Introduction to Instructional Design: A Brief Primer

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Many roles in libraries require that librarians teach, lead workshops, or give instruction to patrons in some way, but most librarians are not adequately prepared for teaching as part of their formal education. Scott Walter (2005) discusses the historical attention drawn to the lack of academic coursework on instruction and teaching in ALA-accredited library science programs in the library literature, and notes that "surveys conducted in the late 1990s found that barely more than one-half…offered even an elective course on instruction" (p.3). Librarians that teach have mostly learned their skills through on-the-job training and self-study opportunities (Walter, 2005) in the form of written texts and journal articles, presentations at professional conferences, or workshops such as the ACRL Institute for Information Literacy Immersion Program.

Even those librarians who have had the opportunity to take a course in instruction realize that one course is inadequate preparation for teaching. As a combination of art and science, teaching requires an integrated understanding of the content you're teaching, the students that you teach, and a continually evolving willingness to experiment with methods and techniques that can best be used to help students learn. This article will attempt to introduce librarians to some aspects of the "science" of teaching by providing a broad overview of instructional design (ID) principles, concepts, theories, and models that can help librarians learn more about instructional design and improve their teaching.

What is Instructional Design?

Instructional Design, Instructional Systems Design, and Instructional System Technology are all terms that are applied to the practice of applying systematic scientific methods to instruction. Much like the discussions in librarianship about what to call "library instruction," the interdisciplinary fields concerned with instructional design don't always agree on the labels. Some of the fields that are involved are education, psychology, information processing, and business. While not everyone agrees on what to call the science, for the purposes of this article, Instructional Design (ID) will be the preferred term. The information introduced here is both common and central to discussions in the field. Steven Bell (2007), who introduced the concept of "blended librarianship," defines instructional design as "the systematic creation of an educational experience that will help students achieve a specified set of learning outcomes" (p. 2). The key term in this definition is *systematic*. Since the 1970's, experts have developed a variety of instructional design models, all mostly based on a basic model called the ADDIE model.

The ADDIE Model

The ADDIE model was developed by the Department of Defense in 1975 (Clark, 2010) and consists of the following components:

- Analysis: The process that clarifies what is to be learned by what population;
- Design: The stage that involves planning how the material is to be delivered to the learner;
- Development: The creation of learning materials, with initial (formative) testing;
- Implementation: The delivery of learning materials to the learner;
- Evaluation: The stage at which the entire process is evaluated (summative evaluation), including assessing learner outcomes.

When the ADDIE model was first developed, it was seen as fairly linear in nature, but in later years, many adaptive models have taken a more cyclical, or iterative, view of the process. The beauty of the model is that each instructional designer can interpret the steps in the process in the way that best fits their organization; it is highly adaptable. Two different but equally useful interpretations of the model by librarians can be found in Bell and Schank (2007) in chapter three, and Wegener (2006) in chapters two through six . While there are countless other useful models of instructional design, the ADDIE model is considered to be a classic that has stood the test of time.

Principles

Another way to view instructional design is through the lens of principles. Because of the proliferation of instructional design theories and models, some ID scholars (Reigeluth, 1999; Merrill, 2002) have analyzed these theories and models and discovered the common, underlying principles that many hold in common. Merrill's First Principles of Instruction (Merrill, 2002) is a well-regarded example of principles that are required for effective instruction.

Merrill's First Principles of Instruction

1. Learning is promoted when learners are engaged in solving real-world problems;
2. Learning is promoted when existing knowledge is activated as a foundation for new knowledge;
3. Learning is promoted when new knowledge is demonstrated to the learner;
4. Learning is promoted when new knowledge is applied by the learner;
5. Learning is promoted when new knowledge is integrated into the learner's work.

These principles strongly correlated with psychological learning theories, particularly those of constructivist theory and all relate to how the learning environment can best be structured to meet learners' needs.

Gagne's Nine Events of Instruction

Similarly, Robert Gagne's (1985) Nine Events of Instruction correlate with how the cognitive processes in the brain affect learning. He conceived these nine events to illustrate how teachers can best facilitate learning.

1. Gain the attention of the learner (to prepare for learning and to motivate the learner);
2. Inform learner of the objective (to prepare for learning and to be explicit about what is to be learned);
3. Stimulate the recall of prior learning (to help integrate new material into existing knowledge);
4. Present new content material (what is to be learned prescribes the content delivery);
5. Provide guided learning (to aid students in practicing and integrating knowledge);
6. Elicit performance (learners demonstrate their recently-acquired knowledge);Provide feedback to the learner (to help the learner to improve performance);
7. Assess performance (to evaluate the learner's performance);
8. Enhance retention and transfer of new knowledge (to further aid students in integrating knowledge).

Seven Principles for Good Practice in Undergraduate Education

Another set of highly regarded principles is Chickering & Gamson's (1987) *Seven Principles for Good Practice in Undergraduate Education*. While initially focused on college undergraduates, these principles are equally applicable to learners of all ages in a variety of environments. Good practice in undergraduate education:

1. Encourages contact between students and faculty;
2. Develops reciprocity and cooperation among students;
3. Encourages active learning;
4. Gives prompt feedback;
5. Emphasizes time on task;
6. Communicates high expectations;

7. Respects diverse talents and ways of learning.

While similar to the other principles that we have reviewed in terms of the inclusion of some specific steps in the instruction process, the Seven Principles also includes some components of affective learning that have not been addressed specifically in the other two examples. For example, the inclusion of the description of the interpersonal relationships in numbers one and two helps to describe how instruction should be designed to facilitate ideal student-teacher and student-student interaction. Number six is related to student motivation, and number seven addresses student intelligences and learning styles.

