
5. **Evaluate** – assess the quality of the instructional products and processes, both before and after implementation (p. 3).

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# 2.

## Introduction

Because instructional design emphasizes facilitating learning and improving performance, instructional designers must begin by acquiring necessary information about their learners' educational journeys. Needs assessment can assist instructional designers to make recommendations and design appropriate solutions (both instructional and non-instructional solutions) that will assist their learners in translating what is taught to their successful implementation.

The purpose of a needs assessment is to identify the gap between the current state of performance and the desired state of performance (Altschuld & Kumar, 2010). This gap in performance is what then becomes the need. While needs assessment can be a powerful and informative tool, the instructional designer cannot get lost in analysis and delay their design work (Stefaniak, Baaki, Hoard, & Stapleton, 2018). They need to be able to work within the scope of their design space, rely on the resources they have available to them, and make decisions to the best of their knowledge.

This chapter will address how validating needs and contextual factors influencing learner performance can be accounted for in instructional design to ensure the transfer of learning in real-world contexts. It will also demonstrate how information gathered from needs assessment can be leveraged to identify and develop the necessary scaffolds to manage the learning experience.

## Exploring the Intersection Between Needs Assessment, Needs Analysis, and Instructional Design

The information that a needs assessment yields provides the details and specifications needed for an instructional designer to create an instructional product that is customized and accounts for the unique needs of the learning audience. It also provides benchmark data regarding the current level of performance (or situation) that the instructional

designer and their team can evaluate and compare after instructional interventions have been designed and implemented. Instructional designers and the team members will also be better positioned to monitor the instructional delivery and transfer of knowledge to the job or desired application if they have been presented with sufficient data concerning these phases.

It is important to differentiate between needs assessment and needs analysis as they are not synonymous with one another but are often used interchangeably. **Needs assessment** is the process of gathering information to determine whether there is a gap between the current state and the desired state. This gap yields *the need*. **Needs analysis** is the process of further investigating the situation to understand why this gap exists in the first place. The data that is gathered during the needs assessment is analyzed to determine what is contributing to or causing the gap (Kaufman & Guerra-Lopez, 2013).

Needs assessment and needs analysis provide an opportunity for an instructional designer to develop instructional materials that can have a meaningful impact on their learning audience. In more cases than not, when instructional designers are brought onto a project, the solution (need) has already been decided:

- We *need* to design an online degree program
- We *need* to design a safety course for incoming employees
- We *need* to design a team training course for the hospital staff

If you look closely, you will see that each of the above-mentioned statements contained the word *need*. Whether it is your client or a supervisor, the need has already been decided. Another caveat is that there are a lot of times where the need has been decided with no needs assessment ever having been conducted (Peterson & Peterson, 2004). Oftentimes when this occurs, the instructional designer begins work on their tasks only to find that they have a lot of unanswered questions:

- Why are the learners experiencing this problem?
- How will they use the instruction after training takes place?
- How will we know if they are implementing what they have learned in their actual jobs?
- How do we know that the instruction we have designed is doing what it was meant to do?
- Has the organization tried this type of instructional method in the past?
- What is the rationale for proposing online instruction?

- Are we sure that instruction is going to solve the problem?
- Is there a subject matter expert that we can speak with to provide some more guidance on what the learners need?

All of these questions are very specific and unique to the learning audience of a project. Some of these questions may be related to the instructional environment while others may be looking ahead to how learners will be expected to transfer this knowledge to a real-world setting (i.e. the classroom, a job).

Regardless of what needs assessment model may be referenced, a typical assessment will consist of five-steps: problem identification, identification of data sources, data collection, data analysis, and recommendations. Table 1 provides an overview of each of these steps. While these steps are usually completed linearly, the individual who is conducting the needs assessment needs to continue to modify the problem and identify additional data sources as more information is uncovered during the assessment. With that in mind, the needs assessment process is very similar to the instructional design process in that both processes are recursive.

**Table 1**

*Overview of needs assessment process*

| Needs Assessment Step | Description |
|---|---|
| Identification of Problem | This step is typically completed in consult with a client (or the individual(s) requesting instructional design services. During this phase, the purpose of the needs assessment (the problem) is identified for the instructional designer to begin gathering data to address the gap in performance. |
| Identification of Data Sources | Once the problem to be explored has been identified, instructional designers must identify data sources that will help them better understand the situation. Instructional designers must gather data that will help them explore the situation from multiple angles. Examples of data sources include, but are not limited to, task analyses, direct observations, focus groups, interviews, document analysis, reviews of existing work products, and surveys. |
| Data Collection | This phase involves the instructional designer gathering data based on the data sources that were identified in the previous step. |
| Data Analysis | Once data collection is complete, the instructional designer begins to analyze all data to identify patterns and factors contributing to the problem identified at the beginning of the assessment. Depending on the findings from the data collection and analysis phases, the problem may be modified to be more consistent with the actual situation as depicted by the data. |
| Recommendations | Upon identifying patterns contributing to the problem, the instructional designer makes a list of recommendations to present to their client. These recommendations are typically prioritized according to the severity of need and level of urgency. |

Figure 1 provides an overview of how needs assessment and needs analysis can help leverage instructional design practices to support the transfer of learning. Conducting a needs assessment provides the instructional designer with the opportunity to contextualize their project. It provides them with an opportunity to gain insight into things they should include in their designs, as well as things they should consider to avoid. Regardless of the situation, a needs assessment will help an instructional designer identify or verify the project needs. This is especially helpful when the needs have already been identified without the guidance of a needs assessment.

Needs analysis also aids the instructional designer by providing some context as to why these needs exist in the first place. If learners are facing recurring challenges completing a particular task, instructional designers should understand the causes so that they can account for these issues in their designs. By developing a better understanding of factors that contribute to or inhibit the transfer of learning, instructional designers will be able to

develop a more realistic approach to the instructional solution. It will also provide them with the opportunity to determine if certain non-instructional interventions are needed to support the transfer of learning.

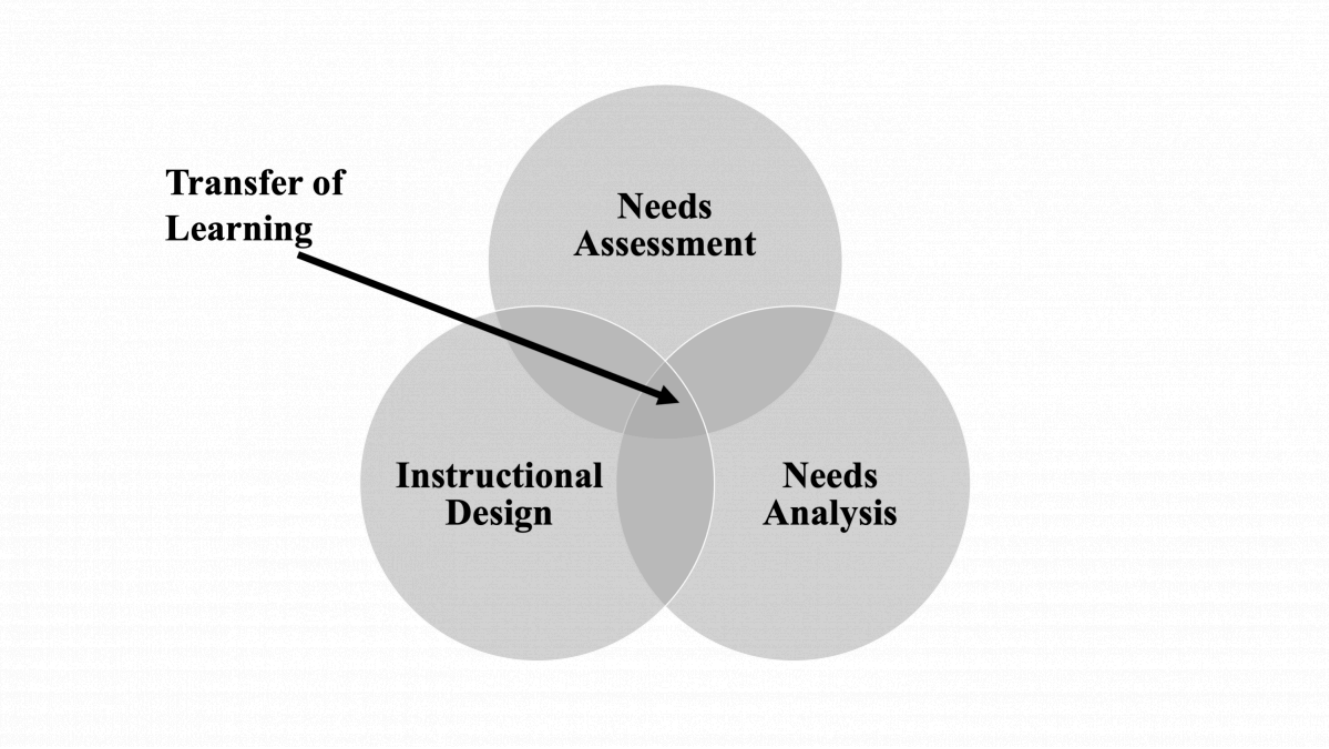


*Figure 1: The relationship between needs assessment, needs analysis, and instructional design*

## The Role of Context in Needs Assessment

Needs assessment is recognized as being an important component of the instructional design process (Dick, Carey, & Carey, 2009, Morrison, Ross, Kalman, & Kemp, 2013; Smith & Ragan, 2005; Cennamo & Kalk, 2019); however, it often tends to be minimized to focus more on learner analysis. Contextual analysis is also a term that is used synonymously with needs assessment in a lot of instructional design literature. A seminal piece written by Tessmer and Richey (1997) suggested that contextual analysis should account for factors influencing performance in the orienting, instructional, and transfer contexts. Figure 2 provides an overview of the more common factors that influence each of these contexts. Tips for how to address these three contexts will be discussed further in this chapter. By addressing these factors in instructional design practices, designers put

themselves in a better position to design experiences that were relevant to the learning audience.

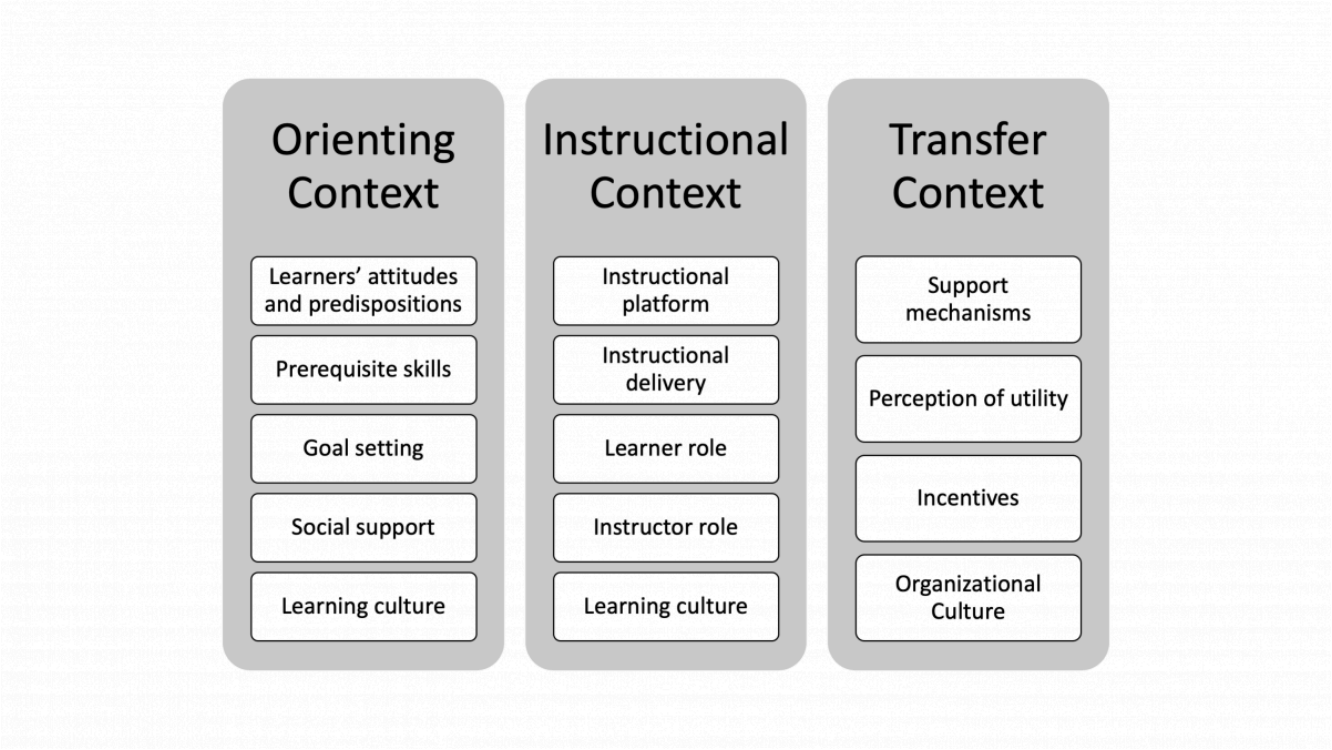


*Figure 2 Common contextual factors influencing instructional design adapted from Tessmer & Richey (1997)*

While contextual analysis aims at understanding the learner's work practice, needs assessment further delves into identifying, classifying, and validating the needs of users as they pertain to the context (environment). It is imperative that a designer fully understand the intricacies and nuances of the context (environment) so that they can design a prototype that addresses particular contextual factors that may support or inhibit the transfer of learning into the real-world environment (Smith & Ragan, 2005). These factors, both good and bad, ultimately influence the instructional designer's design.

While there are different types of analyses that an instructional designer may be required to employ during a project, it is important to recognize that while they are all different, they are not mutually exclusive. While each has different foci, all of these foci fall under the needs assessment umbrella.

Table 2

*Overview of analyses an instructional designer may utilize to inform their design*

| Method of Analysis | Description | Resources and Studies for References |
| --- | --- | --- |
| Needs Analysis | Analysis that occurs after a needs assessment has been conducted to understand the root causes contributing to a problem.<br>The process of understanding the root causes contributing to a problem. This analysis is conducted after the needs assessment. | Brown (2002)<br>Crompton, Olszewski, and Bielefeldt (2016)<br>Dick and Carey (1977)<br>Stefaniak et al. (2018)<br>Stefaniak, Mi, and Afonso (2015) |
| Contextual Analysis | The process of analyzing factors that may contribute to or inhibit knowledge acquisition and transfer of learning. | Arias and Clark (2004)<br>Morrison, Ross, and Baldwin (1992)<br>Perkins (2009)<br>Tessmer and Wedman (1995) |
| Environmental Analysis | The process of focusing on the impact that the learner may have on the environment outside of the organization such as customers, competitors, industry, and society. | Lowyck, Elen, and Clarebout (2004)<br>Marker (2007)<br>Rothwell (2005)<br>Tessmer (1990) |

| | | |
|---|---|---|
| Learner Analysis | The process of capturing an in-depth understanding of an instructional designer's learning audience. Demographic data, prerequisite skills, and attitudinal information are typically gathered to inform the instructional designer. | Baaki et al. (2017)<br>Dudek and Heiser (2017)<br>Öztok (2016)<br>Stefaniak and Baaki (2013)<br>van Rooij, S. W. (2012) |
| Task Analysis | The process of conducting direct observations of individuals performing job-related tasks and documenting in a step-by-step fashion. Task analyses are done to help instructional designers design instruction that is aligned with how the job will be performed in a real-world setting. | Jonassen, Tessmer, and Hannum (1998)<br>Militello and Hutton (1998)<br>Schraagen, Chipman, and Shalin (2000) |

Table 2 provides an overview of the various types of analyses that may be used. Examples of instructional design studies that have explored these topics in more detail are also included for reference. A commonality among all of these analyses is that they typically involve collecting data from multiple sources to gain a better understanding of the situation. Out of all of the analyses listed in Table 2, needs assessment is most often the most time-consuming because it requires instructional designers to identify appropriate data sources, collect data, conduct data analysis, and consult with their client on recommendations for moving forward. Direct observations, document analysis, interviews, focus groups, and surveys are all examples of the types of data collection tools an instructional designer may utilize when conducting an analysis.

The use of the above-mentioned data sources has been used to inform the development of learner personas in instructional design (Anvari & Tran, 2013; Avgerinou & Andersson, 2007; Baaki, Maddrell, & Stauffer, 2017; van Rooij, 2012). With more emphasis being placed on user experience design practices, more attention is being placed on *who* our learners are as opposed to generalizing the learning audience. Learner analyses and contextual

analyses are complementary in that both yield data that will inform the other. Environmental analyses add an additional layer by focusing on the impact that the learner may have on the environment outside of the organization such as customers, competitors, industry, and society (Rothwell, 2005).

## The Reality of Instructional Design Work and Needs Assessment

While I would love to see every instructional designer be an advocate for needs assessment and push back when clients or supervisors present need statements with no assessment validating that the identified needs warrant instruction, the reality is that most instructional designers will have a hard time arguing the need to pause a project and conduct a thorough needs assessment (Hoard, Stefaniak, Baaki, & Draper, 2019; Stefaniak et al., 2018). Needs assessments *are* conducted; but often because the client has recognized the importance of needs assessment before approaching an instructional designer to work on a project. It is also important to note that a needs assessment is only as good as the data that is collected.

**Table 3**

*Needs statements and further inquiries*

| **Client Need Statements** | **Instructional Designer Inquiries** |
|---|---|
| We *need* to design an online degree program. | How are courses currently being offered?<br>What is the market for online instruction?<br>What is the rationale for moving towards the development of an online degree? |
| We need a new learning management system. | How are training materials currently being stored?<br>What features are used in the existing LMS?<br>What features are needed?<br>How are the instructors and students currently using the LMS? |
| We *need* to design a safety course for incoming employees. | What do incoming employees need to know about safety upon starting a new job?<br>What incident(s) occurred that suggests there is an immediate need to create a safety course?<br>What other training courses are incoming employees expected to complete? |

What does this mean for the instructional designer? Recognizing that the absence of a thorough needs assessment is a common issue in our field, there are strategies that instructional designers can employ to gather additional data and information relevant to the project they have been assigned.

If a client has decided to conduct a needs assessment, it is important for the instructional designer to participate in framing the needs by asking appropriate questions. Table 3 provides an overview of examples of needs statements and questions an instructional designer can ask to gain further clarification of the situation. Like most projects, there are varying degrees of complexity an instructional designer can delve into when addressing needs assessment (Rossett, 1999). The amount of time and resources that an instructional designer can apply towards gathering additional data for a project will ultimately determine the scalability of the level of analysis that is completed (Stefaniak, 2018; Tessmer, 1990).

Just because a client or a supervisor may not allocate the time or funding needed to support a needs assessment, that does not mean that the instructional designer has to abandon the idea altogether. At the very least, there are key components that an instructional designer should address during an initial intake meeting with the client or kick-off meeting with the instructional design team. Table 4 provides examples of different steps instructional designers can take if they were to scale a needs assessment project.

**Table 4**

Scalability of instructional design needs assessments

| Level of Scale | Tasks |
|---|---|
| Low (1–2 weeks) | • Review existing training materials.<br>• Review documents explaining job processes.<br>• Meet with a subject matter expert (in the organization) to provide guidance on content that should be emphasized in the instructional product.<br>• Obtain an overview of the learning audience by the client. |
| Medium (1 month) | • Review existing training materials.<br>• Conduct observations of employees performing job tasks.<br>• Update existing task analyses.<br>• Meet with individuals that represent multiple levels of authority within the organization related to the instructional project.<br>• Obtain an overview of the learning audience by the client. |
| High (several months) | • Review existing training materials.<br>• Review strategic planning documents.<br>• Meet with individuals that represent multiple levels of authority within the organization.<br>• Conduct observations of employees performing job tasks.<br>• Update existing task analyses.<br>• Conduct interviews and/or focus groups to understand factors that are inhibiting the transfer of learning.<br>• Triangulate information from multiple sources to understand patterns contributing to or inhibiting employee/learner performance on the job. |

Table 5 provides an example of a form that instructional designers can use to gather the data they need to ensure their instructional design work is contextually relevant to the learners' needs. This form is not meant to be an exhaustive list of questions instructional designers should ask at the beginning of a project; rather, it is intended to help instructional designers spark conversation with their client about the contextual factors and needs of the project that should be addressed throughout the design. Depending on the information provided in the intake form, instructional designers will decide whether a detailed task analysis is required to understand specific tasks expected of the learning audience.

**Table 5**

*An example of an instructional design intake form*

**INSTRUCTIONAL DESIGN PROJECT INTAKE FORM**

**Date:** **Client:**

**Instructional Designer:** **Project Name:**

**PROJECT OVERVIEW**

1. What is the purpose of the project (instructional need)?
2. What is the scope of the project?
3. Learning platform (i.e., face-to-face, blended, online)
4. Overarching course goal
5. Learning objectives
6. What level of importance is the training? (i.e., severe, moderate, mild)

**LEARNING AUDIENCE**

1. Who is the intended learning audience?
2. What are the learners' experiences with the project topic?
3. What challenges do learners typically experience with this topic?
4. What are the learners' overall attitudes toward training?
5. What information will the instructional designer have access to regarding the learning audience? (i.e., job observations, meetings with learners, work products, interviews, etc.)

**INSTRUCTIONAL ENVIRONMENT**

1. How will the instruction be delivered?
2. How will learners access the material?
3. What is the length of the course?
4. What are the learners' roles during instruction?
5. What is the instructor's role during instruction?
6. What types of assessment need to be included in the instruction?

**TRANSFER (APPLICATION CONTEXT)**

1. How soon after the training will learners apply their newly acquired skills?
2. What are the anticipated challenges with applying these new skills in a real-world environment?
3. What resources are available to support learners during this transfer phase (i.e., job aids)?
4. Who is responsible for monitoring learners with transference?

**EVALUATION**

1. How and when will the instructional training be evaluated for effectiveness?
2. Who will be responsible for conducting an evaluation?
3. What methods of evaluation will be used to determine the efficiency and effectiveness of the instruction?

**OTHER COMMENTS**

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# Conclusion

To adhere to Richey et al.'s (2011) definition of instructional design encompassing the facilitation of learning, instructional designers must task themselves with gathering as much information as they can to understand the contexts that their learners will experience (i.e. the learning and transfer contexts). Not only is it necessary for the instructional designer to understand the instructional environment, but they must also have insight into how their learners will apply the knowledge obtained from instruction and apply it to a real-world setting. The purpose of this chapter is to provide instructional designers with an introduction to the potential that needs assessment offers instructional designers and provide some strategies and tools that can be applied to an instructional design project regardless of the context.

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## Source

# 3.

## Introduction

Designing a course that best fits the needs of learners requires both an understanding of who the learners are, as well as actual efforts to evaluate and understand their needs. The chapter reviewed both conceptual issues that concern learner analysis as well as practical approaches you can use to analyze actual learner needs.

Because of this, learner analysis is an important aspect of the instructional design process. It is important to remember that learners are not empty containers in which knowledge can simply be poured. They have experiences through which they understand the world and through which they will understand or evaluate the instruction. In this way, learning is a process that involves change in knowledge; it is not something that is done to learners but instead something that learners do themselves (Ambrose et al., 2010). Hence, "consideration of the learners' prior knowledge, abilities, points of view, and perceived needs are an important part of a learner analysis process" (Brown & Green, 2015, p.73).

Although various scholars may use different verbiage, broadly, a learner analysis can be understood as the process of identifying critical aspects of the learner, including demographics, prior knowledge, and social needs (Adams Becker et al., 2014, and "is characterized as an iterative process that informs vital instructional design decisions from front-end analysis to evaluation" (Saxena, 2011, p. 94) by customizing the instruction to the previous knowledge of each individual learner so that the learner controls their own learning and has a deeper understanding of the classroom material (Reigeluth & Carr-Chellman, 2009). For example, an instructor teaching a biology master's program can expect learners to have a solid foundational knowledge of biology. At an undergraduate level however, the instructor may expect students to have a somewhat limited understanding of biology. The instructor will also have to take into consideration the learner group characteristics such as first-generation students, international students, adult learners, and learners with accessibility needs (e.g. requiring note-taking accommodations and extra time on exams), all of which may influence teaching of content, distribution of content, and pace of content distribution in the classroom. Another characteristic is the learning preferences within the group of learners, such as

whether they prefer and respond better to small group learning, hands-on experiences, or case studies.

Much has been written about learner analysis, in terms of definition and the process by which it can be accomplished. However, regardless of the definition advanced, what is important to discern is that through a learner analysis, the learner contributes to the instructional design of the course and miscommunications between the learner, instructor, and course goals are identified (Adams Becker, 2014; Dick et al., 2009; Jonassen et al., 1999; Fink, 2013). A learner analysis ensures that the learner benefits from a productive learning environment that can leave a lasting impact on their lifelong learning (Adams Becker et al., 2014; Dick et al., 2009; Jonassen et al., 1999; Fink, 2013).

The focus of this chapter is on how to conduct a learner analysis. This process often includes identifying learners' characteristics, their prior knowledge, and their demographics, all of which are key factors to consider when designing a learning environment (Adams Becker et al., 2014; Dick et al., 2009; Jonassen et al., 1999; Fink, 2013). Demographics include the environment in which the learner lives and works, ethnicity, accessibility to technology, and educational background. Other factors—such as motivation, personal learning style, and access to content—also play a role in how individuals learn (Adams Becker et al., 2014; Dick et al., 2009; Jonassen et al., 1999; Fink, 2013).

The chapter begins with explaining the components of a learner analysis, describing reasons for a learner analysis, and providing a learner analysis worksheet. The next section of the chapter explains an area that the authors believe is often not discussed when writing about learner analysis: the ethics of working with learners, developing personas, and experience mapping. The last section of the chapter includes a learner analysis design project to enable the reader to put into practice some of what is covered in the chapter.

## Components of a Learner Analysis

When designing learning environments, there needs to be a birds-eye view of the entire process from who the learner is, the environment, background of the learner, and the goal of the learning environment. An educator cannot make assumptions about learners based on the educator's experience. The following are key factors of the learner analysis to consider.

## 1. Learner Characteristics

Understanding the characteristics of learners can help shape the design of the course. For example, if your class is an executive-level course for Fortune 500 high-level officers, you may expect learners with professional experience, and who have different goals for learning and their careers, which is different from a class of undergraduate students who have little to no work experience.

In examining factors of learner characteristics, these are key questions to think about (Adams Becker et al., 2014; Dick et al., 2009; Jonassen et al., 1999; Fink, 2013):

- Who are the learners?
- What personal characteristics do these learners possess?
- What are the dimensions of the learner?
- What contributes to the reason for learning about the topic?
- What is the reason for enrolling in the course?
- What are the student's learning styles?
- What is it about the topic that motivates the learner?

## 2. Prior Knowledge

Time is a finite resource for most people, so instructional time should not be wasted covering material that learners already know, but instead building on their prior knowledge. Students' prior knowledge influences how they interpret and filter new information given in the classroom (Ambrose et al., 2010; Cordova et al., 2014; Dochy et al., 2002; Umanath & Marsh, 2014).

In examining factors of prior knowledge, there are key questions to think about:

- What do learners already know?
- How might this information contribute to the content and order of what you teach?

## 3. Demographics

Understanding who the learners are and their demographics can directly impact the instructional material. It is important, for example, not to include instructional material that may be culturally insensitive or that has no connection to students. This is particularly important when using media such as film that could be considered historic to one group and offensive to another. Culture is integral to learning and plays a central role in "determining the learning preferences, styles, approaches and experiences of learners" (Young 2014, p. 350). It is worth noting that culture can also relate to organisational cultures. For example, using learning materials or illustrations that promote collaboration amongst employees in an organization that does not have or prioritize such a practice, may run contrary to the typically established culture.

In examining factors of demographics, key questions to think about are:

- Where are the learners coming from in terms of their education level, ethnicity, demographic, hobbies, area of study, grade level?
- Why are these demographics important for the material you will be teaching?

## 4. Access to Technology

In education, it is important to make sure that all learners have access to the educational material. As technology becomes a necessity to participate in learning opportunities, it is also important to gauge whether or not students have access to technology. Material should be flexible, but you can imagine if you are assigning work through an app that is only available for Apple devices, how this can affect learners who own Android phones. Thus, make sure that throughout the course, educational material is universally accessible.

Sometimes issues of access can be tricky or surprising. For example, if there is only one computer, or limited internet bandwidth, but two parents and two children all need to access it for their job or homework, then there is not sufficient access. Similarly, the computer or internet access may be too old to play the instructional multimedia in a module. Thus, it is important to look beyond the statistics to truly understand the level of access.

In examining factors of access, key questions to think about are:

- How accessible is technology to every learner in my class?
- Are learning materials universally accessible for individuals with disabilities?
- If access is not universal, how can I adapt my course curriculum to include all learners?

## Put Your Skills to Use: The Learner Analysis Questionnaire

When conducting a learner analysis, a collection of learner information will help develop a positive learning environment. The Learner Analysis Questionnaire below is one way to collect and record key factors and general information about the learners, using information available from student enrollment data. This worksheet can be adapted for designing instruction for various learning environments including higher education, k-12 education, corporate, and military. Student information is often provided when a student enrolls, and academic advisors or student enrollment professionals may also be able to share this information with you.

## *Learner Analysis Questionnaire*

- Size of target audience
- Are there any subgroups that may participate?
- Age ranges
- Educational/grade level, or academic program year.
- How long have they been out of an educational setting?
- Gender breakdown
- Cultural backgrounds
- Primary language
- Employment status
- Socioeconomic status
- Traditional/non-traditional/first generation learners?
- Geographic location(s)

- Internet connectivity?
- Access to technology?

