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Introduction to Instructional Design and the ADDIE Model

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What is Instructional Systems Design?

The most widely used methodology for developing new training programs is called Instructional Systems Design (ISD). It is also known as Instructional Systems Design & Development (ISDD), the Systems Approach to Training (SAT), or just Instructional Design (ID). This approach provides a step-by-step system for the evaluation of students' needs, the design and development of training materials, and the evaluation of the effectiveness of the training intervention.

ISD evolved from post-World War II research in the United States military to find a more effective and manageable way to create training programs. These efforts led to early ISD models that were developed and taught in the late 1960's at Florida State University. Today, Walter Dick and Lou Carey are widely viewed as the torchbearers of the methodology, with their authoritative book, *The Systematic Design of Instruction* (Dick and Carey).

Why Use a Systems Approach?

A system is any set of components that work together to achieve a specified outcome or goal. Think of the cruise control system on your car. You set the desired speed (or goal) and the cruise control sets the gas injection to the proper level. An important aspect of any system is the feedback mechanisms that ensure the goal is achieved or maintained. Using the cruise control analogy, the car does not just lock the gas pedal in one position. If you begin to drive uphill, the car briefly slows down until the speedometer information is fed back to the cruise control system, which then increases the amount of gas and the desired speed is reached once again.

Just as a systems approach with its requisite feedback makes cruise control a viable system to maintain driving speed, so, too, the systems approach provides the smoothest development means for training programs.

The ADDIE Model

There are more than 100 different ISD models, but almost all are based on the generic "ADDIE" model, which stands for Analysis, Design, Development, Implementation, and Evaluation, as illustrated in the figure below. Each step has an outcome that feeds the subsequent step.

Analysis --> Design --> Development --> Implementation --> Evaluation

During analysis, the designer develops a clear understanding of the "gaps" between the desired outcomes or behaviors, and the audience's existing knowledge and skills. The design phase documents specific learning objectives, assessment instruments, exercises, and content. The actual creation of learning materials is completed in the development phase. During implementation, these materials are delivered or distributed to the student group. After delivery, the effectiveness of the training materials is evaluated.

Alternate Design Models

The ADDIE model has been criticized by some as being *too* systematic, that is, too linear, too inflexible, too constraining, and even too time-consuming to implement. As an alternative to the *systematic* approach, there are a variety of *systemic* design models that emphasize a more holistic, iterative approach to the development of training. Rather than developing the instruction in phases, the entire development team works together from the start to rapidly build modules, which can be tested with the student audience, and then revised based on their feedback.

The systemic approach to development has many advantages when it comes to the creation of technology-based training. To create engaging metaphors or themes, artists and writers work together in a process that validates the creative approach with students early in the development cycle. Programmers and designers garner agreement as to which learning activities are both effective as well as possible, given the constraints of the client's computers or network.

Despite these advantages, there are practical challenges with a purely systemic design approach in the management of resources. In most cases, training programs must be developed under a fixed -- and often limited -- budget and schedule. While it is very easy to allocate people and time to each step in the ISD model, it is harder to plan deliverables when there are no distinct steps in the process. The holistic approach begs the questions, "How many iterations, and time, will it take to finish the program?" "Do the contributions made by programmers and artists in the design phase, who have no formal background in instruction, warrant the extra time required and additional compensation for this time?"

Introducing a Rapid Prototyping Phase

For best results, the development process for CD-ROM or Web-based training programs should use a modified ADDIE model, which borrows from the most valuable aspects of the systemic approach. Specifically, a rapid prototype phase is inserted after, or as an extension of, the design phase. A rapid prototype is simply a quickly assembled module that can be tested with the student audience early in the ISD process. The evaluation typically looks at things like how well the learners responded to the creative metaphor, how effective the learning activities are, and how well the program performs on the chosen technology platform. Based on the feedback, the design can be

revised and another prototype developed. This iterative process continues until there is agreement and confidence in the prototype.

In this process, only after the prototype is completed is additional development work done. However, this work often moves more quickly after a rapid prototype than in the traditional ADDIE model. Instructional designers and writers are able to proceed more efficiently since they know exactly what the program will look like and what it will be capable of doing. Additionally, with all of the major technical issues resolved, final programming becomes a simple matter of assembly of media components.

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