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Research Article

The Social Component of Information Systems—How Sociability Contributes to Technology Acceptance

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Abstract

The adoption of information systems is often explained in terms of usefulness and ease of use. Lately, researchers have begun to recognize that a hedonic streak in human beings provides a further contributing factor in the adoption and acceptance of information systems. Embedded in this streak is a broader social aspect that incorporates not only the solitary, individual pleasure one gets from using the system, but also a pleasure that one gets from interacting and socializing with others through the system. This becomes particularly evident in virtual environments that support high levels of interaction with others and with artifacts embedded in an immersive context. By drawing on IS theories of technology acceptance and IS success, and on theories of social interaction from evolutionary psychology, activity theory, situated action, and distributed cognition, we test the construct of sociability and its antecedents in Second Life—a popular virtual environment. Our results support that, in addition to an information and system component, a social component contributes to IS usage.

Keywords: *Virtual Worlds, Sociability, Information Systems.*

* Paul Pavlou was the accepting senior editor. This article was submitted on June 27, 2011 and went through two revisions.

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The Social Component of Information Systems—How Sociability Contributes to Technology Acceptance

1. Introduction

"People on the net are not only solitary information processors but also social beings. They are not only looking for information; they are also looking for affiliation, support, and affirmation" (Sproull & Faraj, 1997, p. 38).

Being sociable through technology is now commonplace in our increasingly technologically infused times. Four years after their first public initiation in 2004, social networks had already attracted more than 580 million people worldwide (Eldon, 2008). Two years later in 2010, the same year that 25 billion messages were sent on Twitter (Pingdom, 2011), that number had surged to 950 million (Ries, 2010). In June 2013, Facebook exceeded one billion active monthly users (Facebook, 2013). Other social sites, such as Second Life, a virtual community that uses avatars to mimic social life, have attracted over 28 million users (Grid Survey, 2012). More and more we use our computer—or other increasingly sophisticated electronic gadgets—not just to enhance productivity, but also to interact and socialize with business partners and friends.

Traditional technology acceptance and IS success models focus on the one-to-one interaction between a user and a system from a mostly individualistic cognitive perspective. For example, research studies have scrutinized how individuals respond to the usefulness and ease of use of word processing applications (e.g., Davis, Bagozzi & Warshaw, 1989), office systems (Venkatesh & Davis, 2000), and email (e.g., Davis, 1989; Kettinger & Grover, 1997); they have studied websites (e.g., Agarwal & Karahanna, 2000; Moon & Kim, 2001; van der Heijden, 2004), and scrutinized how satisfied individuals are with data warehouses and their provided information (e.g., Wixom & Todd, 2005). All of these studies adopt a "tool" level perspective (Davern, 1997; Wand & Weber, 1990), meaning that an individual's perceptions in interacting with the tool itself is recorded and analyzed—but not the interactions embedded within the technology. Technologies have evolved such that they provide an environment in which individuals are able to engage, interact, and socialize with others.

In this study, we introduce the concept of "sociability" as a human's desire to socialize with others that can be met through the use of technology. The increase in technologies that mediate interactions allows individuals to experience a different dimension of information systems: a linked network over which they are able to engage, interact, and socialize. While socializing with others is intrinsic to human beings (e.g., Biocca & Harms, 2001; Biocca, Harms, & Burgoon, 2003), its importance as part of our work life has been neglected—perhaps from the perception that it might undermine the seriousness and structuredness of our professional work. The IS field is infused with what Brown and Bell (2006, p. 230) term "negative utilitarianism", or the exaggerated emphasis on purpose. Exceptions to this view, however, (e.g., van der Heijden, 2004; Igbaria, Parasuraman, & Baroudi, 1996; Agarwal & Karahanna, 2000; Venkatesh, 1999, 2000) have shown that hedonic values, or the pleasure that we experience, is a necessary ingredient in motivating individuals to use information systems and that this hedonic value can rarely be measured by its efficiency or effectiveness gains (Brown & Bell, 2006). Increasingly, information systems are not solely used because of some particular and useful organizational goal or because of easy-to-use interfaces—instead, we also use technology for enjoyment, to stay connected with friends and colleagues, or to sometimes seek out strangers that we can relate to in some way.

In this paper, we argue that sociability, which incorporates a hedonic element, has an increasing influence on technology usage intentions. Socializing with others mediated by technology is a factor that has surfaced in recent years and that has grown with the development of networks, hardware, and software that enable such interactions (Brown & Duguid, 2000). Even though the technical foundation of networks is an invention that dates back to the early 1970s, its presence is yet to be reflected in our current IS usage models. This paper demonstrates that a social component of information systems plays an important role in the prediction of usage intentions and that its antecedents can be managed and tweaked by IS developers.