*Note.* Adapted from https://en.wikiversity.org/wiki/Instructional_design/Learner_analysis/what_when_whyLearner Analysis: What/When/Why

## Ethics of Working With Learners

There is now an ever-increasing amount of information on learners available on the internet broadly, and specifically through learning management systems and social media that institutions and designers can access. Data on learners includes but is not limited to: personal information, enrollment information, academic information, and other data collected by educational institutions. What was once kept private between the learner and institution on paper can no longer be assumed as safe. Records which are now held in digital format are vulnerable to hackers and are enticing to outside agencies that are seeking to monetize the data. How, then, do institutions assure ethical use of learners' data that may be needed or used for learner analysis? How much data is reasonable to share? If institutions are asking learners to be ethical in their academic assignments, shouldn't institutions do the same when it comes to working with learners? This section covers professional expectations regarding ethical conduct towards learners.

## Professional Expectations

In the context of conducting a learner analysis, a professional is expected to be "committed to the needs and best interests of their clients who are basically their learners" (Wainaina et al., 2015, p. 68). There are various code of conducts from which one can draw guidance for ethical practice as most professional organizations have codes of conduct or ethics. An example is the Association of Educational and Communication Technology (AECT). However, it is critical to know that just because one adheres to a code of ethics, it does not mean there will never be conflict. What is unfortunately inherent in all human relationship is a level of conflict, even when one has good intentions. So the question then is that what happens when conflicts or perceived ethical violation occurs

especially when a designer is engaged in collecting data needed for learner analysis? There are various approaches, but here we suggest the following ethical framework developed by Mathur and Corley (2014) which suggests considerations and questions to ask:

- Fact-finding – Most conflicts are related to communication or lack thereof. Hence one of the first steps is to engage in fact-finding exercises. What are the facts? What is known and what is not known?
- Who is involved – who are the people that care about this case or incident? What has been (mis)communicated? Who are the individuals involved?
- What is the conflict? – Is the conflict about the frameworks being used? If so, what are those frameworks and what is conflicting? If the conflicts concern the values, morals, or policies, establish what those are and what needs to be adhered to.
- Potential consequences to actions — What are some of the possible consequences for any actions taken to solve the dilemma? How would the people involved like to be treated? What is the role of the designer in solving the conflict (whether or not the designer is involved in causing this conflict)?
- Reflection – Lastly, reflect on the actions taken. What are the repercussions, if any, to the actions taken from the difficulty?

Educators have a responsibility entrusted upon them when educating learners. The duties include but are not limited to, creating a safe environment and being professional not just in virtual space but also in digital space. When educators neglect their responsibility to be professional and ethical (an expectation that we often have for students), this can be detrimental to learners.

## Developing Personas in Learner Analysis

It is often stated that if you want to know a person, you must walk in their shoes. This idiom captures the goal of a learner analysis by helping us figuratively walk in someone's shoes and come to understand them more deeply. One way to do this is through personas. Personas are fictional characters that embrace the needs and goals of a real user or group of learners (Faily & Flechais, 2011). Personas help generate an understanding of learners and what their key attributes are that learning designers need to know for their designs

(Dam & Siang, 2019). Personas may be fictional characters, but they are built based on real learner analysis data and thus embrace the needs and goals of real learners.

Effective personas do five things (from usability.gov):

1. Represent the majority of learners
2. Focus on the major needs of the learner
3. Provide clear understanding of the learners' expectations
4. Provide an aid to uncovering universal features
5. Describe real individuals

To develop your own persona, the following chart in Table 1 can be helpful.

| Objective | Questions |
|---|---|
| Define the purpose/vision of the course | What is the purpose of the course?<br>What are the goals of the course? |
| Describe the user | Personal<br>What is the age of the learner?<br>What is the gender of the learner?<br>What is the highest level of education this learner has received?<br>Professional<br>How much work experience does your learner have?<br>What is your learner's professional background?<br>Why will the learner take the course?<br>Technical<br>What technological devices does the learner use on a regular basis?<br>What software and/or applications does the learner use on a regular basis?<br>Through what technological device does your user primarily access the web for information? |
| User motivation | What is the learner motivated by?<br>What are the learner's needs? |

When developing your persona, remember to organize the information in an easy-to-read logical format, and make it as visual as possible to convey the greatest sense of the "humanness" of the learners. Key pieces of information to include are the persona group (i.e. learner), fictional name, personal demographics, goals and tasks for the course, physical/social/technical environment, and a casual picture representing their learning environment.

Personas are a helpful way for designers to create a more engaging, more productive, and more effective educational experience for learners. Follow the guidelines provided in Table 1 when creating personas and be flexible and open to new information, as the personas may not be the same from start to finish.

## Understanding Learners Through Experience Mapping

The popular adage of "the customer is always right," is often used to emphasize the importance of providing excellent customer service (Samson et al., 2017). While educational institutions are different from traditional service industries, they can still benefit from paying attention to learners' experiences. An experience map is a strategic tool that captures the journey of customers from point A to point B and generalizes critical insights into learner interactions that occur across such experiences. The journey captured in experience mapping, which is adapted from Schauer (2013), is split into four characteristics that generalize the experience of a learner:

1. uncover the truth
2. chart the course
3. tell the story
4. use the map

The first step, uncover the truth, includes studying the learner's behavior and interactions across channels and touchpoints. Channels are the interactions a person has with a product or service. Touchpoints are the interactions of a person with an agent or artifact of an organization. In the first part of the experience mapping, a designer finds various data and insights relevant to the experiences in the mapping process, including actually talking to the learners. Previous learner surveys and evaluations of the course or program are a good data source to begin. In order for the map to be believable, it needs to tell an authentic story and provide strong insights.

The second step, chart the course, collects the takeaways from learners to create actionable results. After you have collected data, obtained key aspects of the learner's journey, and obtained quotes from learners, it is time for the third characteristic: tell the story visually in a way that creates empathy and understanding. The goal of this

characteristic is for the experience map to stand on its own, inspire new ideas, and foster strategy decisions.

The last step is to show the map to stakeholders that have insights and interactions with learners. Telling the story to stakeholders provides insights into the learner's experiences. The experience must go beyond the physical location and create an experience of usability such as identity, familiarization, memorability, and satisfaction (Ghani et al., 2016). Failure to meet the learner's needs can result in loss of interest, bad reviews, and challenges to getting the learners to accomplish the task.

As with personas, there are a number of examples of what format an experience map might take. Most are considered copyrighted and proprietary to the organizations developing them and so cannot be included here

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# 4.

## Introduction

After a needs analysis is conducted, the next step in the conduct a task analysis. Task analysis for instructional design is a process of analyzing and articulating the kind of learning students are expected to know how to perform. Following the determination that an instructional need exists (needs assessment), task analysis is used to analyze that need for the purpose of developing the instruction. In this process, task analysis and instructional analysis can be designed at the same time and stage (Seels and Glasgow, 1998). Task analysis is the main part of designing courses and projects in education, industry, government, and business. There are multiple approaches for conducting a task analysis. Brown and Green (2006) list the following as popular methods:

- Jonassen, Hannum and Tessmer's Approach (1989)
- Morrison, Ross and Kemp's Three Technique (2004)
- Dick, Carey, and Carey Instructional Analysis (2001)
- Smith and Ragan's Analysis of the Learning Task (2005)

This chapter will detail the Smith and Ragan's Analysis of the Learning Task method (2005).

## Smith and Ragan's Analysis of the Learning Task

Instead of using the term task analysis, Smith and Ragan chose to characterize their method as analysis of the learning task. They describe the key difference as "transforming goal statements into a form that can be used to to guide subsequent design" (Smith and Ragan, p. 76). The influence of Robert Gagne and Charles Reigeluth in their emphasis of a conditions based instructional design model is illustrated in this analysis. Brown and Green (2006) describe that the information-processing analysis in Smith and Ragan's approach as the key step in the process.

An overview of Smith and Ragan's Analysis of the Learning Task (2005):

1. Write a Learning Goal
2. Determine the types of learning of the goal
3. Conduct an information-processing analysis of that goal
4. Conduct a prerequisite analysis and determine the type of learning of the prerequisites
5. Write learning objectives for the learning goal and each of the prerequisites

## Learning Goal

The Learning goal describes the knowledge the learner is expected to obtain as a result of instruction (Mager, 1962). Normally, they start from very broad statements such as "learners will be able to fix a broken computer." This phase starts to narrow the scope of the learning goal and focus on how to provide instruction. Remember, these are not objectives. Objectives will be covered specifically at the end of the process. Constructing the learning goal does not need to be complex, however it needs to be focused.

Keep in mind learning goals may already predetermined depending on your setting. K-12 education may have learning goals set on the local or state level. Trade or vocational areas, industry training boards or employers' associations set learning goals that need to be followed for qualifications to be accredited. Even in higher education, an instructor may 'inherit' a course where the goals are already set, either by a previous instructor or by the academic department. These situations require flexibility with the analysis.

### Examples

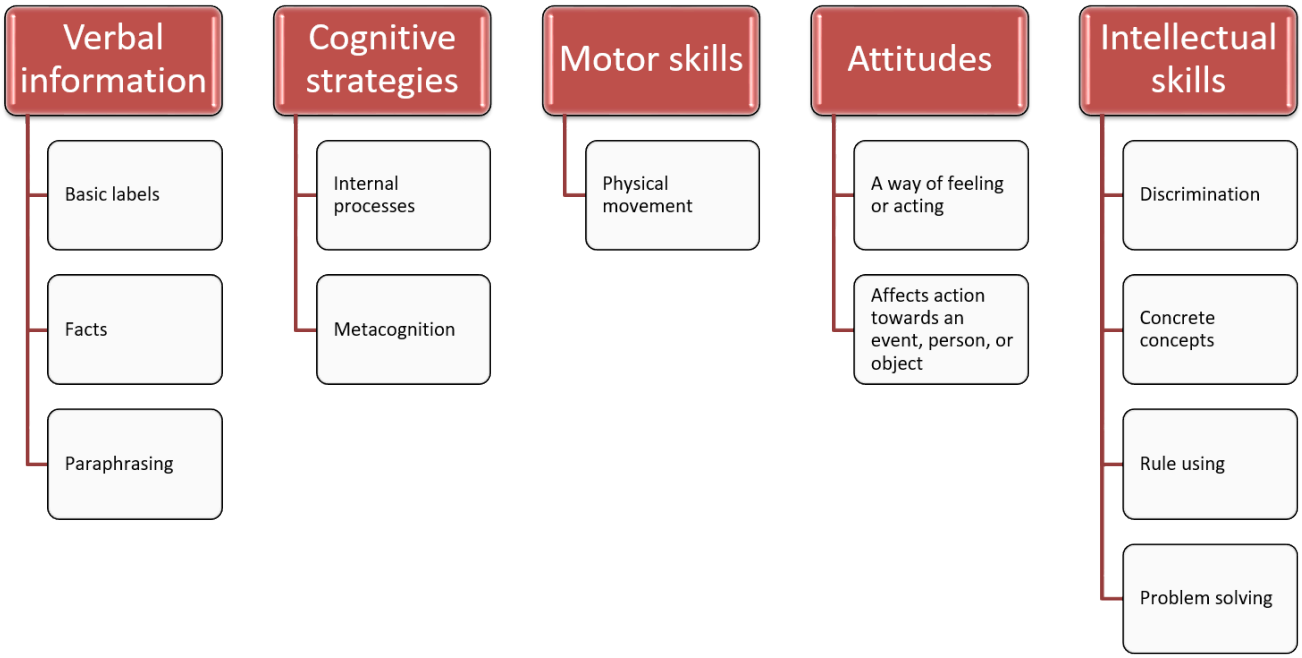
- When provided a malfunctioning computer, the learner will be able to diagnosis the malfunction and conduct a repair.
- When given pertinent information about student loan reform, the learner will be able to write a position letter to their United State Congress representatives.
- When provided movie information, the learner will be able to classify the movie into a specific genre.

# Types of Learning

Robert Gagné posited that not all learning is equal and each distinct learning domain should be presented and assessed differently. Therefore, as an instructional designer, one of the first tasks is to determine which learning domain applies to the content. The theoretical basis behind the Conditions of Learning is that learning outcomes can be broken down into five different domains: verbal information, cognitive strategies, motor skills, attitudes, and intellectual skills (see Figure 1).

**Figure 1**

*Gagné's Domains of Learning*




Verbal information includes basic labels and facts (e.g. names of people, places, objects, or events) as well as bodies of knowledge (e.g. paraphrasing of ideas or rules and regulations). Cognitive strategies are internal processes where the learner can control his/her own way of thinking such as creating mental models or self-evaluating study skills. Motor skills require bodily movement such as throwing a ball, tying a shoelace, or using a saw. Attitude is a state that affects a learner's action towards an event, person,

or object. For example, appreciating a selection of music or writing a letter to the editor. Intellectual skills have their own hierarchical structure within the Gagné taxonomy and are broken down into discrimination, concrete concepts, rule using, and problem solving. Discrimination is when the learner can identify differences between inputs or members of a particular class and respond appropriately to each. For example, distinguishing when to use a Phillips-head or a flat-head screwdriver. Concrete concepts are the opposite of discrimination because they entail responding the same way to all members of a class or events. An example would be classifying music as pop, country, or classical. Rule using is applying a rule to a given situation or condition. A learner will need to relate two or more simpler concepts, as a rule states the relationship among concepts. In many cases, it is helpful to think of these as "if-then" statements. For example, "if the tire is flat, then I either need to put air in the tire or change the flat tire." Finally, problem solving is combining lower-level rules and applying them to previously unencountered situations. This could include generating new rules through trial and error until a problem is solved.

### Gagné's Impact on Instructional Design

The impact Robert Gagné had on the field of instructional design cannot be understated. For example, from his initial work we can trace the evolution of the domains of learning from the Conditions of Learning through other theories such as Merrill's Component Display Theory (1994), to Smith and Ragan's Instructional Design Theory (1992), to van Merrienboer's complex cognitive skills in the 4C/ID model of instructional design (1997). For the first time, those designing instruction had a process to follow, a blueprint. And almost 60 years later, Gagné's work still serves as the basic framework all instructional designers who use systematic processes follow.

## Information Processing Analysis

Once a learning goal is established and a learning domain selected, the next step is conduct the information processing analysis. Smith and Ragan (2005) describe this process as discovering the mental and physical tasks to complete the learning goal.

This process is iterative; meaning that it can be done multiple times and with different information. If new tasks or questions are discovered, include it in the next analysis for further refinement.

Smith and Ragan (2005) state ten steps to complete an information-processing analysis:

1. Read and gather as much information as possible about the task and content
2. Convert goal into representative 'test" question
3. Give problem to several individuals who understand the task and observe
4. Ask individuals questions about completing the task
5. If more than one individual used, identify commons steps
6. Identify shortest, least complex path to achieve task
7. Identify factors that can lead to more complex path
8. Select the circumstances and path that best match your goal
9. List steps and decision points for your goal
10. Confirm results with other experts (p. 84-85)

## Example

The process listed above applies to all information processing analysis. There are specific methods to employ depending on the learning domain of your goal.

### Prerequisite Analysis

Learning prerequisite analysis includes applying rules, concepts, solving problems and intellectual skills as prerequisite skills that facilitate learning of a higher skill. The analysis is often used for traditional instruction to describe learning levels before beginning a lesson and to define what must be taught, and the sequence in which to teach it. Each task has sub tasks in this process in order to reach the objectives in both simple and complex tasks.

Let's use a previous learning goal from above: When provided movie information, the learner will be able to classify the movie into a specific genre. An information process analysis example of an action movie showed that the learner had to decide three major criteria: pacing stunt, and plot information. So a leaner must know specifics in order to make an informed judgement. This can be done in either a bulleted list with sub bullets

or a graphics (similar to information processing analysis). The example listed below uses bullets for the first two steps

The first step in the in information analysis example: Recall characteristics of an action movie

The prerequisite analysis would be:

1. Know what a characteristic in cinema terms
2. Know what action is considered in cinema terms
3. Know what a movie is considered in cinema terms

The next step was determining if the movie was fast-paced

The prerequisite analysis would be:

1. Know pacing structure of a movie
2. Know pacing synonyms
3. Know what a plot is
    1. Define elements of a plot
4. Know what a slow pace structure looks like

Once the prerequisite analysis is complete, the knowledge required are turned into **enabling objectives**. This type of objective sets additional knowledge or skills that are required into order to reach the **terminal objective.** A Terminal objective is a more defined version of the learning goal. Both types of objective follows the format outlined below.

## Writing Objectives

A learning objective is a description of an optimal performance learners are expected to be able to exhibit before they are considered competent in meeting the learning goal (Mager, 1962). Essentially, the goal describes the knowledge the learner is expected to obtain, while the objective describes how the learner will demonstrate that they have obtained that knowledge. Once learning goals are established, learning objectives that are directly associated with these specific outcomes should be built. Consider the following example of a misaligned learning outcome and learning objective proposed by Dick and Reiser (1989): “The learning goal is developing lifelong health habits and the associated learning

objective is listing the major bones in the leg,"(p. 23). Although both the outcome and the objective both fall under the content area of Health and the Human Body, the listing of the major bones in the leg would not be an appropriate performance to assess whether or not learners would be able to develop lifelong health habits.

Mager (1984) proposes that there are three elements of a quality learning objective: **performance**, **condition**, and **criterion**. The performance is what the learner is expected to do or the result of the instruction. The condition describes the circumstances in which the performance should occur. The criterion establishes the minimum threshold of acceptable performance. Furthermore, an objective should clearly express an observable behavior that students are expected to perform in order to indicate achievement (Dick & Reiser, 1989). Orelove (1995), stated that when a goal includes the absence of performance on the part of a student it also lacks quality. For example, Johnny will sit quietly for 20 minutes or By the end of the course, students should know historically important dates in history (p. 4). Neither of these examples requires observable activity or quality performance on the part of the
students. In addition, neither goal is measurable. According to Benjamin Bloom. objectives should be measurable and serve to help create a structure for hierarchically classifying the measurability of learning objectives (Bloom, Engelhart, Furst, and Krathwohl, 1956; Anderson and Krathwohl 2001).

A simple way to craft learning objectives is to use the Heinrich, Molenda, Russell, and Smaldino's (1996) ABCD format.

- **A**udience
- **B**ehavior (Mager's performance element)
- **C**ondition (Mager's condition element)
- **D**egree (Marger's criterion element)

Heibrich et al. (1996) uses Mager's (1984) three elements while adding the audience. The audience as being the learner. Sometimes, the generic term "learner" or "student" can be used. It is a best practice to be specific as possible (Heibrich et all, 1996). For example, a 12th grade history students or English Composition I students.

## Objective Builder

To assist in writing learning objectives, the University of Central Florida (UCF) has created an easy to use objective builder at https://cdl.ucf.edu/teach/resources/objective-builder-tool/ . This tool uses a modified version of Heibrich et all (1996) ABCD format. The audience and condition are flipped to yield a CABD format. This was done to improve readability. Objective builder offers three learning domains to choose the behavior: cognitive (thinking), affective (feeling), and psychomotor (doing). Each domain uses a specific framework along with associated measurable verbs. The audience, condition, and degree components are textboxes and are displayed once they are entered. At the end of one objective, more can be added. Copy the objectives into a learning management system or word document when completed. It is released open-source so this means it is free to host on your own website and edits can be made. More information is available at https://github.com/ucfopen/objective-builder.

## Examples

**Audience (A)**, **Behavior (B)**, **Condition (C)**, and Degree of Mastery **(D).**

Learning objective written in the cognitive domain at the understanding level of Anderson and Krathwohl Revised Bloom's Taxonomy of the Cognitive Domain.

- **Given a blank map of the United States a fifth grade social student will identify all 50 states and capitals** with 90 percent accuracy

Learning objective written in the affective domain at valuing level of the Krathwohl and Bloom's Taxonomy of the Affective Domain

- **Given a group project, the group members will seek input from everyone** throughout the entire project.

Learning objective written in the psychomotor domain at the guided response level of Simpson's Taxonomy of the Psychomotor Domain

- **Given pizza ingredients**,**the employee will assemble a pizza** in less than 10 minutes.

Terminal objective example

- When provided a plot, pacing, and the frequency of stunts, the learner will be able to classify the movie into a specific genre within two attempts.

Enabling objective example

- When given a movie scene, the learner will determine how many stunts occurred within two attempts.

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# 5.

## Introduction

The need for a bridge between basic learning research and educational practice has long been discussed. To ensure a strong connection between these two areas, Dewey (cited in Reigeluth, 1983) called for the creation and development of a "linking science"; Tyler (1978) a "middleman position"; and Lynch (1945) for employing an "engineering analogy" as an aid for translating theory into practice. In each case, the respective author highlighted the information and potential contributions of available learning theories, the pressing problems faced by those dealing with practical learning issues, and a general lack of using the former to facilitate solutions for the latter. The value of such a bridging function would be its ability to translate relevant aspects of the learning theories into optimal instructional actions. As described by Reigeluth (1983, p. 5), the field of Instructional Design performs this role.

Instructional designers have been charged with "translating principles of learning and instruction into specifications for instructional materials and activities" (Smith & Ragan, 1993, p. 12). To achieve this goal, two sets of skills and knowledge are needed. First, the designer must understand the position of the practitioner. In this regard, the following questions would be relevant: What are the situational and contextual constraints of the application? What is the degree of individual differences among the learners? What form of solutions will or will not be accepted by the learners as well as by those actually teaching the materials? The designer must have the ability to diagnose and analyze practical learning problems. Just as a doctor cannot prescribe an effective remedy without a proper diagnosis, the instructional designer cannot properly recommend an effective prescriptive solution without an accurate analysis of the instructional problem.

In addition to understanding and analyzing the problem, a second core of knowledge and skills is needed to "bridge" or "link" application with research–that of understanding the potential sources of solutions (i.e., the theories of human learning). Through this understanding, a proper prescriptive solution can be matched with a given diagnosed problem. The critical link, therefore, is not between the design of instruction and an autonomous body of knowledge about instructional phenomena, but between instructional design issues and the theories of human learning.

Why this emphasis on learning theory and research? First, learning theories are a source of verified instructional strategies, tactics, and techniques. Knowledge of a variety of such strategies is critical when attempting to select an effective prescription for overcoming a given instructional problem. Second, learning theories provide the foundation for intelligent and reasoned strategy selection. Designers must have an adequate repertoire of strategies available, and possess the knowledge of when and why to employ each. This knowledge depends on the designer's ability to match the demands of the task with an instructional strategy that helps the learner. Third, integration of the selected strategy within the instructional context is of critical importance. Learning theories and research often provide information about relationships among instructional components and the design of instruction, indicating how specific techniques/strategies might best fit within a given context and with specific learners (Keller, 1979). Finally, the ultimate role of a theory is to allow for reliable prediction (Richey, 1986). Effective solutions to practical instructional problems are often constrained by limited time and resources. It is paramount that those strategies selected and implemented have the highest chance for success. As suggested by Warries (1990), a selection based on strong research is much more reliable than one based on "instructional phenomena."

The task of translating learning theory into practical applications would be greatly simplified if the learning process were relatively simple and straightforward. Unfortunately, this is not the case. Learning is a complex process that has generated numerous interpretations and theories of how it is effectively accomplished. Of these many theories, which should receive the attention of the instructional designer? Is it better to choose one theory when designing instruction or to draw ideas from different theories? This article presents three distinct perspectives of the learning process (behavioral, cognitive, and constructivist) and although each has many unique features, it is our belief that each still describes the same phenomena (learning). In selecting the theory whose associated instructional strategies offers the optimal means for achieving desired outcomes, the degree of cognitive processing required of the learner by the specific task appears to be a critical factor. Therefore, as emphasized by Snelbecker (1983), individuals addressing practical learning problems cannot afford the "luxury of restricting themselves to only one theoretical position… [They] are urged to examine each of the basic science theories which have been developed by psychologists in the study of learning and to select those principles and conceptions which seem to be of value for one's particular educational situation' (p. 8).

If knowledge of the various learning theories is so important for instructional designers, to what degree are they emphasized and promoted? As reported by Johnson (1992), less

than two percent of the courses offered in university curricula in the general area of educational technology emphasize "theory" as one of their key concepts. It appears that the real benefits of theoretical knowledge are, at present, not being realized. This article is an attempt to "fill in some of the gaps" that may exist in our knowledge of modern learning theories. The main intent is to provide designers with some familiarity with three relevant positions on learning (behavioral, cognitive, and constructivist) which should provide a more structured foundation for planning and conducting instructional design activities. The idea is that if we understand some of the deep principles of the theories of learning, we can extrapolate to the particulars as needed. As Bruner (1971) states, "You don't need to encounter everything in nature in order to know nature" (p. 18). A basic understanding of the learning theories can provide you with a "canny strategy whereby you could know a great deal about a lot of things while keeping very little in mind" (p. 18).

It is expected that after reading this article, instructional designers and educational practitioners should be better informed "consumers"of the strategies suggested by each viewpoint. The concise information presented here can serve as an initial base of knowledge for making important decisions regarding instructional objectives and strategies.

## Learning Defined

Learning has been defined in numerous ways by many different theorists, researchers and educational practitioners. Although universal agreement on any single definition is nonexistent, many definitions employ common elements. The following definition by Shuell (as interpreted by Schunk, 1991) incorporates these main ideas: "Learning is an enduring change in behavior, or in the capacity to behave in a given fashion, which results from practice or other forms of experience" (p. 2).

Undoubtedly, some learning theorists will disagree on the definition of learning presented here. However, it is not the definition itself that separates a given theory from the rest. The major differences among theories lie more in interpretation than they do in definition. These differences revolve around a number of key issues that ultimately delineate the instructional prescriptions that flow from each theoretical perspective. Schunk (1991) lists five definitive questions that serve to distinguish each learning theory from the others:

1. How does learning occur?
2. Which factors influence learning?
3. What is the role of memory?
4. How does transfer occur? and
5. What types of learning are best explained by the theory?

Expanding on this original list, we have included two additional questions important to the instructional designer:

1. What basic assumptions/principles of this theory are relevant to instructional design? and
2. How should instruction be structured to facilitate learning?

In this chapter, each of these questions is answered from three distinct viewpoints: behaviorism, cognitivism, and constructivism. Although learning theories typically are divided into two categories–behavioral and cognitive–a third category, constructive, is added here because of its recent emphasis in the instructional design literature (e.g., Bednar, Cunningham, Duffy, & Perry, 1991; Duffy & Jonassen, 1991; Jonassen, 1991b; Winn, 1991). In many ways these viewpoints overlap; yet they are distinctive enough to be treated as separate approaches to understanding and describing learning. These three particular positions were chosen because of their importance, both historically and currently, to the field of instructional design. It is hoped that the answers to the first five questions will provide the reader with a basic understanding of how these viewpoints differ. The answers to the last two questions will translate these differences into practical suggestions and recommendations for the application of these principles in the design of instruction.

These seven questions provide the basis for the article's structure. For each of the three theoretical positions, the questions are addressed and an example is given to illustrate the application of that perspective. It is expected that this approach will enable the reader to compare and contrast the different viewpoints on each of the seven issues.

As is common in any attempt to compare and contrast similar products, processes, or ideas, differences are emphasized in order to make distinctions clear. This is not to suggest that there are no similarities among these viewpoints or that there are no overlapping features. In fact, different learning theories will often prescribe the same instructional methods for the same situations (only with different terminology and possibly with different intentions). This article outlines the major differences between the three positions in an attempt to facilitate comparison. It is our hope that the reader

will gain greater insight into what each viewpoint offers in terms of the design and presentation of materials, as well as the types of learning activities that might be prescribed.

## Historical Foundations

Current learning theories have roots that extend far into the past. The problems with which today's theorists and researchers grapple and struggle are not new but simply variations on a timeless theme: Where does knowledge come from and how do people come to know? Two opposing positions on the origins of knowledge-empiricism and rationalism have existed for centuries and are still evident, to varying degrees, in the learning theories of today. A brief description of these views is included here as a background for comparing the "modern" learning viewpoints of behaviorism, cognitivism, and constructivism.

Empiricism is the view that experience is the primary source of knowledge (Schunk, 1991). That is, organisms are born with basically no knowledge and anything learned is gained through interactions and associations with the environment. Beginning with Aristotle (384-322 B.C.), empiricists have espoused the view that knowledge is derived from sensory impressions. Those impressions, when associated contiguously in time and/or space, can be hooked together to form complex ideas. For example, the complex idea of a tree, as illustrated by Hulse, Egeth, and Deese (1980), can be built from the less complex ideas of branches and leaves, which in turn are built from the ideas of wood and fiber, which are built from basic sensations such as greenness, woody odor, and so forth. From this perspective, critical instructional design issues focus on how to manipulate the environment in order to improve and ensure the occurrence of proper associations.

Rationalism is the view that knowledge derives from reason without the aid of the senses (Schunk, 1991). This fundamental belief in the distinction between mind and matter originated with Plato (c. 427-347 B.C.), and is reflected in the viewpoint that humans learn by recalling or "discovering" what already exists in the mind. For example, the direct experience with a tree during one's lifetime simply serves to reveal that which is already in the mind. The "real" nature of the tree (greenness, woodiness, and other characteristics) becomes known, not through the experience, but through a reflection on one's idea about the given instance of a tree. Although later rationalists differed on some of Plato's other ideas, the central belief remained the same: that knowledge arises through the mind.

From this perspective, instructional design issues focus on how best to structure new information in order to facilitate (1) the learners' encoding of this new information, as well as (2) the recalling of that which is already known.

The empiricist, or associationist, mindset provided the framework for many learning theories during the first half of the 20th century, and it was against this background that behaviorism became the leading psychological viewpoint (Schunk, 1991). Because behaviorism was dominant when instructional theory was initiated (around 1950), the instructional design (ID) technology that arose alongside it was naturally influenced by many of its basic assumptions and characteristics. Since ID has its roots in behavioral theory, it seems appropriate that we turn our attention to behaviorism first.

