

CHAPTER 6

Assessing interactivity in computer-mediated research

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Introduction

Almost every scholarly examination of the concept of interactivity to date has mentioned conceptualization difficulties (Rafaeli 1988; Moore 1989; Heeter 2000; Schultz 2000; McMillan 2002). This chapter is an attempt to proceed beyond complaints about ambiguity and overuse of the interactivity concept. Both theory and practice require a well-defined, clear and measurable definition for interactivity. Interactivity shows up in a very large number of titles and publications and is very often cited in technical and marketing discourse. Despite both scientific and popular interest, the literature to date has provided too little focus on why interactivity matters and a surprising dearth of empirical reports on outcomes of interactivity. A basic common understanding of the concept is required, one that has enough openness to enable multidisciplinary examination of interactivity from different perspectives.

Interactivity has been a matter of debate and interest for almost three decades now. It is located at the confluence of mass and interpersonal communication and perhaps serves as one of the bridges of these two. Similarly, interactivity is poised between traditional and innovative media,

as an explaining construct. An important theoretical contribution would be to understand how interactivity can be used to traverse the transition between mass, interpersonal and intrapersonal (psychological), as well as the connection between old and new. In both cases, the advantage is in preserving the links to all sides, not in assigning the construct exclusively to one side. One of the interesting features of the concept of interactivity is its continued prominence in scholarly thought despite technological changes.

In this chapter, we argue that interactivity is not unique to computers or networks and cannot be reserved solely for the discussion of so-called 'New Media'. Restricting analysis of interactivity to the domain of computerized and new technology alone problematizes comparisons with traditional media as well as with further developments of the new media. If we study only 'new media', we are constrained in our ability to build a cumulative theory based on evidence, because the domain of 'New Media' itself changes rapidly. The term 'New Media' is old and misleading, since any latest technology is always new (Marvin 1988): furthermore, it does not necessarily create new concepts, though it can highlight some.

We begin by reviewing some of the leading definitions and then highlight the primary conceptual development of interactivity. We discuss the correlates of interactivity and the different ways studies have measured it and look into some of the effects of interactivity by surveying empirical findings. This chapter will also suggest treating interactivity as a unidimensional variable rather than a multidimensional construct. We claim expected, actual and perceived interactivity are the relevant frameworks when examining the variable. Finally, we highlight the importance of information, meaning and value and their relation to interactivity.

Definitions (etymology, use and misuse) of interactivity

Interactivity has been defined in various fields from different perspectives. Over the years, different definitions seem to have touched on a rich array of related concepts and it appears that studies have covered almost every possible aspect of new media characteristics. Among the more popular conceptualizations of interactivity we find synchronicity (Van Dijk 1999; Kioussis 1999; Liu and Shrum 2002; Mundorf and Bryant 2002), control (Neuman 1991; Rogers 1995; Jensen 1998; Lieb 1998; Shih 1998; Steuer 1992; Lombard and Snyder-Dutch 2001; Coyle and Thorson 2001; Stromer-Galley and Foot 2002), rapidity and speed (Lombard and Ditton 1997; Zeltzer 1992; Novak *et al.* 2000), participation (Dyson 1993), choice variety (Ha and James 1998; Liu 2003), directionality (Markus 1990; Van Dijk 1999; Downes and McMillan 2000), hypertextuality (Sundar *et al.* 2003; Amichai-Hamburger *et al.* 2004) connectedness (Ha and James 1998), experience (Burgoon *et al.* 2000; Wu 2000; Bucy 2004) and finally responsiveness (Rafaeli 1988; Heeter 1989; Miles 1992; Alba *et al.* 1997; Rafaeli and Sudweeks 1997; Wu 1999; Stewart and Pavlov 2002; Sundar *et al.* 2003).

In surveying the concepts used to describe interactivity, we can identify a rough distinction between a focus on functions of features and a focus on users. A focus on users splits into users' activities and users' behaviour. Let us examine each of these in its turn.

A *focus on function* leads to claims that interactivity is an attribute of technology (Steuer 1992; Kayany *et al.* 1996; Sundar 2004). Steuer

(1992) is a leading proponent of the conception of interactivity as situated within the medium and defines interactivity as 'the extent to which users can participate in modifying the form and content of a mediated environment in real time' (1992: 84). Note that while Steuer's definition ostensibly addresses the users, he is actually talking about the system, looking at interactivity as a feature of the medium, one that can be measured through three components: speed, range and mapping. While the feature of speed is obvious, range refers to the number of possible actions at a given time and mapping 'refers to the way in which human actions are connected to actions within a mediated environment' (Steuer 1992: 86). In light of these definitions, Steuer argues in favour of classifying media along a continuum, based on their level of interactivity. Thus, traditional media are low on his proposed interactive continuum and new media would be ranked as high on the interactive continuum. Likewise, Markus (1990) suggests that interactivity is a characteristic of technologies that enable multidirectional communication.

As a leader in the *focus on users*, Rogers defines interactivity as users' control: 'the degree to which participants in a communication process can exchange roles and have control over their mutual discourse' (Rogers 1995: 314). In the same vein, Shih (1998) suggests the users' ability to control the flow of information is the one that determines the degree of interactivity. Williams *et al.* (1988) defined interactivity as 'the degree to which participants in a communication possess control and exchange roles in mutual discourse'. In their view interactivity is a three-dimensional construct comprising control, exchange of roles and mutual discourse. Discourse was also at the centre of Rafaeli's (1998) definition: however he abandons the notion of control in the interest of clarity.