Drawing on theories of IS and social interaction, we examine the construct of sociability and its antecedents in Second Life—a popular virtual social environment. Sociability captures the desire of individuals to seek out the company of others to have pleasurable social experiences. To this idea, we add the role of technology as an enabler (or appeaser) of this urge. Hence sociability, as defined in this paper, represents an individual's desire to socialize that is satisfied through a system that is able to provide those social interactions with others. Using the modified IS success model of Wixom and Todd (2005) as our nomological frame, we conduct a study that tests this social component in the trifecta of information and system components when determining intentions to use an information system, or, more particularly, a virtual world.

2. The Concept of Sociability

"Social" is a broad term, applicable to multiple contexts and occurrences, and thus has multiple meanings. It can reference or relate to human society as a whole, indicate the preference of living together in groups, or refer to a characteristic that describes experiences, behaviors, or interactions of individuals forming groups. "Being social" mostly refers to the latter two descriptions. It can either describe the urge or the experience that one has when interacting with others. "Being sociable" means that one values and seeks the company of others by pursuing occasions for agreeable conversation and/or conviviality.

Sociability, in contrast, and according to German sociologist Simmel, describes the results of this human trait (Simmel, 1910; Simmel & Hughes, 1949). It recognizes a human's tendency to socialize with others and assigns it a non-utilitarian purpose. Apart from the impulse or urge of human beings to seek out the company of others, sociability also emphasizes its playful character as a pleasurable experience. Sociability finds its etymological roots in the Latin word "socius" and captures aspects of "together" and "united" as part of the interpersonal and inter-subjective human existence. According to Simmel, "sociability distills […] out of the realities of social life the pure essence of association, of the associative process as a value and a satisfaction" (Simmel & Hughes, 1949, p. 255). All of these associations have in common that they "are accompanied by a feeling for, by a satisfaction in, the very fact that one is associated with others and that the solitariness of the individual is resolved into togetherness, a union with others" (p. 254). As a "sociological play-form" (p. 258), sociability always is "contingent upon the joy of others" (p. 257); that is, it causes an individual to give sociable values to others as much as the person receives reciprocal values from these others engaged in the interaction. In sum, sociability describes the impulse or desire of an individual to seek out the company of others to have a playful and pleasurable experience. Associating with others is done in its own right, independent of rational or economic interest. An individual simply enjoys the companionship of others and solely focuses on the basic characteristics of their own action in combination with those others. Society (or "Gesellschaft") then emerges through the interactions of free-playing individuals. "But only the sociable is a 'society' without qualifying adjective, because it alone presents the pure, abstract play of form, all the specific contents of the one-sided and qualified societies being dissolved away" (p. 255). As soon as an interaction between individuals turns utilitarian or even business-like, it is no longer considered sociable. Sociability occurs with no ulterior motive in mind and is free of any objective; it represents a "self-governing play […] [in which individuals] construct and experience the meaning and the forces of its deepest reality, but without the reality itself" (p. 261).

Simmel, a well-regarded scholar of sociology, was one of the first to explore sociability. His work on sociability provides a fruitful anchor point for deriving a technology-related definition of sociability that is applicable to an information systems context. In a networked world, interacting with others is often achieved through the use of information systems. If sociability is defined as the urge of an individual to seek out others to have a pleasurable or playful experience, then sociability in a technology-mediated space should be defined as those parts of an individual's sociability desire that can be met through the use of technology. In other words, it represents the degree to which an individual's desire to socialize is satisfied through a system that is able to provide social interactions with others. As we show later, this revised and IS-adopted definition of sociability is determined by a specific set of environmental characteristics that have designated social affordances (Kreijns, Kirschner, Jochems & van Buuren, 2004, 2007). For example, the state of IS sociability might be activated by the context in which people find themselves.