# Behaviorism

## How Does Learning Occur?

Behaviorism equates learning with changes in either the form or frequency of observable performance. Learning is accomplished when a proper response is demonstrated following the presentation of a specific environmental stimulus. For example, when presented with a math flashcard showing the equation "2 + 4 = ?" the learner replies with the answer of "6." The equation is the stimulus and the proper answer is the associated response. The key elements are the stimulus, the response, and the association between the two. Of primary concern is how the association between the stimulus and response is made, strengthened, and maintained.

Behaviorism focuses on the importance of the consequences of those performances and contends that responses that are followed by reinforcement are more likely to recur in the future. No attempt is made to determine the structure of a student's knowledge nor to assess which mental processes it is necessary for them to use (Winn, 1990). The learner is characterized as being reactive to conditions in the environment as opposed to taking an active role in discovering the environment.

## Which Factors Influence Learning?

Although both learner and environmental factors are considered important by behaviorists, environmental conditions receive the greatest emphasis. Behaviorists assess the learners to determine at what point to begin instruction as well as to determine which reinforcers are most effective for a particular student. The most critical factor, however, is the arrangement of stimuli and consequences within the environment.

## What is the Role of Memory?

Memory, as commonly defined by the layman, is not typically addressed by behaviorists. Although the acquisition of "habits" is discussed, little attention is given as to how these habits are stored or recalled for future use. Forgetting is attributed to the "nonuse" of a response over time. The use of periodic practice or review serves to maintain a learner's readiness to respond (Schunk, 1991).

## How Does Transfer Occur?

Transfer refers to the application of learned knowledge in new ways or situations, as well as to how prior learning affects new learning. In behavioral learning theories, transfer is a result of generalization. Situations involving identical or similar features allow behaviors to transfer across common elements. For example, the student who has learned to recognize and classify elm trees demonstrates transfer when (s)he classifies maple trees using the same process. The similarities between the elm and maple trees allow the learner to apply the previous elm tree classification learning experience to the maple tree classification task.

## What Types of Learning Are Best Explained by This Position?

Behaviorists attempt to prescribe strategies that are most useful for building and strengthening stimulus-response associations (Winn, 1990), including the use of instructional cues, practice, and reinforcement. These prescriptions have generally been proven reliable and effective in facilitating learning that involves discriminations (recalling facts), generalizations (defining and illustrating concepts), associations (applying explanations), and chaining (automatically performing a specified procedure). However, it is generally agreed that behavioral principles cannot adequately explain the acquisition of higher level skills or those that require a greater depth of processing (e.g., language development, problem solving, inference generating, critical thinking) (Schunk, 1991).

## What Basic Assumptions/principles of This Theory Are Relevant to Instructional Design?

Many of the basic assumptions and characteristics of behaviorism are embedded in current instructional design practices. Behaviorism was used as the basis for designing many of the early audio-visual materials and gave rise to many related teaching strategies, such as Skinner's teaching machines and programmed texts. More recent examples include principles utilized within computer-assisted instruction (CAI) and mastery learning.

Specific assumptions or principles that have direct relevance to instructional design include the following (possible current ID applications are listed in italics and brackets following the listed principle):

- An emphasis on producing observable and measurable outcomes in students [behavioral objectives, task analysis, criterion-referenced assessment]
- Pre-assessment of students to determine where instruction should begin [learner analysis]
- Emphasis on mastering early steps before progressing to more complex levels of performance [sequencing of instructional presentation, mastery learning]
- Use of reinforcement to impact performance [tangible rewards, informative feedback]

- Use of cues, shaping and practice to ensure a strong stimulus-response association [simple to complex sequencing of practice, use of prompts]

## How Should Instruction Be Structured?

The goal of instruction for the behaviorist is to elicit the desired response from the learner who is presented with a target stimulus. To accomplish this, the learner must know how to execute the proper response, as well as the conditions under which that response should be made. Therefore, instruction is structured around the presentation of the target stimulus and the provision of opportunities for the learner to practice making the proper response. To facilitate the linking of stimulus-response pairs, instruction frequently uses cues (to initially prompt the delivery of the response) and reinforcement (to strengthen correct responding in the presence of the target stimulus).

Behavioral theories imply that the job of the teacher/designer is to (1) determine which cues can elicit the desired responses; (2) arrange practice situations in which prompts are paired with the target stimuli that initially have no eliciting power but which will be expected to elicit the responses in the "natural" (performance) setting; and (3) arrange environmental conditions so that students can make the correct responses in the presence of those target stimuli and receive reinforcement for those responses (Gropper, 1987).

For example, a newly-hired manager of human resources may be expected to organize a meeting agenda according to the company's specific format. The target stimulus (the verbal command "to format a meeting agenda") does not initially elicit the correct response nor does the new manager have the capability to make the correct response. However, with the repeated presentation of cues (e.g., completed templates of past agendas, blank templates arranged in standard format) paired with the verbal command stimulus, the manager begins to make the appropriate responses. Although the initial responses may not be in the final proper form, repeated practice and reinforcement shape the response until it is correctly executed. FinaIly, learning is demonstrated when, upon the command to format a meeting agenda, the manager reliably organizes the agenda according to company standards and does so without the use of previous examples or models.

# Cognitivism

In the late 1950's, learning theory began to make a shift away from the use of behavioral models to an approach that relied on learning theories and models from the cognitive sciences. Psychologists and educators began to de-emphasize a concern with overt, observable behavior and stressed instead more complex cognitive processes such as thinking, problem solving, language, concept formation and information processing (Snelbecker, 1983). Within the past decade, a number of authors in the field of instructional design have openly and consciously rejected many of ID's traditional behavioristic assumptions in favor of a new set of psychological assumptions about learning drawn from the cognitive sciences. Whether viewed as an open revolution or simply a gradual evolutionary process, there seems to be the general acknowledgment that cognitive theory has moved to the forefront of current learning theories (Bednar et al., 1991). This shift from a behavioral orientation (where the emphasis is on promoting a student's overt performance by the manipulation of stimulus material) to a cognitive orientation (where the emphasis is on promoting mental processing) has created a similar shift from procedures for manipulating the materials to be presented by an instructional system to procedures for directing student processing and interaction with the instructional design system (Merrill, Kowalis, & Wilson, 1981).

## How Does Learning Occur?

Cognitive theories stress the acquisition of knowledge and internal mental structures and, as such, are closer to the rationalist end of the epistemology continuum (Bower & Hilgard, 1981). Learning is equated with discrete changes between states of knowledge rather than with changes in the probability of response. Cognitive theories focus on the conceptualization of students' learning processes and address the issues of how information is received, organized, stored, and retrieved by the mind. Learning is concerned not so much with what learners do but with what they know and how they come to acquire it (Jonassen, 1991b). Knowledge acquisition is described as a mental activity that entails internal coding and structuring by the learner. The learner is viewed as a very active participant in the learning process.

## Which Factors Influence Learning?

Cognitivism, like behaviorism, emphasizes the role that environmental conditions play in facilitating learning. Instructional explanations, demonstrations, illustrative examples and matched non-examples are all considered to be instrumental in guiding student learning. Similarly, emphasis is placed on the role of practice with corrective feedback. Up to this point, little difference can be detected between these two theories. However, the "active" nature of the learner is perceived quite differently. The cognitive approach focuses on the mental activities of the learner that lead up to a response and acknowledges the processes of mental planning, goal-setting, and organizational strategies (Shuell, 1986). Cognitive theories contend that environmental "cues" and instructional components alone cannot account for all the learning that results from an instructional situation. Additional key elements include the way that learners attend to, code, transform, rehearse, store and retrieve information. Learners' thoughts, beliefs, attitudes, and values are also considered to be influential in the learning process (Winne, 1985). The real focus of the cognitive approach is on changing the learner by encouraging him/her to use appropriate learning strategies.

## What is the Role of Memory?

As indicated above, memory is given a prominent role in the learning process. Learning results when information is stored in memory in an organized, meaningful manner. Teachers/designers are responsible for assisting learners in organizing that information in some optimal way. Designers use techniques such as advance organizers, analogies, hierarchical relationships, and matrices to help learners relate new information to prior knowledge. Forgetting is the inability to retrieve information from memory because of interference, memory loss, or missing or inadequate cues needed to access information.

## How Does Transfer Occur?

According to cognitive theories, transfer is a function of how information is stored in

memory (Schunk, 1991). When a learner understands how to apply knowledge in different contexts, then transfer has occurred. Understanding is seen as being composed of a knowledge base in the form of rules, concepts, and discriminations (Duffy & Jonassen, 1991). Prior knowledge is used to establish boundary constraints for identifying the similarities and differences of novel information. Not only must the knowledge itself be stored in memory but the uses of that knowledge as well. Specific instructional or real-world events will trigger particular responses, but the learner must believe that the knowledge is useful in a given situation before he will activate it.

## What Types of Learning Are Best Explained by This Position?

Because of the emphasis on mental structures, cognitive theories are usually considered more appropriate for explaining complex forms of learning (reasoning, problem-solving, information-processing) than are those of a more behavioral perspective (Schunk, 1991). However, it is important to indicate at this point that the actual goal of instruction for both of these viewpoints is often the same: to communicate or transfer knowledge to the students in the most efficient, effective manner possible (Bednar et al., 1991). Two techniques used by both camps in achieving this effectiveness and efficiency of knowledge transfer are simplification and standardization. That is, knowledge can be analyzed, decomposed, and simplified into basic building blocks. Knowledge transfer is expedited if irrelevant information is eliminated. For example, trainees attending a workshop on effective management skills would be presented with information that is "sized" and "chunked" in such a way that they can assimilate and/or accommodate the new information as quickly and as easily as possible. Behaviorists would focus on the design of the environment to optimize that transfer, while cognitivists would stress efficient processing strategies.

## What Basic Assumptions/principles of This Theory Are Relevant to Instructional Design?

Many of the instructional strategies advocated and utilized by cognitivists are also emphasized by behaviorists, yet usually for different reasons. An obvious commonality is

the use of feedback. A behaviorist uses feedback (reinforcement) to modify behavior in the desired direction, while cognitivists make use of feedback (knowledge of results) to guide and support accurate mental connections (Thompson, Simonson, & Hargrave, 1992).

Learner and task analyses are also critical to both cognitivists and behaviorists, but once again, for different reasons. Cognitivists look at the learner to determine his/her predisposition to learning (i.e., How does the learner activate, maintain, and direct his/her learning?) (Thompson et al., 1992). Additionally, cognitivists examine the learner to determine how to design instruction so that it can be readily assimilated (i.e., What are the learner's existing mental structures?). In contrast, the behaviorists look at learners to determine where the lesson should begin (i.e., At what level are they currently performing successfully?) and which reinforcers should be most effective (i.e., What consequences are most desired by the learner?).

Specific assumptions or principles that have direct relevance to instructional design include the following (possible current ID applications are listed in italics and brackets following the listed principle):

- Emphasis on the active involvement of the learner in the learning process [learner control, metacognitive training (e.g., self-planning, monitoring, and revising techniques)]
- Use of hierarchical analyses to identify and illustrate prerequisite relationships [cognitive task analysis procedures]
- Emphasis on structuring, organizing, and sequencing information to facilitate optimal processing [use of cognitive strategies such as outlining, summaries, synthesizers, advance organizers, etc.]
- Creation of learning environments that allow and encourage students to make connections with previously learned material [recall of prerequisite skills; use of relevant examples, analogies]

## How Should Instruction Be Structured?

Behavioral theories imply that teachers ought to arrange environmental conditions so that students respond properly to presented stimuli. Cognitive theories emphasize making knowledge meaningful and helping learners organize and relate new information to existing knowledge in memory. Instruction must be based on a student's existing mental

structures, or schema, to be effective. It should organize information in such a manner that learners are able to connect new information with existing knowledge in some meaningful way. Analogies and metaphors are examples of this type of cognitive strategy. For example, instructional design textbooks frequently draw an analogy between the familiar architect's profession and the unfamiliar instructional design profession to help the novice learner conceptualize, organize and retain the major duties and functions of an instructional designer (e.g. Reigeluth, 1983, p. 7). Other cognitive strategies may include the use of framing, outlining, mnemonics, concept mapping, advance organizers and so forth (West, Farmer, & Wolff, 1991).

Such cognitive emphases imply that major tasks of the teacher/designer include (1) understanding that individuals bring various learning experiences to the learning situation which can impact learning outcomes; (2) determining the most effective manner in which to organize and structure new information to tap the learners' previously acquired knowledge, abilities, and experiences; and (3) arranging practice with feedback so that the new information is effectively and efficiently assimilated and/or accommodated within the learner's cognitive structure (Stepich & Newby, 1988).

Consider the following example of a learning situation utilizing a cognitive approach: A manager in the training department of a large corporation had been asked to teach a new intern to complete a cost-benefit analysis for an upcoming development project. In this case, it is assumed that the intern has no previous experience with cost-benefit analysis in a business setting. However, by relating this new task to highly similar procedures with which the intern has had more experience, the manager can facilitate a smooth and efficient assimilation of this new procedure into memory. These familiar procedures may include the process by which the individual allocates his monthly paycheck, how (s)he makes a buy/no-buy decision regarding the purchase of a luxury item, or even how one's weekend spending activities might be determined and prioritized. The procedures for such activities may not exactly match those of the cost-benefit analysis, but the similarity between the activities allows for the unfamiliar information to be put within a familiar context. Thus processing requirements are reduced and the potential effectiveness of recall cues is increased.

## Constructivism

The philosophical assumptions underlying both the behavioral and cognitive theories

are primarily objectivistic; that is: the world is real, external to the learner. The goal of instruction is to map the structure of the world onto the learner (Jonassen, 1991b). A number of contemporary cognitive theorists have begun to question this basic objectivistic assumption and are starting to adopt a more constructivist approach to learning and understanding: knowledge "is a function of how the individual creates meaning from his or her own experiences" (p.10). Constructivism is not a totally new approach to learning. Like most other learning theories, constructivism has multiple roots in the philosophical and psychological viewpoints of this century, specifically in the works of Piaget, Bruner, and Goodman (Perkins, 1991). In recent years, however, constructivism has become a "hot" issue as it has begun to receive increased attention in a number of different disciplines, including instructional design (Bednar et al., 1991).

## How Does Learning Occur?

Constructivism is a theory that equates learning with creating meaning from experience (Bednar et al., 1991). Even though constructivism is considered to be a branch of cognitivism (both conceive of learning as a mental activity), it distinguishes itself from traditional cognitive theories in a number of ways. Most cognitive psychologists think of the mind as a reference tool to the real world; constructivists believe that the mind filters input from the world to produce its own unique reality (Jonassen, 1991a). Like with the rationalists of Plato's time, the mind is believed to be the source of all meaning, yet like the empiricists, individual, direct experiences with the environment are considered critical. Constructivism crosses both categories by emphasizing the interaction between these two variables.

Constructivists do not share with cognitivists and behaviorists the belief that knowledge is mind-independent and can be "mapped" onto a learner. Constructivists do not deny the existence of the real world but contend that what we know of the world stems from our own interpretations of our experiences. Humans create meaning as opposed to acquiring it. Since there are many possible meanings to glean from any experience, we cannot achieve a predetermined, "correct" meaning. Learners do not transfer knowledge from the external world into their memories; rather they build personal interpretations of the world based on individual experiences and interactions. Thus, the internal representation of knowledge is constantly open to change; there is not an objective reality that learners strive to know. Knowledge emerges in contexts within which it is relevant. Therefore, in

order to understand the learning which has taken place within an individual, the actual experience must be examined (Bednar et al., 1991).

## Which Factors Influence Learning?

Both learner and environmental factors are critical to the constructivist, as it is the specific interaction between these two variables that creates knowledge. Constructivists argue that behavior is situationally determined (Jonassen, 1991a). Just as the learning of new vocabulary words is enhanced by exposure and subsequent interaction with those words in context (as opposed to learning their meanings from a dictionary), likewise it is essential that content knowledge be embedded in the situation in which it is used. Brown, Collins, and Duguid (1989) suggest that situations actually co-produce knowledge (along with cognition) through activity. Every action is viewed as "an interpretation of the current situation based on an entire history of previous interactions" (Clancey, 1986). Just as shades of meanings of given words are constantly changing a learner's "current" understanding of a word, so too will concepts continually evolve with each new use. For this reason, it is critical that learning occur in realistic settings and that the selected learning tasks be relevant to the students' lived experience.

## What is the Role of Memory?

The goal of instruction is not to ensure that individuals know particular facts but rather that they elaborate on and interpret information. "Understanding is developed through continued, situated use … and does not crystallize into a categorical definition" that can be called up from memory (Brown et al., 1989, p. 33). As mentioned earlier, a concept will continue to evolve with each new use as new situations, negotiations, and activities recast it in a different, more densely textured form. Therefore, "memory" is always under construction as a cumulative history of interactions. Representations of experiences are not formalized or structured into a single piece of declarative knowledge and then stored in the head. The emphasis is not on retrieving intact knowledge structures, but on providing learners with the means to create novel and situation-specific understandings by "assembling" prior knowledge from diverse sources appropriate to the problem at hand.

For example, the knowledge of "design" activities has to be used by a practitioner in too many different ways for them all to be anticipated in advance. Constructivists emphasize the flexible use of pre-existing knowledge rather than the recall of prepackaged schemas (Spiro, Feltovich, Jacobson, & Coulson, 1991). Mental representations developed through task-engagement are likely to increase the efficiency with which subsequent tasks are performed to the extent that parts of the environment remain the same: "Recurring features of the environment may thus afford recurring sequences of actions" (Brown et al., p. 37). Memory is not a context-independent process.

Clearly the focus of constructivism is on creating cognitive tools which reflect the wisdom of the culture in which they are used as well as the insights and experiences of individuals. There is no need for the mere acquisition of fixed, abstract, self-contained concepts or details. To be successful, meaningful, and lasting, learning must include all three of these crucial factors: activity (practice), concept (knowledge), and culture (context) (Brown et al., 1989).

## How Does Transfer Occur?

The constructivist position assumes that transfer can be facilitated by involvement in authentic tasks anchored in meaningful contexts. Since understanding is "indexed" by experience (just as word meanings are tied to specific instances of use), the authenticity of the experience becomes critical to the individual's ability to use ideas (Brown et al., 1989). An essential concept in the constructivist view is that learning always takes place in a context and that the context forms an inexorable link with the knowledge embedded in it (Bednar et al., 1991). Therefore, the goal of instruction is to accurately portray tasks, not to define the structure of learning required to achieve a task. If learning is decontextualized, there is little hope for transfer to occur. One does not learn to use a set of tools simply by following a list of rules. Appropriate and effective use comes from engaging the learner in the actual use of the tools in real-world situations. Thus, the ultimate measure of learning is based on how effective the learner's knowledge structure is in facilitating thinking and performing in the system in which those tools are used.

## What Types of Learning Are Best Explained by This Position?

The constructivist view does not accept the assumption that types of learning can be identified independent of the content and the context of learning (Bednar et al., 1991). Constructivists believe that it is impossible to isolate units of information or divide up knowledge domains according to a hierarchical analysis of relationships. Although the emphasis on performance and instruction has proven effective in teaching basic skills in relatively structured knowledge domains, much of what needs to be learned involves advanced knowledge in ill-structured domains. Jonassen (1991a) has described three stages of knowledge acquisition (introductory, advanced, and expert) and argues that constructive learning environments are most effective for the stage of advanced knowledge acquisition, where initial misconceptions and biases acquired during the introductory stage can be discovered, negotiated, and if necessary, modified and/or removed. Jonassen agrees that introductory knowledge acquisition is better supported by more objectivistic approaches (behavioral and/or cognitive) but suggests a transition to constructivist approaches as learners acquire more knowledge which provides them with the conceptual power needed to deal with complex and ill-structured problems.

## What Basic Assumptions/principles of This Theory Are Relevant to Instructional Design?

The constructivist designer specifies instructional methods and strategies that will assist learners in actively exploring complex topics/environments and that will move them into thinking in a given content area as an expert user of that domain might think. Knowledge is not abstract but is linked to the context under study and to the experiences that the participants bring to the context. As such, learners are encouraged to construct their own understandings and then to validate, through social negotiation, these new perspectives. Content is not prespecified; information from many sources is essential. For example, a typical constructivist's goal would not be to teach novice ID students straight facts about instructional design, but to prepare students to use ID facts as an instructional designer might use them. As such, performance objectives are not related so much to the content as they are to the processes of construction.

Some of the specific strategies utilized by constructivists include situating tasks in

real-world contexts, use of cognitive apprenticeships (modeling and coaching a student toward expert performance), presentation of multiple perspectives (collaborative learning to develop and share alternative views), social negotiation (debate, discussion, evidencegiving), use of examples as real "slices of life," reflective awareness, and providing considerable guidance on the use of constructive processes.

The following are several specific assumptions or principles from the constructivist position that have direct relevance for the instructional designer (possible ID applications are listed in italics and brackets following the listed principle):

- An emphasis on the identification of the context in which the skills will be learned and subsequently applied [anchoring learning in meaningful contexts].
- An emphasis on learner control and the capability of the learner to manipulate information [actively using what is learned].
- The need for information to be presented in a variety of different ways [revisiting content at different times, in rearranged contexts, for different purposes, and from different conceptual perspectives].
- Supporting the use of problem-solving skills that allow learners to go "beyond the information given." [developing pattern-recognition skills, presenting alternative ways of representing problems].
- Assessment focused on transfer of knowledge and skills [presenting new problems and situations that differ from the conditions of the initial instruction].

## How Should Instruction Be Structured?

As one moves along the behaviorist-cognitivist-constructivist continuum, the focus of instruction shifts from teaching to learning, from the passive transfer of facts and routines to the active application of ideas to problems. Both cognitivists and constructivists view the learner as being actively involved in the learning process, yet the constructivists look at the learner as more than just an active processor of information; the learner elaborates upon and interprets the given information (Duffy & Jonassen, 1991). Meaning is created by the learner: learning objectives are not pre-specified nor is instruction predesigned. "The role of instruction in the constructivist view is to show students how to construct knowledge, to promote collaboration with others to show the multiple perspectives that can be brought to bear on a particular problem, and to arrive at self-chosen positions to

which they can commit themselves, while realizing the basis of other views with which they may disagree" (Cunningham, 1991, p. 14).

Even though the emphasis is on learner construction, the instructional designer/teacher's role is still critical (Reigeluth, 1989). Here the tasks of the designer are two-fold: (1) to instruct the student on how to construct meaning, as well as how to effectively monitor, evaluate, and update those constructions; and (2) to align and design experiences for the learner so that authentic, relevant contexts can be experienced.

Although constructivist approaches are used quite frequently in the preparation of lawyers, doctors, architects, and businessmen through the use of apprenticeships and on-the-job training, they are typically not applied in the educational arena (Resnick, 1987). If they were, however, a student placed in the hands of a constructivist would likely be immersed in an "apprenticeship" experience. For example, a novice instructional design student who desires to learn about needs assessment would be placed in a situation that requires such an assessment to be completed. Through the modeling and coaching of experts involved in authentic cases, the novice designer would experience the process embedded in the true context of an actual problem situation. Over time, several additional situations would be experienced by the student, all requiring similar needs assessment abilities. Each experience would serve to build on and adapt that which has been previously experienced and constructed. As the student gained more confidence and experience, (s)he would move into a collaborative phase of learning where discussion becomes crucial. By talking with others (peers, advanced students, professors, and designers), students become better able to articulate their own understandings of the needs assessment process. As they uncover their naive theories, they begin to see such activities in a new light, which guides them towards conceptual reframing (learning). Students gain familiarity with analysis and action in complex situations and consequently begin to expand their horizons: they encounter relevant books, attend conferences and seminars, discuss issues with other students, and use their knowledge to interpret numerous situations around them (not only related to specific design issues). Not only have the learners been involved in different types of learning as they moved from being novices to "budding experts," but the nature of the learning process has changed as well.

- Emphasis is on the collaborative nature of learning and the importance of cultural and social context.
- All cognitive functions are believed to originate in, and are explained as products of social interactions

- Learning is more than the assimilation of new knowledge by learners; it was the process by which learners were integrated into a knowledge community.
- Believed that constructivists such as Piaget had overlooked the essentially social nature of language and consequently failed to understand that learning is a collaborative process.

## Social Constructivism

The default epistemology in education is an empirical/reductionist approach to teaching and learning. The shared epistemological basis for these two perspectives, on the other hand, is interpretativism, where knowledge is believed to be acquired through involvement with content instead of imitation or repetition (Kroll & LaBoskey, 1996).

There is no absolute knowledge, just our interpretation of it. The acquisition of knowledge therefore requires the individual to consider the information and – based on their past experiences, personal views, and cultural background – construct an interpretation of the information that is being presented to them.

Students 'construct' their own meaning by building on their previous knowledge and experience. New ideas and experiences are matched against existing knowledge, and the learner constructs new or adapted rules to make sense of the world. In such an environment the teacher cannot be in charge of the students' learning, since everyone's view of reality will be so different and students will come to learning already possessing their own constructs of the world.

Teaching styles based on this approach therefore mark a conscious effort to move from these 'traditional, objectivist models didactic, memory-oriented transmission models' (Cannella & Reiff, 1994) to a more student-centred approach.

## Main Theorists

John Dewey is often cited as the philosophical founder of this approach. Bruner and Piaget are considered the chief theorists among the cognitive constructivists, while Vygotsky is the major theorist among the social constructivists.

## Dewey

John Dewey rejected the notion that schools should focus on repetitive, rote memorization & proposed a method of "directed living" – students would engage in real-world, practical workshops in which they would demonstrate their knowledge through creativity and collaboration. Students should be provided with opportunities to think from themselves and articulate their thoughts.

Dewey called for education to be grounded in real experience. He wrote, "If you have doubts about how learning happens, engage in sustained inquiry: study, ponder, consider alternative possibilities and arrive at your belief grounded in evidence."

## Piaget

Piaget rejected the idea that learning was the passive assimilation of given knowledge. Instead, he proposed that learning is a dynamic process comprising successive stages of adaption to reality during which learners actively construct knowledge by creating and testing their own theories of the world.

Although less contemporary & influential, it has inspired several important educational principles such as:

- Discovery learning
- Sensitivity to children's' readiness
- Acceptance of individual differences
- Learners don't have knowledge forced on them – they create it for themselves

A common misunderstanding regarding constructivism is that instructors should never tell students anything directly but, instead, should always allow them to construct knowledge for themselves. This is actually confusing a theory of pedagogy (teaching) with a theory of knowing. Constructivism assumes that all knowledge is constructed from the learner's previous knowledge, regardless of how one is taught. Thus, even listening to a lecture involves active attempts to construct new knowledge.

## Bruner

Influenced by Vygotsky, Bruner emphasises the role of the teacher, language and instruction. He thought that different processes were used by learners in problem solving, that these vary from person to person and that social interaction lay at the root of good learning.

Bruner builds on the Socratic tradition of learning through dialogue, encouraging the learner to come to enlighten themselves through reflection. Careful curriculum design is essential so that one area builds upon the other. Learning must therefore be a process of discovery where learners build their own knowledge, with the active dialogue of teachers, building on their existing knowledge.

Bruner initiated curriculum change based on the notion that learning is an active, social process in which students construct new ideas or concepts based on their current knowledge. He provides the following principles of constructivistic learning:

- Instruction must be concerned with the experiences and contexts that make the student willing and able to learn (readiness).
- Instruction must be structured so that it can be easily grasped by the student (spiral organization).
- Instruction should be designed to facilitate extrapolation and or fill in the gaps (going beyond the information given).

## Vygotsky

Social constructivism was developed by Vygotsky. He rejected the assumption made by Piaget that it was possible to separate learning from its social context.

According to Vygotsky(1978)

"Every function in the child's cultural development appears twice: first, on the social level and, later on, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals." (p. 57)

Although Vygotsky died at the age of 38 in 1934, most of his publications did not appear

in English until after 1960. There are, however, a growing number of applications of social constructivism in the area of educational technology.

By the 1980s the research of Dewey and Vygotsky had blended with Piaget's work in developmental psychology into the broad approach of constructivism. The basic tenet of constructivism is that students learn by doing rather than observing. Students bring prior knowledge into a learning situation in which they must critique and re-evaluate their understanding of it.

This process of interpretation, articulation, and re-evaluation is repeated until they can demonstrate their comprehension of the subject.

## Model of Learning

Social Constructivist

**1. Language, Culture, & Knowledge** Vygotsky emphasized the role of language and culture in cognitive development and in how we perceive the world, and claimed that they provide frameworks through which we experience, communicate, and understand reality.

He demonstrated the importance of language in learning by demonstrating that in infants, communication is a prerequisite to the child's acquisition of concepts and language. But, he suggests that people learn with meaning and personal significance in mind, not just through attention to the facts:

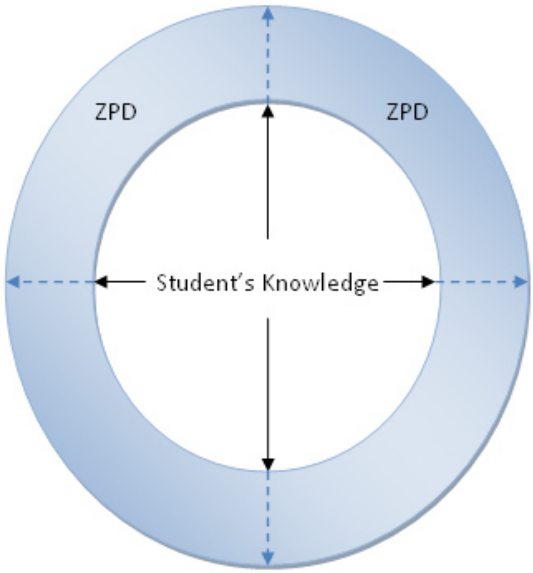
I do not see the world simply in colour and shape but also as a world with sense and meaning. I do not merely see something round and black with two hands; I see a clock.... (p. 39)

Language and the conceptual schemes that are transmitted by means of language are essentially social phenomena. Knowledge is not simply constructed, it is co-constructed.

