

# THEORIES OF LEARNING

## 6. DESIGN THEORIES & MODELS (PRESCRIPTIVE)

### 6.1. Design-Based Research Overview

Design-based research (DBR) in education is probably very old, but recent interest can be traced back to the early nineties. Researchers have defined critical characteristics of design experiments as:

- **Addressing complex problems in real contexts in collaboration with practitioners,**
- **Integrating known and hypothetical design-principles with technological affordances to render plausible solutions to these complex problems, and**
- **Conducting rigorous and reflective inquiry to test and refine innovative learning environments as well as to define new design-principles.**

According to the Design-Based Research Collective, the central goals of designing learning environments and developing theories or “prototheories” of learning are intertwined. Second, development and research take place through continuous cycles of design, enactment, analysis, and redesign. Third, research on designs must lead to sharable theories that help communicate relevant implications to practitioners and other educational designers. Fourth, research must account for how designs function in authentic settings. It must not only document success or failure but also focus on interactions that refine our understanding of the learning issues involved. Fifth, the development of such accounts relies on methods that can document and connect processes of enactment to outcomes of interest.

Design research was developed to address several issues central to the study of learning, including the following:

- The need to address theoretical questions about the nature of learning in context.
- The need for approaches to the study of learning phenomena in the real world rather than the laboratory.
- The need to go beyond narrow measures of learning.
- The need to derive research findings from formative evaluation.

For some, DBR seems have been used to make a difference, but mostly at the level of small-scale interventions and in the lives of individual teachers and schools. Furthermore, authors claim that DBR offers a best practice stance that has proved useful in complex learning environments, where formative evaluation plays a significant role, and this methodology incorporates both evaluation and empirical analyses and provides multiple entry points for various scholarly endeavors.

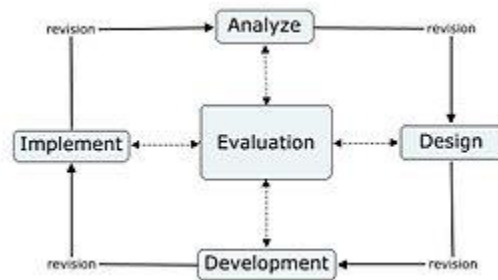
Summarily, design-based research (DBR) is a type of research methodology commonly used by researchers in the learning sciences. Within design-based research methodology, interventions are conceptualized and then implemented iteratively in natural settings in order to test the ecological validity of dominant theory and to generate new theories and frameworks for conceptualizing learning, instruction, design processes, and educational reform. Data analysis often takes the form of retrospective, cross-iteration comparisons. Design-based research methodologies are often viewed as non-scientific by circles in the post-positivist learning research tradition due to the ongoing changes and interactions that are made by researchers who neither do purely empirical observational ethnographic research or purely empirical experimental research in which fixed and isolated variables will be measured and not tinkered with mid-experiment but rather use quasi-experimental methods in which the experimental design is always going through changes and modifications during the middle of experimental interventions. The method was first proposed as design-experiments as Allan Collins in 1990 and 'design experiments' by Ann Brown in 1992. Collins originally proposed design-experiments as contributing to a design science, like aeronautics or artificial intelligence, rather than towards analytic science, such as physics or psychology.

## **6.2. ADDIE Model of Instructional Design**

The ADDIE model is a framework that lists generic processes that instructional designers and training developers use. Perhaps the most common model used for creating instructional materials is the ADDIE Model. This acronym stands for the 5 phases contained in the model (Analyze, Design, Develop, Implement, and Evaluate). The ADDIE model was initially developed by Florida State University to explain the processes involved in the formulation of an instructional systems development (ISD) program for military inter service training that will adequately train individuals to do a particular job and which can also be applied to any inter service curriculum development activity. The model originally contained several steps under its five original phases; Analyze, Design, Develop, Implement, and

Evaluation, whose completion was expected before movement to the next phase could occur. Over the years, the steps were revised and eventually the model itself became more dynamic and interactive than its original hierarchical rendition, until its most popular version appeared in the mid-80s, as we understand it today.

