Chapter 27
Interactivity in Distance Education and Computer–Aided Learning, With Medical Education Examples

D. John Doyle
Cleveland Clinic, USA

Patrick J. Fahy
Athabasca University, Canada

ABSTRACT

Medical educators commonly place considerable importance on the notion of "interactivity" in the educational process. Interactivity may be defined as a reciprocally active situation whereby a two-way flow of information or opinion exists between a source and a user, and where the source responds to the user's input. Advocates of interactivity maintain that well-designed interactivity in educational systems helps capture the learner's interest, has the potential to speed the learning process, and even allows for continuous assessment of the degree to which the material is mastered. Medical educators also point out that technology can allow for high-quality interactivity by providing for frequent and relevant user feedback, by recognizing when students misunderstand a concept, and by providing learning aids such as animations or graphs that vary depending on user input. However, badly designed interactivity can also impede student progress.

INTRODUCTION

Webster's Revised Unabridged Dictionary defines interaction as: 1. intermediate action, 2. mutual or reciprocal action or influence; as, the interaction of the heart and lungs on each other. The *Oxford English Dictionary* defines interactivity as reciprocally active, allowing a two-way flow of information between source and user, responding to the user's input. This is the view advocated by many observers (Wagner, 1994; Wagner, 1997; Anderson, 2003). Notes Anderson: "Simply stated, interactions are reciprocal

events that require at least two objects and two actions. Interactions occur when these objects and events mutually influence one another" (p. 8). The concept of "interaction" in education and training varies with subject domain (e.g., philosophy versus physics), with format (e.g., conventional versus distance education) and with other factors. Although the term is frequently overused and poorly understood, the notion of interactivity remains important and useful, and is especially topical given the availability of technologies designed to support advanced interactivity.

BACKGROUND

In his book *The Art of Interactive Design*, Crawford (2002) discusses the notion of interactivity in terms of a conversation: "a cyclic process in which two actors alternately listen, think, and speak," and notes that the "quality of the interaction depends on the quality of each of the subtasks (listening, thinking, and speaking)." This model of interactivity avoids some of the pitfalls associated with some definitions offered in the past.

As noted above, educators place considerable importance on interactivity in learning (Anderson & Garrison, 1995; Fahy, 2005; Garrison & Cleveland-Innes, 2005; Lapadat 2007, Faghihi et al., 2016). Well-designed interactivity can help capture the learner's interest, has the potential to speed learning, and allows for continuous assessment of the degree to which the material is mastered. Technology (at least theoretically) can allow for high-quality interactivity by providing for frequent and relevant user feedback, by recognizing when students misunderstand a concept, and by providing aids such as animations or graphs that vary with user input. However, badly designed interactivity can also impede student progress, suppressing, or making more difficult, program flexibility and learner independence (Burbules & Callister, 2000; Faghihi et al., 2016) (*vide infra*).

The importance of interactivity in learning is illustrated by the fact that a number of journals address this topic. For instance, the *Journal of Interactive Learning Research* (JILR) publishes manuscripts dealing with "the underlying theory, design, implementation, effectiveness, and impact on education and training of the following interactive learning environments," including such varied topics as "authoring systems, cognitive tools for learning computer-assisted language learning, computer-based assessment systems, computer-based training, computer-mediated communications, computer-supported collaborative learning, distributed learning environments, electronic performance support systems, interactive learning environments, interactive multimedia systems, interactive simulations and games, intelligent agents on the Internet, intelligent tutoring systems, microworlds, virtual reality based learning systems," and anything else related to these.

In this review, we will discuss interaction in distance education and training, with an emphasis on medical education. Since educational technologies are often used to support interactivity, an important theme will be how technologies can support or impede interaction.

Interaction in Publication

Few would argue that published documents form a very important component in education. Stevan Harnard (1992) has emphasized that electronic publication provides a dimension of interactivity in

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