**2. The Zone of Proximal Development** Vygotsky believed that learning takes place within the Zone of Proximal Development. In this, students can, with help from adults or children who are more advanced, master concepts and ideas that they cannot understand on their own. This model has two developmental levels:

1. The level of actual development – point the learner has already reached & can problem-solve independently.
2. The level of potential development (ZDP) – point the learner is capable of reaching under the guidance of teachers or in collaboration with peers.

The ZDP is the level at which learning takes place. It comprises cognitive structures that are still in the process of maturing, but which can only mature under the guidance of or in collaboration with others.




*The Zone of Proximal Development*

**White circle**: what the student can learn unaided
**Blue circle**: what student can learn with help
**ZDP**: area of 'potential' where learning takes place

To ensure development in the ZDP, the assistance/guidance received must have certain features:

1. **Intersubjectivity** – the process whereby two participants who begin a task with different understandings arrive at a shared understanding (Newson & Newson, 1975). This creates a common ground for communication as each partner adjusts to the perspective of the other.
2. **Scaffolding** – adjusting the support offered during a teaching session to fit the child's current level of performance. This captures the form of teaching interaction that occurs as individuals work on tasks such as puzzles and academic assignments.
3. **Guided participation** – a broader concept than scaffolding that refers to shared endeavours between expert and less expert participants

## General Discussion

It is apparent that students exposed to the instructional approaches described above would gain different competencies. This leads instructors/designers to ask two significant questions: Is there a single "best" approach and is one approach more efficient than the others? Given that learning is a complex, drawn-out process that seems to be strongly influenced by one's prior knowledge, perhaps the best answer to these questions is "it depends." Because learning is influenced by many factors from many sources, the learning process itself is constantly changing, both in nature and diversity, as it progresses (Shuell, 1990). What might be most effective for novice learners encountering a complex body of knowledge for the first time, would not be effective, efficient or stimulating for a learner who is more familiar with the content. Typically, one does not teach facts the same way that concepts or problem-solving are taught; likewise, one teaches differently depending on the proficiency level of the learners involved. Both the instructional strategies employed and the content addressed (in both depth and breadth) would vary based on the level of the learners.

So how does a designer facilitate a proper match between learner, content, and strategies? Consider, first of all, how learners' knowledge changes as they become more familiar with a given content. As people acquire more experience with a given content, they progress along a low-to-high knowledge continuum from 1) being able to recognize and apply the standard rules, facts, and operations of a profession (knowing what), to 2) thinking like a professional to extrapolate from these general rules to particular, problematic cases (knowing how), to 3) developing and testing new forms of understanding and actions when familiar categories and ways of thinking fail (reflection-in-action) (Schon, 1987). In a sense, the points along this continuum mirror the points of the learning theory continuum described earlier. Depending on where the learners "sit" on the continuum in terms of the development of their professional knowledge (knowing what vs. knowing how vs. reflection-in-action), the most appropriate instructional approach for advancing the learners' knowledge at that particular level would be the one advocated by the theory that corresponds to that point on the continuum. That is, a behavioral approach can effectively facilitate mastery of the content of a profession (knowing what); cognitive strategies are useful in teaching problem-solving tactics where defined facts and rules are applied in unfamiliar situations (knowing how); and constructivist strategies are especially suited to dealing with ill-defined problems through reflection-in-action.

A second consideration depends upon the requirements of the task to be learned. Based on the level of cognitive processing required, strategies from different theoretical perspectives may be needed. For example, tasks requiring a low degree of processing (e.g., basic paired associations, discriminations, rote memorization) seem to be facilitated by strategies most frequently associated with a behavioral outlook (e.g., stimulus-response, contiguity of feedback/reinforcement). Tasks requiring an increased level of processing (e.g., classifications, rule or procedural executions) are primarily associated with strategies having a stronger cognitive emphasis (e.g., schematic organization, analogical reasoning, algorithmic problem solving). Tasks demanding high levels of processing (e.g., heuristic problem solving, personal selection and monitoring of cognitive strategies) are frequently best learned with strategies advanced by the constructivist perspective (e.g., situated learning, cognitive apprenticeships, social negotiation).

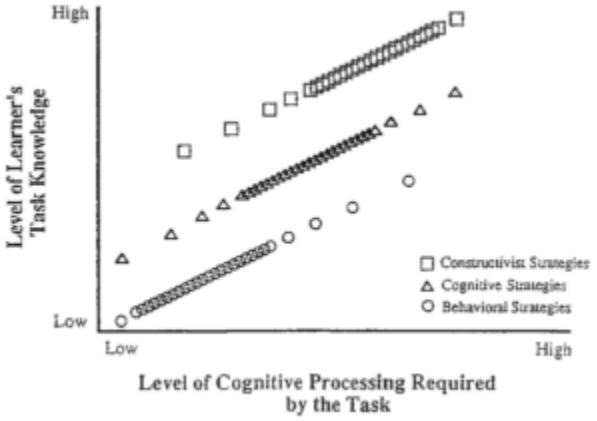



*Figure 1. Comparison of the associated instructional strategies of the behavioral, cognitive, and constructivist viewpoints based on the learner's level of task knowledge and the level of cognitive processing required by the task.*

Critical questions instructional designers must ask is not "Which is the best theory?" but "Which theory is the most effective in fostering mastery of specific tasks by specific learners?" Prior to strategy(ies) selection, consideration must be made of both the learners and the task. An attempt is made in Figure 1 to depict these two continua (learners' level of knowledge and cognitive processing demands) and to illustrate the degree to which strategies offered by each of the theoretical perspectives appear applicable. The figure

is useful in demonstrating: (a) that the strategies promoted by the different perspectives overlap in certain instances (i.e., one strategy may be relevant for each of the different perspectives, given the proper amount of prior knowledge and the corresponding amount of cognitive processing), and (b) that strategies are concentrated along different points of the continua due to the unique focus of each of the learning theories. This means that when integrating any strategies into the instructional design process, the nature of the learning task (i.e., the level of cognitive processing required) and the proficiency level of the learners involved must both be considered before selecting one approach over another. Depending on the demands of the task and where the learners are in terms of the content to be delivered/discovered, different strategies based on different theories appear to be necessary. Powerful frameworks for instruction have been developed by designers inspired by each of these perspectives. In fact, successful instructional practices have features that are supported by virtually all perspectives (e.g., active participation and interaction, practice and feedback).

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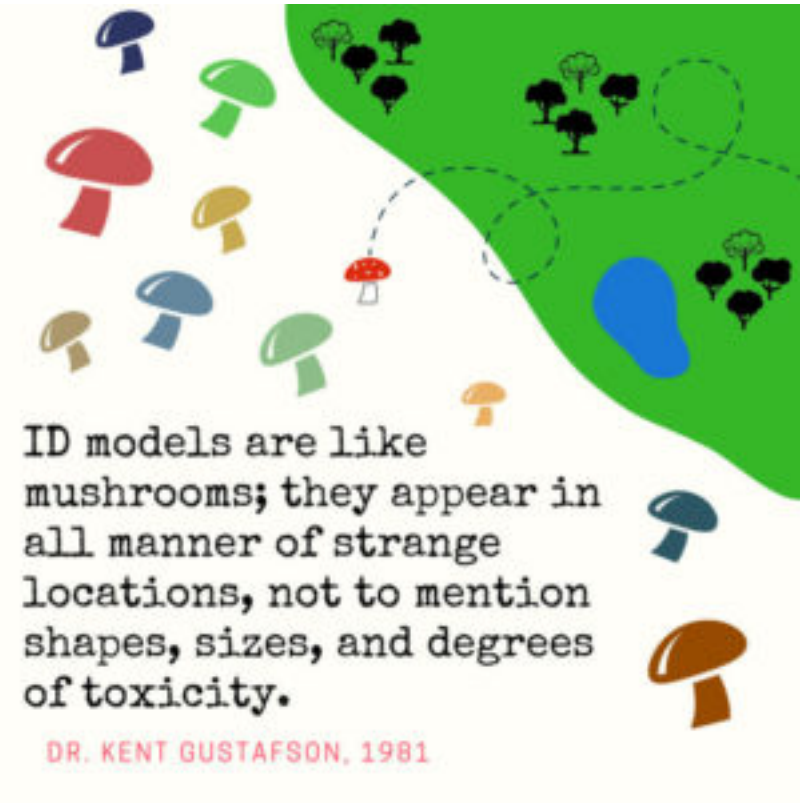
# 6.

## Introduction

Researchers and practitioners have spent the past 50 years attempting to define and create models of design with the intent to improve instruction. As part of a joint, inter-university project, Barson (1967) defined instructional development as the systematic process for improving instruction. Perhaps most interesting about this project and subsequent report is the caution that many different conditions influence learning, including the use of media, and that generalizing any sort of model would potentially be hazardous at best and disastrous at worst. Shortly thereafter, however, Twelker, Urbach, and Buck (1972) noted that a systematic approach to developing instruction was an increasingly popular idea, but cautioned that instructional design (ID) methods varied from simple to complex. These historical observations predicted the reality that every instructional design project is unique every time with no two projects ever progressing through the process identically. These differences, sometimes subtle while at other times significant, have given way to literally dozens of different models used with varying popularity in a wide variety of learning contexts.




Mushrooms

## Models

Because there are so many different ID models, how to choose which one to use? A total of 34 different instructional design models (see Table 1 for a summary) have been covered by Survey of Instructional Design Models text since its first edition in 1981, and this list does not include every model. Still, this list of models is useful in providing a concise guide to some of the more common approaches to instructional design.

Table 1

Instructional Design Models included in editions of the Survey text

| Model Name | 1st Ed 1981 | 2nd Ed 1991 | 3rd Ed 1997 | 4th Ed 2002 | 5th Ed 2015 |
|---|---|---|---|---|---|
| Banathy (1968) | x | | | | |
| DeCecco (1968) | x | | | | |
| Blake & Mouton (1971) | x | | | | |
| Briggs (1970) | x | | | | |
| Baker & Schutz (1971) | x | | | | |
| Gerlach & Ely (1971) | x | x | x | x | x |
| Instructional Development Institute (Twelker et al., 1972) | x | x | x | | |
| Learning Systems Design (Davis, Alexander, & Yelon, 1974) | x | | | | |
| IPISD (Branson, Rayner, Cox, Furman, & King, 1975) | x | x | x | x | x |
| Blondin (1977) | x | | | | |
| Morrison, Ross, Kemp, & Kalman (Kemp, 1977) | x | x | x | x | x |
| Dick, Carey, & Carey (Dick & Carey, 1978) | | x | x | x | x |
| Gilbert (1978) Front End Analysis | x | | | | |
| Courseware Development Process (Control Data Corporation, 1979) | x | | | | |
| ASSURE (Heinich, Molenda, & Russell, 1982) | | x | x | x | x |
| Diamond (1989) | | x | x | x | x |
| Dick & Reiser (1989) | | x | x | | |
| Van Patten (1989) | | x | x | | |
| Bergman & Moore (1990) | | x | x | x | x |
| Leshin, Pollock, & Reigeluth, (1992) | | x | x | | |
| IPDM (Gentry, 1993) | | | x | x | x |
| Smith & Ragan (1993) | | | x | x | x |
| de Hoog, de Jong, & de Vries (1994) | | | | x | x |
| Bates (1995) | | | | x | x |
| PIE (Newby et al., 1996) | | | | x | x |
| 4C/ID (van Merriënboer, 1997) | | | | | x |

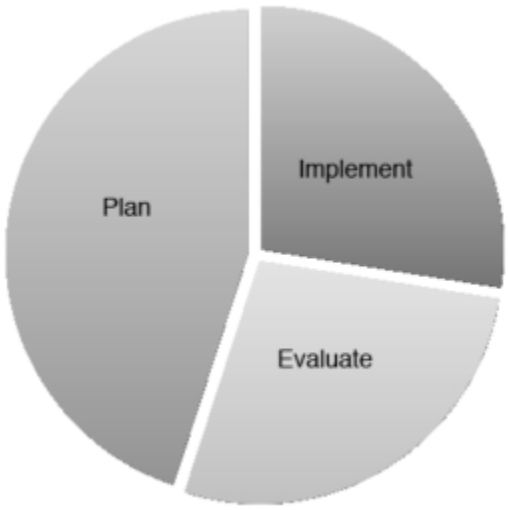
| | | | | | |
|---|---|---|---|---|---|
| ISD Model 2 (Seels & Glasgow, 1997) | | x | | x | x |
| CASCADE (Nieveen, 1997) | | | | x | x |
| Rapid Collaborative Prototyping (Dorsey, Goodrum, & Schwen, 1997) | | | | x | x |
| UbD (Wiggins & McTigue, 2000) | | | | | x |
| Agile (Beck et al., 2001) | | | | | x |
| 3PD (Sims & Jones, 2002) | | | | | x |
| Pebble in the Pond (Merrill, 2002) | | | | | x |
| ILDF (Dabbagh & Bannan-Ritland, 2004) | | | | | x |
| TOTAL | 13 | 12 | 13 | 15 | 21 |

Note. All references refer to the original or first edition of a model; however, the current name of the model as well as current scholars affiliated with the model may vary from the original iteration.

When considering the models featured in Table 1, determining which one to use might best be decided by taking into account a few factors. First, what is the anticipated delivery format? Will the instruction be synchronous online, synchronous face to face, asynchronous online, or some combination of these formats? Some models are better tailored for online contexts, such as Dick and Carey (1978); Bates (1995); Dabbagh and Bannan-Ritland (2004); or Morrison, Ross, Kemp, Kalman, and Kemp (2012). Another way to think about how to select a model involves accounting for the context or anticipated output. Is the instruction intended for a classroom? In that case, consider Gerlach and Ely (1971); ASSURE (Smaldino, Lowther, Mims, & Russell, 2015); PIE (Newby et al., 1996); UbD (Wiggins & McTigue, 2000); 4C/ID (van Merriënboer & Kirschner, 2007); or 3PD (Sims & Jones, 2002). Perhaps the instructional context involves producing an instructional product handed over to another organization or group. In this case, consider Bergman and Moore (1990); de Hoog et al. (1994); Nieveen (1997); Seels and Glasgow (1997); or Agile (Beck et al., 2001). Lastly, perhaps your context prescribes developing a system, such as a full-scale curriculum. These instructional projects may benefit from the IPISD (Branson et al., 1975); Gentry (1993); Dorsey et al. (1997); Diamond (1989); Smith and Ragan (2004); or Pebble in the Pond (Merrill, 2002) models. Deciding which model to use need not be a cumbersome or overwhelming process. So long as a designer can align components of an instructional problem with the priorities of a particular model, they will likely be met with success through the systematic process.

## Featured Models

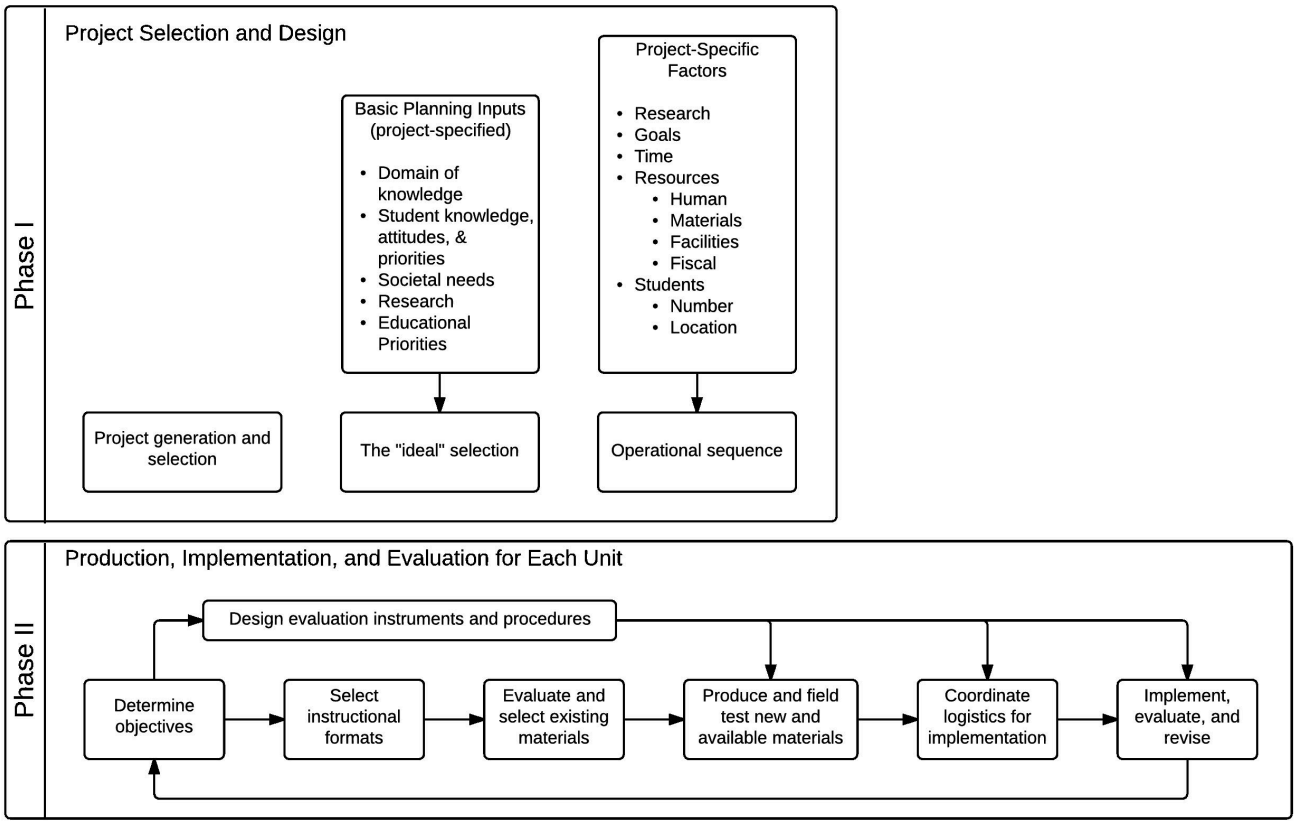
# Pie Model




The PIE Model: Newby, Stepich, Lehman, and Russell (1996)

Consider the following examples. The Plan, Implement, Evaluate (PIE) model from Newby, Stepich, Lehman, and Russell (1996) encourages an emphasis on considering how technology assists with instructional design, focusing on the what, when, why, and how. This phase produces an artifact or plan that is then put into action during implementation followed by evaluating both learner performance and instruction effectiveness. During planning, designers work through a series of questions related to the teacher, learner, and technology resources. The questions are answered while also taking into consideration the implementation and evaluation components of the instructional problem. When considered through the lens of the ADDIE process, PIE combines the analyzing, designing, and developing phases into a singular focus area, which is somewhat illustrated by the depiction in Figure 3.

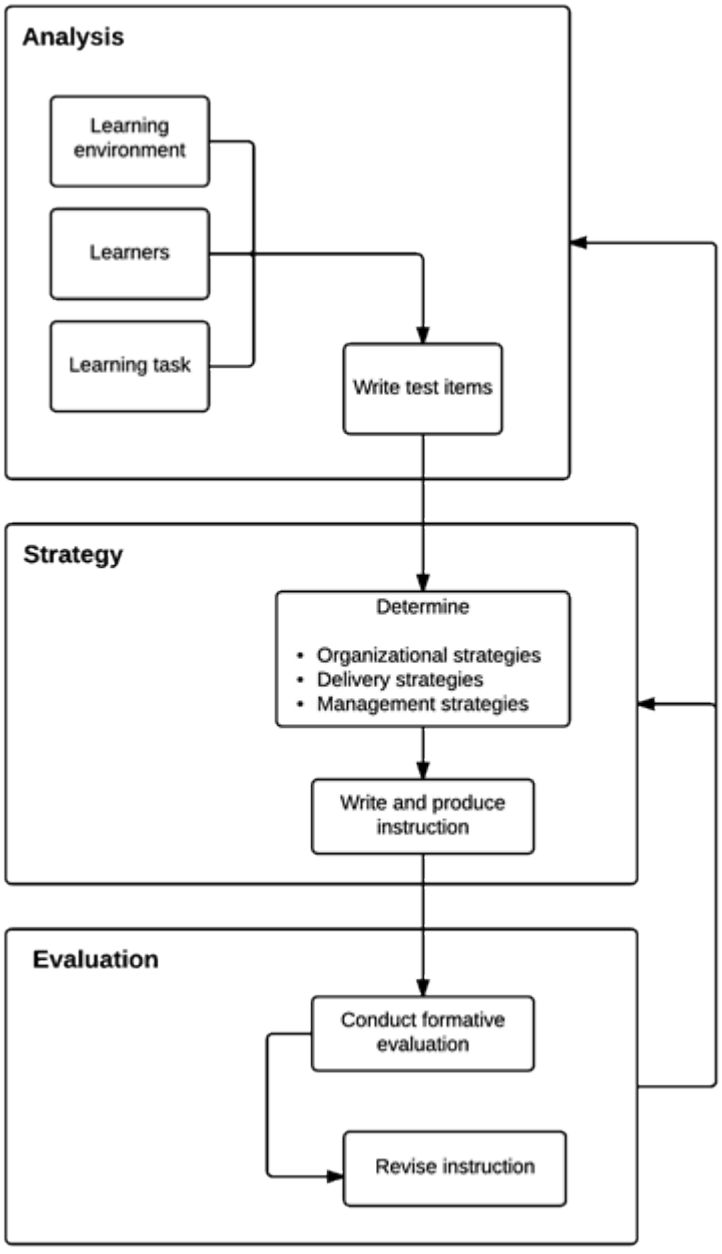
# Diamond Model




The Diamond Model (1989)

The Diamond (1989) model prescribes two phases: "Project Selection and Design" and "Production, Implementation, and Evaluation for Each Unit." Phase I of the Diamond model essentially combines analyzing and designing, while Phase II combines developing, implementing, and evaluating. Diamond placed an emphasis on the second phase of the model by prescribing an in-depth, parallel development system to write objectives, design evaluation instruments, select instructional strategies, and evaluate existing resources. Then, as new resources are produced, they are done so with consideration to the previously designed evaluation instruments. The evaluation is again consulted during the implementation, summative evaluation, and revision of the instructional system. These two examples help demonstrate what is meant by ADDIE being the general process and models being specific applications.

# The Smith and Ragan Model




The Smith and Ragan Model (1999)

Smith and Ragan (1999) created an instructional design process model that is becoming increasingly popular for students and professionals in the field of instructional technology

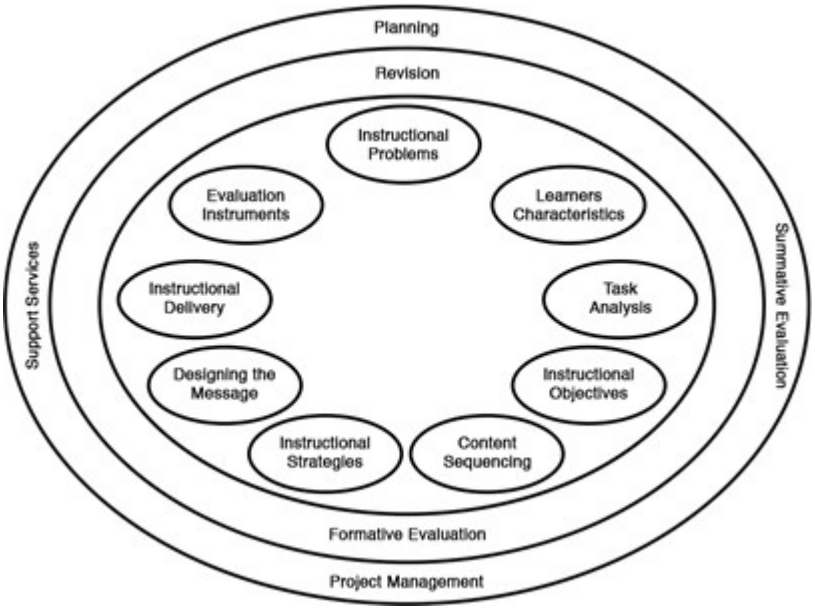
who are particularly interested in the cognitive psychology base of the ID process. Almost half of the procedures in their process address the design of instructional strategies.

Smith and Ragan's model has three phases: analyzing the learning context, generating instructional strategies, and formative and summative evaluation. These three phases provide the conceptual framework for the eight steps that comprise their ID process. Their eight-step approach includes: analyzing the learning context, analyzing the learners, analyzing the learning task, assessing learner performance, developing instructional strategies, producing instruction, conducting evaluation, and revising instruction.

Analyzing the learning context involves a two-part procedure: 1) substantiation of a need for instruction in a certain content area, and 2) preparing a description of the learning environment in which the instructional product will be used. Analyzing the learners describes procedures for describing the stable and changing characteristics of the intended learner audience. Analyzing the learning task describes procedures for recognizing and writing appropriate instructional goals. Assessing learner performance describes procedures for identifying which of sever- al possible assessment items are valid assessments of objectives for various types of learning. Developing instructional strategies is the step that presents strategies for organizing and managing instruction. Producing instruction is the step that provides strategies for translating the decisions and specifications made in previous steps into instructional materials and trainer guides. Production is followed by formative and summative evaluation. Smith and Ragan offer procedures for evaluating the effectiveness of the instructional materials both during development and after implementation. Lastly, revising instruction offers procedures for modifying the proposed instruction. Although this description suggests that the process is highly linear, Smith and Ragan caution that circumstances often require concurrent attention to several steps in their model.

The Smith and Ragan model reflects their philosophic belief that applying a systematic, problem-solving process can result in effective, learner-centered instruction. Their model is particularly strong in the area of developing specific instructional strategies, a common weakness of many other ID models.

# Morrison, Ross, Kalman, and Kemp Model




Morrison, Ross, Kalman, and Kemp Model (1994)

This popular ID model initially was created by Kemp and adapted by Kemp, Morrison, and Ross in 1994. In the sixth edition of their book Kalman joined the group of authors, but the important influence of Kemp remains obvious. The most significant change to this model includes design considerations for technology-based instruction. Computer-based, web-based, and distance instruction are classified into five groups: drill-and- practice, tutorials, simulations, games, and hypermedia. The benefits of each type of instruction are summarized and design considerations are detailed for both individualized and group-based instruction. Morrison, Ross, Kalman, and Kemp (2011) present an instructional development model (Figure 12) with a focus on curriculum planning. They approach instruction from the perspective of the learner rather than content and contrast ID with traditional design practice by asking the following questions:

1. What level of readiness do individual students need for accomplishing the objectives?
2. What instructional strategies are most appropriate in terms of objectives and student characteristics?
3. What technology or other resources are most suitable?
4. What support is needed for successful learning?
5. How is achievement of objectives measured?

6. What revisions are necessary if a tryout of the program does not match expectations? (p. 6)

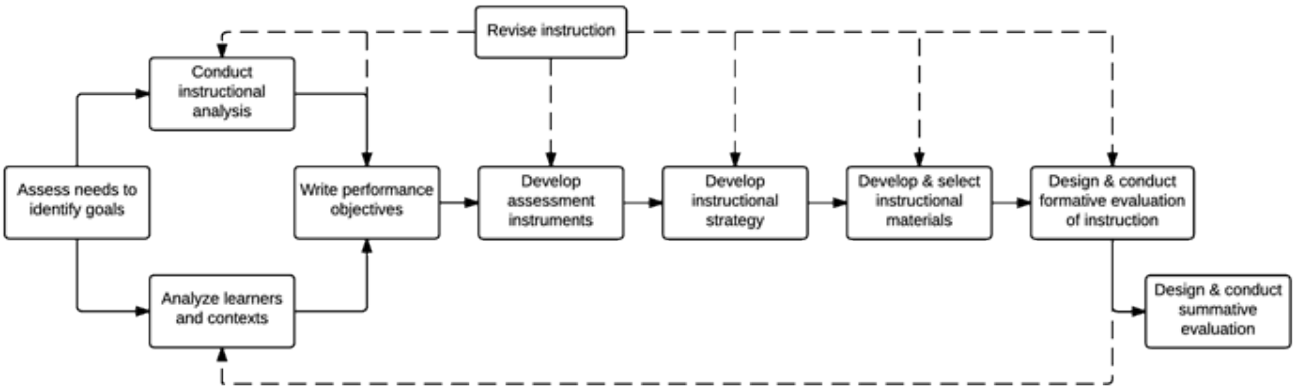
Based on how various individuals might approach de- signing a course, Morrison, Ross, Kalman, and Kemp (2011) identify four fundamental planning elements for systematic instructional planning that are represented by answers to the following questions:

1. For whom is the program developed? (learners)
2. What do you want the learners or trainees to learn or demonstrate? (objectives)
3. How is the subject content or skill best learned? (methods)
4. How do you determine the extent to which learning is achieved? (evaluation)

The entirety of the Morrison, Ross, Kalman, and Kemp model includes the four interrelated elements of the framework as they relate to additional components and ongoing processes that continue throughout the life of an instructional design project, as illustrated by the outer ovals in the figure.