Rafaeli defined interactivity as

a variable characteristic of communication settings . . . an expression of the extent that in a given series of communication exchanges, any third (or later) transmission (or message) is related to the degree to which previous exchanges referred to even earlier transmissions.

(Rafaeli 1988: 111)

Therefore, Rafaeli examined interactivity as a process-related variable. In his definition, interactivity is predicated on the relatedness of

sequential messages. A broader definition of interactivity was offered by Rafaeli (1990) and Rafaeli and Sudweeks (1997): 'The extent to which messages in a sequence relate to each other and especially the extent to which later messages recount the relatedness of earlier messages.' Rafaeli and Sudweeks emphasize that these exchanges are simultaneous, continuous and carry a social, binding force.

Some, like Ha and James (1998) use a combined definition. They consider interactivity as consisting of playfulness, choice, connectedness, information collection and reciprocal communication. Ha and James examined the interactivity of 110 business websites, testing their assumption that interactivity – as they define it using the above listed features – engages potential consumers and builds a relationship between a company and these consumers. Another hybrid, multidimensional definition is offered Liu and Shrum (2002), who defined interactivity as 'the degree to which two or more communication parties can act on each other, on the communication medium and on the messages and the degree to which such influences are synchronized'. In other words, their proposed definition merges three dimensions: active control, two-way communication and synchronicity.

In summary, we described some of the common definitions of interactivity and highlighted the differences between some of the conceptions. Definitions vary in focus (feature or user), scope (unidimensional or multidimensional) and temporal orientation (is interactivity a snapshot quality, or a process?). We subscribe to the user-oriented, unidimensional and process-based position.

Problematizing the definition

The above discussion reveals the complexity of establishing a clear definition for interactivity. Obviously, interactivity cannot be simultaneously defined in such diverse ways and still be useful to be studied. Some of the suggested keywords for interactivity can be considered as synonyms. Thus, instead of talking about website interactivity we can relate to website responsiveness or Internet application speed. Others considered these keywords when defining 'interactivity as –'. Many consider interactivity to be a multidimensional construct and therefore define it in an

even more blurred manner. We argue that these conceptual shortcuts, based as they are in technological developments (high synchronicity, broad bandwidth, multimedia capabilities, multi-tasking) or on the psychological assumptions that new media creates new mental abilities (control, involvement, choice availability, ease of use) could be misleading.

A relevant notion to our discussion is the concept of affordances (Gibson 1979; Norman 1988). 'Affordance refers to the perceived and actual properties of the thing, primarily those fundamental properties that determine just how the thing could possibly be used' (Norman 1988: 9). For example, studies tried to compare email affordances in comparison with face-to-face communication (e.g. Sproull and Kiesler 1986). Most of the findings of this line of research tend to produce somewhat problematic results. Only an overly simplistic technological determinism approach will assume that technologies create or reshape the basic aspects of our human behaviour. This approach has been questioned increasingly in recent years (Rafaeli 2004). Although we support the idea that technology enable its users to perform activities, caution is called for when speaking about the inherent capabilities of the technology.

More generally, a conceptual definition should be considered more broadly than just a single situation, determined by specific environment and tools. When speed is affected by broader bandwidth, does interactivity – defined by speed – also disappear? Can we really talk about environments and telepresence in the same manner at the beginning of the twenty-first century as before? Hyperlinks are rapidly being woven into graphics, animation and other forms of expression and are no longer textual artefacts alone. Does this change their relation to interaction?

A basic and useful definition of interactivity is one that can be implemented on any medium, regardless of its characteristics, its actors or the specific situation. This is not to argue that interactivity always performs in the same way. Nevertheless, we do hope for a definition that holds the meaning constant. The definitions based on the elements of responsiveness emphasize the process and only assume media, actors and situation, rather than hang the definitions on them. As a process-related variable, the concept

of interactivity is similar to the characteristics of other conceptual definitions. For example, when scholars examine the concept of 'Need for Cognition' they do not constrain themselves to particular situations. Instead, they try to examine whether and how the concept 'works' in different situations. So, a generalizable nomenclature should be used whether one embraces the responsiveness definition or not.

Concept development

We find consistently divergent approaches in explicating interactivity. It would be helpful to identify and discuss separately three qualitatively distinct literature-based frameworks of definition:

1. Interactivity as a process related variable,
2. Interactivity as an invariable medium characteristic, and
3. Interactivity as a perception-related variable.

The scholarly divergence on conceptualizations of interactivity is related directly to the choice of framework: studies that consider interactivity as a process-related variable focus on the ways that two (or more) participants transferred information between each other (e.g. Rafaeli 1985; Rogers 1995; Rafaeli and Sudweeks 1997; Stewart and Pavlou 2002). Studies that consider interactivity as a medium characteristic focus on the technological features and the ability to generate activity (e.g. Markus 1990; Rust and Varki 1996; Sundar 2004). Yet a third strand of studies considers interactivity as a perception related variable and focuses on users' experiences and self-reports (e.g. Wu 1999; Newhagen 2004).