3. Hypothesis Development

According to well-established theories in IS, the intention to use an information system is an important construct that mediates the impact of various, typically utilitarian variables, on actual usage behavior (e.g., Davis et al., 1989; DeLone & McLean, 1992). The UTAUT model, for example, relies heavily on cognitively derived constructs, such as performance and effort expectancy, as do the majority of other IS adoption and success models (Venkatesh, Morris, Davis, & Davis, 2003). The anticipated benefit or effort is evaluated against the belief one holds, which reflects the cognitively thinking human being. In recent years, however, IS researchers have recognized this over-reliance on utilitarian usage (Bagozzi, 2007; Brown & Bell, 2006) and have rooted that future models of IS usage should incorporate a hedonic component (e.g., Agarwal & Karahanna, 2000; Igbaria et al., 1996; van der Heijden, 2004; Venkatesh, 1999, 2000). This hedonic component in form of perceived enjoyment has been defined as “the degree to which a user experiences fun when using the system” (van der Heijden, 2004, p. 696).

Hedonism has a long-standing tradition as a philosophical stance since Democrit (ca. 460 BC) and Plato (ca. 424 BC) acknowledged that pleasure is an important ingredient in a person’s life motivations or pursuits. But since there is not a true hedonistic human being, because a true hedonist would always strive to maximize pleasure, the predictive power of utilitarian variables in existing IS usage models remains intact. However, their dominance diminishes if this hedonic streak in a user is activated (van der Heijden, 2004).

When predicting intentions to use a technology, hedonic variables differ from their utilitarian counterparts primarily in their non-goal orientation. The behavior is performed per se (i.e., for the behavior in and by itself and in its own right, without any other anticipated desirable goals but pleasure) (Moneta & Csikszentmihalyi, 1996; Trevino & Webster, 1992). And this pleasure is evident in numerous technology usage patterns. For example, 83 percent of the U.S. population watches YouTube videos during non-working hours; of those that watch during work hours, 40 percent report doing so for both business and pleasure (Huff, 2008). Regular users of the virtual world Second Life spend an remarkable 14 hours per week “in-world” (Linden Lab, 2009); an average of 11.4 hours per week are voluntarily contributed by individuals to open software developments because of their affinity for contributing to and exchanging ideas with others (David, Waterman, & Arora, 2003). And Facebook reports that users spend 700 billion minutes per month on their site, a figure up by 50 times since 2009 (Lee, 2009; Facebook, 2013).

Originally introduced as early as the 1990s in the forms of enjoyment (Davis, Bagozzi & Warshaw, 1992)[1], microcomputer playfulness (Webster & Martocchio, 1992)[2], and perceived fun/enjoyment (Igbaria et al., 1996), the hedonic aspect of information systems has earned a place in the research of IS usage intention models. The applicability of hedonism to information systems has increased due to the advancement of technologies and applications. There is now an abundance of information systems available whose primary purpose is no longer organizational efficiency and effectiveness, but enjoyment—and not only in personal, but also in workplace settings. In the recent past, perceptions of enjoyment have been used to explain the usage of instant messaging (Li, Chau, & Lou, 2005; Rouibah, 2008), Web sites (Anandarajan, Simmers, & Igabria, 2000; Moon & Kim, 2001; van der Heijden, 2004), game-based training (Venkatesh, 1999), spreadsheets (Hackbarth, Grover & Mun, 2003), and blogs (Hsu & Lin, 2007). All of these studies view enjoyment as having a direct impact on intentions to use the respective technology. The following hypothesis reflects on this state of research by restating the following:

Hypothesis 1: *Perceptions of enjoyment influence positively intentions to use information systems.*

[1] Davis et al. (1992) defined enjoyment as “the extent to which the activity of using the computer is perceived to be enjoyable in its own right”.

[2] Webster and Martocchio (1992) defined microcomputer playfulness as “the degree of cognitive spontaneity in microcomputer interactions.” They measured it as “Characterize yourself when you use mircrocomputers” followed by a list of adjectives such as spontaneous, flexible, inquisitive, and so on.

While enjoyment as a predictor variable in predicting usage intentions has been indeed showcased sufficiently (e.g., Hsu & Lin, 2007; Venkatesh, 2000), there is a surprising lack of research that scrutinizes its potential precursors. In addition, prior studies also commonly view the enjoyment an individual experiences from using the system from a solitary perspective (i.e., the assumption is that pleasure is only realized from the interaction between individual and system). It is this human-computer interaction that most studies have concentrated on, culminating in the extreme case in which humans treat computers as equivalent social actors. In fact, when designing social cues into the technology, it has been shown that humans develop social agency toward computers and interact socially with them (Johnson, Marakas & Palmer, 2008; Marakas, Johnson & Palmer, 2000; Moon, 2000; Wang, Baker, Wagner, & Wakefield, 2007). While this focus on human-computer interaction is a legitimate one (e.g., when studying personal productivity applications in which the tool requires the undeterred attention of the user), it is not the objective of this paper. We suggest that a broader perspective is required as technologies increasingly support settings in which the interaction with others is the focus of attention.

