Running head: THE FIELD OF INSTRUCTIONAL TECHNOLOGY

Instructional Design

Teresa Hill

University of Houston ClearLake

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Assignment 3

Caroline M. Crawford

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Abstract

One core purpose for designing instruction is to create learner-centered material. There are various models and learning theories that an instructional designer may use in order to ensure learner-centered material. This paper will provide a conceptualized definition of instructional design and the learning theories of Behaviorism, Cognitivism and Constructivism. In order to provide an understanding in regards to how instructional materials are created, a brief synopsis of three instructional models are provided along with an explanation of instructional systems and instructional system design. This paper concludes with personal conjectures regarding my favored design model and learning theory.

Instructional Design

Defining Instructional design, to sum up, may start out simple-creating material for training!-but the definition becomes more complex when one forms the definition based on the processes involved in designing instruction. As this suggests I not only define Instructional design as a process for creating material for training, but also as a process of developing material using elements of design, progression, implementation, and evaluation in order to produce learner-centered material.

Comprehension of developing learner-centered instruction stems from knowing how instructional design is formed. Instructional design is fashioned from the use of instructional systems and instructional system designs. Instructional systems are the arrangement of resources and procedures in order to facilitate learning. As described, instructional systems "…have a variety of forms, ranging from narrowly focused technical training courses to loosely structured student-focused learning environments and exist in virtually any institution with the express purpose of developing human capacities (Gagne, Golas, Keller, & Wager, 1995, p.18). So, in order to develop human capacities, instructional systems are created by using Instructional System Design.

Designers, by the use of instructional system design, are able to identify and solve instructional problems. In addition, designers are able to analyze, design, develop, reproduce, implement, and evaluate instructional material (Jonassen, 2004).

Overview of Instructional Design Models

Instructional system designs are employed through the use of instructional design models. Design models, to name a few, include:

- ADDIE
- Dick & Carey's Systems Approach Model
- Rapid Prototyping
- Kaufman's Organizational Elements Model
- Cognitive Flexibility Theory as a Pedagogy for Web-Based Course Design
- Merrill's Component Display
- Reigeluth's Elaboration

Models of instructional design, according to Patricia Rogers (2002), usually describe a step-by-step procedure for designing instruction. Materials based on a particular design model "were often meant to be "teacher proof" in that all of the learner outcomes were "assured" because output from each element of the model was carefully linked to the others in a progressive, systematic process (Rogers, 2002, p.4). In other words, using a model for designing instruction would provide for a "systematic and scientific product" (Gagne, Golas, Keller, & Wager, 1995, p.18). This in turn would result in that product being documentable, reproducible, and lead to expected outcomes (Gagne, Golas, Keller, & Wager, 1995).

Most design models have similar components, but vary by the methods provided for creating instruction. It often helps to understand a model better by looking at other models (Donald Clark, 2005). Therefore, a comparison was conducted of the ADDIE

model against Dick & Carey's Systems Approach Model, Mager's Criterion Referenced Instruction, and Rapid Prototyping.

ADDIE Model

Again, there are numerous design models, but what makes the ADDIE model unique is that it is often viewed as the foundation for the remaining ISD models (Wikipedia, 2007). Each letter in the acronym A.D.D.I.E. represents the design stage of Analysis, Design, Development, Implementation, and Evaluation (Wikipedia, 2007).

When an instructional designer uses the ADDIE model to develop instruction, they begin with the first stage analysis. An analysis is conducted in order to determine what needs to be learned, goals and objectives, and any additional components that may be needed (learning-theory.com, 2007). The next step-Design; this stage is considered "the blueprint for guiding the development of instruction (Gagne, Golas, Keller, & Wager, 1995, p.26). At this point, the designer would develop solutions or prototypes to include testing, redesign, and redevelopment (Jonassen, 2004, p.686). After the Design stage is completed the instructional designer executes the stage of development. Development, as described by the Learning Theory Database (2007), is the actual creation (production) of the context and learning materials. Once the context is created, one would follow through with implementing the material-actually using the product. Once implemented, the final stage of evaluation is warranted in order to determine that trainees can learn from the material (Rogers, 2002, p.201)