There have been several attempts to divide interactivity into categories or classify its components (Hoffman and Novak 1996; Haeckel 1998; Jensen 1998; Stromer-Galley 2000; McMillan 2002). Hoffman and Novak (1996) contrasted person interactivity and machine interactivity. Stromer-Galley (2000) points to the distinction between human to human and human to media interaction. In a similar manner, Schultz (2000) offers two categories of interactivity when considering journalistic websites: reader to reader and journalist to reader interactivity. Many others have also considered

the interactivity that occurs between the user and the text (Bezjian-Avery *et al.* 1998; Steuer 1992; Williams, Rice and Rogers 1988). Furthermore, these categories seem to influence various fields studying interactivity, for example in relation to distance learning, Moore (1989) acknowledged three types of interactivity: learner-content, learner-instructor and learner-learner interactions. Hillman, Willis and Gunawardena (1994) added another type: learner-interface. These categories are an echo of the same classifications mentioned earlier.

For parsimony, we can think about interactivity literature as being present in one or more of the following categories: user to user, user to medium; user to content; medium or agent to medium or agent.

We turn first to the user to users/person to person/ human to human category. Prime examples of this approach include Rafaelis' (1988) definition of interactivity. The second category is user to medium/human to machine/user to system. This category includes much of the work about para-social interaction (e.g. Horton and Wohl 1956; Rafaeli 1990; Hoerner 1999; Cohen 2002) as well as scholars such as Jensen, who defined interactivity as 'A measure of a media's potential ability to let the user exert an influence on . . . the mediated communication' (Jensen 1998: 201). The third category is user to content/user to document/user to message. Here, for example, is Rice's (1984) seminal study. Rice was among the first to define new media as facilitating 'interactivity among users or between users and information' (1984: 35). Lastly, the fourth category is medium to medium/agent to agent. For example, Pavlik (1998) defined interactivity as compatible and conducive for non-human actors. Interactivity, according to Pavlik is a 'two-way communication between source and receiver, or, more broadly, multidirectional communication between any number of sources and receivers' (1998: 137).

We suggest an alternative to this four-category approach. Although the who-to-whom dimensions in this categorization may be useful to describe various possible aspects of interactivity, we posit that a more significant theoretical contribution will be to explicate the generalizable antecedents and consequences of interactivity, going beyond specific nature of actor. For instance,

when reviewing the conceptualization of interactivity Kiouisis (2002) suggests differentiating between the information-technological structure of the medium, the context of communication settings and the users' perception. Although we find this more comprehensive than the previous frameworks of typology, it still raises some problems. In this chapter, we choose to deal with correlates and consequences, leaving the issue of antecedents (users' personal psychological factors) of interactivity for a separate investigation.

Consider the following vignette, for example. In response to the use of offensive language by a participant in online synchronous discussion group, the participant is rebuked via a message from management. The user is told not to use such words in this application. Psychologically and motivationally, does it matter to the user (or to a bystander or anyone else) whether the rebuking message originated from a human entity or a machine-generated automatic response? Essentially, we claim that the 'real' origin, especially on CMC, is virtually unknowable and largely irrelevant for the analysis of the process. We can easily imagine an artificial intelligence participant mimicking a human response (see Reeves and Nass 1996). Of course, the dynamics of response and response to response are intriguing, hence the importance of the interactivity construct. However, does the identity or humanity of the rebuking person or agent necessarily affect the interactivity involved? If we examine the meaning of interactivity for the participants, we have to examine its consequences. Of course, the consequences vary across human and non-human participants. When dealing with human actors (fully or partly) we search for the cognitive and emotional effects. When dealing with synthetic actors we focus on functional effects.

Interactivity as a characteristic of the medium

Some scholars regard interactivity as the functional features of the medium (Durlak 1987; Heeter 1989; Sundar *et al.* 1998; Massey and Levy 1999; Ahern and Stromer-Galley 2000). For those scholars, functional features of the Internet include hyperlinks, chats, downloads and the like. For example, Massey and Levy (1999)

operationalized websites' interactivity by examining functional features such as email links, feedback forms and chat rooms. Similarly, McMillan (1998) examined bulletin boards, search engines, registration forms and online ordering.

Heeter (1989) suggested six dimensions to assess the measure of interactivity for a medium:

1. Complexity of choice available
2. Amount of effort users must exert to access information
3. Responsiveness of the medium
4. Monitoring information use
5. Ease of adding information and
6. Facilitation of interpersonal communication.

Heeter applied these dimensions to 53 different media, interpersonal through mass, assigning values to each dimension in order to obtain an interactivity measure for each medium.

Quite a few scholars have taken the position that interactivity is a characteristic of the medium (e.g. Markus 1990; Hoffman and Novak 1996). Note that identifying interactivity as a characteristic of the medium is not the same as describing interactivity as a feature of the medium. Often, characteristics and variability are confused needlessly. Those who claim that the Internet is by definition an interactive medium (Rust and Varki 1996) are actually suggesting a continuum of interactivity (Steuer 1992). This approach divides media into 'low' and 'high' interactivity according to technological features and falls clearly on the side of treating interactivity as a variable, not a trait.

There is a continuum of interactivity only in the sense that interactivity is enabled by or through technological features and or their procedures. Enabling interactivity means that the actual process and its perceptions are optional. Nevertheless, even those who prefer to categorize media by their level of interactivity should realize that the convergence process that media, networks and computers have been undergoing makes it more difficult to differentiate media by their levels of interactivity. For example, consider a study measuring or manipulating website interactivity levels. Remember that a web page is a digital document that can contain various features of content, presented in different forms such as text, picture, audio, video etc.

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Remember, too, that a page may be uniquely customized at the users' end, via variable interfaces (for example browser, resolution, size). So that which seems one way to the producer, may (and often does) display and behave quite differently to different surfers. Another important definition relating to websites should acknowledge that defining a web page as a medium constructed by HTML is to ignore the other various platforms that are enclosed by websites.