The notion of viewing humans as highly social beings has received limited attention in information systems literature. There are at least two explanations. The first is rooted in the theoretical backdrop that IS usage models are based on. By mostly taking the perspective of the intelligent or thinking human being, those models have predominantly paid attention to cognitive processes, including judgment, decision-making, comparison, analysis, abstraction, and reasoning; less attention has been paid to social psychological aspects. Exceptions comprise social cognitive theory, for example, that acknowledges the social origins of much of human action by being part of a society (Bandura, 1988; Stajkovic & Luthans, 1998), or social exchange theory, which posits that an individual partakes in social interactions that will lead to some kind of reward (Blau, 1964).

A second reason for the neglect of the social component in IS regards the nature of technologies themselves. There has been limited technological support of interactions between humans (Brown & Duguid, 2000). Even though the technical foundation of networks is an invention that dates back to the early 1970s[3], its presence is yet to be reflected in our current IS usage models. Current models focus on usefulness, ease of use, and satisfaction with the system or information, but are less focused on the network effect as predicted, for example, by Metcalf's law. Traditional IS theories did not need to consider social networks because the use of IS primarily for socializing (with a few exceptions such as email, Internet bulletin boards, and Internet relay chat and its predecessors) is relatively new. As a result, traditional technology acceptance and IS success models have mainly focused on the one-to-one interaction between a user and an information system. This perspective relegates an individual to a "solitary information processor" (Sproull & Faraj, 1997, p. 38) who interacts with the object (here: system or application), but not with individuals that might be at the other end of the system or application connected through the network. IS researchers are said to have stopped at the "tool level" (Davern, 1997; Wand & Weber, 1990), meaning that solely an individual's perceptions in interacting with the tool itself has been studied and analyzed. For example, IS research has scrutinized how individuals respond to word processing applications (e.g., Davis et al., 1989), or email (e.g., Davis, 1989; Kettinger & Grover, 1997) or websites (e.g., Agarwal & Karahanna, 2000; Moon & Kim, 2001; van der Heijden, 2004). The field has also recognized that social norms impact an individual's intentions to use a technology (Taylor & Todd, 1995; Venkatesh et al., 2003). More specifically, an individual is influenced by the expectations put forth by others in the usage of technology[4]. But this is also a unidirectional view that sees the individual as the target of social behavior, and not as the initiator of social interactions toward others. Consequently, Legris,

[3] Social studies of such networks date further back to the 1940s and 1950s. "Sociometry" was introduced as a field of research concerned with "human interrelations" (Moreno, 1941). For example, Coleman, Katz, and Menzel (1957) study the role of social networks in the diffusion of innovation among physicians; Bott (1955) studies conjugal roles in urban families from a social network perspective.

[4] Social norms, "the perceived social pressure to perform or not to perform the behavior" (p. 188, Ajzen, 1991), originates from the theory of planned behavior. In the IS context, Thompson, Higgins, & Howell, (1991) define social norms as an "individual's internalization of the reference group's subjective culture, and specific interpersonal agreements that the individual has made with other, in specific social situations" (p. 126).

Ingham, & Collerette, (2003) argue that there is a need to include factors related to human and social change processes into the technology acceptance model (TAM). Similarly, Bagozzi (2007) suggests the addition of new variables grounded in emotional, and group/social/cultural behaviors into the IS acceptance paradigm. Interactions that information technologies are able to facilitate have been neglected thus far. Even the literature on hedonic use of IS focuses on a one-to-one interaction between a user and the system (e.g., Agarwal & Karahanna, 2000; van der Heijden, 2004).

With the increasing support of technology-mediated social interactions (Brown & Duguid, 2000), however, we are able to engage, interact, and socialize with others through technology. In addition, we regularly interact and socialize with others that are not in our immediate presence. We experience others as if they were co-present and socially engaged with us (Bailenson & Beall, 2006; Brown & Bell, 2006;), and, through media technologies, our social interaction has not been limited to the people immediately around us. A great deal of what is commonly called social interaction is not with physical others, but with "representations of others made accessible to our senses via email, film, teleconferencing, and other media technologies" (Biocca & Harms, 2001, p. 4). Hence, sociability is geared toward those parts of a human's desire to socialize with others that can be met through the use of technology.

