Chapter 3
Systems Thinking in Instructional Design

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Abstract

The word system in Instructional Systems Development tends to connote systematic process. Yet systems scientists suggest this is a limiting interpretation. What would it mean to incorporate more powerful notions of system, for example wholeness and interdependence, in designing instruction? Perhaps experienced practitioners do so and can offer us direction. The study reported here asked designers to identify what they considered to be key relations among components of an instructional system—those things that made the relations among parts important to consider. The results reveal that components are seen as highly interdependent and suggest that simple ISD models and procedures fail to capture much of the systemic nature of the process. Possibilities for supporting practice and developing expertise are implied.

1. BACKGROUND

The process of creating instructional events, activities, lessons, and courses is often given the formal label Instructional Systems Design or Instructional Systems Development (ISD). In this phrase, systems may connote a number of things, but tends to most often be interpreted as systematic process, that is, an orderly pattern in which one set of considerations precedes another (e.g., Hug & King, 1984). Considerations are typically clustered in stages or steps that define major entities relevant to instruction such as who the learners are, what they need to learn, and what instructional methods will be used, and these stages are arranged in a logical sequence.

If as systems scientists suggest, the system emerges more from the relationships among parts than from the parts themselves, then the system of ISD is most evident not in the
separate steps or activities, but in the logic or orderly pattern among them. For example, the early definition of goals and the use of these goals in subsequent decisions would appear to be a key feature, as would empirical justification in a final evaluative stage (Dick & Carey, 1996).

This logic of ISD is often illustrated in models, in which component stages are identified and arranged, say in a series of boxes with lines or arrows between. An essentially linear pattern is frequently represented, although authors' descriptions suggest a more complex process involving iterations and looping. The nature of such iterations, for example, what causes them to be initiated and how they occur, is not very clear, a fact that is not surprising given our relatively poor understanding of design practice. One could argue that the basic linear process is maintained while adjustments are a matter of judgment and depend on experience, or one could describe the entire activity as being less predictable and composed more of *ad hoc* decision making. The accuracy and utility of such positions may be more a matter of context and/or moment-to-moment situational details. Regardless, the fact is we have little explicit knowledge of what instructional designers think about in their practice. Therefore, arguing for or against a particular position regarding the logic of ISD, that is, the nature of the system, tends to be a matter of speculation with more theoretical than empirical basis. Pieters and Bergman (1995) is a notable exception. They surveyed graduates of their educational technology program and found support for teaching a basic systematic process.

To shed light on such issues, relatively direct methods such as protocol analysis could be employed (e.g., Rowland, 1992; Perez & Emery, 1995). A specific focus on systemic relations in such analyses could be quite revealing. However, these methods are relatively costly in terms of time and effort on the part of both researcher and subject. Another, perhaps less powerful, option is to rely on retrospective reports, for example, to use surveys and interviews in which practitioners are asked what they think about when they design. The problem here is that retrospective reports tend to be unreliable (Ericsson & Simon, 1984).

Attempting to work around these difficulties and obtain a fresh perspective, we decided to ask about the product of ISD rather than the process, that is, about the instruction or instructional system created by designing rather than about designing itself. This seems justified since evidence does exist that what is designed influences how designing occurs, as well as that designers are at least as product-oriented as process-oriented in their thinking (Hubka & Eder, 1987). Furthermore, this seems reasonable because each element of process tends to be fairly clearly associated with a particular product: needs analysis defines a need; learner analysis defines the learners; task analysis defines the task and content; media selection specifies media; etc.

We asked, therefore, how does the concept of system, in terms of relations among parts, manifest itself in instructional designers' thinking. To approach this in a way that went beyond stepwise activity, we asked about the relations among components of the design product. For example, we asked how designers think about relations between the content and activities that might be involved in a lesson, rather than about the processes that went into their selection and creation.