

CHAPTER 3: INSTRUCTIONAL DESIGN MODELS

Overview

This Chapter aims at introducing you to the systematic design process by presenting some popular Instructional design models.

Definitions

Design is essentially a rational, logical, sequential process intended to solve problems.

Instructional Design is the systematic process of translating general principles of learning and instruction into plans for instructional materials and learning.

Models, like myths and metaphors, help us to make sense of our world. Whether it is derived from whim or from serious research, a model offers its user a means of comprehending an otherwise incomprehensible problem. An instructional design model gives structure and meaning to an I.D. problem, enabling the would-be designer to negotiate her design task with a semblance of conscious understanding. Models help us to visualize the problem, to break it down into discrete, manageable units.

The value of a specific model is determined within the context of use. Like any other instrument, a model assumes a specific intention of its user. A model should be judged by how it mediates the designer's intention, how well it can share a work load, and how effectively it shifts focus away from itself toward the object of the design activity.

Models, like other tools, shape the consciousness of those who use them. The tool molds the wielder who molds the tool, ad infinitum. Our models frame the reality we impose on the world and the experience that is forged out of their use brings us to higher levels of understanding about the design problem, but only within the framework of the specific models we adopt.

Instructional Design (ID) Models are the systematic guidelines instructional designers follow in order to create a workshop, a course, a curriculum, an instructional program, or a training session. ID Models are visualized representations of an instructional design process, showing the main elements or phases, and their relationships. More commonly known by their names, Dick & Carey Model, ADDIE Model, Kemp Model, etc., these models share three major activities: analysis, strategy development, and evaluation.

The three models (ADDIE, Dick & Carey, Kemp) included here are a very small sample of all the models that exist. The wide array of available models can be applied to the wide array of circumstances in which ID is applied. The trio are examples of distinct approaches. The models in the graphic below are placed in a column grid to show how the differing elements of the models line up with the five basic phases: analysis, design, development, implementation, and evaluation (ADDIE!).

ADDIE is a general purpose model, most useful for creating instructional products, but also applicable for program design.

Dick & Carey model exemplifies the systematic approach to curriculum and program design.

Kemp's model is most useful for large-scale programs involving groups of people and multiple resources.