Morrison, Ross, Kalman, and Kemp's model communicates their belief that ID is a continuous cycle with revision as an on-going activity associated with all of the other elements. They feel the teacher/designer can start anywhere and proceed in any order. This is essentially a general system view of development wherein all elements are interdependent and may be performed independently or simultaneously as appropriate. Although the Morrison, Ross, Kalman, and Kemp model indicates that the developer can start anywhere, in their narrative it is presented in a conventional framework starting with topics, tasks, and purposes. The classroom orientation of the model is apparent through their choice of the words, *topics* and *subject content* for determining what will be taught. Both K-12 and business and industry instructors can readily identify with these words. From a teacher's perspective the strength of this model is the concept of starting "where you are." Also, the emphasis on subject matter content, goals and purposes, and selection of resources makes it attractive to teachers. The inclusion of design considerations for technology-based instruction and project management gives the model a modern appeal that is not found elsewhere. This model is one of the few that continues to be modified over time.

# The Dick, Carey, and Carey Model




Dick, Carey, and Carey (2009)

Without a doubt the most widely cited ID model is one originally published by Walter Dick and Lou Carey, to which they have now added James Carey. Both advocates of ID and its most vocal critics invariably cite this model when expressing their opinions about the desirability of systematically designing instruction. The Dick, Carey, and Carey model has become the standard by which all other ID models (and alternative approaches to de- sign and development of instruction) are compared.

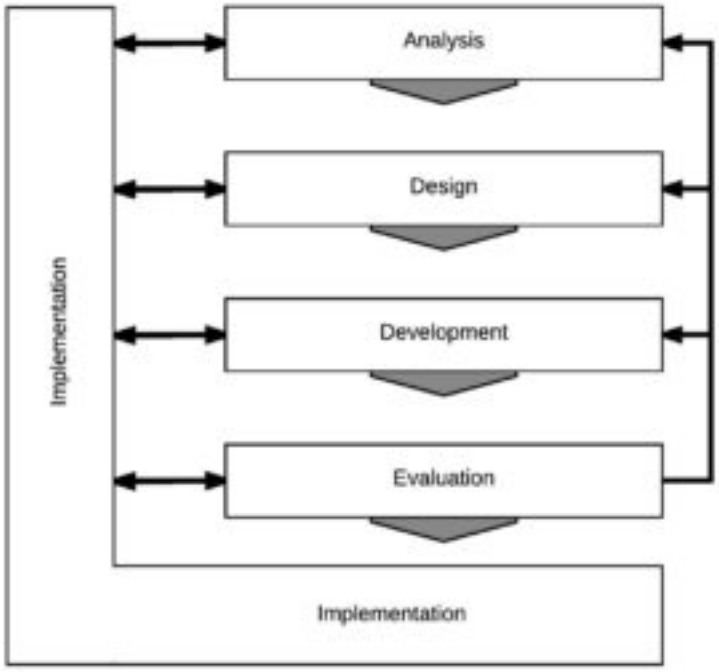
In their widely used text, now in its seventh edition, Dick, Carey, and Carey (2009) include a model that is largely unchanged from earlier editions. This model might be considered product oriented rather than system oriented depending on the size and scope of step one activities (identify instructional goals). Additionally, the first step has been updated to reflect that identifying goals may occur through a variety of actions, including established goals, learner experience, analysis, or some other requirement. The authors have also refreshed the narrative to include learning with portable devices. The serial case study is directed at a specific instructional product, but parts of the narrative suggest a more encompassing perspective. For our purpose we consider it to be a course or system level model that is also applicable to projects having a more limited focus.

Dick, Carey, and Carey's model begins with Identify Instructional Goal(s). The first component of their model immediately distinguishes it from many other instructional development models by promoting needs assessment procedures and the importance of identifying clear and measurable goals. They recommend criteria for establishing instructional goals as a way to decide what the designer is trying to achieve before beginning the ID process. Two steps are then done in parallel: Conduct Instructional Analysis and Analyze Learners and Contexts. The former is vintage hierarchical analysis

as conceived by Gagné, with added procedures for constructing cluster analysis diagrams for verbal information. The latter step specifies collecting information about prospective learners' knowledge, skills, and attitudes and the environment in which they are situated. The next step is to Write Performance Objectives in measurable terms, followed by Developing Assessment Instruments. Criterion-referenced test items then are generated for each objective. In the Develop Instructional Strategy step they recommend ways to develop strategies for assisting particular groups of learners to achieve the stated objectives. The next step is to Develop and Select Instructional Materials. Dick, Cary, and Carey acknowledge the desirability of selecting as well as developing materials, but the degree of emphasis devoted to development suggests that they are far more interested in original development. The next step is to Design and Conduct Formative Evaluation, a process for which they give excellent guidance. The process of conducting a formative evaluation of instructional materials is iterative and consists of at least three cycles of data collection, analysis, and revision. The first cycle pinpoints errors in the materials. The second cycle occurs after these errors have been corrected and is designed to locate additional errors in the materials and procedures. The third cycle is a field trial that is conducted following the refinement of materials after the second cycle and is intended to identify errors when the materials are used in their intended setting. Design and Conduct Summative Evaluation also deter- mines the degree to which the original instructional goals (and perhaps other unintended ones) have been achieved.

The Dick, Carey, and Carey model reflects the fundamental design process used in many business, industry, government, and military training settings, as well as the influence of performance technology and the application of computers to instruction. It is particularly detailed and useful during the analysis and evaluation phases of a project.

# Plompt's OKT Model




Plompt's OKT Model

Plomp's (1982) OKT model, which is taught at the University of Twente in The Netherlands, looks quite similar to the ADDIE process, but adds testing/revising the instructional solution prior to full implementation. When OKT was initially introduced, online or web-based instructional design had not yet become part of the conversation. Yet, his model astutely factors in the technology component not yet commonly seen in other ID models referenced at the time. Notice how the OKT process calls for a close relationship between implementation and the other phases as well as alignment between evaluation and the other phases. This design facilitates internal consistency in decision making. The intent here was to ensure that design decisions relating to technology-based resources were consistently applied across the instructional problem.

At their core, instructional design models seek to help designers overcome gaps in what is learned due to either instruction, motivation, or resources. Thus, some models seek to address non-instructional gaps, like motivation. See Keller's (2016) work on motivational design targeting learner attention, relevance, confidence, satisfaction, and volition (ARCS-V). Other models examine strategies related to resources, like technology or media integration. Examples here include Action Mapping (Moore, 2016); Substitution, Augmentation, Modification, Redefinition (SAMR) Model (see Hamilton, Rosenberg, &

Akcaoglu, 2016 for a discussion); and TPACK-IDDIRR model (Lee & Kim, 2014). And still other models consider other gaps and needs like rapid development. (See the Successive Approximation Model (SAM) from Allen Interaction, n.d.)

Recently, many instructional designers have emphasized the design gaps in ID, drawing upon the broader field of design theory to guide how designers select and arrange constructs or components. One model, known as Design Layers (Gibbons, 2013), helps designers prioritize concerns encountered during the ID process and may overlay with an existing or adapted ID model being followed. In other words, a designer may use design layers to organize the problems to be addressed, but still use other models based on ADDIE processes to solve some of these problems. While unintentional, the field of instructional design often focuses on corporate and adult learning contexts, sometimes feeling exclusionary to the K-12 instructional designer (note: UbD, Wiggins & McTigue, 2000, is one of the more well-known ID models also used by K-12 teachers and instructional facilitators). Carr-Chellman's (2015) Instructional Design for Teachers (ID4T) model and Larson and Lockee's (2013) Streamlined ID represent attempts to break down some of the complex perceptions of ID, making it more accessible for K-12 teachers and newer instructional designers.

The primary takeaway from this entire discussion should be that ID is rarely a simple process. In practice, designers often draw upon personal experience and the wide variety of models, strategies, and theories to customize each instance of instructional design.

## Tips From the Field

The following short quotes about the practice of ID and ID models from scholars, students, and practitioners provide focused advice that are good tips for the beginning designer and great reminders for the more advanced designer.

- Focus on the systematic and iterative process of instructional design. Models are not discrete steps to be checked off. [Kay Persichitte, University of Wyoming]
- The ADDIE paradigm is fundamental to most models, with appropriate evaluation of each step implied. [Jon Anderle, University of Wyoming]
- Be aware of the tension in the field between theory and practice. [Tara Buñag, University of the Pacific]
- Practicing ID means considering all of the available tools. It's too easy for a designer

to fixate on a single instructional technique as a panacea. [Rhonda Gamble, Sweetwater County School District #1]

- In addition to the regular resources often referenced, don't forget to look at the works of Robert F. Mager. They are foundational to the field. [Landra Rezabek, retired University of Wyoming]
- It bears repeating often; the reality of the instructional design practice is unique and complex each and every time. [Camille Dickson-Deane, University of Melbourne]
- Careful and purposeful instructional design brings an inherent positivity to learning. [Terry Callaghan, Albany County School District #1]
- A dollar spent on formative evaluation pays off tenfold when it comes to implementation of a new course or program. [Tom Reeves, retired The University of Georgia]
- Consider Robert Mager's performance analysis flowchart or Ruth Clark's Content-Performance Matrices for teaching procedures, processes, facts, concepts, and principles. All are brilliant! [Marcy Brown, The CE Shop, Inc.]
- When building out your toolbox, take a look at Cathy Moore and her Action Mapping. [David Glow, Restaurant Magic Software]
- Build opportunities into online courses to collect data and conduct research about the course design, organization, assessments, and teaching effectiveness. This can be used for iterative enhancements. [Athena Kennedy, ASU Online]
- Educate stakeholders involved in the ID process on what you do and why you do it. This is crucial for successful collaboration in design and development. [Megan C. Murtaugh, IDT Consultant]
- Instructional design is a creative process. [Rob Branch, The University of Georgia]
- Understand the systemic implications of what you propose. If you don't know the difference between systemic and systematic, please familiarize yourself—it will have vast implications. Please know that models of ID are specifically pedagogical in purpose. They teach you the basics, but the real ID process is not captured by a model. Instead you have to approach it more as art, as a holistic process. [Ali Carr-Chellman, University of Idaho]
- Think about what good instruction means. Are you following a sound design procedure, e.g., ADDIE? Are you adhering to best practices of the professional community? Are your strategies supported by learning theory? Are design decisions validated by demonstrated gains on pre- and post- measures? Each of these has a role in creating good instruction, but don't forget to meet the needs of learners, especially those at the margins. [Brent Wilson, University of Colorado Denver]

- Robert F. Mager (1968) once noted that, "If telling were teaching, we'd all be so smart we could hardly stand it." When working on the phase of any model that involves material development, designers must be careful with overloading learners with information. Further, presenting information must consider what Hugh Gardner, a professor at the University of Georgia, used to call the "COIK" phenomenon; Clear Only If Known. This phenomenon encourages breaking down complex language, avoiding jargon, and making expert knowledge accessible. These tasks are not easy, but must be part of the process. [Marshall Jones, Winthrop University]

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# 7.

## Introduction

Measuring student learning is critical in the teaching and learning processes and can serve many purposes. Instructors can use assessment results to plan future instruction, adapt current instruction, communicate levels of understanding to students, and examine the overall effectiveness of instruction and course design. The measurement of student learning can take place before, during, or after instruction. Before lessons are even developed, instructors need to know what students already know and can do related to the content. There is no point in wasting time teaching something students already know, or in starting at a level that is so advanced students don't have the prerequisite knowledge necessary to be successful. To that end, the learner analysis in instructional design could be considered a type of assessment. Giving a pre-assessment, also called diagnostic assessment, can provide instructors with this valuable information. Measuring student learning during instruction, a formative assessment, provides instructors with important information about how students are progressing towards the learning objectives while there is still time to adjust instruction. Instructor may ask questions such as:

- Are students getting it?
- Are they confused about something that needs to be retaught?
- Is it time to move on with new material?

Finally, measuring student learning at the end of instruction, a summative assessment, provides information about the degree to which students mastered the learning objectives.

This chapter outlines practical strategies instructional designers can use to develop high-quality assessments to measure student learning. Best practices are the same for constructing diagnostic, formative, and summative assessments. Links to additional tools and resources are also provided.

## Constructing High-Quality Assessments

High-quality assessments are those that lead to valid, reliable and fair assessment results. Validity refers to the trustworthiness of the assessment results. For instance, if a student gets 80% of test items correct, does that mean they understand 80% of the material taught? Does the assessment measure what it purports to measure, or is the final score polluted by other factors? For example, consider a test that assesses mathematical ability and is made up of word problems. When taken by an English language learner or by an emerging reader, does the test assess math, reading, or a combination of both? The reliability of an assessment refers to the consistency of the measure. Multiple-choice test items, when properly constructed, are highly reliable. There should be only one correct answer and it is easy to grade. Essay items or performance assessments, on the other hand, are more subjective to grade. Finally, the extent to which an assessment is fair is a characteristic of a high-quality assessment. Fairness is the degree to which an assessment provides all learners an equal opportunity to learn and demonstrate achievement. While some aspects of validity and reliability can be measured through statistical analysis, it is uncommon that such complex measurement procedures are used for typical classroom assessments. Attending to best practices in assessment alignment and test item and assessment construction helps instructional designers increase the validity, reliability, and fairness of assessment instruments.

## Assessment Alignment

One of the most important concepts in assessment is alignment. It is critical that assessments and assessment items are aligned with goals and objectives. It is impossible to determine the extent to which learners have met course or workshop goals and objectives if their knowledge and skills have not been assessed. Assessment alignment tables and test blueprints are two tools instructional designers can use to align assessments and assessment items with learning objectives.

## Learning Taxonomies and Learning Objectives

Learning taxonomies assists instructional designers in constructing both learning objectives and assessment items. Bloom's Revised Taxonomy and Webb's Depth of Knowledge (DOK) are two frameworks commonly used by educators to categorize the academic rigor of an assessment as a whole or individual assessment items. To increase the content validity of an assessment, the complexity of the individual test questions should align with the level of knowledge or skill specified in the learning goal. If a learning objective states that a student compares and contrasts information, it is not appropriate for test items to simply ask students to recall information. Likewise, if the learning goal states that students will be able to synthesize information, a paper-and-pencil test will likely not be a sufficient measure of that skill.

Bloom's Revised Taxonomy divides learning into three domains: cognitive, affective, and psychomotor (Anderson et al., 2001). This chapter focuses on the cognitive domain which consists of six levels that vary in complexity. The three lower levels (remembering, understanding, and applying) are referred to as lower order thinking skills also called LOTS. The top three (analyzing, evaluating, and creating) are referred to as higher order thinking skills, or HOTS. Lists of verbs associated with each of these levels are readily available on the web and are very instrumental in helping instructional designers write measurable learning objectives and test questions that go beyond recalling definitions.

Similar to Bloom, Webb divides levels of knowledge into increasingly complex categories. These include recall and reproduction, skills and concepts, strategic thinking, and extended thinking (Webb, 1999). Student tasks range from a student being able to recall facts to synthesizing information from a variety of sources. These descriptions can help instructional designers design assessment tasks that range in complexity.

## Assessment Alignment Tables

Regardless of the assessment method, instructional designers can ensure that learning goals, objectives, and assessments align by creating an alignment table. In the example below, course goals, student learning outcomes, and assessments are aligned in a table. This example is from a college level course on teaching with technology for pre-service teachers. This table indicates there is at least one learning objective aligned with each

course goal and at least one assessment method aligned with each objective. If you find that a particular learning objective isn't being assessed, you can go back and develop an assessment to measure the learner's progress. A link to an Assessment Alignment Table Template is provided at the end of this chapter in the Additional Resources list.

**Table 1**

*Example Assessment Alignment Table*

| Learning Goal | Student Learning Objective (SLO) | Assessment(s) |
|---|---|---|
| Plan and implement meaningful learning opportunities that engage learners in the appropriate use of technology to meet learning outcomes. | SLO1. Develop a technology integrated activity plan that meets the needs of diverse learners (e.g. ELL, at-risk, gifted, learners with learning disabilities). | Technology Integration Portfolio |
| | SLO2. Explain how and why to use technology to meets the needs of diverse learners (e.g. ELL, at-risk, gifted, students with learning disabilities). | Technology Integration Portfolio<br>Midterm |
| Use technology to implement Universal Design for Learning. | SLO3. Describe the elements of UDL included in the technology integrated activity. | Technology Integration Portfolio |
| Model and require safe, legal, ethical, and appropriate use of digital information and technology. | SLO4. Describe legal, ethical, cultural, and societal issues related to technology. | Midterm<br>Final |

## Table of Specifications

In addition to creating an alignment table for all assessments in the entire course, instructional designers can also create a table of specifications, or test blueprint, to align individual test items to course objectives. A table of specifications aligns the learning objective, all items on a single test, and the level of knowledge being assessed. This is evidence of content validity. This also helps the instructional designer see if the test includes items related to all the learning goals, and if the assessment items are written to elicit knowledge at the appropriate level of complexity. If you find that you have too many questions about one topic or not enough about another, or that you are only asking lower level questions when the learning objective is focused on higher order thinking skills, the

test can be edited accordingly. The figure below shows a test blueprint for a 12-item test about assessment. Each number represents the question number on the test. A link to a Table of Specifications Template is provided at the end of this chapter in the Additional Resources list.

**Table 2**

*Sample Test Blueprint for a 12 Item Test*

| Learning objective | Level of Knowledge | |
|---|---|---|
| | Lower Order | Higher Order |
| Analyze learning objectives in terms of format, specificity, reasonableness, and alignment. | 1, 2 | 8, 12 |
| Explain the importance of alignment when designing lessons and assessments. | 3, 5 | 10 |
| Compare and contrast reliability and validity of classroom assessment | 4, 6, 7 | 11, 9 |

## Assessment Formats

Common assessment formats include multiple-choice and essay questions, observation, oral-questioning, and performance-based assessments. This chapter focuses on paper-and-pencil tests and performance assessments. Best practices in constructing each are described below. These guidelines help increase the validity, reliability, and fairness of assessments.

### Multiple-Choice Best Practice Guidelines

Multiple-choice items are very easy to grade (assuming there is only one correct answer) but very difficult to write. Coming up with plausible distractors, or the incorrect responses, is the hardest part. If some answer choices aren't plausible (ones that are

meant to be funny, for example), the probability that a student will be able to guess the correct answer increases. It is also difficult, but not impossible, to write multiple-choice questions that assess higher-order thinking skills. Tips for constructing multiple-choice test questions that assess HOTS are provided below.

1. All answer choices should be similar in length and grammatically correct in relation to the item stem.
2. Avoid “all of the above”, and “none of the above” answer choices.
3. Avoid confusing combinations of answer choices such as “A and B”; “B and C”; “A, B and C but not D”.
4. Avoid negatively stated stems. If you must use them, bold the negative word to make it what you are asking clearer to the learner.
5. Avoid overlapping answer choices. (This most commonly occurs with number choices.)
6. The item stem should make sense on its own and not contain any extraneous information.
7. Don’t include any clues in the item stem that would give the answer away.
8. Don’t include too many answer choices. Typically, multiple choice questions contain four options.
9. Ensure the correct answer is the best answer.
10. Randomize the order of the correct answers.

**Table 3**

*Examples of Poor and Improved Items*

| Poor Item | Improved Item | Explanation |
|---|---|---|
| If a boy is swimming two miles an hour down a river that is polluted and contains no fish and the river is flowing at the rate of three miles per hour in the same direction as the boy is swimming, how far will the boy travel in two hours?<br>a. four miles<br>b. six miles<br>c. ten miles<br>d. twelve miles | A boy is swimming two miles per hour down a river relative to the water. The water is flowing at the rate of three miles per hour. How far will the boy travel in two hours?<br>a. four miles<br>b. six miles<br>c. ten miles<br>d. twelve miles | The poor item contains extraneous information and a confusing sentence structure. In the improved item, the extraneous information was removed. In addition, the prompt was broken up into several sentences and the actual question stands on its own. |
| Which one of the following is not a safe driving practice on icy roads?<br>a. accelerating slowly<br>b. jamming on the brakes<br>c. holding the wheel firmly<br>d. slowing down gradually | All of the following are safe driving practices on icy roads EXCEPT<br>a. accelerating slowly.<br>b. jamming on the brakes.<br>c. holding the wheel firmly.<br>d. slowing down gradually. | When reading the poor item, a test taker may not recognize that they are being asked to pick a non-example of a safe driving practice. In the improved item, the word “except” is in all caps and underlined to call attention to what is being asked. |
| In most commercial publishing of a book, galley proofs are most often used ———————— .<br>1. page proofs precede galley proofs for minor editing.<br>2. to help isolate minor defects prior to printing of page proofs.<br>3. they can be useful for major editing or rewriting.<br>4. publishers decide whether book is worth publishing. | In publishing a book, galley proofs are most often used to<br>1. aid in minor editing after page proofs.<br>2. isolate minor defects prior to page proofs.<br>3. assist in major editing or rewriting.<br>4. validate menus on large ships. | In the poor item, each answer choice is not grammatically correct in relation to the item stem. Often, a test taker can pick out the correct answer choice because it is the only one that is grammatically correct and not because they actually knew the answer. In the improved item, the item stem and answer choices have been edited so that they are all grammatically correct. |

## Tips for Writing Higher Order Thinking Multiple-Choice Questions

**Tip 1**: Use scenarios or provide examples that are new to learners. This allows you to ask learners to do more than simply recognize the correct answer. (Note that this can be problematic if you are assessing struggling readers or ESL learners. Know your audience!)

**Tip 2**: Develop multiple-choice questions around a stimulus you provide such as a map, graph, diagram, or reading passage. These are called interpretive exercises. Interpretive exercises include a set of data or information and a series of multiple-choice questions having answers that are dependent upon the information given.

## Best Practice Guidelines for Writing Essay Items

Essay questions are a good way to assess deep understanding and reasoning skills. Students can provide more in-depth answers in essay questions. Essay questions are also much easier to write than multiple-choice items. They are, however, harder to grade. Below are best practice guidelines for constructing and grading essay items and some real-world examples.

- Select the most important content in the workshop or unit to assess with essay times. Using essay items limits the amount of content you can cover on any one test because they take more time for a learner to answer. If one topic is less important than another, consider only asking multiple-choice questions about it.
- Write the prompt to focus learners on the key ideas they should address in their response. For example, tell learners how many reasons should they give, or how many examples should they provide. Stating directly what you want means that the learner doesn't have to try to interpret how much is enough.
- Break multi-faceted questions up into individual items. If the question is very long, make it more than one essay question on the test. This helps focus both the test taker and the grader.
- Include scoring criteria with the prompt and assign appropriate point values. If you want someone to provide three reasons why the Renaissance began in Italy, decide how many points each reason should count and make that clear to the learner. It is

very difficult to objectively grade an essay question worth 10 or 20 points without first determining the grading criteria.
- Only include essay items that require higher-order thinking. Essay questions are too time consuming to grade. If it can be assessed with a multiple-choice question instead, don't waste valuable time reading essay answers.
- Avoid allowing learners to select which essay items they answer. This keeps learner scores comparable. If learners can choose which essay questions to answer, the test is not assessing the same thing for all students.

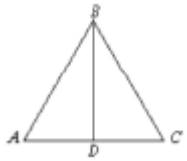
Note: Essay items can also be assessed with rubrics. See Performance Assessments and Rubric Development for more information on how to construct a rubric.

## Essay Item Examples

Below are examples of high- and low-quality essay items. Note that the high quality examples include explicit instructions about what needs to be included in the answer. In addition, how the points will be allocated is clear. The low quality essay items are both very broad in scope. A test taker could easily answer the question without touching on any of the topics the instructor wanted them to include in their answer. In addition, it isn't clear to the test taker or the instructor how the points are allocated. This can lead to inconsistencies in grading.

### *High-Quality Examples*

1. Proof 1: Given ABC is equilateral, and BD is the angle bisector of angle ABC. Prove that the measure of angle ADB and angle CDB is equal to 90 degrees. Provide the statement and reason for each step using the two-column proof format. (1/2 point for each correct statement and 1/2 point for each correct reason given. 8 total points.)




2. Compare and contrast large-scale assessment and classroom assessment on the dimensions of frequency and nature of feedback. (2 points frequency, 2 points feedback. 4 total points)

### *Low-Quality Examples*

1. Explain weather and climate. (20 points)
2. Describe the three principles of Universal Design for Learning. Do you believe they should be used to guide instruction? Why or why not? (10 points)

## Best Practice Guidelines in Developing Performance-Based Assessments

Performance-based assessment allows learners to apply knowledge and skills in authentic situations. Performance-based assessment results in the creation of a performance or a product. Performance examples include public speaking, inventing something to solve a problem, putting on a play, or playing in a basketball game. Public service announcements, digital videos, and infographics created by learners are examples of products. Consider the following guidelines when constructing performance assessments:

1. Design a task that applies to real-world situations. The more authentic a performance-based assessment can be the more meaningful it will be to the learner, although access to resources and time will certainly impose project limitations. For example, writing a paper on gardening, designing a garden, and creating a garden are all examples of performance tasks with varying degrees of authenticity.
2. Develop a task description that includes the following:
    1. Purpose/learning objectives. Why are the learners completing this task? Write

the learning objectives in learner friendly language.
    2. Clear directions. Break down the task into its component parts. Don't assume learners know how to jump immediately into creating the final performance or product.
    3. Perimeters and constraints. How much time do the learners have to complete the project? What resources are they allowed to use? Is it a group or individual project? Who are they allowed to ask for help?
    4. Assessment criteria. How will the performance or product be graded? This is discussed in more detail below in the Rubrics section.
3. Develop any job aides learners will need in order to complete the task. Do you need to teach any additional skills such as how to locate articles in a database, how to measure volume, or how to use a particular piece of software?
4. If at all possible, provide learners with an example.

## Rubrics

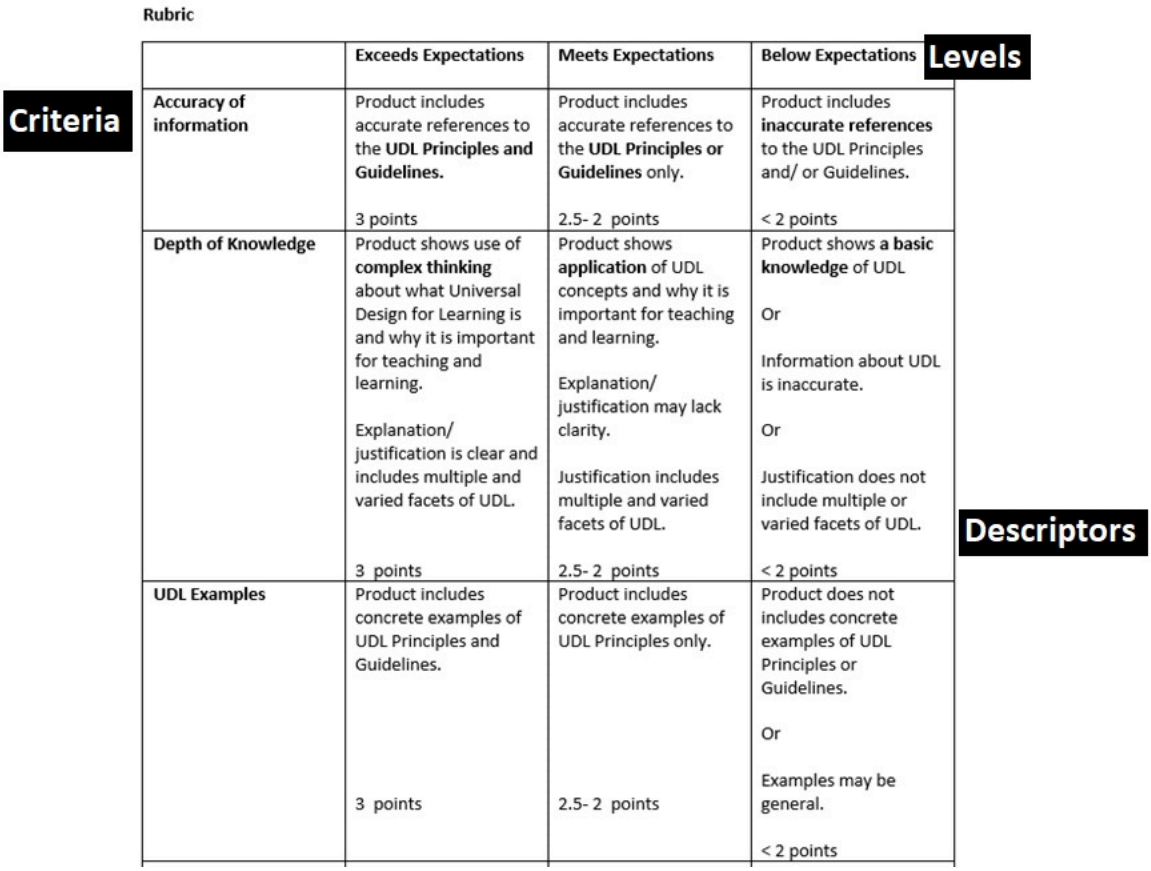
As discussed earlier in the chapter, reliability is related to scoring consistency. One way to help ensure scoring consistency is to use rubrics for grading subjective assessment items, including essay questions and performance assessments. Rubrics focus the attention of a grader on what is most important about the assignment. Rubrics include topics or elements and descriptions of levels of performance. This provides a roadmap for how to assess an assignment that is more subjective than a multiple-choice question. Without a rubric, it is easy for a grader to grade for one thing for the first 10 papers and grade for something else the last 10 papers. This occurs when an instructor has a lot of papers to grade, grading takes place over several days, and if more than one instructor is grading the same assignment. Providing a rubric up front is also beneficial to the student. They communicate to the student from the beginning what is important, on what to focus, and where to spend time and energy.

There are three types of rubrics: holistic, analytic, and single-point. This section will focus on analytic rubrics, because they allow instructors to assess the component parts of the performance assessment individually and provide the clearest grading criteria. Several additional resources about the different types of rubrics are provided below.

An analytic rubric consists of criteria, levels of performance, and descriptors.