Technological features may not be interactive or non-interactive for themselves, but as the presence of our voice, hands and eyes have the potential to facilitate interactivity in face-to-face interaction so are various features other than HTML. HTML can offer the users the function of hypertext. However, dynamic applications such as Java scripts, ASP and Flash can prompt interactivity between the medium and the users or between the users themselves: for example, using dialog scripts on a website can enable elicitation and response to user's questions. Since websites tend to be a mixture of both static information and dynamic applications, one should be careful to examine or simulate the communication processes that use websites in a fashion that expresses the entire range of expressive and communicative potential.

Sundar, Kalyanaraman and Brown (2003) studied website interactivity by means of manipulating hyperlinks. They found that user's perceptions of interactivity in websites were positively associated with the amount of hyperlinks a website embedded. Similarly, Amichai-Hamburger *et al.* (2004) offer that interactivity increased as a result of more clickable hyperlinks available to the users. A critique of this approach might suggest that the use of hyperlinks may indicate user's control rather than actual interactivity. A more moderate definition linking interactivity and hypertextuality can be traced in Snyder-Dutch's (1996) work that suggests that hypertext is a non-linear feature that enhances interactivity.

Interactivity continuum is yet another misconception of interactivity:

Generally, any new communication technology will be dubbed interactive if it allows some degree of user response. Traditional media (e.g. television, radio and newspapers) rank low because their capacity for feedback is limited.

Among the various new media, interactivity is highly connected to the following: computers, cellular communications, digital communications, video-conferencing, software, virtual reality, the world wide web, etc.

(Kiousis 2002: 370)

We propose that interactivity is not merely a medium characteristic. Recent technological developments have simplified this argument. Presumably, we can agree that the notion of interactivity continuum based on the technology (print, audiovisual, digital) or continuum based on the medium (books–television–computer) are not useful anymore when considering new media such as a website, since it can perform in many different ways.

In the marketing literature, advertising effectiveness is associated with interactivity (Cho 1999; Leckenby and Li 2000, Macias 2000; Lombard and Snyderdutch 2001) and examination of marketing communication interactivity places consumers at the centre of the study (Stewart and Pavlou 2002). Ghose and Dou (1998) suggest that interactivity improves businesses website quality and attract customers: 'We expect that the attractiveness of sites would increase with the increase in the number of interactive functions' (1998: 30). By 'interactive functions', they refer to features such as feedback, site surveys, key word search, software downloading, multimedia shows etc. Liu and Shrum (2002) examined online marketing web features alongside three dimensions of interactivity – active control, synchronicity and two-way communication. While most of the studies find relatively positive effects of interactivity on consumers' attitude and response toward websites' ads (Cho and Leckenby 1999; Yoo and Stout 2001), several studies find no effects or actual negative effects of interactivity (Sundar *et al.* 1998; Coyle and Thorson 2001).

Technological developments of new media may improve users' ability to perform exchanges of messages and engage in a communication process. Features that help improve the synchronicity, speed, presence and control can create a better environment that enables interactivity. Nevertheless, these features cannot be considered as the single determinant of interactivity.

Correlates of interactivity

Correlates of interactivity have been studied from a variety of perspectives. Table 6.1 presents some examples of studies that defined various variables as correlates of interactivity. Let us look at some psychological variables that were studied as associated with interactivity.

For example, Amichai-Hamburger, Fine and Goldstein (2004) concentrate on the concept of Need for Closure (NFC). Using Webster and Kruglanski's (1994) scale they examined the correlations between users with high vs. low NFC and the level of websites' interactivity. They found that low NFC users prefer a higher level of interactivity than high NFC users. This study uses hypertextual links as the operationalization for interactivity. As explained above, we question this operationalization, of interactivity as hypertextual links alone.

Sohn and Leckenby (2002) examined the correlations between users' internal vs. external 'locus of control' and perceived interactivity relative to Web surfing. They found internally controlled users more likely to perceive a higher level of interactivity than those oriented to external 'locus of control'. 'Locus of control' refers to 'the

extent to which persons perceive contingency relationships between their actions and their outcomes' (MacDonald 1973: 169). In a sense, this finding hints at perceived interactivity as a form of leverage. When people are more likely to act on the world (rather than expect the world to act on them), they are more likely to perceive interactivity in communication situations.

Interestingly, many studies mention various further correlates without providing empirical evidence to validate these claims. Among the more intriguing additional constructs still awaiting empirical verification are the postulated strong relation of 'ostensible sense of fun' to interactivity (Rafaeli 1988) and the subjective sense of telepresence – a user's perception of 'being in' the mediated environment (Steuer 1992). The notion that 'interactivity is out there' or 'being out there' is rather vague. With this concept, perhaps more than with others, there is a danger of falling into a tautological trap. This ambiguity of causality, combined with the difficulties in achieving consensus on the very definition of interactivity and the effort required to operationalize interactivity properly, result in a multitude of studies that still lack construct validity and unified focus.

Table 6.1 Correlates of interactivity

Correlates of interactivity	References
Time flexibility	Lombard and Ditton 1997; Downes and McMillan 2000
Telepresence	Steuer 1992
Mimic interpersonal communication	Leary 1990
Social presence, transparency, user friendliness	Durlak 1987
User awareness of mediated environments	Murray 1997
Need for closure	Amichai-Hamburger, Fine and Goldstein 2004
Involvement	Rafaeli and Sudweeks 1997; Cho and Leckenby 1999
Sense of fun, cognition, learning, frankness, openness and sociability	Rafaeli 1988
Locus of control	Sohn and Leckenby (2003)
Need for cognition	Sohn, Leckenby and Jee 2003; Jee and Lee 2002

Measurements of interactivity

We presented some of the difficulties in describing interactivity. Table 6.2 offers some examples of approaches to operationalizing and measuring interactivity. As can be seen, the ontological divides are echoed in epistemology.