Instructional Systems Design Models

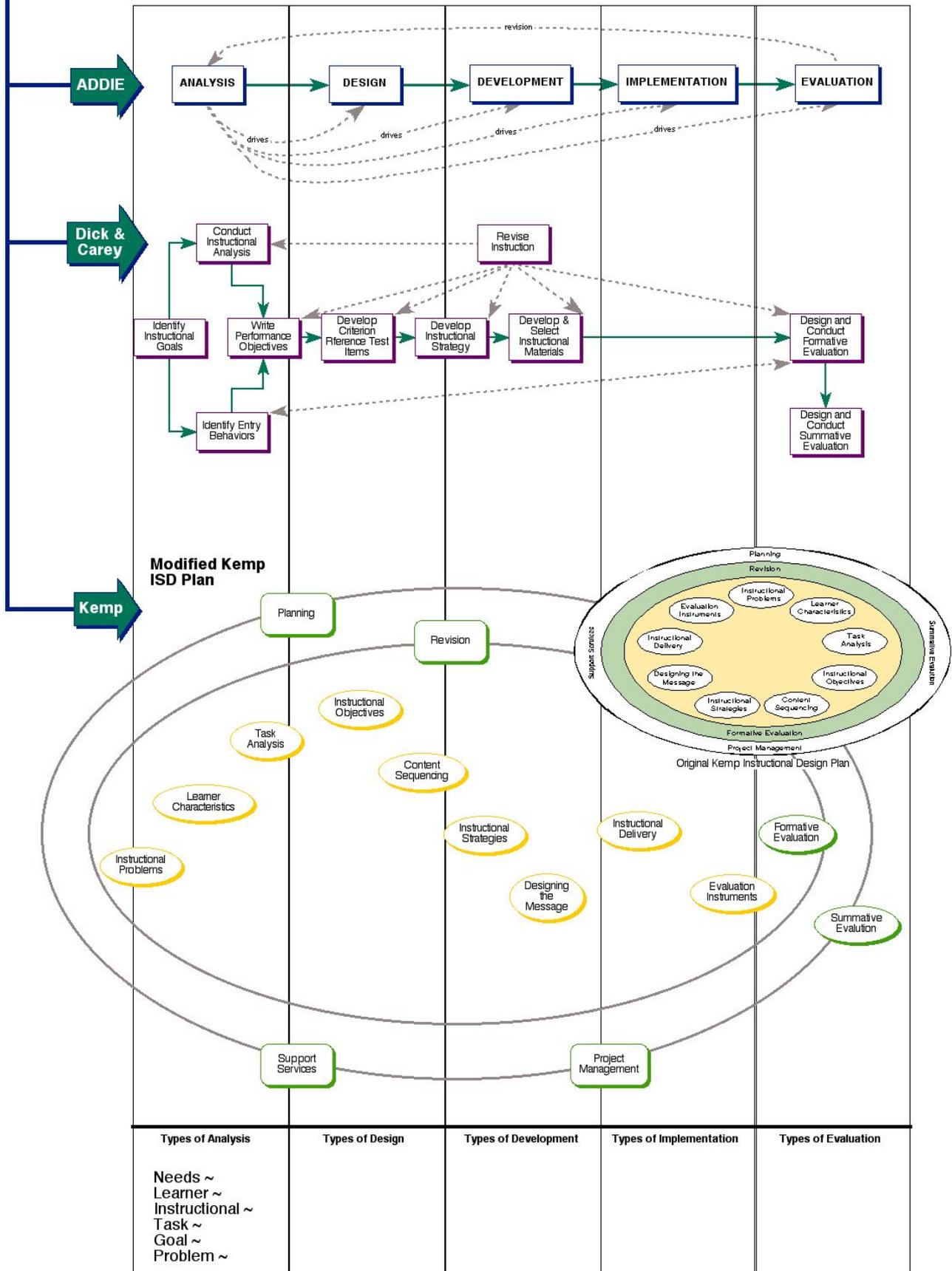


Figure 3.1: Instructional Design Models' Chart

The ADDIE Model

Instructional design is the systematic approach to the Analysis, Design, Development, Implementation, and Evaluation of learning materials and activities.

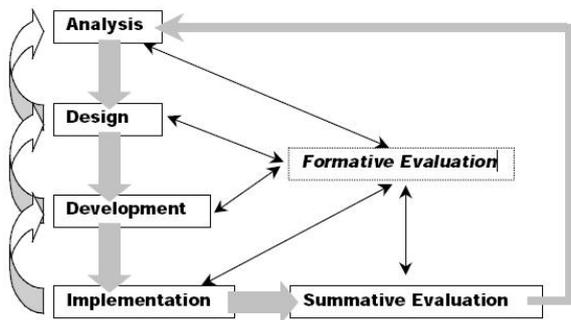


Figure 3.2: The ADDIE Model

Instructional design aims for a learner-centered rather than the traditional teacher-centered approach to instruction, so that effective learning can take place. This means that every component of the instruction is governed by the learning outcomes, which have been determined after a thorough analysis of the learners' needs.

These phases sometimes overlap and can be interrelated; however, they provide a dynamic, flexible guideline for developing effective and efficient instruction.

The ADDIE Model is an iterative instructional design process, where the results of the formative evaluation of each phase may lead the instructional designer back to any previous phase. The end product of one phase is the starting product of the next phase.

	Sample Tasks	Sample Output
Analysis the process of defining what is to be learned	Needs assessment Problem identification Task analysis	Learner profile Description of constraints Needs, Problem Statement Task analysis
Design the process of specifying how it is to be learned	Write objectives Develop test items Plan instruction Identify resources	Measurable objectives Instructional strategy Prototype specifications
Development the process of authoring and producing the materials	Work with producers Develop workbook, flowchart, program	Storyboard Script Exercises Computer assisted instruction
Implementation the process of installing the project in the real world context	Teacher training Tryout	Student comments, data
Evaluation the process of determining the adequacy of the instruction	Record time data Interpret test results Survey graduates Revise activities	Recommendations Project report Revised prototype