**Figure 1**

*Example of an Analytic Rubric*




## Best Practice Guidelines for Creating Rubrics

1. Determine the criteria. Criteria can be written as a learning objective or category. Criteria should be measurable, important to the performance task, and taught. For example, creativity is often assessed in performance-based assessments. If creativity was not explicitly taught, it shouldn't be measured.
2. Determine the weight of each criteria. Will they all be worth the same amount of points or will some count for more than others?
3. Determine the number of performance levels. How many levels of the rating scale will be delineated on the rubric? Will they be numbers such as 4, 3, 2, 1 or descriptive such as developing, meets expectations, and exceeds expectations. Typically, analytic rubrics contain three to five performance levels.
4. Write descriptors for each of the performance levels. This is the hardest part! Descriptors should address the quality of the product. It is okay to count project

elements for some of your criteria (i.e. number of references, number of graphs), but not for all of them. See examples of quality and numerical descriptors below.

## Numerical Descriptors vs Quality Descriptors Example

**Table 4**

*Numerical Descriptors in an Annotated Bibliography Rubric*

| | **4** | **3** | **2** | **1** |
|---|---|---|---|---|
| **Quality / Reliability of Sources** | All sources cited are reliable and trustworthy. | At least 80% of sources cited are reliable and trustworthy. | At least 50% of sources are reliable and trustworthy. | Less than 50% of sources cited are reliable and trustworthy. |
| | 5 points | 4-3 points | 2 points | 0-1 point |

**Table 5**

*Quality Descriptors in a Technology Lesson Plan Rubric*

| | **Exceeds Expectations (A)** | **Meets Expectations (B to C)** | **Below Expectations (C- and below)** |
|---|---|---|---|
| **Teacher candidate develops a learner-centered, technology-integrated activity that promotes creativity, collaboration, or communication, and results in a learner-created product.** | Activity promotes significant learner engagement through creativity, collaboration, and communication. Actively includes opportunity for learner to create a product. | Activity promotes creatively, collaboration, or communication and focuses on learner engagement with technology. Actively includes opportunity for learner to create a product. | Activity focuses on teacher-use of technology but lacks opportunities for learner engagement and/or product creation |
| | 5 points | 2-4 points | 1 point |

Note also that the rubric element directly above is written as a learning objective rather than simply a category.

## Conclusion

Aligning test items and performance assessments to learning objectives, using best practice guidelines to create assessments, and using rubrics to grade complex tasks, are strategies instructional designers can use to develop high-quality assessments. High-quality assessments provide instructors with accurate information regarding the extent to which learners met the learning objectives, a critical component of the teaching and learning process. Accurate assessment results help instructional designers plan future instruction, adapt current instruction, communicate levels of understanding to students, and examine the overall effectiveness of instruction and course design.

## References

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Webb, N. (1999). Alignment of science and mathematics standards and assessments in four states (Research Monograph No. 18). Washington, DC: CCSSO.

## Source:

# 8.

## Introduction

An ***instructional strategy*** describes the instructional materials and procedures that enable students to achieve the learning outcomes. Your instructional strategy should describe the instructional materials' components and procedures used with the materials that are needed for students to achieve the learning outcomes. The strategy should be based on the learning outcomes and information from the other previous instructional design steps. You can even base your strategy on how you or others have solved similar problems. You can save time and money by not re-inventing the wheel. However, be careful; a lot of existing instructional material is designed poorly.

Use the instructional strategy as a framework for further developing the instructional materials or evaluating whether existing materials are suitable or need revision. As a general rule, use the strategy to set up a framework for maximizing effective and efficient learning. This often requires using strategies that go beyond basic teaching methods. For example, discovery-learning techniques can be more powerful than simply presenting the facts. One common pitfall in creating online lessons is teaching in the same way as was done with traditional methods. If this is done, then there may only be minimal value in transferring the material to an online system. As Emile Chartier said, "Nothing is more dangerous than an idea, when it is the only one you have." Note that you can address a variety of learning styles if you teach with a variety of different methods and media. No one single teaching method or medium is ideal for all learners. As you proceed through developing an instructional strategy, start specifying the media that would most effectively teach the material.

## Learning Domain Strategies

Each of Gagne's Domains of Learning (look back at the Analysis: the learning task chapter) is best taught with different instructional strategies.

## *Verbal Information*

***Verbal information*** is material, such as names of objects, that students simply have to memorize and recall.

When teaching verbal information:

- Organize the material into small, easily retrievable chunks.
- Link new information to knowledge the learner already possesses. For example, use statements such as
  "Remember how", or "This is like …". Linking information helps the learner to store and recall the material.
- Use mnemonics and other memory devices for new information. You may recall that the musical notes of the treble clef staff lines can be remembered with the mnemonic Every Good Boy Deserves Fudge.
- Use meaningful contexts and relevant cues. For example, relating a problem to a sports car can be relevant to some members of your target audience.
- Have the learners generate examples in their minds, such as create a song or game with the information or apply the knowledge to the real world. If the student only memorizes facts then the learning will only have minimal value.
- Avoid rote repetition as a memorization aid. Rote learning has minimal effectiveness over time.
- Provide visuals to increase learning and recall.

## *Intellectual Skills*

***Intellectual skills*** are those that require learners to think (rather than simply memorizing and recalling information).

When teaching intellectual skills:

- Base the instructional strategy and sequencing on the hierarchical analysis done earlier. Always teach subordinate skills before higher-level skills.
- Link new knowledge to previously learned knowledge. You can do this explicitly (e.g., the bones in your feet are comparable to the bones you learned about in your hands)

or implicitly (e.g., compare the bones in your feet to other bone structures you have learned about).
- Use memory devices like acronyms, rhymes, or imagery for information such as rules or principles. You can use the first letters of words to help memorize information. For example, "KISS" means "Keep It Simple Stupid". General rules can often be remembered through rhymes such as "i before e except after c". Remember that rules often have exceptions. Tell your learners about the exceptions. Memory devices are best for limited amounts of information.
- Use examples and non-examples that are familiar to the student. For instance, when classifying metals, iron and copper are examples while glass and plastic are non-examples.
- Use discovery-learning techniques. For example, let students manipulate variables and see the consequences.
- Use analogies that the learners know. However, be careful that learners do not over-generalize or create misconceptions.
- Provide for practice and immediate feedback.

## *Psychomotor Skills*

***Psychomotor skills*** are those that require learners to carry out muscular actions.

When teaching psychomotor skills:

- Base the instructional strategy on the procedural analysis done earlier.
- Provide directions for completing all of the steps.
- Provide repeated practice and feedback for individual steps, then groups of steps, and then the entire sequence.
- Remember that, in general, practice should become less dependent on written or verbal directions.
- Consider visuals to enhance learning.
- Consider job aids, such as a list of steps, to reduce memory requirements. This is especially important if there are many procedures or if the procedures are infrequently used.
- After a certain point, allow learners to interact with real objects or do the real thing. How much can you learn about swimming without getting wet?

Note that some skills involve other learning-domain classifications. For example, when learning how to operate a camcorder, many of the skills are psychomotor. However, deciding how to light an image is an intellectual skill. Also, note that the required proficiency level can affect the instructional strategy. There is a big difference between being able to imitate a skill and being able to automatically do a skill.

### *Attitudes*

***Attitudes*** involve how a student feels about the instruction, whether they will value or care about the material presented to them.

When teaching attitudes:

- Base the instructional strategy on the instructional design steps done earlier.
- If you can, show a human model to which the students can easily relate. One consideration is that it may be better if the model is of the same socioeconomic group.
- Show realistic consequences to appropriate and inappropriate choices.
- Consider using video.
- Remember that attitudes taught through computer technology are not guaranteed to transfer to the real world. If appropriate and possible, consider arranging for practice opportunities to make the choice in real life. Alternatively, use role-playing to reinforce the attitudes taught.

Note that it can be difficult to test whether the attitudes taught have transferred to real situations. Will learners behave naturally if they know that they are being observed? If learners have not voluntarily permitted observations, then you must consider whether it is ethical to make the observations.

## Sequencing Learning Outcomes

Using your needs and learning task analysis, determine the sequence of how the learning

outcomes will be taught. In general, to best facilitate learning, you should sequence the learning outcomes from:

- easy to hard
    - You could teach adding fractions with common denominators and then with different denominators. Your lesson could first deal with writing complete sentences and then writing paragraphs.
- simple to complex
    - As an example, teach recognizing weather patterns and then predicting the weather.
    - Cover replacing a washer and then replacing a faucet.
- specific to general
    - You could teach driving a specific car and then transfer the skills to driving any car. Similarly, you could cover adjusting the brakes on a specific mountain bike and then generalize the procedure to other mountain bikes
    - Note that some students like to learn through an inductive approach (that is, from the general to the specific). For example, students could be presented with a number of simple examples, and based on those, be asked to generalize a rule. That general rule can then be applied to solving specific examples. Since some students will not enjoy an inductive approach, do not use it all of the time. Rather consider an inductive approach as a way to provide some variation and occasionally address other learning preferences.
- concrete to abstract
    - As an example, teach measuring distances with a tape measure and then estimating distances without a tape measure. Cover writing learning outcomes and then evaluating learning outcomes.
- the known to the unknown
    - You could do this by starting with concepts learners already know and extending those concepts to new ideas. In other words, build on what has been previously taught.

Each of these methods of sequencing learning outcomes enables students to acquire the needed knowledge base for learning higher-level skills. Note that these guidelines are not black and white rules.

## *Motivating Students*

*As Lao Tzu observed, "You can no more teach without the learner than a merchant can sell without a willing buyer." Follow the ARCS motivation model to ensure that students will be motivated to learn.*

## *ARCS Motivational Model*

As described by Keller, motivation can be enhanced through addressing the four attributes of Attention, Relevance, Confidence, and Satisfaction (ARCS). Try to include all of the attributes since each alone may not maintain student motivation. Your learner analysis may have provided useful information for motivating students. You should build motivational strategies into the materials throughout the instructional design process. This is challenging since each learner is an individual with unique interests, experiences, and goals.

### *Attention*

Gain **attention** and then sustain it. You can gain attention by using human-interest examples, arousing emotions such as by showing a peer being wheeled into an ambulance, presenting personal information, challenging the learner, providing an interesting problem to solve, arousing the learner's curiosity, showing exciting video or animation sequences, stating conflicting information, using humor, asking questions, and presenting a stimulus change that can be as simple as an audio beep. One way to sustain attention is by making the learning highly interactive.

### *Relevance*

***Relevance*** helps the student to want to learn the material by helping them understand how the material relates to their needs or how it can relate to improving their future.

For example, when teaching adult students how to solve percent problems, having them calculate the gratuity on a restaurant bill may be more relevant than a problem that compares two person's ages. You can provide relevance through testimonials, illustrative stories, simulations, practical applications, personal experience, and relating the material to present or future values or needs. Relevance is also useful in helping to sustain attention. For material to be perceived as being relevant, you must strive to match the learner's expectations to the material you provide.

### *Confidence*

If students are confident that they can master the material, they will be much more willing to attempt the instruction. You will need to convince students with low confidence that they can be successful. You can do this through presenting the material in small incremental steps, or even by stating how other similar students have succeeded. Tasks should seem achievable rather than insurmountable. You should also convince students who are overconfident that there is material that they need to learn. You can do this by giving a challenging pre-test or presenting difficult questions.

### *Satisfaction*

Satisfaction provides value for learning the material. Satisfaction can be intrinsic from the pleasure or value of the activity itself, extrinsic from the value or importance of the activity's result, for social reasons such as pleasing people who's opinions are important to them, for achievement goals such as the motive to be successful or avoid failure, or a combination of these. Examples of intrinsic satisfaction include the joy or challenge of learning, increased confidence, positive outcomes, and increased feelings of self-worth. Examples of extrinsic satisfaction include monetary rewards, praise, a certificate, avoidance of discomfort or punishment for not doing it, and unexpected rewards. Some evidence suggests that extrinsic motivation, such as a certificate for completing a course, does not last over time. Nonetheless, it is better to assume that some students need extrinsic motivation. To be safe, try to provide your learners with both intrinsic, which should have more of the focus, and extrinsic rewards. If the intrinsic motivation is high for all learners, you will not need to plan as much for extrinsic motivation. Note that

satisfaction can be provided by enabling learners to apply the skills they have gained in a meaningful way. Remember to let the students know that the material to be learned is important. Consider increasing extrinsic motivation through quizzes and tests.

## Develop and Select Instructional Materials

Based on the instructional strategy for each learning outcome, and information from the other steps of the instructional design process, you need to determine whether materials should be gathered or developed. The main reason for using existing materials (those owned by your institution or purchased) is to save time and money.

### *Gather Existing Material*

Some but likely not all of the needed material may exist. Learning-object repositories may be found within your institution or at provincial/state, national, and international sites. Compare any existing material to the instructional strategy. Determine whether it is suitable and cost-effective. Determine whether the existing material can be adapted or supplemented. The alternative is to get permission to repurpose existing materials for your own needs. Remember, if you include work done by others, you have the proper permissions, and have researched all copyrights regarding the material you have selected.

### *Develop The Needed Material*

The instructional strategy of the materials you develop should consider the learning domain, motivational techniques, each event of instruction, and all of the information gained through the systematic instructional design process. It is wise to create a paper-based version (storyboard) of what will appear on each screen that a student will see. See the Storyboarding section of this chapter for more information. Storyboards are easier to review and edit than content within a learning management system.

Based on the storyboard, make final decisions about the media needed to effectively

teach the material. These decisions are based on what will most effectively teach the material as well as practical considerations such as cost and available expertise. Once you make the decisions, start creating the media. You must consider the file formats that will be used and where the media will be stored, such as DVD-ROM, CD-ROM, Internet, or intranet.

A final storyboard must be created for the person who transfers the material to the learning management system. An accurate storyboard will reduce the number of subsequent revisions needed. After you develop the media, individual pieces can be incorporated into the system. After this, you can begin the final formative evaluation. The components of a complete instructional multimedia package can also include:

- an easy-to-use student manual with directions, strategies, learning outcomes, and summaries
- remedial and enrichment material
- an easy-to-use instructor's manual

An instructional strategy should describe the instructional materials' components and the procedures used with the materials needed for students to achieve the learning outcomes. Your instructional strategy should be based on your instructional analysis, the learning outcomes, and other previous instructional design steps, or on how others have solved similar problems. At the end of this process, you should have a clear set of specifications describing how the material will be taught. You will use the instructional strategy as a framework for further developing the instructional materials or evaluating whether existing materials are suitable or need revision. Consider strategies that go beyond basic teaching methods. Remember that you can address a variety of learning styles if you teach with a variety of different methods and media. No single teaching method or medium is perfect for all learners. As you proceed through developing an instructional strategy, start specifying the media that would most effectively teach the material.

Each learning domain classification is best taught with different instructional strategies. *When teaching verbal information:*

- Organize the material into small easily retrievable chunks, based on a cluster analysis done earlier.
- Link new information to knowledge the learner already possesses.
- Use memory devices like forming images or using mnemonics for new information.
- Use meaningful contexts and relevant cues.

- Have the learners generate examples in their minds, do something with the information, or apply the knowledge to the real world.
- Avoid rote repetition as a memorization aid.
- Provide visuals to increase learning and recall.

*When teaching intellectual skills:*

- Base the instructional strategy and sequencing on a hierarchical analysis done earlier.
- Link new knowledge to previously learned knowledge.
- Use memory devices like forming images or mnemonics for new information.
- Use examples and non-examples that are familiar to the student.
- Use discovery-learning techniques.
- Use analogies that the learners know.
- Provide for practice and immediate feedback.

*When teaching psychomotor skills:*

- Base the instructional strategy on a procedural analysis done earlier.
- Provide directions for completing all of the steps.
- Provide repeated practice and feedback for individual steps, then groups of steps, and then the entire sequence.
- Remember that, in general, practice should become less dependent on written or verbal directions.
- Consider visuals to enhance learning.
- Consider job aids, such as a list of steps, to reduce memory requirements.
- Allow learners to interact with real objects or do the real thing.

*When teaching attitudes:*

- Base the instructional strategy on the instructional analysis done earlier.
- If you can, show a human model to which the students can easily relate.
- Show realistic consequences to appropriate and inappropriate choices.
- Consider using video.
- Remember that attitudes taught through computer technology might not transfer to the real world.

- Note that it can be difficult to test whether the attitudes taught have transferred to real situations.

Based on the subordinate skills analysis, sequence the learning outcomes from lower to higher level skills, easy to hard, simple to complex, specific to general, concrete to abstract, and/or the known to the unknown.

It is important for your lessons to motivate learners because without motivation learning is unlikely to occur. Regular and on-going instructor/teacher presence, especially when students are studying partly or wholly online, is essential for student success. This means effective communication between teacher/instructor and students. It is particularly important to encourage inter-student communication, either face-to-face or online. Motivation can be enhanced through addressing these attributes: Attention, Relevance, Confidence, and Satisfaction (ARCS). Try to include all of the attributes since each alone may not maintain student motivation. You should build motivational strategies into the materials throughout the instructional design process.

- To gain attention, involve and motivate the students. Do this throughout the lesson.
- Inform the student of the learning outcome, before major learning occurs, to help them focus their efforts.
- Stimulate recall of prerequisites by stating the needed prerequisite skills or giving a pre-test.
- When presenting the material, sequence the material in increasing difficulty and in small incremental steps. Use a variety of methods to maintain interest. Provide examples that are meaningful, relevant, and realistic. Base some of the content on the potential for making mistakes. The proportional amount of effort needed to cover a learning outcome should be based on the learning outcome's frequency, importance, and difficulty.
- While presenting the material, provide learning guidance to help students learn the material.
- While presenting the material, elicit the performance so that learners can find out how well they are doing. Do this by asking questions or providing opportunities to practice the skill. Remember to address metacognition within this activity.
- When eliciting the performance, provide detailed feedback. Your feedback should be positive, constructive, and immediate. Your feedback should provide complete information as to why the answer and other answers are right or wrong or guide students in how to attain the stated learning outcome.

- Formally assess the students' performance. Tests should approximate real situations. Test all learning outcomes and only the learning outcomes. Tests should be criterion-referenced.
- Enhance retention and transfer so that students retain the information and can transfer the information beyond the specific ideas presented in the lesson.

Each type of instructional activity has strengths and weaknesses depending on the problem being solved. Incorporating a variety of creative instructional approaches can help maintain student interest and motivation as well as ensure that each student occasionally has a match between their learning style and the teaching style. Many effective lessons include more than one type of instructional activity, some fun ways to learn, and social activities like collaboration and discussions.

Based on the instructional activities for each learning outcome, and information from the other steps of the instructional design process, you need to determine whether materials should be gathered or developed. The main reason for using existing materials (those owned by your institution or purchased) is to save time and money.

The instructional strategy of the materials you develop should consider the learning domain, motivational techniques, each event of instruction, and all of the information gained through the systematic instructional design process. It is wise to create a paper-based version (storyboard) of what will appear on each screen that a student will see. Storyboards are easier to review and edit than content within a learning management system. Based on the storyboard, make final decisions about the media needed to effectively teach the material. After you develop the media, individual pieces can be incorporated into the learning management system.

## Designing Learning Activities

The importance of providing students with a structure for learning and setting appropriate learning activities is probably the most important of all the steps towards quality teaching and learning, and yet the least discussed in the literature on quality assurance.

This is the most critical part of the design process, especially (but not just only) for fully online students, who have neither the regular classroom structure or campus environment for contact with the instructor and other students nor the opportunity

for spontaneous questions and discussions in a face-to-face class. Regular student activities are critical for keeping all students engaged and on task, irrespective of mode of delivery.

These can include:

- assigned readings;
- simple multiple choice self-assessment tests of understanding with automated feedback, using the computer-based testing facility within a learning management system;
- questions regarding short paragraph answers which may be shared with other students for comparison or discussion;
- formally marked and assessed monthly assignments in the form of short essays;
- individual or group project work spaced over several weeks;
- an individual student blog or e-portfolio that enables the student to reflect on their recent learning, and which may be shared with the instructor or other students;
- online discussion forums, which the instructor will need to organize and monitor.

There are many other activities that instructors can devise to keep students engaged. However, all such activities need to be clearly linked to the stated learning outcomes for the course and can be seen by students as helping them prepare for any formal assessment. If learning outcomes are focused on skills development, then the activities should be designed to give students opportunities to develop or practice such skills. These activities also need to be regularly spaced and an estimate made of the time students will need to complete the activities. Student engagement in such activities will need to be monitored by the instructor.

It is at this point where some hard decisions may need to be made about the balance between 'content' and 'activities'. Students must have enough time to do regular activities (other than just reading) once each week at least, or their risk of dropping out or failing the course will increase dramatically. In particular they will need some way of getting feedback or comments on their activities, either from the instructor or from other students, so the design of the course will have to take account of the instructors' workload as well as the students'.

Most university and college courses are overstuffed with content and not enough consideration is given to what students need to do to absorb, apply and evaluate such content. A very rough rule of thumb is that students should spend no more than half their time reading content and attending lectures, the rest being spent on interpreting,

analyzing, or applying that content through the kinds of activities listed above. As students become more mature and more self-managed the proportion of time spent on activities can increase, with the students themselves being responsible for identifying appropriate content that will enable them to meet the goals and criteria laid down by the instructor. However, whatever your teaching philosophy though, there must be plenty of activities with some form of feedback for online students, or they will drop like flies on a cold winter's day.

## Evaluate

The last key 'fundamental' of the teaching and learning process is ***evaluation and innovation***: assessing what has been done, and then looking at ways to improve on it. New tools and new approaches to teaching are constantly coming available. They provide the opportunity to experiment a little to see if the results are better, and if we do that, we need to evaluate the impact of using a new tool or course design. It's what professionals do. But the main reason is that teaching is like golf: we strive for perfection but can never achieve it. It's always possible to improve, and one of the best ways of doing that is through a systematic analysis of past experience. We will discuss the evaluation process (formative and summative evaluations) in section 3.3 of this text. ***Continuous evaluation*** that drives the implementation of improvements is a never ending process ensuring the instructional process is effective and engaging for the student learner today and for tomorrow.

## Building a Strong Foundation of Course Design

The emphasis in this series of steps is on getting the fundamentals of teaching right. Regardless of what revolutionary tools or teaching approaches are being used, what we know of how people learn does not change a great deal over time, and we do know that learning is a process, and you ignore the factors that influence that process at your peril.

For learning leading to successful outcomes, it is important to remember that most students need:

- well-defined learning goals;

- instructional strategies linked with the appropriate learning domains;
- a proper sequencing of instructional events; providing a clear timetable of work, based on a well-structured organization of the curriculum;
- appropriate and engaging learning activities; with regular feedback
- manageable study workloads appropriate for their conditions of learning;
- a skilled instructor; regular instructor communication and presence;
- a social environment that draws on, and contributes to, the knowledge and experience of other students;
- other motivated learners to provide mutual support and encouragement.

There are many different ways these criteria can be met, with many different tools.

## Sources:

# 9.

## Introduction

Instruction is designed to be used. This seemingly obvious statement carries a rather significant implication: the work of an instructional designer should not end upon the final development of the product, but must include considerations for when, where, and how the instruction will be used by real learners in actual situations. This work is called implementation. It requires planning and attention to detail—the same as found throughout the rest of the instructional design process, in fact—to complete successfully. Without implementing an instructional design, all the design work would, in large measure, be wasted.

Implementation is a frequently-skipped step of the instructional design process, however. Designers are often (understandably) ready for their next exciting assignment, and often the client or other stakeholders want to be the primary actors during implementation. The organization the designer works for may also not consider it within their scope to assign instructional designers to help in the implementation phase.

But even when someone else has the actual responsibility to implement an instructional design, the designer can (and should) still be involved, at least in some fashion. Often he or she will have information that no one else has about the design (what certain components are meant for, or how certain features behave), and that information is crucial to ensure it can be implemented successfully. Few people know the entire project as well as the designer does, and this expertise should be drawn upon during the implementation process.

The purpose of this chapter is to introduce considerations that need to be made during the implementation phase of the instructional design process. To organize our discussion we rely on the five stages of introducing a new design as described by Everett M. Rogers (2003). Additionally, it is imperative that instructional designers (or other change agents like teachers or stakeholders) are aware of how people typically use products or services as they are being implemented. So we also describe how adopters of new products or services commonly move through Rogers's stages.

# Adopting New Designs

Gibbons (2013) described the importance of implementation as follows:

Implementation is a period of intense and important change. In addition, it is a period of high-stakes decisions that affect the judgment of continued use of your product. Your product is not only making its first impression on people during implementation, but it is gathering either support or censure from those most likely to determine its viability—students, instructors, and administrators. A careful implementation plan can help your product to be introduced with the best possible chances of success (p. 410).

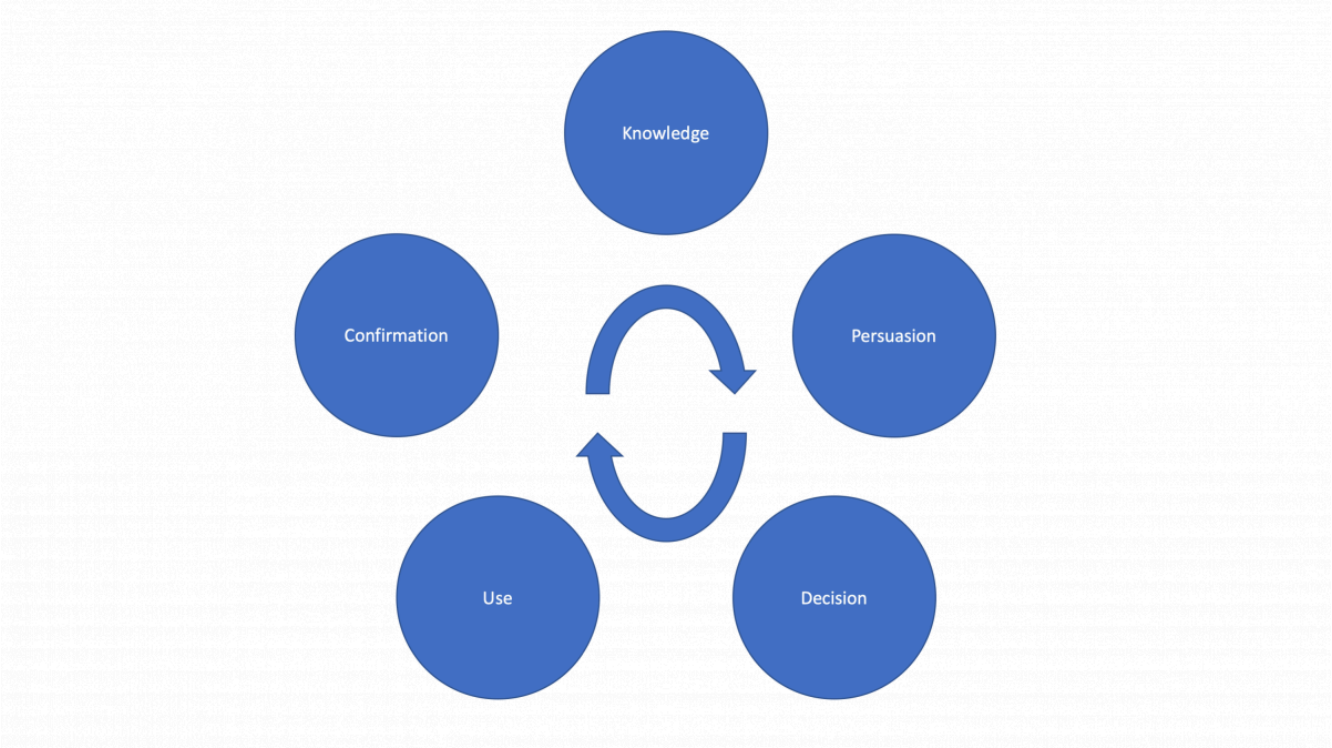
Similarly, Rogers (2003) suggested that, "the perceived newness of an innovation, and the uncertainty associated with this newness, is a distinctive aspect of innovation decision making" (p.161). As a result of this "uncertainty," understanding the design adoption process can help designers plan an instructional design implementation to maximize the chances it can have its intended effect with learners. To help instructional designers create a complete implementation plan, we recommend considering the phases of innovation adoption as a framework for creating their implementation plans (see Figure 1). The five stages in Rogers's model that will be discussed in this chapter are:

- Knowledge
- Persuasion
- Decision
- Use
- Confirmation

Note that the stage when people actually use the new material is stage four of this model! This should be evidence of how important it is to consider many factors that affect how someone will successfully use an instructional design, and encourage designers to not just complete the project and walk away.

**Figure 1**

*The Stages of Roger's Implementation Model*




## Knowledge

The expectation within the knowledge stage is that the adopter becomes aware of the design to be implemented, and determines if a need for adopting (or implementing) the design is actually present. In the context of instructional design, this could mean the designer prepares (or helps prepare) material that is useful to decision-makers about why they should use the instruction. This could take the form of an information sheet, or be more sophisticated like a full marketing campaign. It can also be directed to the students themselves, or others who might be the primary adopter of the design who will then introduce it to students (like a teacher or a school district).

## Persuasion

The persuasion stage occurs when the adopter begins to decide if they find the new design acceptable. During this process, the adopter "actively seeks information about the new idea, decides what messages he or she regards as credible, and decides how he or

she interprets the information that is received" (Rogers, 2003). It is through this process that an adopter begins to decide if the design will be accepted. Instructional designers can facilitate the persuasion stage at the same time they provide knowledge about it. Why is it compelling? How does it fulfill real needs? What can be said about it that adopters will feel emotionally attracted to? (Do more than just provide the facts!) Like before, persuasion can be directed to both the student or other decision-makers.

