

Theories and Principles for E-Learning Practices with Instructional Design

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INTRODUCTION

E-learning has become an area of increasing interest for academics, consultants, and practitioners. Notwithstanding, it seems that in current experiences the instructional dimension is often overlooked. Many e-learning courses are content-oriented and the attention is often put on the technological dimension. We believe that a fruitful contribution in order to overcome the gap between technology and pedagogy and promote a more sensible instructional approach to e-learning, can be derived from *instructional design* (ID). ID is an ever growing field of research (Dijkstra, Seel, Schott, & Tennyson, 1997; Gagné & Briggs, 1990; Merrill, 2001; Reigeluth, 1989; Savery & Duffy, 1995; Wilson & Cole, 1991). Its results have a transversal value with respects to the specific delivery supports adopted in the learning environment. Whether we are dealing with online or face-to-face education, useful criteria from ID can be outlined for designing effective, efficient, and appealing learning experiences.

Therefore, with the aim of suggesting useful criteria and guidelines for e-learning design, this paper focuses

on ID and examines some main approaches that currently characterise this field.

HISTORICAL AND THEORETICAL BACKGROUND

The field of ID emerged more than 40 years ago as psychologists and educators searched for effective means of planning and implementing instructional systems. One of the most important work for the growth of this field was Robert Gagné's *The Conditions-of-Learning* (Gagné, 1965). According to the American psychologist, there are different levels of learning, each of which requires different types of instruction. He distinguished eight types of learning (from signal learning to problem solving) arranged in hierarchical order and proposed nine instructional events as conditions for learning. See Exhibit 1.

These events should provide the basis for designing instruction and selecting appropriate media.

ID from the very start, was configured as a field of research aimed at identifying criteria for the choice

Exhibit 1.

Instructional events	Cognitive Process
Gaining attention	Reception
Informing learners of the objective	Expectancy
Stimulating recall of prior learning	Retrieval
Presenting the stimulus	Selective Perception
Providing learning guidance	Semantic Encoding
Eliciting performance	Responding
Providing feedback	Reinforcement
Assessing performance	Retrieval
Enhancing retention and transfer	Generalization

of the most appropriate learning methods, taking into consideration the conditions-of-learning and the different learning methodologies. And yet this sector was often confused with other fields, thus generating ambiguity and misunderstanding. Recently, Reigeluth (1999) elaborated a deep study on ID with the purpose to clarify its specific field and focus on the epistemological nature of ID theories. Broadly speaking, an ID theory provides more or less general indications on how to facilitate learning and cognitive, emotional, social and physical development of people. But how should the term “theory” be interpreted, and what does an ID theory consist of, compared to other theoretical fields?

First of all an ID theory is design-oriented, that is, it focuses on how to achieve learning results. It therefore has a prescriptive nature, and does not involve the description of cause-effect relations between events, but indicates how to obtain specific results. An ID theory is not true or false, but involves a choice between possible preferable ways of intervening, and thus satisfies preferability criteria rather than that of validity.

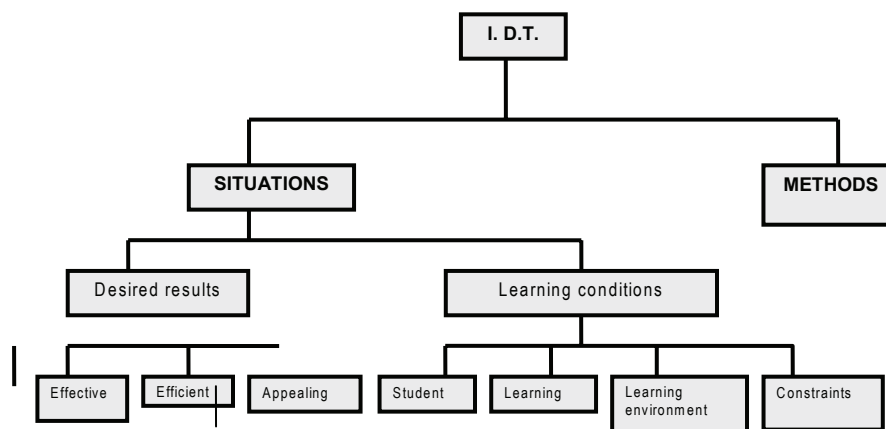
There is a tendency to identify ID with the area of learning theories. Obviously the relationship between these fields is very close since the learning theories have the fundamental role of explaining why an ID theory works or not. However, an ID theory involves the defining of the methods that facilitate learning and indicates the situations in which their use is preferable.

The methods have a situational nature and not a universal one, meaning that they work in certain situations and not in others. The situation affects the choice of methods and influences their applicability.

An ID theory therefore defines not only the methods, but also the situations, while identifying the aspects of the context that influences the choice of the method. In any learning situation, the most important aspects can be put into two macrocategories which are the learning conditions and the desired results. Among the first to be considered are: the nature of that which must be learnt (e.g., understanding concepts is different from developing abilities), the characteristics of the students (e.g., their previous knowledge, their learning strategies, their motivations), the characteristics of the learning environment (e.g., the activities could be carried out at home, or in a class of 20 students, or in small groups at workplaces, etc.), and the organizational and economic constraints. All these conditions can affect the choice of the most favorable methods for achieving the desired results. They must not be confused, however, with the *conditions-of-learning* of Gagné, even when the internal conditions coincide with the category, “student characteristics”, while the external conditions are methods of learning and not conditions of learning. The desired results are the levels of effectiveness, efficiency (costs/time) and appeal (attraction for the student) with which one hopes to reach learning objectives.

The situation is therefore defined in a rather complex way and the intervening factors are multiple. This entails another characteristic of the ID methods, that is, they always possess a probabilistic nature. It means that an ID method does not guarantee that the application of an appropriate method in a certain situation will deterministically lead to the desired results, but

Figure 1. Elements of ID theory (Reigeluth, 1999)



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