The ADDIE Model's five phases are listed and explained below :



**Analyze** – The first phase of content development is Analysis. Analysis refers to the gathering of information about one's audience, the tasks to be completed, how the learners will view the content, and the project's overall goals. The instructional designer then classifies the information to make the content more applicable and successful.

**Design** – The second phase is the Design phase. In this phase, instructional designers begin to create their project. Information gathered from the analysis phase, in conjunction with the theories and models of instructional design, is meant to explain how the learning will be acquired. For example, the design phase begins with writing a learning objective. Tasks are then identified and broken down to be more manageable for the designer. The final step determines the kind of activities required for the audience in order to meet the goals identified in the Analyze phase.

**Develop** – The third phase, Development, involves the creation of the activities that will be implemented. It is in this stage that the blueprints of the design phase are assembled.

**Implement** – After the content is developed, it is then Implemented. This stage allows the instructional designer to test all materials to determine if they are functional and appropriate for the intended audience.

**Evaluate** – The final phase, Evaluate, ensures the materials achieved the desired goals. The evaluation phase consists of two parts: formative and summative

assessment. The ADDIE model is an iterative process of instructional design, which means that at each stage the designer can assess the project's elements and revise them if necessary. This process incorporates formative assessment, while the summative assessments contain tests or evaluations created for the content being implemented. This final phase is vital for the instructional design team because it provides data used to alter and enhance the design.

Connecting all phases of the model are external and reciprocal revision opportunities. As in the internal Evaluation phase, revisions should and can be made throughout the entire process.

### **6.3. ARCS Model of Motivation Design**

The ARCS Model of Motivational Design was created by John Keller while he was researching ways to supplement the learning process with motivation. The model is based on Tolman's and Lewin's expectancy-value theory, which presumes that people are motivated to learn if there is value in the knowledge presented (i.e. it fulfills personal needs) and if there is an optimistic expectation for success. The model consists of four main areas: Attention, Relevance, Confidence, and Satisfaction. Attention and relevance according to John Keller's ARCS motivational theory are essential to learning. The first 2 of 4 key components for motivating learners, attention and relevance can be considered the backbone of the ARCS theory, the latter components relying upon the former.

**Attention:** The attention mentioned in this theory refers to the interest displayed by learners in taking in the concepts/ideas being taught. This component is split into three categories: perceptual arousal, using surprise or uncertain situations; inquiry arousal, offering challenging questions and/or problems to answer/solve; and variability, using a variety of resources and methods of teaching. Within each of these categories, John Keller has provided further sub-divisions of types of stimuli to grab attention. Grabbing attention is the most important part of the model because it initiates the motivation for the learners. Once learners are interested in a topic, they are willing to invest their time, pay attention, and find out more.

**Relevance:** Relevance, according to Keller, must be established by using language and examples that the learners are familiar with. The three major strategies John Keller presents are goal oriented, motive matching, and familiarity. Like the Attention category, John Keller divided the three major strategies into

subcategories, which provide examples of how to make a lesson plan relevant to the learner. Learners will throw concepts to the wayside if their attention cannot be grabbed and sustained and if relevance is not conveyed.

**Confidence:** The confidence aspect of the ARCS model focuses on establishing positive expectations for achieving success among learners. The confidence level of learners is often correlated with motivation and the amount of effort put forth in reaching a performance objective. For this reason, it's important that learning design provides students with a method for estimating their probability of success. This can be achieved in the form of a syllabus and grading policy, rubrics, or a time estimate to complete tasks. Additionally, confidence is built when positive reinforcement for personal achievements is given through timely, relevant feedback.

**Satisfaction:** Finally, learners must obtain some type of satisfaction or reward from a learning experience. This satisfaction can be from a sense of achievement, praise from a higher-up, or mere entertainment. Feedback and reinforcement are important elements and when learners appreciate the results, they will be motivated to learn. Satisfaction is based upon motivation, which can be intrinsic or extrinsic. To keep learners satisfied, instruction should be designed to allow them to use their newly learned skills as soon as possible in as authentic a setting as possible.