## Decision

The decision stage includes the adopter actively participating in tests that will assist them in determining if the design will be adopted or rejected. It is important to note that this process can justifiably lead to either of these results: adoption or rejection. If the design is adopted, it is evidence that it is seen as a solution to the problem or issue the adopter initially defined. If the design is rejected, it can be classified as either active or passive rejection. According to Rogers (2003), active rejection consists of considering adoption of an innovation and then actively deciding not to adopt it. Passive rejection is when no identifiable decision is made, but due to inaction the innovation is effectively rejected. Instructional designers can help with the decision phase by making it as easy as possible for students or decision-makers to try out the instruction before committing to it. Can the designer be on-site for a test of the materials? Can they demonstrate to students or decision-makers what it actually looks like when the instruction is being used? Can they give away a component for free that people can test?

## Use

The next stage in this model is the actual usage of the new design. Using a new product is generally not a one-time endeavor. New design usage is generally considered a long-term process. While the definition of "long-term" can be ambiguous and is heavily determined by the context, it is important to know the use of a new innovation within instructional design is usually not simply "plug and play." There is generally a period of continued education and professional development associated with the adoption. The instructional designer might provide getting started materials so people begin using the materials

successfully, or technical support to make sure problems can be solved as soon as they are apparent. They might have to train the person leading the instruction, or at the very least show students how to use all of the features found in the instruction.

As the design is implemented, it is likely that an event referred to as re-invention may occur. Re-invention is defined in this context "as the degree to which an innovation is changed or modified by a user in the process of its adoption and implementation" (Rogers, 2003, p. 180). It is important to note that re-invention is not necessarily a negative, as it can lead to improved results. For instance, an instructional designer may have intended that students complete an online module individually, but as it begins to be used throughout a company, the employees start to gather together in groups and complete the assignments together. Even though the designer did not intend for this kind of use, evaluations could show that it is more effective—students learn more and have deeper insights as they work together. An implication of this is that designers should make their designs flexible, so they don't break down during re-invention. They should also watch for re-invention because it might give them ideas for how they can design better in the future.

## Confirmation

Confirmation occurs as the adopter evaluates the decision to adopt and implement the design. Are they satisfied with what they chose? During this stage it is possible that the design will be subsequently discontinued. The evaluation can be based on many measures: learner performance, ease of use, satisfaction, cost to maintain, etc. If discontinuance occurs, it is often a result of some kind of dissonance, or the gap adopters experience between what they expected to happen and what actually happened. It is important, then, for continued use of the design, that the instructional designer seeks methods to reduce or eliminate dissonance. Some methods to achieve reduction of elimination include helping adopters understand how to incorporate the design into their existing practices, continued support and training, and fixing problems the adopter may be experiencing with the instruction that interfere with its ability to achieve its intended outcomes.

### Application Exercise

Consider an instructional design project you are either currently involved in, or one you are familiar with. Write a brief implementation plan for this project that uses all five of Rogers's implementation phases.

Prepare a brief presentation about this implementation plan, as if you were assigned to explain to your client why each phase is important to successfully implement the project.

## Attributes of Designs That Lead to Successful Implementation

In addition to the innovation-decision process, it is important for the instructional designer to consider factors in the design itself that contribute to rates of adoption. Rogers (2003) identified five such attributes: relative advantage, compatibility, complexity, trialability and observability.

### Relative Advantage

The concept of relative advantage refers to whether the design is actually an improvement over the current product or service the adopter has been using. If the adopter perceives that the design's value does not exceed that of the current product used, the design is much less desirable and unlikely to be adopted. In contrast, a design that is determined to be of greater value is more likely to be adopted. Instructional designers should be considering the relative advantage of their instruction throughout the design process. How is what they are designing better than the status quo?

### Compatibility

Compatibility is in reference to how well the design aligns with other aspects of the adopter's life and circumstances. This could include the adopter's professional,

pedagogical, and sociocultural ideologies. Conflict with any of these schemas, whether directly impacting the design's actual use, could threaten adoption. As indicated by Rogers (2003), "any new idea is evaluated in comparison to existing practice. Thus compatibility is, not surprisingly, related to the rate of adoption of an innovation" (p. 249). Through careful attention to the adopter's (students or other decision-makers) beliefs, interests, needs, and concerns throughout the design process, designers can help prepare their instruction so it is more compatible with what adopters expect and need.

## Complexity

Complexity is how difficult it is to comprehend, incorporate, and actually use the design. While complexity does not impact the rate of adoption to the same degree as relative advantage and compatibility, the complexity of a design can negatively impact how likely it is for adopters to use (or want to use) it. If a design is perceived to be too difficult to incorporate or use, it is less likely to be adopted in the first place or more likely to be discontinued if it is adopted. Good evaluation and testing of prototypes throughout the instructional design process can help minimize the complexity of their instruction. Designers, in fact, can consider how they can specifically test prototypes to help minimize complexity (such as through a usability test).

## Trialability

Trialability refers to how readily a design can be tested or used with a limited commitment. For example, software is often introduced in stages, or "betas." These stages of progressively more complete versions of a product permit its testing on a limited basis. Such testing permits users to identify issues and helps increase adoption. Trialability has a positive impact on the rate of adoption for early adopters, but is less impactful on the rate of adoption for later adopters (Rogers, 2003). As is hopefully clear, the trialability of instruction is closely associated with the decision phase described above. Designers should prepare for the trialability of their instruction as early as possible in their design process. High fidelity prototypes might be an easy and low-cost way of doing this.

## Observability

Observability refers to "the degree to which the results of an innovation are visible to others" (Rogers, 2003, p. 16). Designs that are more difficult to observe or difficult to explain and operationalize are less likely to be adopted. This can be especially difficult for instructional designers because so much of the learning process is invisible or hard to observe. It helps to make sure the learning goals of the instruction are as measurable and observable as possible. Regularly reporting the results of assessments of student learning can also help. While important, however, observability is the least impactful of the attributes Rogers identified.

## Application Exercise

You are an instructional designer implementing a new computer-based learning tool in a K-12 classroom. The teacher is not technologically savvy and is hesitant to use this new tool. Explain what steps might be taken to support the teacher and mitigate their concerns.

Considering Rogers' five attributes that impact the rate of adoption of innovations, please explain how these attributes would affect implementation decisions that you, as an instructional designer, would make, for this teacher.

# Conclusion

In this chapter, we discussed the implementation phase of the instructional design process. We described important factors of implementation using the five stages of the diffusion of innovations: knowledge, persuasion, decision, implementation, and confirmation. We also reviewed characteristics of a design itself that can impact rates of implementation: relative advantage, compatibility, complexity, trialability and observability.

Implementation is a phase instructional designers should begin planning for at the beginning of their project. By carefully reviewing the material we provide here,

designers—and those they support—will be able to ensure the instruction they create is actually used by those it is intended for so the desired changes that led to its creation can be brought about.

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## Source

# IO.

## Introduction

Instructional designers in a higher education environment wear many different hats on a daily basis. The designer understands there are differences in how adult students learn as opposed to the way children learn. You will rely upon and apply this knowledge to the best of your ability in designing effective, engaging, learning experiences for the student while aiming for ease in facilitation for the instructor. Let's take a look at what a typical instructional designer may face on any typical work day in the higher education world.

## Training

If you are hired as an instructional designer in a higher education institution, your role at some point in time may involve acting as a trainer. Often times, one challenge you will face as a designer training faculty who are not comfortable with technology, or, the learning management system (LMS) selected by the institution. This is where the instructional designer may need to step in and create learning modules for training faculty on how to use the new LMS, or, provide one-on-one training. Even if your institution requires faculty to complete a training course for certification to teach online, there will be instances where certified faculty have forgotten their training on how to accomplish a specific task within the LMS. They will need assistance from the instructional designer to walk them through step-by-step how to complete the task at hand. This may involve meeting with the faculty member in person, emailing step-by-step screenshots and instructions on how to troubleshoot and fix an issue, speaking over the phone to walk the faculty member through step-by-step, or, if necessary, through video conferencing to screen share with the faculty member and show them how to complete the necessary steps to achieve the desired task.

Take into consideration there may be some obstacles to assisting faculty. Time constraints and physical location may play a large role in which resolution style will work for you and a faculty member. The instructional designer may be located stateside, while

a faculty member may be teaching oversees. In this event, time zones could become a great challenge in conducting a phone or web conference.

Training is always something an instructional designer must be prepared to be involved in. You must be able to communicate step-by-step instructions adequately to the faculty you are working with. In this instance, there is a need for excellent verbal, written and visual communication skills on the part of the designer. The communication skills you have learned about in previous chapters will be invaluable to you. Be sure to practice those communication skills on a regular basis and, when the time comes, you will be ready. In the box below, you will find a potential training scenario that you may face as an instructional designer. Think about how you might handle and resolve this issue. If the faculty member were located across the world and they are having urgent problems with an assignment that is due immediately and students are unable to access the assignment. Should you fix the problem for the faculty member, or, do you take the time to train them so they can fix such an issue in the future? Keep in mind the visual picture of your going fishing to provide someone that is hungry with meat, but, if you teach that person how to fish, they will never be hungry again. (Well, as long as the fish are biting, they won't go hungry.). Listening with patience, caring and empathy are essential ingredients in accurately accessing and meeting the needs of the faculty member.

TRAINING SCENARIO: Imagine you are serving a faculty member who is teaching oversees for your institution in Japan, while you are on the east coast of the United States. Your day is their night, and vice versa. There is a limited window of time to work and walk the instructor through any training that is needed. The technology challenged faculty member has emailed you, panicking that a turnitin research paper assignment they have developed in the LMS is not allowing students access to the course assignment. The faculty member does not know how to troubleshoot the issue, the paper is due on the day they've emailed you and not only is the faculty member panicking, but the students as well. Obviously, the time difference is going to cause a great challenge in working with the instructor one on one in a video conferencing situation. **What do you do? How would you handle working with this faculty member to help them solve their issue.** Keep in mind fixing the problem for them will help the students immediately, but does going into the LMS, troubleshooting and fixing the problem yourself actually grow the faculty member's skills in using the LMS? **How can you help the instructor, without potentially doing the work for them, but teaching them how to trouble shoot these kinds of issues so they are able to do this on their own in the future?**

## Course Design

As an instructional designer in higher education, you will be asked to help faculty, departments, etc. build courses from scratch. Whether it is a new course to be offered for the first time, or, the complete redesign of an existing course, you need to have a plan in place. Where do you start? What do you do? Who do you work with? This is your first job as an instructional designer, your anxiety is kicking in, and you are not sure where to start? You begin by pulling from the learning theories, instructional design processes like the ADDIE, and Bloom's Taxonomy previously learned in your instructional design courses and by pulling from your learned and practiced communication skills. It is always best to start with an initial meeting with the instructor and/or department SME(s). Discover in this, your analysis phase, what their instructional goals are for the course. Ask the SME to help you understand the prerequisite skills (entry skills) the students planning to take the course may already possess or know. Then, you carefully start to follow each step of the ADDIE model (or your institutions preferred instructional design model) to build the course modules and units, identifying instructional materials and media to include in the course that meets the instructional goals of the course. Meeting with the instructor or department SME(s) on a regular basis and at each stage to evaluate and determine if the alignment of the decided upon learning objectives and assessments are appropriate for the course level and whether they compliment each other. Evaluate at each stage of the process. Once the course is close to completion, if there is time, it is a good idea to have the instructor or the departmental SME(s) assume a student role and take some of the assessments and work through the course modules to ensure that the appropriate items, are being assessed and that the assessments meet the criteria, learning objectives, and the set instructional goals of the course. Additionally, taking the assessment from the student's viewpoint is also a good idea to ensure that the assessment itself is functioning properly within the LMS and that the instructions and the questions are understandable for the student.

When designing a course, the instructional designer will draw upon the theories of ***pedagogy*** (the instruction of children) or, ***andragogy*** (the instruction of adults). In the higher education world, you will be predominately pulling from the andragogy theories since faculty are working with adults. An instructional designer understands that children and adults do not learn similarly. Therefore, it must first consider the appropriate learning styles to fit the courses. Challenges that you may face as a designer may be in assisting faculty (especially in higher education realm) that do not know the theories of pedagogy

or andragogy. Although the faculty is the submit matter expert, they may not have any training in teaching or theories of instruction and learning. This can present difficulties for the designer. You must be able to explain the learning theory behind the design. Learning theory and Bloom's Taxonomy may not be in their vocabulary. You as the instructional designer will be the one to bridge the gap for such faculty between their mastery of their content knowledge with the incorporation of learning theory as you assist in the design of their courses.

You will find that instructor's can get very excited about new technologies and will throw an idea to their instructional designer wanting to use this new technology they have discovered into their course. Remind faculty of the importance that the technology or media selected must meet the instructional goals of the course. If it does not, it is not appropriate for their course. Another challenge may be your unfamiliarity with this technology and the faculty are expecting you to figure out how they can use the technology in their course? The instructor will see you as the expert in instructional technology. The research skills you have learned during your educational program will assist in bringing you through challenges of this nature along with a lot of patience and empathy for the faculty member. Research skills are invaluable to an instructional designer in researching a new technology to find out how it works, and to effectively assist the instructor in determining if the technology is appropriate for use in their course. Don't be afraid to let the instructor know that you are unfamiliar with the specific technology and that it will take you a little time to research. Always be sure to think about costs involved, the available budget allowable, and also the integration with your institution's LMS, any time a new technology is recommended. Sometimes, it make require getting your educational technology or information technology staff involved to determine the integration details of a new technology. Sometimes, the costs may outweigh the benefits of the technology. Clarity, comfort level with technology, and a good understanding of your institution's policies are also useful here.

In higher education, there is a culture to share faculty among various institutions, including those on an international/global scale and often times, international faculty may only be visiting for one semester, or for an academic year. Language can often be a barrier between the instructional designer and faculty if one of the individuals first language is different from the other. Good communication skills are essential here for the instructional designer. First, listen with empathy and understanding, exercising patience with the faculty that is asking for your assistance. Remember, do not get frustrated, keep your tone always friendly and helpful, and open to their ideas. This will help ease tensions from both sides of the table. Remember, you are there to assist faculty, and to ultimately

create a rich, engaging, valuable learning experience for the student. This opens up opportunities for you to learn something new about a new culture that you did not already know, which grows your experiences, knowledge, skills and value to your institution as you learn to work with individuals from other cultures than your own. Remember that you and the instructor have the same goals in this situation. Finding common ground and working through the language barrier is doable and extremely rewarding for all.

*COURSE DESIGN SCENARIO*: You have been contacted by a visiting international instructor who is teaching a new graduate mathematics course online for the first time for your institution. The course starts in two weeks. You panic, math is the one thing that almost kept you from graduating from college, and the whole idea of helping design a math course when your skills are limited in this area frightens the life out of you. Not only do you have to get over your fear of math, but, the faculty member's English skills are limited, and, they have never taught online before. This instructor has gone through the university's LMS training, but still doesn't know where to go from there. The instructor has reached out to you to assist them in developing their new graduate online math course from scratch. **Where do you start? How do you navigate the language barriers? How do you help the instructor get their course developed and ready to deliver in less than two weeks?** Adding to your stress, the instructor has a new writing pad that he has never used before and has indicated that he wants to use this new device to make instructional videos for his students so that he can walk them through solving complex graduate level equations. You believe instructional videos would be very useful for the students. However, **you are unfamiliar with this writing pad the instructor has. How do you teach them to use it when you have never seen one before?**

## Course Evaluations/Reviews

Depending on your institution's organizational structure, you may be involved in evaluating or reviewing courses to determine if they meet set institutional standards. A recommendation prior to being involved in any course review that you participate and complete the Quality Matters "Applying the QM Rubric (APPQMR) workshop. Quality Matters workshops (QM) are nationally recognized standards for online education, and will give you a great sense of what should be included in an online course. These standards can also be applied to improving any face to face course as well. There are specific costs for attending QM workshops, but well worth the professional development and time invested for an instructional designer benefiting the institution in which you work and serve. Perhaps checking with your institution, as they may help pay for professional development for instructional designers.

Below are a few items that are recommended to check for when conducting a course evaluation or review:

- The Instructor has provided contact information and that it is easily access in their course.
- The Instructor has provided clear instructions on how and where to get started in their course (perhaps in a "Getting Started" or "Start Here" module.)
- That the course is easily navigable for a new student.
- The instructor has provided clear learning objectives for both the course and for each learning module so that students will be able to understand what is expected of them at the end of each learning module and at the end of the course.
- That learning materials and assignments are provided in units/modules that organize the learning into digestible chunks that meet the instructional goals of the course.
- Check for alignment between the learning objectives and assessments and that they tie to the instructional goals of the course.
- Check that learning objectives are appropriate for the course level (undergraduate or graduate).

At any given time, you may be contacted or approached by an administrator (dean, department chair, associate department chairs, program coordinators, etc.) requesting an in-depth course review. You will need to know what to look for, and what suggestions to make for improvements to a course. You will apply the ADDIE in this situation, as well as recommended national standards and set institutional standards in determining whether a course is of high quality. In such instances, you may feel that your ethical and personal loyalties are divided. It can be a difficult situation. In such instances, always maintain a professional tone in your review.

It is highly recommend in your in-depth review summary report that you begin with a compliment of something the instructor is doing well in the course. This will ensure a positive tone of voice. Do not use the words "the instructor failed…" or, any similar verbiage as this could be detrimental to the instructor's future at your institution. Instead, stick to the facts and do not interject personal options. Use such verbiage as "it is highly recommended that the instructor include clear learning objectives in each unit/module, which may improve student learning outcomes." This is a much more positive tone, and gives advice on what to add. Do not criticize the structure the instructor is currently using, but recommend potential improvements for organization or navigation for a course.

Recommendations for any improvements to a course will always be better received if it is not condescending in nature. Be positive, upbeat, and present your findings in such a way that it may improve student learning, content retention, and helping to meet the instructional goals of the course. Remain positive in your tone and always use a formal, professional written communications style. Following this format will serve you well in any higher education environment.

COURSE EVALUATION/REVIEW SCENARIO: You have been working for less than a year as an instructional designer, and, you are contacted by a department chair asking for an in-depth course review of a faculty member's courses because students are not performing well in their course. You have worked with the faculty member in the past and respect them as a person, but already know that their courses need a great deal of work to be considered effective from an instructional design perspective. **How do you handle this?** You like the professor and do not wish to cause them any potential harm or risk their losing their job. However, it is your job to provide the service the department chair is asking for. **How do you approach this situation?**

## Creating Instructional Videos

Depending on the structure at your institution of higher education, there may be opportunities for you work with the instructor or departmental SME's to actually develop and create instructional videos. If so, such software as Camtasia can be very helpful in doing so. Camtasia is very user friendly, and very easy to edit video materials and some of the newer versions allow you to upload PowerPoints directly into Camtasia and then add voice and animations very easily. Other potential options, may be Voice Thread where you can create voice overs of a PowerPoint presentation and make it into an instructional video of sorts. There are many others, these are just two options available for you to consider should the need arise in the future. Always remember to keep in mind when creating instructional videos, it is wise to create a script, and include that script into the course so that there is a transcription of the video already available to any student with a disability that may need the text version. Being proactive is wise in the instructional design world. When creating instructional materials or interactive assignments, always keep in mind potential accommodations that may be necessary for students with a disability and how you might meet those accommodations before the need occurs.

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## Special Projects Can Grow Your Leadership Skills

Without a doubt, at some point in your higher educational career, you will become involved in some special projects. You may even be assigned as a leader in some of these projects. What do you need to know about juggling special projects with every day assignments and tasks?

First, you need to determine and know what your supervisor's policy and wishes are regarding clear timelines for special projects that you are assigned. Taking on a special project with a fuzzy or vague completion date can be difficult to manage and you may go on for a long time "spinning your wheels in sand". Always try to get a clear understanding of what your supervisor's expectations are for completion of the special project.

Next, if you are taking the leadership role in the project, determine who needs to get involved in the planning of this special project (this usually also means consulting or collaborating with your supervisor) and immediately set out to schedule meetings with these individuals to determine the scope and process for meeting the goals of the project.

Next, work with these identified individuals on a timeline for the project and determine if other departments or individuals need to be included in on the planning. If there are others that need to be included, schedule another meeting to inform and include them in the process before you go any further in the planning stages.

Hold regular meetings of this group (if applicable or necessary) to keep everyone informed of work progress and assignments to keep the project moving forward. Follow-up on assignments at specific agreed upon intervals.

Once the project is complete, it is always recommended to hold a debriefing or send out a brief survey to determine improvements for leading similar future projects and how you might improve upon your skills as a project leader. Information you derive from such an experience and evaluation can help you improve your professional skills and value to your institution.

# Source

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# II.

## Introduction

As an Instructional Designer working in K–12 education in America, never has the access to and demand for using technology to support and extend learning and improve teaching been greater. That said, all indications are that these expectations will increase for teachers to effectively model, use, and integrate technologies in their classrooms and in their own professional development. The 2017 NMC Horizon Report cites these key trends (pp. 10-20):

- Long-term (5 or more years): advancing cultures of innovation and deeper learning approaches;
- Mid-term (next 3 to 5 years): growing focus on measuring learning and redesigning learning spaces;
- Short-term (next 1 to 2 years): blended learning designs and collaborative learning.

Getting and succeeding at a job in K––12 already requires K––12 teachers to have experience with contemporary technologies, a desire to maintain their technology skills through continuous professional development, and a willingness to become leaders in the integration of educational technologies to improve student outcomes. These trends specifically focus attention on key areas of the field of educational/instructional technology including instructional design (e.g., learner assessment, media use, instructional strategies), distance learning, digital technologies, and affecting change in the K––12 setting.

In particular, these short-term and mid-term trends will require instructional personnel in schools to model, use, and integrate technologies in ways that teachers may not have experienced in their teacher preparation program. Examples include contemporary shifts to flexible learning environments, active or experiential learning pedagogies, supplementing face-to-face instruction with online (blended) instruction, flipped classrooms, virtual learning, cognitive tutors, maker spaces, and incorporating mobile technologies within all kinds of learning settings.

In this chapter, we will explore how to get and succeed at a job in K–12 including

the skills, knowledge, and roles of school personnel related to the field of educational/instructional technology, suggestions for professional development, and developing a professional community of support.

The National Center for Statistics (NCES) offers insights based on the latest available school data (Fall 2016) for both public and private K-–12 schools. The report documented increasing public school enrollment in Fall 2016, with public school systems employing about 3.1 million full-time-equivalent (FTE) teachers resulting in a pupil/teacher ratio of 16.1 to 1, close to the 2000 ratio of 16.0 to 1. Private schools were projected to employ .4 million FTE teachers with a pupil/teacher ratio of 12.2 to 1, compared to a ratio of 14.5 to 1 in 2000. The NCES continued with these projections:

- The number of K–12 teachers needed is projected to increase 8% between 2011 and 2023.
- Pupil/teacher ratios for K–12 are projected to decrease to 14.9 to 1 by 2023.
- New teacher hires in public schools are projected to increase 32% between 2011 and 2023.
- New teacher hires in public schools are projected to increase 32% between 2011 and 2023.
- New teacher hires in private schools are projected to increase 19% between 2011 and 2023.

## Skills, Knowledge, and Roles

In today's school districts, there are technology skills required of every person, and the number of specialized positions continues to increase over the last couple of decades. Depending on the position assignment, those skills and the requisite knowledge to demonstrate those skills will be very unique. A degree in Instructional Design or Educational Technology will prepare you for an exciting career in a K-12 environment.

BUILDING-LEVEL TECHNOLOGY SPECIALIST

***Building-level technology specialists*** work in schools to facilitate, oversee, and provide support to school personnel about the use of technology. Most of these jobs involve basic technology support with hardware, software, and connectivity, which require individuals to troubleshoot and be the first line of technology support. These jobs in some states and school districts may also involve teaching courses (for instance, media use or technological literacy).

In elementary schools (typically Grades K–5), students typically spend 45–50 minutes every 5 or 6 days in a computer lab for dedicated technology time. The building-level technology specialist, in these cases, serves as the technology teacher, working with students on technology-rich projects, or other technology-based activities. In middle and secondary schools (typically Grades 6–12), the building-level technology specialist/facilitator works with classroom teachers to provide consultation about using various technologies to support teaching and learning. In all of these cases, opportunities for these building-level technology experts to work with teachers on the design of technology-rich instructional activities varies greatly; in some cases these individuals are expected to be well- versed and knowledgeable of only specific technology(ies), and in other cases they are expected to be experts in both instruction and other topics related to technology use.

Individuals who work in this role typically hold, or are in the process of earning, their state's technology specialist endorsement. Earning this endorsement usually includes taking courses in a graduate certificate or master's degree program. Some of these programs also require the completion of a successful internship in a school setting. Since these requirements differ in various states and in some cases districts, those interested in this role should make inquiries about specific requirements for this role. Some districts offer part-time assignments as technology facilitators combined with the classroom teacher role.

## *MEDIA SPECIALIST*

The contemporary media specialist (aka the library media specialist) typically has a Masters degree either in the field of educational/instructional technology or in a post-baccalaureate program that has emphasis in technology integration, multimedia development, or school media. Some states require a special license or certificate for these positions and some allow a bachelor's degree with other academic coursework. Media specialists generally must document prior experience in elementary or secondary education and knowledge of technology use and integration. Because they serve the entire school community, they must have good oral and written communication skills and they must demonstrate effective interpersonal relationships with students, staff, and parents.

***Media specialists*** have basic librarianship skills such as the ability to select and provide access to a wide variety of materials which meet the needs of various learning situations as they interact to support teachers, as well as the knowledge and ability to teach information and technology literacy. The most common requirement is the knowledge and ability to work with technology and assist integration in the classroom. The media specialist does not typically serve in a technical or trouble-shooting role for technologies used in the school, but this may be an additional expectation in smaller or rural settings. In this era of mobile devices, media specialists may be called upon to develop policy statements regarding use of and access to mobile devices, student computer use, digital privacy, internet safety, student or faculty access to and use of copyrighted materials, and/or other topics related to technology in schools.

Media specialists are usually hired on a faculty contract that includes tenure and some additional days of responsibility at the start and end of the school year. Success as a media specialist requires frequent professional updates related to emerging technologies and their potential for supporting or extending instruction. One such area that has grown significantly in the last decade is blended learning. As the flipped classroom model has become more popular, the expansion of student access to classroom materials and the teacher through a combination of online, face-to-face, and/or synchronous computer-mediated technology has proliferated. The media specialist may be the bridge to these innovative instructional environments for faculty and parents. Many states have a state level professional organization for media specialists to share and collaborate on a regular basis.

## *DISTRICT LEVEL TECHNOLOGY LEADER*

Almost all districts now have at least one person in an administrative technology leadership role. These people often have extensive classroom and technology integration experience with graduate preparation that included both the academic and the technical aspects of the field of educational/instructional technology. They are usually responsible for developing, implementing, and updating a district-level technology plan. These administrators will also be responsible for managing budgets, purchases (e.g., comparing options, contractual agreements, user plans), installments, warranties, service and/or upgrade agreements, insurance coverage, and safety for all technology in the district. They may play a major role in the development of district level policies related to technology and, at a minimum, they have the administrative responsibility for the fair and legal implementation of all such policies. They have supervisory responsibility that varies but often includes district "technicians": personnel who have technology maintenance and installation roles not related to students or faculty. District Technology Leaders usually interact closely with the local school board, superintendent, other academic administrators (including principals), and sometimes the media specialists.

District technology leaders are typically hired on "at will" administrative contracts that are year-round and may stipulate a term set for review and renewal. They are often members of the Council of Chief State School Officers (CCSSO). The CCSSO offers regular workshops and professional development opportunities related to contemporary and emerging technology use and integration issues. These individuals typically have served as a school-based technology specialist before taking on this larger role.

## *STATE TECHNOLOGY LEADER*

State technology leaders are typically entrenched in the communities of both K––12 education and educational policy. Like district-level technology leaders, these individuals have to manage and work with budgets and contracts, and help to make sense of federal or state policies related to technology access or technology tools that influence the work of school districts and personnel in K–12 settings.

In many cases these state technology leaders work closely with other state leaders from curriculum and instruction, assessment and accountability, school performance, accreditation, and other divisions within state departments of education. In the past

decade one of the larger issues has been the increase in administering high-stakes state assessments via the internet on laptops and desktops. In many cases, state assessment and accountability leaders must work with state departments of education to make these decisions and to set policy and implementation guidelines. State technology leaders also advise and consult with state department of education personnel and other state leaders to ensure that adequate connectivity and infrastructure are in place for high-stakes assessments to be administered online.

State technology leaders also have potential to influence and drive policy and initiatives that influence the entire state. For example, many states who have endorsed and implemented initiatives to turn classrooms into 1-to-1 technology-rich environments do so only through funding and political support driven by the state department of education and other state technology leaders. Another example is the growing demand for blended classroom options in K–12 settings, which also relies on extensive internet access, strong infrastructure, and personal access for students to computer-based technologies outside the classroom. Most state technology leaders have served as district technology leaders prior to taking on this expanded role and they often rely on their colleagues in surrounding states for sharing ideas about new opportunities or state-wide initiatives.

## *PROFESSIONAL DEVELOPMENT FACILITATOR*

***Professional development facilitators*** support the integration of technology in K–12 settings by working directly with teachers, school-based technology specialists, media specialists, and district technology leaders. Professional development facilitators either work in this role full-time or serve primarily in another role and facilitate professional development as an additional or secondary responsibility. These individuals are well versed at working with district and state leaders to identify teachers' needs, and then designing and implementing learning experiences to support teachers' use of educational/instructional technologies.