Learning Theories

There are three major perspectives or schools of thought on learning. They are the Behaviorist Perspective, Cognitivist Perspective, and Constructivist Perspective. (Ertmer & Newby, 1993). These perspectives have developed historically over time and are often viewed as an evolutionary continuum. This section is a very brief introduction to the three learning theories.

Behaviorist Perspective

The behaviorist perspective of learning focuses on rewarding, or reinforcing, desired responses in the learning environment. B. F. Skinner was one of the psychologists whose work contributed to this school of thought. As a teacher, when using the behaviorist perspective, it is important to structure learning so that practice activities produce the desired results and that students then receive positive feedback or reinforcement.

Cognitivist Perspective

The cognitivist perspective, as the name implies, focuses on the cognitive processes that occur in the brain as learning occurs. Some examples of this mental processing are how learners assimilate new knowledge and accommodate it into their memory. Some important theorists in this area are David Ausubel and Rob Forshay. One major component of the cognitivist perspective is that

it actively involves the learner in employing learning strategies (such as mnemonics or advance organizers) to help structure and enhance their own learning.

Constructivist Perspective

The constructivist perspective focuses on how learners "construct" meaning as they learn. Learning is designed to carefully match the learner and the learning environment so that the knowledge acquired is attached to real-world, contextual practice. Important theorists in the constructivist school of thought are Jean Piaget and Lev Vygotsky. One way to think about learning in the constructivist arena is to think of apprenticeship models or on-the-job training.

Many teachers and instructional designers find that different tasks, concepts, or principles can best be taught by employing one or more of these perspectives when planning the learning environment. In other words, some things are best learned by employing the behaviorist perspective, others with the cognitivist perspective, and still others with the constructivist perspective. In general, more simple tasks and processes might be taught at the behaviorist end of the continuum, while more complex concepts and processes would employ cognitivist and constructivist learning theories.

Library-specific Learning Models

While most of the discussion in this article has come from literature in the fields of educational psychology and instructional design, there are several theorists whose writings relate directly to libraries and learning. Carol Kuhlthau's (1991) research focusing on the Information Seeking Process (ISP) (1991) is probably the most familiar of the library-specific models discussed here. Kuhlthau notes that the "ISP is the user's constructive activity of finding meaning from information in order to extend his or her state of knowledge on a particular problem or topic" (p. 361). The process that occurs as users seek information is something that Kuhlthau has studied in a variety of settings over time. Unlike many other models, Kuhlthau pays special attention to the learner's feelings and affect during each step in the

process. The six basic steps of Kuhlthau's ISP are:

1. Initiation: Learners begin the research process by recognizing a need for information. This step is characterized by feelings of uncertainty or apprehension;
2. Selection: The learner begins by selecting a topic to research and being set to begin the research process. Feelings of optimism or excitement may accompany this step;
3. Exploration: As the research process begins in earnest, the learner may again feel frustrated or uncertain, as information-seeking produces too little or too much in the way of results, or if the information found doesn't fit with the learner's existing knowledge or beliefs;
4. Formulation: As the learner gathers enough information and begins to focus their information-seeking, they again feel confident and their goals become more clear;
5. Collection: This stage is where most information-gathering takes place, once the focus of the research is clear and well-developed. At this point, the learner will be efficient and effective in finding relevant resources on their subject and integrating them into their own body of knowledge;
6. Presentation: This is the stage at which the learner prepares to present the information to others in the form of a paper, presentation, or some other use of the findings. If the research has gone well, feelings of satisfaction, confidence, and relief are prevalent.

Brenda Dervin's work on "sense-making" (1983) as learners interact with information systems is also relevant to libraries. Dervin believes that learners collect information in context as they go , making sense of it, or integrating it into their own knowledge and experience. When the learner finds a gap in their own knowledge, called a "discontinuity," they then choose to interact with some information system in order to gain additional knowledge to make sense of the world. Dervin's model consists of a person in a situation, the gap in knowledge (the discontinuity), and the goal to close that gap. While Dervin's research is closely intertwined with communication studies and is applicable in many fields, the sense-making methodology fits well with the information-seeking behavior of learners. One final model that can be easily adopted for library user education is Keller's (1987) ARCS model. This simple model of motivation consists of:

- Attention: Learners can only learn if you gain and keep their attention;
- Relevance: Learners stay motivated and thus learn best when content is relevant to their interests and needs;
- Confidence: Learners learn best when the content is structured so that they feel that they can be successful;
- Satisfaction: Learners need to feel that they have gained some sort of satisfaction from the learning experience, either in enjoyment or in achievement.

Working to keep students motivated is crucial to their learning, so it is important to design the content and learning environment to best achieve that goal.

Conclusion

This brief overview is designed to help the reader gain a basic understanding of instructional design models, principles, and learning theories that can help to improve library instruction. Further information can be gained through sources cited in the reference list, or at these websites: http://www.nwlink.com/~donclark/hrd learning/development.html; and http://www.instructionaldesign.org

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