Methods of examining interactivity span a wide range of approaches. Scholars have used content analysis using human or automatic rating procedures (Schultz 1999); self-reports (Cho and Leckenby 1999) and carried out a few experimental and quasi experimental studies. While some (e.g. Schultz 1999) suggested coding interactivity by examining the availability of feedback tools in online journals, others (e.g. Lee 2000) suggested it should not be measured by counting medium features, rather by examining users' experience and perceive interactivity.

Massey and Levy (1999) content analysed Asian newspapers using five dimensions of interactivity: complexity of choice available, responsiveness to the user, the ease of adding

information, facilitation of interpersonal communication and immediacy. Teo *et al.* (2003) studied the correlations between the level of website interactivity and factors such as users' efficiency. To test these relations they used a controlled laboratory experiment of undergraduates' students. In a qualitative, interview-based study, Downes and McMillan (2000) found that the direction of communication and control over the communication process influences the dimensions of the perceptions of interactivity.

To summarize, methodological choices do not necessarily resolve the conceptual fog. Rather, different methods follow, naturally, in the footsteps of divergent definitions.

We claimed earlier that a sound definition of interactivity is one that can be generalized beyond single situations, individual media or specific actors. When operationalizing interactivity, the main concern should be the unit of measurement. If the chosen unit of measurement is a technological feature of the medium, it could not by itself indicate user-related effects.

Table 6.2 Examples of scales and measures of interactivity

Measures/scale of interactivity	Unit of measurement	References
The degree to which a person actively engages in message (advertising) processing by interacting with (advertising) messages and advertisers using 7-item facet scales, 5-point Likert-type scales	The user	Cho and Leckenby 1999
Websites designed to have different degrees of interactive features and opportunities for interactive exchanges	Websites' feature	McMillan and Hwang 2002; Teo <i>et al.</i> 2003
The presence or absence of features (onsite poll, a 'contact us' email link etc.) enabling or facilitating user contact with a political candidate and/or campaign.	Websites' feature	Warnick, Xenos, Endres and Gastil (2005)
Perceived interactivity scale contained five items from respondents answers about the responsiveness of website and the easy of navigation in it	The user	Wu 1999
Number of choices in a website and whether there was a clickable image	Websites' feature	Coyle and Thorson 2001
Interactive websites that includes internal links relating to a software and a flat websites without links	Websites' feature	Amichai-Hamburger <i>et al.</i> 2004

A variable conceptualized at the medium level and measured at that level, will likely have its effects moderated by individual psychological filters. In such a case, to claim that interactive feature impacts individuals, evidence needs to rule out alternative, individual-level explanations. This is yet another reason to think about interactivity at the level of the participant perceptions or through the prism of process, that measures the actual performance of participants.

Empirical findings: interactivity impact/effects

In the preceding sections, we followed the conceptual development of interactivity, presented some of its definitions and discussed problems in defining interactivity as an internal feature of the medium. We presented a few of the correlates

assigned to interactivity and surveyed the methods used to measure it. We turn now to empirical evidence regarding outcomes of interactivity. Table 6.3 presents some examples of interactivity consequences.

As can be seen in Table 6.3, many of these studies speak to the advantages offered by interactivity to the relations of individuals with the political process, institutes and figures. For example, Stromer-Galley's (2000) study highlights the effect of interactivity as a way to facilitate the citizen political involvement. Similarly, Ha and James (1998) and Sundar and Kim (2004) address users' involvement as an effect of interactivity in the marketing field. Many others (e.g, Hackman and Walker 1990; Liaw and Huang 2000) investigated several effects of interactivity in distance learning environments and find that higher interactivity leads learners to increase and refine their evaluation of the learning process.

Table 6.3 Consequences of interactivity

Effects of interactivity	Study
Increased interactivity leads to increased citizen participation in political process	Stromer-Galley 2000
Interactivity plays a role in creating the attraction of networks and in generating their growth	Rafaeli and Sudweeks 1997
Interactivity fosters engagement and relationship building between a company and its customers	Ha and James 1998
Interactive advertising has a positive influence on consumers' perceptions of brands and advertising	Macias 2003
The level of website interactivity influenced participants' perceptions of the political candidate as well as their levels of agreement with his policy positions	Sundar <i>et al.</i> 2003
Commercial advertising interactivity enhances user involvement with product by providing more product information hence leads to more positive evaluations	Sundar and Kim 2004
Interactivity provides an opportunity for organizations to build relationships with publics, through two-way symmetrical interactive applications	Samsup and Yungwook 2003
Higher degrees of interactivity yield better advertising effects (favourable attitude toward the target ad, favourable attitude toward the brand and high purchase intention)	Cho and Leckenby 1999
Interactivity led to a heightened sense of telepresence	Coyle and Thorson 2001
Interactivity leads to the social construction of meaning as students share knowledge and participate in collaborative and cooperative activities in the online environment	Maddux <i>et al.</i> 1997