Individuals in this role are usually members of the International Society for Technology in Education (ISTE) as well as the state affiliates of ISTE. In some cases, these individuals are also a member of Learning Forward (formerly known as the National Staff Development Council), which focuses on issues related to teacher professional development.

For those interested in this work, a good starting point is to initially facilitate sessions

at district, state, and national educational technology conferences. This initial work will give professional development facilitators experience about planning a short professional learning experience for teachers and allow them to work with teachers in a lower-risk environment. Partnering with other professional development facilitators may also provide experience with the development and delivery of professional development workshops that extend or enhance introductory professional development activities.

## *DEVELOPING A PROFESSIONAL LEARNING NETWORK (PLN)*

For those seeking jobs in K--12 settings as an educational technology leader in any of the roles described in this chapter, it is essential to develop your professional learning network (PLN) through the use of social media, especially Twitter and Facebook at this time. Occasionally educational organizations or bloggers will post a list of recommendations on who to follow.

1. A ***professional learning network* (PLN)** includes teachers, educational technology leaders, and educational technology organizations increases the likelihood that professionals will stay abreast of technologies and innovations that are being used in K--12 classrooms.
2. Educational bloggers typically tweet out or post on Facebook their recent blog posts. It is more efficient to read social media posts and click on longer blogs and articles for those topics that are of interest instead of subscribing or reading several blogs weekly.
3. Twitter Chats have gained popularity over the last few years. These occur when an individual or organization hosts a Twitter chat by posting a series of questions to which others respond, creating an asynchronous, open conversation. Twitter Chats are a great way to learn a lot of information about a topic, exchange many ideas in a short period of time, and expand a PLN by engaging with others.
4. Networking leads to professional relationships. By being active on social media and participating (reading, posting, and responding to others), educators are forming a professional network that leads to professional relationships with others who share your interests and offer greater variety of experiences and supports.

As educators think about their social media presence and the development of a PLN, they need to be very cognizant of what they post Educon social media and how others may

interpret posts on accounts that are not related to education. They might want to consider keeping a social media account for professional use and a separate one for social personal use. If the same social media accounts for both professional and personal accounts are used, users should be responsible about what they post or photos that they are tagged in or associated with. Many employers, especially in K–12 settings, are very sensitive to the social media presence of potential employees. Also, remember that in this era of "Googling" everything, a current or future employer, the students' parents, and/or the students, themselves, may choose to "Google" the educator and find all his or her social media activity. Educators must always remember that they have a professional reputation to protect!

## Success as a K-12 Instructional Technologist

In order to be a successful educational technologist in K-12 settings, the skills and knowledge needed are detailed above and vary by position. However, regardless of what position(s) educators are seeking in K–12 settings, there are a few recommended dispositions that will likely contribute to success.

### *COLLABORATE*

K–12 settings are collaborative environments that require all school personnel to work together for the common goal of supporting student learning. The path of an educational technologist in K––12 settings (regardless of specific role) is likely to intersect with administrators, teachers, building-level instructional leaders, as well as district and state leaders who focus on administration, curriculum, and testing/accountability.

Typical work with people in these various roles will be to problem solve, troubleshoot, and plan technology-related efforts to support teaching and learning. Since these different roles represent different interests and each requires a unique niche of expertise related to K–12 settings, successful K–12 educational technologists must be adept at listening to and working with others from different backgrounds, both professionally and culturally. In preparation for this work, educators' knowing as much as possible about the roles, responsibilities, and backgrounds of the individuals they interact with increases the likelihood that their interactions will be positive and beneficial.

## *EMBRACE FLEXIBILITY*

The world of educational/instructional technology is ever changing, as new tools are developed and new devices are proliferating. K–12 settings may change rapidly too, as initiatives from district and state boards of education and superintendents serve as a catalyst for new projects. As individuals in these leadership positions change, it is important to maintain a perspective of flexibility, and cope with these changes with an attitude of, "How can I positively contribute to these new efforts?"

The ability to be flexible is also important when working in school settings with administrators and classroom teachers. Research indicates that technology is likely to be used by teachers who feel supported to use technology and who have access to onsite help in their school building (Glazer, Hannafin, Polly, & Rich, 2009). Since school-based technology leaders work closely with classroom teachers, they should be ready to roll with the punches and be flexible if teachers change their minds and modify planned technology-related lessons and projects. Educational technology leader in a K-12 setting often your job is to provide consultation and brainstorm ideas with teachers and other school personnel to help them make decisions that they feel are most likely to support success for their students.

## *MAINTAIN A LEARNER-CENTERED PERSPECTIVE*

In technology leadership roles, learners include educators the leader is working with, as well as K–12 students. A learner-centered perspective includes knowing the background, interests, and needs of learners, and then ensuring that learning opportunities support the development of related skills and knowledge, regardless of the age or context of the learner. In the case of a building-level educational technology leader, this could include doing a survey of teachers' technology interests and needs and planning professional learning opportunities and resources to support teachers. It may also include working with administrators and curriculum leaders to identify topics and concepts that are difficult to learn and then developing technology-rich experiences to support the learning of these concepts.

For district and state educational technology leaders who are more removed from K–12 students but who work closely with other district leaders, the idea of learner-centered work may include analyzing the needs of districts and schools in terms of technology

access, technology professional development or interests, and working on developing and refining initiatives to help meet those needs. Without a doubt,: learner-centered work is not the roll out of canned and one-size-fits-all professional development, projects, or new technological tools. Further, learner-centered work is also not a one-time experience that assumes implementation without follow-up and support. Research shows the benefit of ongoing, comprehensive support that is relevant to the daily work of learners (Lawless & Pellegrino, 2007; Polly & Orrill, 2012).

### *BE A LIFELONG LEARNING LEARNER*

As stated earlier, educational technology work in K–12 settings requires keeping up with changing infrastructure, technologies, audience demands/needs, and approaches to teaching and learning in classrooms. To be successful in K–12 settings, being a lifelong learner who seeks out new information is essential. Most school districts and state departments of education mandate professional learning experiences for all employers. These may include workshops, courses, and conferences. Such opportunities to stay on the cutting edge of K–12 uses of technology are invaluable and should definitely be taken advantage of.

## Summary

The potential for educational/instructional technologies to support, enhance, and extend effective teaching and improved student learning is documented in the research and literature over many decades now BUT there continue to be examples of the misuse or inappropriate use of technology in our schools, as well. The need for all instructional personnel to understand and implement basic instructional design skills with technologies cannot be overemphasized. The proliferation of blended learning options in K–12 is a global phenomenon. Instructional personnel may also find the chapter by Persichitte, Young, and Dousay (2016) useful. In it, the authors distinguish blended and online learning settings, discuss a variety of types of learner assessment, and describe contemporary trends, challenges, and recommendations for the effective assessment of learning in blended and online courses. The content targets teachers, instructional designers, administrators, and program managers of K–12 blended and online learning

settings. Suggestions are included for using web-based communication tools for feedback and assessment and the authors conclude with a discussion of implementation topics associated with assessment in these learning environments that deserve additional attention and consideration.

The jobs described in this chapter have great opportunity to influence improved technology integration in K–12 settings and improve learner outcomes. Though this MIT report (Willcox, Sarma, & Lippel, 2016) was focused on reforms in higher education, we think this idea of a dynamic digital scaffold is relevant to instructional personnel in K–12 schools, as well:

> …***dynamic digital scaffold***—a model for blended learning that leverages technology and online programs to help teachers improve instruction at scale by personalizing the students' learning experiences. Technology will not replace the unique contributions teachers make to education through their perception, judgment, creativity, expertise, situational awareness, and personality. But it can increase the scale at which they can operate effectively (p. 39).

Examples of such personalized learning are being documented in technologically-rich, face-to-face classrooms and in the emerging K–12 virtual learning classrooms. So this comment from the National Education Policy Center (NEPC) press release for Virtual Schools Expand Despite Poor Performance, Lack of Research Support, and Inadequate Policies reminds us of the system-wide nature of the work of educational technology professionals in K-12 settings:

> An analysis of state policies suggests that policymakers continue to struggle to reconcile traditional funding structures, governance and accountability systems, instructional quality, and staffing demands with the unique organizational models and instructional methods associated with virtual schooling (Molnar, 2017).

## Final Advice

A few suggestions for those looking at career options related to educational technology in K–12 systems today, knowing that technology integration skills and instructional design knowledge can be the "edge" that gives job seekers the advantage in a K–12 search for any of the positions described in this chapter.

- Take advantage of as many opportunities as possible to expand professional and personal uses of technology.
- Take care of your social media presence in all situations and in all media.
- Take active steps to develop a  PLN and nurture its growth as a career progresses.
- Expect that the future will include expectations that educators use technologies to connect and communicate with parents, learners, and others in ways not yet anticipated.
- Consider career options that blend instructional expertise with interest and experience with  technology.

ORGANIZATIONS TO CONSIDER FOR ADDITIONAL LEARNING AND SUPPORT

Edutopia – https://www.edutopia.org/

Gates Foundation – https://www.gatesfoundation.org/

International Society for Technology in Education – http://www.iste.org

Learning Forward – https://learningforward.org/

Lumen Learning – https://www.lumenlearning.com/

## Source

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# 12.

## Introduction

A ***consultant*** means different things to different people, but basically means "to consult," or seek someone's opinion, advice, or guidance; or, seen from the other side, to consult is to offer someone your opinion, advice, or guidance. Think of the many ways you have already been a consultant either giving or receiving advice, guidance, and opinions. You are likely to have already been a consultant in some way today. Being an instructional design consultant is not much different than the other kinds of formal and informal consulting you have probably already done. Simply, a professional consultant offers considered opinions related to tailored solutions for specific clients and their needs. This chapter is an introduction to the world of consulting and discuss how to prepare for and find a job as a consultant, write proposals and contracts, and succeed as a consultant.

## Preparing for a Job as a Consultant

As you prepare for a job as a consultant, it is important to establish how a consultant is different from other employment types. In this section, you will read about what sectors consultants work in, why firms use consultants, what skills you will need, where you will physically work, and whether or not consulting is a good fit based on your individual circumstances.

## The Difference between a Consultant and Contractor

As a consultant, you are more likely to work directly with your client rather than through an intermediary organization. If you work for yourself or with other consultants, you will need to choose a business structure, such as a sole proprietorship or limited liability corporation (LLC). You are more likely to work under an IRS Form 1099, which means that

you will be paid a gross amount and you'll need to pay for your own taxes and medical insurance.

A ***contractor*** is often perceived as someone who is working for a limited amount of time in a narrow role with specific tasks on a larger project within a formal organization. A contractor might work directly for an agency as a W-2 employee (the taxes will be paid by the agency) but work on-site at the client's organization.

There are different tax and legal implications and business license requirements for owning a business, so be sure to consult professionals such as tax lawyers and CPAs.

## Where do Consultants work??

Instructional design is a field of expertise that is used across all economic sectors to work on projects from industry to non-profit organizations to the military to PK-12 education to corporations to higher education and government. The best source of information for employment across economic sectors, as well as information about specific occupations, is the United States Department of Labor. Be sure to review the Department's Occupational Outlook Handbook and ONet Online.

You may need additional or specialized skills, depending on the specific sector. For example, if you consult for PK-12, you will most likely need teaching experience. If you want to consult for the military and often in government positions, you will need to have a security clearance. It may be easier to work directly with an agency who is already set-up to work in these areas.

## Why are Consultants Used?

Firms use consultants for a variety of reasons. Perhaps the firm is looking for someone with specialized skills to work on a short-term (or longer-term) project, or perhaps the firm is looking for someone with an outside or new perspective. While consultants can provide objectivity in their evaluation and advice, note that consultants sometimes have pre-existing relationships with members of an organization's leadership who may want the consultant to offer an "objective" stamp of approval for a specific direction already identified. There are other challenges to objectivity, such as wanting to please

leadership for the benefit of future contracts or some other perk. Of course, some firms hire consultants to be a genuine change catalyst; for example, a consultant could identify current or potential problems as well as potential solutions. A firm might hire consultants to leverage their networks, supplement the capacity of internal personnel, or just do the dirty work of budget and/or personnel cuts (think about the role of George Clooney in the movie, Up in the Air). Asking a firm why they are hiring a consultant may offer additional information to help you tailor your approach.

## What Skills are Needed?

The list of skills may seem short, but it takes a good deal of self-reflection to determine if you have the skills required to become a successful consultant. Whether or not you will make a career out of consulting or continue to work full-time and consult on the side, the skills are the same.

The following list will help guide you through some of the questions you should ask yourself:

- Initiative and self-motivation/discipline – Are you a self-starter? Are you motivated to work even when no one is managing you?
- Self-awareness – Do you know what you are good at? Are you a generalist or a specialist?
- Adaptability – How do you feel when schedules change, someone makes an unexpected demand on you, or opportunities and constraints shift? Can you adapt to working on time-limited projects at different benchmarks with different clients across multiple sectors requiring different aspects of your expertise?
- Structure – What is your method or practice for working? Are you more laid back or hyper-organized?
- Communication – How will you deal with difficult situations with a client?
- Project management – Are you able to juggle multiple tasks and deadlines?
- Basic business acumen – Can you budget effectively?
- Technological skills – Are you able to fix your own IT issues? Are you familiar with hardware and software?
- Networking – Do you have a list of professional contacts? Are you comfortable talking to strangers about your business?

## What is the Work Environment like?

As a consultant, you will need a place to work. This space will vary depending on your particular needs. There are benefits and challenges to every work environment, whether you work at home or an off-site space or have a workspace at the client's office.

**Working at home.** There are many benefits to working at home. You will not be sitting in traffic every day and you will have a lot more flexibility if you need to tend to your family's needs. You also will not be spending money on lunches, gas, snacks from the vending machine, or dry-cleaning.

However, you will need to treat it like a job outside of the home. It's important to have a dedicated space at home where you can work. Ideally this is in a separate room that isn't your bedroom or family room. This dedicated space should have the appropriate office equipment for your job. You may find it beneficial to get ready for work each day and schedule a lunch break.

There are some challenges to working at home: isolation and distractions. In a traditional work environment, people are all around you all day long. You may only interact with some people in passing at the water cooler, but it's enough to feel connected to others. "Working" at home may mean that you have more flexibility, but this can distract you from doing your actual work. Try to limit these and other distractions (TV, pets, and kids).

**Renting office space.** If working at home is challenging because of the distractions, there is also the option of renting a dedicated office space. One benefit is that you have a place to go to, so it feels like you are going to work. These dedicated office spaces offer a variety of services, such as having a physical mailing address or P.O. Box, standard office equipment (photocopier, printer, and fax machine), Internet, a receptionist, kitchenette, and a conference room to meet with clients. Prices will vary depending on size of the space and services included.

There are also shared co-working spaces in several markets around the country. You have the flexibility of renting a desk only when you need it, as opposed to renting an entire office on a more permanent basis. It may also be helpful to have other freelancers/contractors around you. However, you have to consider the distractions again. Will you be able to focus on your own work and not be distracted by the projects going on around you?

If an office space is outside of your budget, find another place you can go to like a library, a community center, an apartment clubhouse, or your local (quiet) coffee shop.

**Working on-site.** As a consultant, you may also be working at the client's location. Your workspace may be anything from a cubicle or desk to a shared conference room. The client knows you're there for a short-term project, so you may not have a permanent workspace. If there is a specific dress code or core business hours or work at home policy, you will need to abide by the house rules.

You will have more direct access to the client, so you may feel like you are more of a member of a team. However, in this case, it is important to remember that you are not an employee of that company, so you may not be able to enjoy the same benefits as an employee, such as use of the gym or discounts. At some companies, you may need to have an employee escort you into the building each day. You may not have access to the same systems or be able to contact people directly (e.g. the off-site LMS administrator).

**Using technology.** Regardless of the physical space in which you choose to work, you will also need to consider what technology you'll need such as a lightweight laptop, a reliable phone, and an Internet connection. Depending on the quality of service at home and your cell phone plan, you may need a home phone with a dedicated line.

You may be required to purchase your own software to work on projects. Instructional designers use a variety of software for development and more general business software for word processing, spreadsheet creation, and presentations. Tracking your invoices and business expenses will require financial software. You will also need to consider how you will be connecting with clients if you need to host video and audio conferencing. There are many options available, so look at what best serves your needs.

## Is Consulting Right for Me?

As mentioned before, consulting requires a particular skillset. It also requires that you have the time, financial ability, and support system to be a successful consultant.

**Time.** How do you know if you have the time to be a consultant? Only you can make that decision. Do you really know how much time you spend performing tasks in the many areas of your busy life? Do you really know how much time you have for a consulting career or even side job?

There are several time trackers available such as Toggl, MyHours, TimeCamp, Klok, ManicTime, RescueTime, SlimTimer, and good ole fashioned paper templates. Be sure to set a specific time and deadline for exploring and

deciding, though, or you might end up wasting time learning about how you spend your time.

**Risk tolerance.** As a consultant, you will not be receiving a steady salaried paycheck so there is financial risk involved. Consulting income has a lot of ebbs and flows depending on how many hours you are billing. It's important to know that you probably will not be billing 100% of your work hours. Every hour that you're "working" you may not be able to bill to a client. In fact, you may only be able to bill 50% of your hours to a client. The other part of the time you'll be networking or finding new opportunities. This may seem like it will not take a lot of time, but it is critical to your success as a consultant to spend a lot of time doing these two tasks.

There may be less busy times of the year. Toward the beginning of the year, businesses may be trying to determine their budgets for the year and you will not have any billable hours. Toward the end of the year, businesses may have run out of consulting budgets and again, you will not have any billable hours.

Think about how many weeks of vacation you want to take during the year. As a consultant, you will not be paid for your vacation time so you may want to have money set aside for the leaner times. You may even want to get your feet wet initially by keeping your full-time job and start your consulting business on the side. Only you can determine your own personal level of risk.

**Supporters and distractors.** You will encounter people and circumstances who will support your efforts and those who will distract you. You will need to consider your individual situation and ask yourself if your partner or spouse, family, and friends will support your work as a consultant that may require you to work long hours or travel frequently. Will those individuals support you when your income may be scarce? Will you have to say no to that long-awaited vacation because you have a project deadline?

## Finding Opportunities

Finding a job as a consultant has a lot to do with your goals. Based on those goals, you need to set the pace of the transition from your present state into your future state as a consultant. You may need to start slowly, tackling a few tasks each week and "poking around" for opportunities.

There are different ways to find consulting opportunities and the process closely mimics a traditional job search. Searching online job sites, having a social media presence,

and networking are the main ways to find an opportunity. You may also have more advantages than you even know. Be sure to check out the U.S. Small Business Administration's set-asides for small businesses, such as those owned by women, veterans with service-connected disabilities, and those who are socially and/or economically disadvantaged. Some state governments offer similar set-asides, so be sure to check with offices in your particular state. You may find it easier to secure subcontracting opportunities with larger organizations that can tackle large government contracts that are likely beyond the capacity of most small businesses, especially if you do qualify for special status with the Small Business Administration or other federal or state programs.

**Sites that collate jobs.** Essentially, you are looking for a job in the traditional sense. Check out various

**Social media presence.** Social media can be beneficial to look for opportunities and to announce that you are looking for opportunities. Many companies have LinkedIn, Facebook, and Twitter accounts through which they may post opportunities.

Companies will be looking at your web presence, so be strategic in what you're posting. You may want to have a Twitter account where you post best practices or articles that you find that are related to your business. Creating a LinkedIn account is also a good idea. Using specific keywords and a targeted headline will help guide people (including recruiters) to you. Be sure to add a skills section. Don't just create an account and not be active. Use the tool to your advantage and post on the feed.

As a consultant, it's important to create your own brand to differentiate yourself from the competition. Make sure you create a strong digital portfolio to showcase your work. You can use templates in Google Sites, Weebly, or Wix to build your site and then pay to personalize your website's URL.

**Local groups.** Speaking at local events in your community is a good way to network. As noted in the skills section, effective communication and marketing yourself is a key skill as a consultant. Joining a public speaking group, such as your local chapter of Toastmasters International, will help build your confidence as a public speaker and you will also be networking with other professionals. You never know when and where you will find a consulting opportunity. Check out your local chamber of commerce for networking events.

**Professional organizations.** Joining a professional organization and meeting other professionals is a great way to find opportunities through the online job boards and network at the events. Some suggestions are ATD, ISPI, USDLA, AECT, Quality Matters,

or OLC, depending on what meets your needs. Remember that many organizations offer less expensive student rates for membership.

**Career services office.** Do not be afraid to head to your current or former university. Career services may have mailing lists to join or networking events to attend.

**Targeting specific firms.** You can always reverse roles and search for consulting companies as if you were a potential client to find less-known firms.

**Cold-calling.** Cold-calling is a lot like dating. You will need to make a lot of phone calls to get your foot in the door. Be brief and say that you will follow up with an email. If you do not feel comfortable calling, you can also send an email to the company or organization. In either case, have a script ready to sell your services and know that not every meeting will result in work.

**Converting job/internship posting to consulting gig.** Another option is to apply to a traditional job or internship posting and sell your consulting services. Be sure to include the benefits of using a consultant for this type of position. However, it's helpful to know who the decision-maker is instead of sending your resume and cover letter through an electronic system.

## Writing Proposals or Contracts

Now that you have been able to find an opportunity, you are at the proposal and/or contract stage. Depending on the size of the firm, the proposal and contract may be combined. The proposal/contract will be very detailed and will need to be thought out carefully.

## Scope and Capacity

You need to know two "big picture" items to convert a call for proposals (CFP), request for proposals (RFP), or request for quote (RFQ) into a contract. You need to know the scope of the work being sought and your capacity for meeting the scope of that work. Read the scope carefully and ask questions of the point of contact listed for additional information. You need to completely understand the scope of the work required in order to accurately gauge your capacity to take on the work.

## Respond as Requested

The "call" for a proposal or quote is likely to be quite detailed and prescriptive in the way that you should submit your proposal. Be very careful to follow the precise requirements of the call. Answer every question and respond to every section with the requested information – no more, no less. Do not assume details; clarify any questions you have. Even in clarifying the details, reach out to only the point of contact listed and in only the way(s) listed in the call.

The components of your proposal should match precisely the questions and sections stated in the call. Use the exact same language and titles. Do not add sections or attachments unless those are requested. If the call neither explicitly accepts nor declines such additional information, ask the listed point of contact if the additional information you think will be useful would be accepted by the organization. Remember the adage that less is more; too much information or too many examples could make your proposal look unfocused and unprofessional.

Many calls, especially for larger contracts, will specify the timeline after proposals are submitted. While it may be okay to follow-up with smaller organizations, especially those with whom you already know a point of contact, you do not want to breach an established protocol by pestering employees or becoming a nuisance with overt or veiled attempts at follow-up. If you cannot follow the steps outlined in the call, then an organization might assume that you cannot complete the project within established guidelines either.

## How much do I Charge?

Determining cost is always tricky. There are pros and cons to using an hourly rate versus a fixed rate. When you're first starting off you may want to use an hourly rate until you get a feel for scoping projects. You can charge a different hourly rate for managing the project versus production work. If you charge an hourly rate, you run the risk of not calculating enough hours to complete the project or not charging enough to cover your overhead (taxes, business expenses, travel, etc.). That being said, it might be better to use fixed-rate billing rather than an hourly rate. Remember that you are selling your value so think of your cost in terms of a set value, not by how many hours it takes to complete a job. With

a flat rate, your clients will know exactly what they will be paying. There are benefits to both sides. It's really dependent on how financially comfortable you are.

As a guide, The eLearning Guild's 2017 Guild Research U.S. Salary Calculator provides annual salary information based on factors such as location, industry, education, and years of experience. This may provide a starting point for you to determine where you should be salary wise. Another great resource is from Harold Jarche. Although his information is from 2007, the ranges are still very much in-line with what instructional design consultants charge today. You will notice that business tasks cost more than production work. Overall, the range for consulting may be from $25-$200/hr depending on what type of work you will be doing.

## Standard Contract Components

A contract between you and your client will ensure that your interests are protected, that the work is clearly defined, and that you have established communication and compensation expectations. These contracts typically have a standard set of components. Consider developing your own template for the components of a contract that you want to use. Even if the firm may has a standard contract, having your own template can help you ensure that your important points are included.

Some of the components are rather obvious, like the names of the parties involved. The contract should include directly or reference as an attachment or appendix the specific scope of work to which both parties agreed. You and a representative of the organization should initial each page of the contract as well as fully sign the last page. Ensure that the scope of work is signed separately if it is not included as an embedded component of the contract.

Another important component of the contract is the list of deliverables and the timeline on which those deliverables are due. Remember that deliverables occur on both sides of the project, not just from you to the firm. For example, what access to resources like key individuals and documents will you need to be successful? Make sure there is written confirmation that such access will be granted and include such permission and access as part of the detailed timeline. Client approvals of different stages of a project, especially a large project, should also be included. How long after you share a design plan or set of storyboards should the client offer feedback and approval? Include the specific dates or time range (for example, "within five business days"). For your planning purposes, be sure

that you know all of the tasks that need to occur to reach each benchmark along your timeline, and that the timeline is approved by both parties.

Finally, communication expectations and information for both primary and secondary points of contacts should be listed in the contract. In terms of communication, how often are status reports expected, and to whom should those reports be submitted? Are there different individuals who grant permissions, answer questions, and receive status updates? What are acceptable ways to communicate (in person, email, telephone, postal mail)? The approved or preferred methods of communication should include the names of specific individuals (at least one main, primary point of contact and one secondary, backup point of contact) and their direct contact information, such as individual email addresses, room numbers, or telephone numbers.

**Costs, payments, and penalties.** You will need to determine the costs, payments, and penalties involved when billing a client. You'll also need to identify when you want to be paid and your cashflow. Let's think about this situation: You state that you will invoice bi-weekly, net 30. What does this mean? It means you'll start working on day 1, submit an invoice around day 15 (bi-weekly is every other week), and then the 30-day clock starts. The client will have 30 days to pay the invoice. What does this mean for you? You will not see a check until 45 days after you have started the work. How will you pay your bills if you don't have income for six weeks? Unfortunately, that first check may be delayed by the mail and the client's accounting department. So, in reality, you may not see a check for nearly two months. You may want to change your payment terms to net 15. You can also include a penalty for late payments. A typical charge is 1.5% compounded monthly for a late payment.

**Non-disclosure and non-compete agreement.** Both of these provisions protect the client. Non-disclosure prevents the consultant from discussing trade secrets, client lists, and other pertinent information. Non-compete prevents you, as the consultant, from starting up your own business after consulting at a company for a designated time period, which could be from six months to two years (any more than that and you should consider whether or not you want to take the position), and within a certain geographic area (which should be focused and not broad like "East Coast"). It may also include information about not soliciting clients or employees from that company.

An important note is that not all states allow non-compete agreements. They are governed by state laws, so check with your state to determine whether or not you can include one in your contract.

**Early termination of contract.** Unfortunately, contracts may need to be terminated early. This could be for a variety of reasons, but it really should be reserved for really

serious issues such as non-payment. You can include a timeframe for written notification for termination and an early termination fee.

**Terms of use.** Having access to work samples to place in a portfolio or listing the client on your website should be discussed on a case-by-case basis and either be included in the contract or discussed at project completion.

## Succeeding as a Consultant

After you have finished your first project (and subsequent projects), a good tip is to think about the lessons learned of what worked, what did not work, and how you can move forward. Take what you have learned to the next opportunity.

## Adapting to Changing Needs

As a consultant, you will be juggling both your personal life and your professional life. You may need to move to a different city or state, or your kids may need you to have a more flexible schedule to be more involved with their extracurricular activities. You will also have to balance the consulting side, which requires you to be more adaptable. You may need to hire additional resources to assist you to keep working on multiple projects. Clients may change depending on their needs and budget. As the economy changes over time, your focus on a particular industry may change. Who knew the high-tech industry was going to take a hit in the early 2000s or the mortgage industry was going to have a crisis in 2008? Be prepared as much as you can, and have a safety net for the leaner times.

## When Things Go Wrong

As with anything in life, there may be times when something goes wrong at the company, in your personal life, within the client/consultant relationship, or with something outside of either's control. You have resources available to you. Ask for help from a mentor when you need it. You can find mentors through the SBA or your network.

## Maintain and Grow Clients

The best way to maintain and grow your client list is to keep working. Be careful of relying on a single client. While the work may be steady and lucrative for a while, that client's needs or budgets may change. One way to grow your client list is to look at other firms that do work similar to the work of your current clients. However, remember your non-compete or other agreements before investigating if those firms have similar needs.

Another way to grow your client list is to reconsider some of the decisions you made at the beginning of your consulting journey. Do you want to broaden the kinds of consulting work you are willing to do or perhaps the kinds of clients for which you are willing to work? Maybe new opportunities have popped up since the last time you did an environmental scan of your area; there might be new firms or changing needs. Repeat some of the steps in the Finding a Job section to see what might be new.

Meanwhile, the best way to maintain your client list is simple relationship management. Always do a good job with your work. Reach out occasionally to offer casual greetings or an article you know is relevant to your client's work without seeking anything in return. You might even consider sending seasonal cards small fruit baskets, or offer free webinars to the firm's employees or associated organizations. Always remember to maintain the relationship in ways other than just soliciting work.

## Staying Current

Staying current is an important part of being a successful consultant and it requires some introspection. Think about your reputation as a consultant. Do you perform quality work and deliver the materials on time? Are you still networking with others in the field by speaking at local events and conferences? Do you need to update or refocus your skills? Are you using the most up-to-date software? Are there gaps in your knowledge? These are all things you should consider in order to stay current.

## Conclusion

Now that you have been introduced to consulting, you should be walking away with some information that will help you decide whether or not consulting is a good fit for you. Consulting can definitely be an exciting, yet challenging, job. It can force you out of your comfort zone and provide many great opportunities to hone your craft within LIDT.

## Source

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