Chapter IX
A Pragmatic Framework for Promoting Interactivity in E-Learning

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ABSTRACT

As e-learning keeps growing, an increasing amount of learning activities can be expected to take place through interactivity between the learner and e-learning materials. To better understand the processes and qualities of interactivity in e-learning, the chapter proposes a framework for analyzing and promoting interactivity from an information processing perspective. The framework consists of the dimensions of accessibility, information attributes of multimedia, learner control versus system control, hypermedia navigation, and cognitive engagement.

CHAPTER OBJECTIVES

The reader will be able to:

- Differentiate interactivity from interaction
- Describe ways to improve accessibility in e-learning
- Discuss effective use of multimedia to their respective advantages
- Discuss the interrelationships between learner control and system control
- Describe methods to facilitate learner navigation in hypermedia
- Describe strategies to foster cognitive engagement

INTRODUCTION

Interactivity is an appealing notion today. However, interpretations of interactivity remain fragmented, inconsistent, and rather messy (Rose, 1999). Interaction between human interlocutors...
is often mixed with interactivity between learners and learning materials. Many people use the two terms interchangeably. Some researchers feel that interaction between the learner and the learning material should be differentiated from interaction between human interlocutors (Kennedy, 2004; Gilbert & Moore, 1998; Sims, 2000). To distinguish the two constructs, we use the term interactivity to refer to the interaction between the learner and the e-learning source, as distinguished from interaction between the learner and the instructor, or among learners themselves. Although many of the points discussed in the chapter can apply to interactivity with learning materials in general, the focus of the chapter is on interactivity with e-learning sources. E-learning source is defined as a combination of digital media, computer user interfaces, learning materials, domain knowledge base, and supporting software programs.

Interactivity and interaction can be differentiated in more than one dimension. A key differentiation is in the types of response and feedback. Response and feedback between human interlocutors are usually spontaneous and therefore unlimited in variability, whereas responses and feedback from e-learning sources are generally pre-designed or programmed, thus lacking spontaneity and limited in variability. Another differentiation is in the communication interfaces. Interaction between human interlocutors is mostly verbal and often vocal, enriched by paralinguistic features such as tone of voice, pitch and volume, body language, and facial expressions. On the other hand, interactivity between a learner and the e-learning source is facilitated mostly through digital media and electronic input and output devices.

As e-learning keeps growing, an increasing amount of learning activities can be expected to take place through the direct contact between the learner and the e-learning materials, rather than through direct interaction between the learner and the instructor. However, the interactive learning research community has not been able to provide adequate guidance yet for designers to promote interactivity. Very little research has been undertaken to actually determine what is happening during the interactive process (Sims, 2000). Most of the previous studies on interactivity have focused on user interfaces, learner responses, and system feedback (Schwier & Misanchuk, 1993; Sims, 1997). Few attempts have been made to analyze interactivity from an information processing perspective.

**PERSPECTIVES OF INTERACTIVITY**

With the advancement of digital technology, interactivity has come to be regarded by many as an innate attribute of instructional software (Rose, 1999) and interactivity is often described in terms of technology capabilities (Gilbert & Moore, 1998; Wagner, 1994, 1997). Computer-generated virtual reality allows the learner to experience simulated real-life situations, explore imaginary possibilities, and test “wild” hypotheses. Database-supported library systems can let the user search for desired information with far more effectiveness and efficiency. The Internet and World Wide Web have made it possible to pool computer resources around the world and build connections between distributed information nodes, allowing people to interact in a truly world-wide scope.

As technology capabilities grow, the issue of system control versus learner control becomes prominent. Constructivism tells us that learning is more likely to be active when the learner has control over the learning activities. Active learning generally leads to a greater depth and breadth of processing, which in turn leads to deeper and more durable learning. Learner control has been examined from various perspectives including: (a) content modality, (b) content coverage, (c) sequence of access and learning paths, (d) online help, and (e) opportunities to assess learning progress (Merrill, 1975; Sims, 1999).

Learner control and system control are inextricably coupled. While allowing some degree of learner control, an instructional source must be
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