Kemp Model

The oval shape of Kemp model (as depicted in the "original" diagram) gives the designer the sense that the design and development process is a continuous cycle that requires constant planning, design, development and assessment to insure effective instruction. The model is systemic and nonlinear and seems to encourage designers to work in all areas as appropriate. For ease of explanation, the description of the model will start in the innermost sphere at "twelve o'clock" and proceed clockwise:

- Identify instructional problems, and specify goals for designing an instructional program.
- Examine learner characteristics that should receive attention during planning.
- Identify subject content, and analyze task components related to stated goals and purposes.
- State instructional objectives for the learner.
- Sequence content within each instructional unit for logical learning.
- Design instructional strategies so that each learner can master the objectives.
- Plan the instructional message and delivery.
- Develop evaluation instruments to assess objectives.

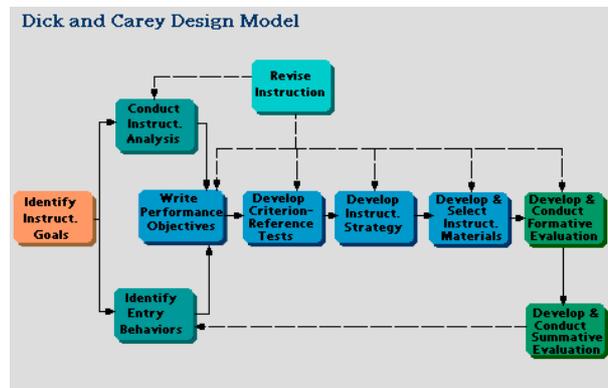
- Select resources to support instruction and learning activities.

Revision encircles all nine elements of model. The two outer ovals illustrate the feedback feature, which allows the designer to make changes in the content or treatment of elements at any time during the development cycle. The idea is to improve any weak parts of the program as they are discovered to better insure learners will be able to accomplish the instructional objectives at a satisfactory level.

The nine elements form a logical, clockwise sequence. However, the starting point and order in which the designer addresses the individual elements is not predetermined. The use of the oval as a visual organizer underscores this purpose. Designers may use the model flexibly to suit their own needs. The elements are not connected with lines or arrows, which would indicate a linear, sequential order. All programs or projects may not require all nine elements.

The word element is used as a label to describe each of the nine parts. In keeping with the non-linear concept of the model, terms such as step, stage, level, or sequential item were deliberately not used.

The modified Kemp ID Plan is a reconceptualization of Kemp's plan in order to fit the elements into the ADDIE schema. The undulating sequence of the non-connected oval shapes are meant to convey a similar idea as the original Kemp plan. The encircling ovals serve the same purpose as the original plan.



Steps

- Assessing Needs to Identify Instructional Goal(s).
- Conducting a Goal Analysis.
- Identifying Subordinate Skills and Entry Behaviors.
- Analyzing Learners and Contexts.
- Writing Performance Objectives.
- Developing Assessment Instruments.
- Developing an Instructional Strategy.
- Developing Instructional Materials.
- Designing and Conducting Formative Evaluations.
- Revising Instructional Materials.
- Designing and Conducting Summative Evaluations

Identify instructional goals: What do you want learners to be able to do when they have completed the instruction?



Conduct Instructional Analysis: Instructional Analysis refers to the procedures applied to an instructional goal in order to identify the relevant skills and their subordinate skills and information required for a student to achieve the goal (the purpose is to determine the skills involved in reaching a goal).

Identify entry behaviors and learners characteristics: A step-by-step determination of what people are doing when they perform the goal and what entry behaviors are needed. Involves identification of the context in which the skills will be learned and the context in which the skills will be used.

The Dick & Carey Model

Overview

Historical position: It is based on the idea that there is a predictable and reliable link between a stimulus (instructional materials) and the response that it produces in a learner (learning of the materials). The designer needs to identify the sub-skills the student must master that, in aggregate, permit the intended behavior to be learned and then select the stimulus and strategy for its presentation that builds each sub-skill.