Continued

Table 6.3 Consequences of interactivity *cont.*

Higher web site interactivity leads to a higher level of trust that brings about a positive effect on customers intention to purchase	Sukpanich and Chen 2000
Increased levels of interaction result in increased positive attitudes toward learning	Hackman and Walker 1990
Higher interactivity correlates with higher communication-processing load	Jones <i>et al.</i> 2004
Interactivity enhances student satisfaction	Liaw and Huang 2000
Increased interactivity on a website has positive effects on users' perceived satisfaction, effectiveness, efficiency, value and overall attitude towards a website	Teo <i>et al.</i> 2003

The preponderance of field empirical evidence regarding consequences of interactivity leans toward positive outcomes. Interactivity has been shown to correlate positively with citizen participation in political process, learning satisfaction, positive assessment of the website etc. It should be noted that there have been some indications that interactivity may have other than positive outcomes. However, only very few negative or problematic outcomes of interactivity have been given empirical documentation. Possible negative or problematic consequences include for example the contribution of interactivity to communication processing loads (Jones *et al.* 2004). Bucy (2004) described the 'interactivity paradox' as another possible problematic consequence of interactivity: 'subjects evidently enjoyed news site interactivity and the active involvement it entailed more than reading electronic text, but this form of online participation produced a certain amount of disorientation, exacting a cognitive and emotional cost' (p. 65). Interactivity's effects are curvilinear. At a certain point saturation sets in.

Clearly, interactivity taxes the individuals involved, places demands on cognitive processing and weighs down on social processes. These complicating outcomes of interactivity ought to have a price. Serious research into interactivity must resist the temptation and enamour of interactivity long enough to view it critically and examine its costs as well.

In surveying some of the empirical evidence that studies found as consequences of interactivity, we call attention to one recurrent motif. It seems that regardless of the conceptual definition of interactivity postulated by these papers and regardless of their unit of analysis and the

way they choose to operationalize it – the consequences of interactivity constantly lead to some attributes about the users. This is curious, in light of the advocacy in earlier interactivity literature for a differentiation of interactivity categories along user to user, user to medium; user to content; medium or agent to medium or agent. As we will further discuss later, interactivity is not confined to humans. Thus, we argue once again that it is essential to go beyond the nature of actor and try to explicate the generalizable antecedents, process and consequences of interactivity.

Following the investigation of interactivity as a concept, let us turn now to a further discussion of the constructs of interactivity as a variable.

Interactivity as a multidimensional variable

Several scholars examine interactivity as a multidimensional construct (e.g. Ha and James 1998; Heeter 1989; Massey and Levy 1999). A multidimensional approach is comforting and, indeed, expresses well the richness of online phenomena. Nevertheless, we argue for a unidimensional definition of interactivity instead. In our view interactivity would become a useful intellectual construct only if it is focused and its definition clarified. Variety and richness can be found in multiple and widespread applications rather than in internal ambiguity. Interactivity can and should be applied to the study of a long list of settings. However, for it to make sense and be helpful it should mean as few as possible things. In the same way other concepts from many fields (for example: 'need for cognition' or 'political involvement') can perform in various fields of our

human life, with various scales and methods to study them – but they all refer to the same psychological/social meaning. One might change the unit of analysis, the vehicles through which to study the phenomena, but not its basic meaning.

Although we intuitively tend to describe and discuss interactivity as a human-related process, a generalizable conception should allow for interactivity involving non-human actors. We turn now to discuss interactivity as a human behaviour, in contrast (or not?) to non-human actors.

Interactivity as human behaviour

Does interactivity require humans? Some systems are intended purely for person-to-person interaction. Increasingly, though, systems are becoming hybrid, with portions of communication sequences and sometimes entire communication sequences carried out between humans and machines, or even between machines without human involvement at all. How does interactivity fit into this cyborgian landscape? When the actors are human, there is reason to focus on cognitive and emotional effects. With systems that contain only synthetic actors, the search is mostly for functional effects.

Our discussion regarding the importance of information in the process of interactivity has clear implications for human responsiveness. However, considering interactivity as a process involving transmissions/exchanges of messages is a general notion, because we refer to a rich spectrum of information types transmitted between communicants. This spectrum could contain data, gestures, spoken words, or any other symbols or content. In that sense, we can measure interactivity between users, between users and media and even amongst media. However, the differences are not that clear, since technological developments such as agents can perform in many similar attributes of human responsiveness. Agents are programmes that have self-presence in creation of content can mimic interpersonal behaviours. In addition, humans use their social rules in their interactions with computers (Reeves and Nass 1996).

The conceptions of medium richness (Daft and Lengel 1986) and reduced cues (Sproull and

Kiesler 1986, 1991) postulated that media varied along a continuum defined by its information richness. These conceptions gained much popularity and some empirical evidence in the early (and old) years of new media studies. However, it is now apparent that the real question involves social presence (Short *et al.* 1976; Rice 1984) or virtual presence that engages with actors' sense of intimacy and immediacy and, not the more mechanical and simplistic channel bandwidth.

Rafaeli and Noy (2005) found virtual presence significantly affecting the bidding behaviour in online auction, resulting from the transmission of social cues during an auction. Thus, they note that even simple agents that can imitate face-to-face or human-like interaction and generate the interactivity effects. These laboratory results should impact the debate regarding medium richness, weighing against the medium traits approach.