Although popular in its use, the ADDIE model does not provide a simple approach to creating training due to its' step-by-step order. This liner order often leads to time-constraints because instruction has to be developed and completed in phases. In

addition, ADDIE is too repetitive; the designer follows the same order-analyzes, develop, design, implement, and evaluate; which does not provide for flexibility. However, it is the models lack of flexibility that makes it straightforward and easy to use in most genres of training development except for business. Most business designers, and I agree with there perspective, view ADDIE as

> "weak in relation to business objectives, outcomes, deliverables and its ability to identify business problems. It should be clear from the review of each of the phases that the ADDIE model contains no formal business tools and has no activities dedicated to business issues. Without such tools and activities, it is impossible to develop training programs that address business issues (Islam, 2006, p.10)

Overall, ADDIE is a great starting point for an instructional designer because this model is the catalyst for remaining models and provides the designer with the fundamental building block for creating instructional material.

Model Comparisons

Dick & Carey's Instructional Design Model

Breaking instruction down into smaller components is the premise of this model. Reduction "allows for instruction to be specifically targeted to skills and knowledge to be taught and supplies the appropriate conditions for the learning outcome" (Mcgriff,2001, paragraph 4). Similar in scope to ADDIE, Dick & Carey's model expands upon the development stages of analyze, design, development, implementation, and evaluation (Prestera, 2002).

A depiction of the Dick & Carey Model is provided in Figure 1. On the left side of the model, there are three areas for analysis. Design, the next three areas, deals with performance objectives, criterion referenced test, and instructional strategies. Development and selection of material occur in the next step and is followed by evaluation. Implementation is incorporated within evaluation and include pilot and field test (Gagne, Golas, Keller, & Wager, 1995, p.39)

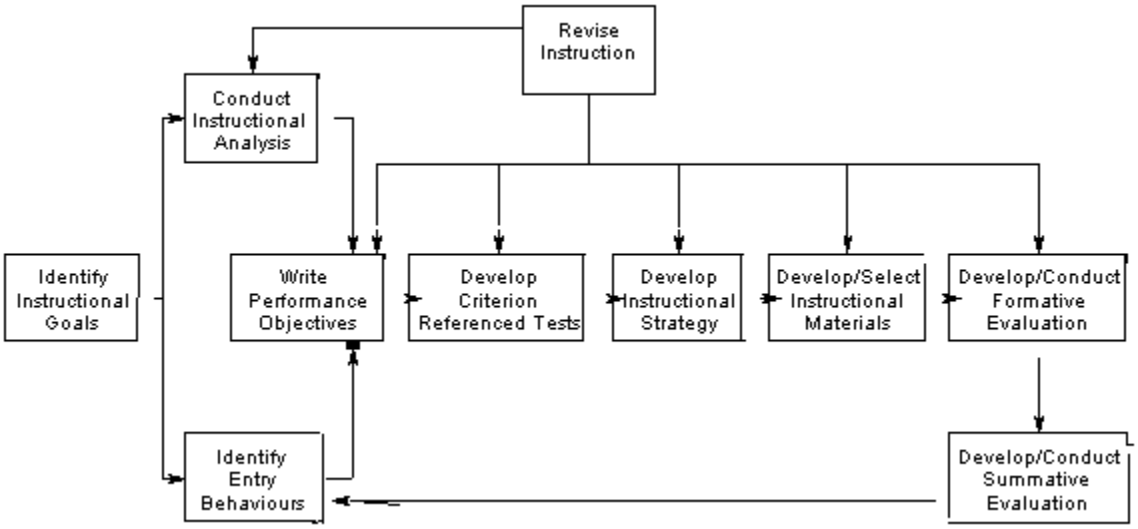


Figure 1 Dick and Carey's Instructional Design Model (Gagne, Golas, Keller, & Wager, 1995)

Steven McGriff (2001) describes the elements of Dick & Carey's model as:

1. Determine instructional goal: what do you want learners to be able to do when they have completed the instruction?
2. Analyze the instructional goal: a step-by-step determination of what people are doing when they perform the goal and what entry behaviors are needed.
3. Analyze learners and contexts: context in which the skills will be learned and the context in which the skills will be used.

