

Multimedia Interactivity on the Internet

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INTRODUCTION

With the interactive capabilities on the Internet, business activities such as product display, order placing and payment are given a new facelift (Liu & Shrum, 2002). Consumer experience is also enhanced in an interactive environment (Haseman, Nuipolatoglu & Ramamurthy, 2002). A higher level of interactivity increases the perceived telepresence and the user's attitude towards a Web site (Coyle & Thorson, 2001). When it comes to learning, a higher level of interactivity improves learning and learner satisfaction (Liu & Schrum, 2002). While interactivity does not necessarily enable enhanced gain in user learning, it positively influences learners' attitudes (Haseman et al., 2002). Interactivity has been shown to engage users in multimedia systems (Dysart, 1998) to encourage revisits to a Web site (Dholakia et al., 2000), to increase satisfaction toward such systems (Rafaeli & Sudweeks, 1997), to enhance the visibility (as measured in number of referrals or backward links) of Web sites (Chen & Sockel, 2001) and to increase acceptance (Coupey, 1996).

BACKGROUND

According to the Merriam Webster dictionary, "interactivity" refers to 1) being mutually or reciprocally active, or 2) allowing two-way electronic communications (as between a person and a computer). However, within the scientific community, there is little consensus of what interactivity is, and the concept often means different things to different people (Dholakia, Zhao, Dholakia & Fortin, 2000;

McMillan & Hwang, 2002). McMillan and Hwang (2002) suggest that interactivity can be conceptualized as a process, a set of features and user perception. Interactivity as a process focuses on activities such as interchange and responsiveness. Interactive features are made possible through the characteristics of multimedia systems. However, the most important aspect of interactivity lies in user perception of or experience with interactive features. Such an experience may very likely be a strong basis for future use intention.

Interactivity is considered a process-related construct, where communication messages in a sequence relate to each other (Rafaeli & Sudweeks, 1997). Ha and James (1998, p. 461) defined interactivity as "the extent to which the communicator and the audience respond to, or are willing to facilitate, each other's communication needs." Interactions between humans via media are also called mediated human interactions or computer-mediated communication (Heeter, 2000). Early studies tend to consider interactivity as a single construct, where multimedia systems vary in degrees of interactivity. Recent studies suggest that interactivity is a multi-dimensional construct.

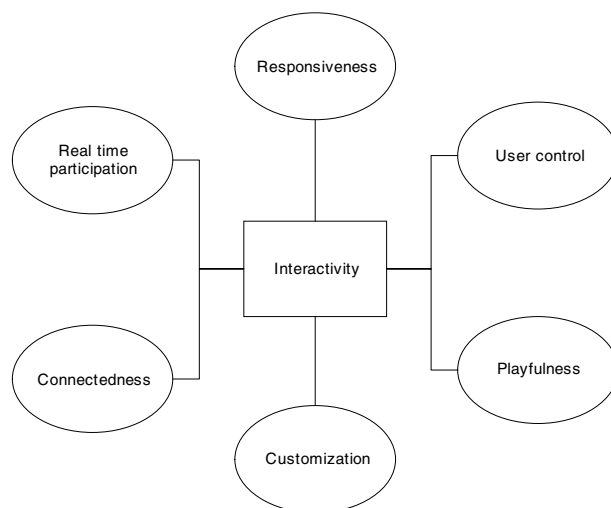
As research continues to uncover the dynamic capabilities of multimedia systems, the definition of interactivity evolves to include aspects of hardware/software, processes during which the interactive features are used and user experience with interactive systems. Dholakia et al. (2000) suggest the following six interactivity dimensions: 1) user control, 2) responsiveness, 3) real-time interactions, 4) connectedness, 5) personalization/customization, and 6) playfulness. Similarly, Ha and James (1998)

suggest five interactivity dimensions: 1) playfulness, 2) choice, 3) connectedness, 4) information collection, and 5) reciprocal communication.

Within the context of multimedia systems, we view interactivity as a multidimensional concept referring to the nature of person-machine interaction, where the machine refers to a multimedia system. Figure 1 presents a conceptual framework, including interactivity dimensions defined as follows:

- **User control:** The extent to which an individual can choose the timing, content and sequence of communication with the system.
- **Responsiveness:** The relatedness of a response to earlier messages (Rafaeli & Sudweeks, 1997).
- **Real-time participation:** The speed with which communication takes place. This can range from instant communication (synchronous) to delayed response communication (asynchronous).
- **Connectedness:** The degree to which a user feels connected to the outside world through the multimedia system (Ha & James, 1998).
- **Personalization/Customization:** The degree to which information is tailored to meet the needs of individual users. For example, interactive multimedia learning systems must be able to accommodate different learning styles and capabilities.

Figure 1. Interactivity as a multidimensional concept



- **Playfulness:** The entertainment value of the system; that is, entertainment value provided by interactive games or systems with entertaining features.

TECHNOLOGIES AND PRACTICES

The ubiquity of multimedia interactivity in general and on the Internet in particular is realized through the exponential growth in information technology. Specifically, the growth in computational power enabling ever-increasingly multimedia features coupled with advances in communication technologies and the Internet are pushing the interactivity frontier. Such technologies include, but are not limited to, a range of technologies, from the basic point and click to highly complex multimedia systems.

In practice, and in their quest for interactivity, companies and organizations have resorted to a variety of techniques to encourage interactions in their systems. Table 1 provides a framework to map important multimedia/Web features from the existing literature to the six interactivity dimensions discussed in Figure 1. The goal of this framework is to offer practitioners a basis to evaluate interactivity in their multimedia systems. For example, a Web site designer may want to compare his or her design with popular Web sites in the same industry to measure if they offer a similar level of interactivity. Two important issues concerning the comparison include what interactive features are recommended for comparison and how to quantify interactivity features for comparison. The framework in Table 1 serves to answer the first question. One way to answer the second question involves simply counting the number of interactivity features in each of the interactivity dimensions. This counting technique is referred to as the interactivity index (II) and is frequently used by researchers to quantify interactivity. The quantified results, if measured consistently, can be used for longitudinal or cross-industry comparisons. Additionally, interactivity is examined with other constructs. Readers interested in empirical results focusing on the relationship between interactivity dimensions and other constructs are referred to the cited references, such as Ha and James (1998), Dholakia et al. (2000); Chen and Sockel (2001); McMillan and Hwang (2002); Burgoon, Bonito,

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