Interactivity with the medium and through the medium

Because of the importance of perception in mediated interactivity, we can focus on the psychological aspects of user–content interaction. Interpersonal processing of information meaning might generate interactivity with evidently a static messaging. There exists a tradition of research into para-social interaction (Horton and Wohl 1956) which occurs when an individual interacts with figures or representations of content in a medium. In their seminal research, Horton and Wohl wrote, 'We propose to call this seeming face-to-face relationship between spectator and performer a para-social relationship' (1956: 215). Researchers that used this framework such as Houlberg (1984) found empirical evidence of such para-social relationships between viewing audiences and local television newscasters. Perse (1990) found that that a high degree of para-social interaction with a television persona strengthens the viewer's cognitive and affective involvement with the programme. Rafaeli (1990) raised some concerns regarding para-social interaction, assuming it could serve as a manipulation designed to attain a larger and more loyal audience. Hoerner (1999) suggested studies have to broaden their para-social definition: 'A more

contemporary conceptualization of para-social interaction has been described as the interpersonal involvement of the user with the media being consumed.' Hoerner found that some websites' elements other than personas, such as styles of textual and graphic presentations, could serve to create para-social relations through interaction with the website.

In para-social interaction, the individual perceives the interaction as real, even though in reality there may be no interaction at all. This evokes a parallel concept of *perceived interactivity*. Both para-social interaction and perceived interactivity are intrapersonal perceptions that occur at the psychological level. From the intrapersonal perspective, human-computer interaction could be articulated as a para-social interaction (Sundar and Nass 2000), as whether or not it actually happened matters less than whether it was perceived to have happened.

We turn now to focus on the fundamental dimensions of interactivity from the user's perspective. We describe these dimensions as a process that contains the expected interactivity, its actual realization and the perceived interactivity.

Expected, actual and perceived interactivity

By now, it should come as little surprise that some have decided to abandon the debate regarding the way we can 'capture' interactivity in the physical world and turn to consider interactivity as an experiential phenomenon. For example, several scholars consider interactivity as an experience and define it as perceived interactivity (Lee 2000; McMillan and Downes 2000; Newhagen *et al.* 1996; Kiouisis 1999).

The paradox is that even when research defines interactivity in a particular setting as high or low, users can subjectively have different feelings, experiences, or perceptions of interactivity of different levels or intensity. Therefore, subjective and objective interactivity might diverge and could confound study. Obviously, an advanced Internet user who is more literate and experienced in using a specific Internet application might have a different interpretation and might perform differently with 'interactive features'.

In order for this subjective, experiential process we call interactivity to work, individuals must assess other participants of communication exchanges as acting similarly. A 'theory of interaction' must form in the mind of the interactant for interactivity to take place. Thus, we can acknowledge the existence of indirect series of information exchanges between participants in which one should not expect his transmission to be returned by the previous exchanges. Interactivity may still exist when a response occurs at delayed time or physically removed location.

On the other hand, we can also articulate a concept of *expected interactivity*. Sohn and Leckenby (2003) defined expected interactivity as 'the extent of interactivity that a person expects to experience during a prospective interaction with the medium'. We argue this definition should have border limits, one that can contain the evaluation of interactivity as a process, not just interaction with the medium. For example, users of an Instant Messaging application have some expectations regarding the interactivity involved in an interaction with other users or with the application itself. Thus, defining expectations towards interactivity further highlights our notion on interactivity. The expected interactivity of any individual would be based on their unique personal characteristics, different psychological variances and mostly based on subjective experience with interactivity. This is essentially the reverse of perceived interactivity.

Newhagen (2004) argues that interactivity is an information-based process, embedding meaning in symbols, that takes place within the individual. In contrast, Sundar (2004: 386) argues that 'Interactivity is a message (or medium) attribute, not a user attribute'. According to Sundar, defining interactivity as a perceptual variable is inaccurate because it situates interactivity within the user, which further obscures the concept of interactivity. Thus, he argues that perceived interactivity could confound perceived usability. Although we agree with Newhagen that interactivity is an information-based process, we suggest that the process of attributing meanings be considered as perceived interactivity rather than interactivity itself. Moreover, although we agree with Sundar that perception

or experience cannot be regarded as interactivity itself, we cannot agree with his position in this debate, as he situates interactivity as a medium attribute. We prefer viewing interactivity as a process. In summary, we posit a definition that is at a midpoint between Newhagen and Sundar, though sufficiently divergent from either position.

We support the differentiation of expected interactivity, actual (realization of) interactivity and perceived or experienced interactivity. While the first and the last are subjective perceptions, the realization of interactivity is process related and real. Emphasizing subjectivity in the consideration of expected and perceived interactivity and considering interactivity as a process of information exchanges puts forward the notion of information meaning (Newhagen 2004). We turn, therefore, to a short discussion of the role of information in interactivity and ties to information theory.

The importance of information: meaning, value and its relations to interactivity

Following Rafaeli's (1988) definition we emphasize that interactivity is rooted in the realm of mediated interaction. A medium is involved. Although this definition is driven from interpersonal communication models of conversation, it has various wider applications. While this model states that transmission of information is in the centre of the process, it does not relate to the antecedents or implications of that process. While interactions can be studied in various areas from different perspectives, when we study the media information is obviously in the centre of the interaction. This conceptualization of interactivity situates the medium as an essential part of our inquiry.

The basic models of the communication process offered by Wiener (1948), Shannon and Weaver (1947), Osgood (1954), Schramm (1954) and others, also considered communication as an exchange of information/messages between sender and receiver. These exchanges depend on the channel of transmission and the process of coding and decoding these messages. While most of these early theoreticians hail from a technological background, the application of

their models to human behaviour is quite obvious. Considering the responsiveness-based definition again, we can relate it to these models of information/messages transmission. While the information theory and transmission approach successfully maps the structure of the process, interactivity (defined as responsiveness) addresses the inner process. Thus, interactivity is offered as the concept that captures the substance of the communication process.