4. Write performance objectives: specific behavior skills to be learned, the conditions under which they must be performed and the criteria for successful performance.
5. Develop assessment instruments: based on the objectives
6. Develop instructional strategy: identify strategy to achieve the terminal objective; emphasis on presentation of information, practice and feedback, testing.
7. Develop and select instruction: using the stated strategy produce instructional materials.
8. Design and conduct formative evaluation: testing of instructional materials in one-to-one, small groups or field evaluations so that the materials can be evaluated with learners and revised prior to distribution.
9. Revise instruction: data from the formative evaluation are summarized and interpreted to attempt to identify difficulties experience by learners in achieving the objectives and to relate these difficulties to specific deficiencies in the materials.
10. Summative evaluation: independent evaluation to judge the worth of the instruction.

(McGriff, 2001, paragraph 2). Note, elements of ADDIE are present, but vary by terminology and detail.

In comparison to ADDIE, Dick & Carey's model includes an analysis of the learner (prior knowledge, motivation), contexts (relevance, support), and instruction to include entry behaviors (Mcgriff, 2001). Whereas ADDIE promotes identifying a performance problem (what needs to be learned) in a business setting or other

environment (Rossett, 1995, as cited in Reiser & Dempsey, 2002). Dick and Carey's model also expands ADDIE elements by providing a guideline for the use of revision at any stage in order to improve development, criterion-referenced tests (assessments), selection of instructional materials, and formative and summative evaluations (Mcgriff, 2001).

Overall, I view the Dick and Carey model as being just as time consuming as ADDIE, however, I am partial to the expandability of the design elements. This expandability provides for additional insight and inclusion of key instructional fundamentals.

Mager's Criterion Referenced Instruction

Mager's Criterion Referenced Instruction involves adding a criterion of acceptable performance to objectives which informs the learner of how well they will have to perform in order to be deemed competent (Mager, 1997). In general a criterion (i.e. criteria) depletes the use of vague language in an objective by specifying time limits, accuracies needed, and quality (Mager, 1997, p.115-123). These specifications can be derived from job, academic, and improvement requirements or from personal experiences (Mager, 1997, p.130-132).

An instructional designer using Mager's Criterion Referenced Instruction model would be guided, as conveyed by Greg Kearsley (2007), in the steps of:

- Goal/task analysis- identifies what needs to be learned.
- Performance objectives – exact specification of the outcomes to be accomplished and how they are evaluated (the criterion).

- Criterion referenced testing - evaluation of learning in terms of the knowledge/skills specified in the objectives.
- Development of learning modules tied to specific objectives.

In comparison, ADDIE allots for sequencing the unit to objectives (Gagne, Golas, Keller, & Wager, 1995, p. 220); but does not provide additional instructions on how to design and measure performance. Dick & Carey's model incorporates the use of Mager's Criterion model by including the model as a step for developing performance objectives. A discovered benefit of Mager's Criterion Referenced Instruction is that it allows for measuring the learning against standard, not other learners (Hammons & Barnsley, 1992). In opposition, a disadvantage of Mager's model is the focused upon developing objectives (i.e. standards) and not quality instruction; whereas ADDIE involves a step-by step procedure for developing quality instruction. Although, Mager's model does not focus on designing for instruction; the model can be used in conjunction with other models as evident by Dick & Carey's instructional model (Kearsley, 2007).