Brief definition: The Dick and Carey model prescribes a methodology for designing instruction, based on a reductionist model of breaking instruction down into smaller components. Instruction is specifically targeted on the skills and knowledge to be taught and supplies the appropriate conditions for the learning of these outcomes.

Write performance objectives: The purpose is to translate the needs and goals into specific and detailed objectives. This includes specific behavior skills to be learned, the conditions under which they must be performed and the criteria for successful performance.

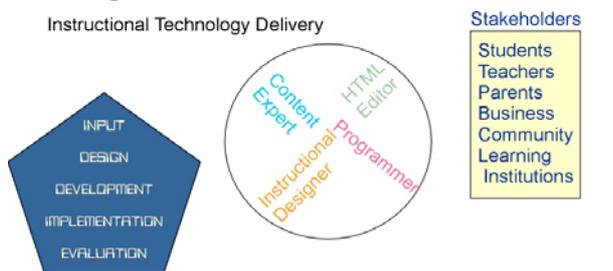
Develop Criterion - Reference Tests: Derive assessment instruments based on the objectives to:

- Diagnose an individual's possessions of the necessary prerequisites for learning new skills
- Check the results of student learning during the process of a lesson
- Provide document of students progress for parents or administrators

It is useful in evaluating the instructional system itself (Formative/ Summative evaluation) and for early determination of performance measures before the development of lesson plan and instructional materials

Develop instructional strategy: Instructional strategy is an overall plan of activities to achieve an instructional goal; it includes the sequence of intermediate objectives and the learning activities leading to the instructional goal. Its purpose is to identify the strategy to achieve the terminal objective and to outline how instructional activities will relate to the accomplishment of the objectives. Emphasis is given on presentation of information, practice and feedback, and testing. A well-designed lesson should demonstrating know-ledge about the learners, tasks reflected in the objectives, and effectiveness of teaching strategies.

Example. Choice of delivering methodology: Teacher-led, Group-paced vs. Learner-centered, Learner-paced.



Objective Background Concept Examples Summary Practice

Develop and select instructional materials: The aim is to produce instructional materials taking into account the instructional strategy that has been adopted (e.g., should we use printed or electronic media or both, to convey events of instruction?). Try to use of existing materials when this is possible. The role of teacher depends on the choice of delivery system)

Develop and conduct formative evaluation: Formative evaluation is an evaluation designed to

collect data and information that is used to improve a program or produce; it is conducted while the program is still being developed. The purpose is to provide data for revising and improving instructional materials. This includes testing of instructional materials in one-to-one, small groups or field evaluations so that the materials can be evaluated with learners and experts of the field.

Revise instruction: The aim is to revise the instruction so as to make it as effective as possible for larger number of students. 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.

Summative evaluation: Summative evaluation is an evaluation designed and used after an instructional program has been implemented and formative evaluation completed. Its purpose is to conduct independent evaluation to judge the worth of the instruction and study the effectiveness of the instruction system as a whole and make recommendations about its adoption or retention. Summative evaluation is conducted:

- After the system has passed through its formative stage
- In a small scale or large Scale
- For a short period or long period

Key terms

Needs assessment: The formal process of identifying discrepancies between current outcomes and desired outcomes for an organization

Performance objectives: A statement of what the learners will be expected to do when they have completed a specified course of instruction, stated in terms of observable performances

Sub-ordinate objectives: An objective that must be attained in order to accomplish a terminal objective.

Terminal objective: An objective the learner will be expected to accomplish when they have completed a course of instruction

Hierarchical analysis: Technique used with goals in the intellectual skills domain to identify the critical subordinate skills needed to achieve the goal, and their inter-relationships.

Instructional implications: Learning is based on mastering a set of behaviors which are predictable and therefore reliable. The correct instructional analysis and instruction will lead to demonstrable skills.

References

Walter Dick, Lou Carey, James O. Carey: The Systematic Design of Instruction. Allyn & Bacon. 2001, (5th Edition), ISBN: 0-321-03780-4.

Kemp E., Morrison G. R., Ross S. M. (1996). Designing Effective Instruction, 2nd Edition. Upper Saddle River, NJ: Prentice-Hall.