Conclusion

A sizeable number of fresh and mostly yet-unpublished dissertations about this subject from recent years (2000 and afterwards) investigate the various aspects of interactivity. Many of these studies examine interactivity in distance learning environments (e.g. Brady 2004; Dozier 2004; MacLean 2004). For example, Brady (2004) studies the effect of degrees of interactivity within an educational website on students and finds that interactivity positively influenced learning outcomes, website satisfaction and perception of flow and student time on task. Dozier (2004) examined the relationships of interactivity, social constructivism and satisfaction with distance learning among US Army Infantry soldiers participating in college distance learning courses. Findings support the use of highly interactive social constructivist instructional approaches in computer-mediated and other learning environments. MacLean (2004) also explores the role of interactivity in the learning environment. His study analysed archived online discussions forums to determine the factors contributing to asynchronous learning networks' interactivity. Among others, he found correlations between the motivation students had to post messages and the levels of interactivity displayed by the messages.

Categorizations of interactivity continue to serve as a framework of many studies. For example, Sukpanich (2004) used the results of an online survey to test two dimensions of interactivity – machine interactivity and person interactivity – in order to predict consumers' intentions to purchase online. Results indicate machine interactivity is positively associated with online purchase intentions through its influence on physical telepresence, attitudes,

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perceived behavioural control and trust. Person interactivity was positively associated with online purchase intentions through its influence on social telepresence, subjective norms, perceived behavioural control and trust. Users–agents interactivity is in the center of Huang’s (2003) exploration. Huang studied emotional displays and interactive responses playing a key role in evoking social response from users to agent interactivity. Findings indicate interactive media users felt higher levels of mutual awareness with the animated characters presented.

Similar, to Sukpanich (2004), several studies (Johnson 2002; Yin 2002; Yu 2004) focused on the relations of interactivity and marketing/consumer behaviour. For example, Yin (2002) examined interactivity and its effect on some key consumer variables Yu (2004) surveyed video games’ players to examine their perceived interactivity. The results showed respondents’ buying behaviour was significantly influenced by the characteristics of interactivity and vividness.

Interactivity effects are still enigmatic. For example, Wang (2000) followed the effects of interactivity of web campaigns in Taiwan’s 2000 presidential election. Contrary to the theory-based hypothesis, moderate interactivity seemed to produce the most positive online communication effects. Moderate interactivity yielded more effects than either high or low interactivity, suggesting a curvilinear relationship reminiscent of other communication variables. In the same manner, Hong (2003) studied the impacts of the levels of interactivity role, among other variables, in creating an experience of telepresence and the intention to revisit a website. Although interactivity had a strong effect on telepresence, it did not show the same significant effect on website revisiting intentions.

Thinking about the various conceptualizations of interactivity, we suggest that future research should be specific about articulating

the part of the model chosen for focus. Figure 6.1 proposes a generic perspective of interactivity as a process of media expectations, realizations and perceptions.

Looking at this model, we can place interactivity studies along its phases. One can focus on the *exogenous* antecedents of interactivity, examining the external factors that influence the individual such as situations’ place, norms, social restrictions, group pressures etc. or study the *internal* factors that consist of individuals’ physiological and psychological needs. However, some studies could pass over this level and consider the various *expectations* users have towards interactivity. Although these expectations result from the internal and external factors, they can be considered as a user subjective attribute. Decision processes involve the assessments of prior expectations into frameworks of either rational or subjective decisions that result in the actual uses of the users. Actual uses are the *realizations* of interactivity, the traceable activities of the users (or artificial players) that researchers can measure (e.g. posting a message in a forum). The results of these activities are measurable objective outcomes. Nevertheless, we can focus on the *perceived* outcomes as experienced by the users.

This chapter began with conceptualization difficulties of the construct of interactivity. We suggested forging and embracing a common definition. We propose viewing interactivity in a broader perspective than just that limited to new media, computers or networks. We support defining interactivity as a *process-related variable* concerning *responsiveness*. A generic model is offered that examines the interactivity process over time by considering expectations, realizations and perceptions sequentially. It appears that the concept of interactivity and the empirical studies moved from being medium-focused through a process focus, arriving at the perception focus

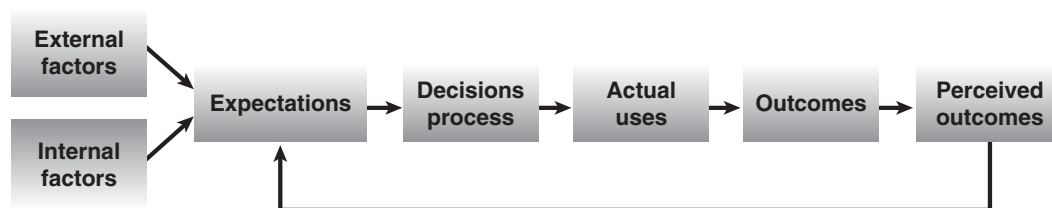


Figure 6.1 Interactivity analysis model.

proposed here. While the antecedents of interactivity are subject to further research and have not been covered here, this chapter offered a review of the correlates and consequences of the interactivity construct. The chapter takes one more step toward the formation of a theory of the interactivity process, the expectations, uses and perceptions of it and the role these play in understanding communication processes, including those that occur online.

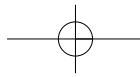
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Draft - Not for Citation