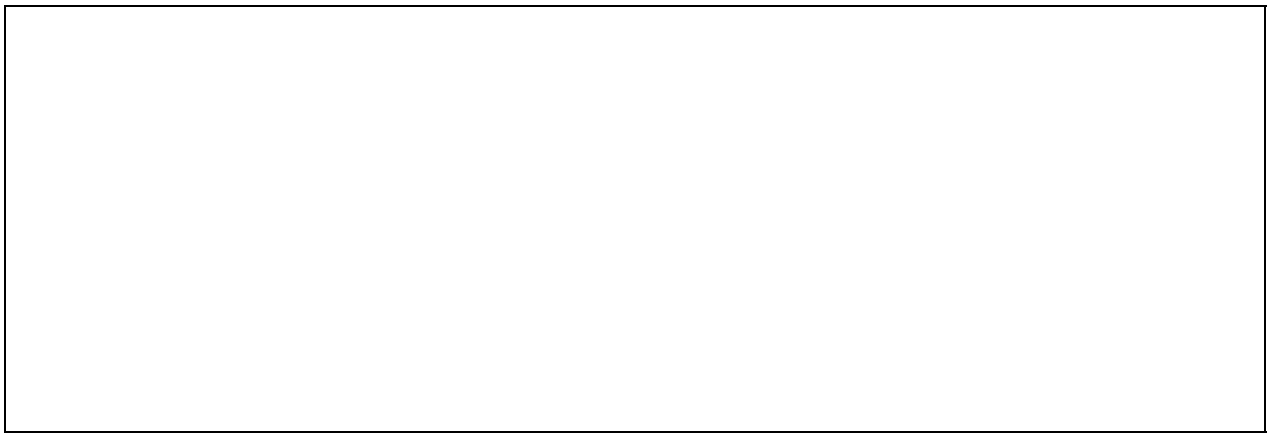
Rapid Prototyping

Viewed as a trend, rapid prototyping involves "quickly developing a prototype product in the very early stages of an instructional design project and then going through a series of rapid tryout and revision cycles until an acceptable version of the product is produced (Gustafson & Branch, 1997a, as cited in Reiser & Dempsey, 2002). Rapid Prototyping is used, along with the client, to create working models of instructional projects (Reiser & Dempsey, 2002). In the design of instruction, Rapid Prototyping "may cover one particular part of the product in detail or generalize the entire product.

Examples might take the form of a few pages of a student handbook or a typical module or interface" (Rogers, 2002, p. 188).

Rapid Prototyping merges the steps of ADDIE (wikiebooks,2006). A representation of this model is provided from Wikibooks (2006), refer to figure 2.

Figure 2



As evident from figure 2, Rapid prototyping allows designers to work with other members in order to:

- Concretely view the form, medium, and content of possible products
- Share opinions and ideas regarding the concrete form, and
- Predict the ultimate utility of those products and forms

(Rogers, 2002, p.188).

Variances from ADDIE include:

- The allotment for a prototype in the beginning of the design stage
- Time constraints are minimized
- Communication between the user and designer occurs throughout development
- Development is flexible because prototyping does not follow a step-by-step process (Wikibooks, 2006).

Behaviorism, Cognitivism, and Constructivism

Instructional design, at its core, is learner-centered. Learner-centered instruction means that the learner's performance is the focal point of all instruction (Reiser & Dempsey, 2002, p.21). In order to know what variances my occur in a learner's performance, an overview is provided of three key psychological theories-Behaviorism, Cognitivism, and Constructivism.

Behaviorism implies that the learner has learned according to the actions they display. If the learner receives a positive response, then the action is repeated and retained. If the learner receives a negative response the action and information is not repeated nor retained. Learning is therefore defined, according to the behaviorist theory "as a change in behavior in the learner" (Learning Theories Knowledgebase, 2007).

Cognitivism evaluates the processes involved in learning. This theory implies that learning occurs internally by processing the received information. Information is received and entered into the brain, "transformed, reduced, elaborated, stored, recovered, and used. A key focus of cognitive psychology is looking at how to communicate knowledge to learners in the most effective and efficient way by looking at metal processes and how the brain is changed during the course of learning (Wikibooks, 2006, paragraph 1).

Constructivism places emphasis on how the individual interprets objects and events in relation to personal believes, experiences, and prior knowledge. Constructivism consist of the individual constructing the new knowledge based on thinking about and interpreting there experience (Newby, 1996, p. 34). Generally, using instructional design models assist in the inclusion or at least the consideration of varying learning performances, learning styles, and learning philosophies.

Personal Opinion Concerning Philosophies

In the end, there is no one right instructional design model or learning philosophy, nor is one better than the other. As this suggest, I personally favor the Rapid Prototype model and the learning theory of Constructivism. I begin projects with the end in mind; what should it appear to be first, and I enjoy brainstorming-covering all bases from the start. I also favor the flexibility offered by the Rapid Prototype model, not creating one section of design at a time. Furthermore, Rapid Prototyping aligns with the theory of Constructivism because it allows for the learner or customer to share their ideas and beliefs regarding the design of the project. My personal learning philosophy takes on a Constructivist approach; in the end it is the learner who is responsible for assimilating, interpreting, and processing information for retention and use.

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