Note that sociability, as defined in this paper and based on Simmel's definition, does not have an ulterior rational or economic end, and it is performed in and by itself. It represents a "play-form" (Simmel & Hughes, 1949, p. 258) of human beings whose pleasurable experiences are associated with the formation of relationships with others. However, recognizing the influence of social aspects on enjoyment is rather recent in the IS discipline. Suggested predecessors of enjoyment, or the degree to which an individual experiences fun when using a system, include for example concepts such as attachment motivation[5], relationship commitment[6], perceived critical mass[7] (Li et al., 2005), flow[8], arousal[9], (Wang et al., 2007), and social norms and curiosity (Rouibah, 2008).

Attachment motivation, for example, captures the idea that individuals want to be attached to others because it is critical for their overall wellbeing (Baumeister & Leary, 1995; Li et al., 2005). Humans that are able to share with others and exchange thoughts and feelings are considered more attached and typically experience a high level of enjoyment from their close togetherness. Particularly communicating worries, concerns, stress, and anxieties with others has shown to be of great importance for developing positive emotions (Baumeister & Leary, 1995). The same is true for those that expose a strong relationship commitment (i.e., those that desire to be part of a relationship) (Li et al., 2005). The closeness that develops among partners, while combating loneliness, also serves as an essential precursor of happiness (Baumeister & Leary, 1995).

Compared to sociability, enjoyment has a more generic scope: it encompasses the pleasure one experiences when trying things out (alone or with others) with no rational or economic ulterior objective (Simmel, 1910). The term "thing" can either encompass objects, such as a toy, a book, or a software application, or, alternatively, it could entail interacting with others. The urge to be social, or sociability, captures the latter. In sum, the pleasure that we derive from sharing this pleasure with others feeds right into the pleasure we derive from performing the behavior per se, as captured by the following hypothesis:

Hypothesis 2: *Sociability influences positively perceptions of enjoyment.*

The extent to which sociability can be lived and can lead to enjoyment is influenced by the technology that supports it. From a sociability perspective, websites (Wang et al., 2007; Wakefield, Wakefield, Baker, & Wang, 2011), instant messaging (Li et al., 2005), virtual communities (Brown & Bell, 2006; Bailenson & Beall, 2006), or computer-supported collaborative learning environments (Kreijns et al.,

[5] That is, to keep constant contact with others.
[6] That is, to maintain established relationships.
[7] A subjective perception of the critical number of current users.
[8] Measured by interest, curiosity, attentions, and control.
[9] Measured by items such as relaxed, calm, sleepy.

2007) are experienced differently depending on the technological capabilities that are present. A typical website, for example, does not show who else is currently online—it neither allows for a direct exchange in form of verbal or non-verbal communication (an important prerequisite of social exchange (Homans, 1958), nor does it allow a person to develop a sense of a meeting location. A virtual world, on the other hand, through the virtue of avatars interacting in a persistent space, provides exactly these aspects. Virtual worlds allow for avatars to be aware of other avatars “in-world”, of verbal or non-verbal communication between avatars, and of location. Avatars can move, speak, gesture, change eye gaze, and show facial expressions. Instant messaging ranges in between the two prior examples. While it does not permit developing a sense of location, it does permit users to interact with others who are online via written communication.

With the advent of these recent technologies, particularly virtual worlds, sociability becomes more prominent. While studies have examined sociability, or rather constructs akin to it, they have mostly applied social network approaches (Brown & Bell, 2006; Sykes, Venkatesh & Gossin, 2009). By focusing on the size and strength of the relationships between actors in the network, these studies have not looked into the construction of sociability experiences or their associated antecedents. They also have overlooked the most developed technologies that are able to mimic human social interaction (i.e. virtual worlds, despite an understanding that a “transformed social interaction” is taking place within these technologies) (Bailenson & Beall, 2006, p. 2).

In accordance with our definition of sociability as being those elements of a human’s desire to socialize with others that can be met through the use of technology, we identify what it is about a technology that can influence sociability. We first turn to two theories that have received much attention in IS literature: social presence and media richness.

Social presence theory posits that a medium’s social effects are principally related to the social presence of the medium (Short, Williams & Christie, 1976). Social presence is defined as the continuous awareness of the co-presence of another sentient being and a sense of engagement with them (Gunawardena, 1995). This conceptualization implies that social presence can be defined as the quality of the medium itself. Virtual environments have been categorized based on their levels of social presence (Hayashi, Chen, Ryan & Wu, 2004; Keng & Lin, 2006). Differing levels of social presence have been used to explain variances in small group communication quality (Lowry, Roberts, Romano, Cheney & Hightower. 2006), group members’ ability to voice opinions, uncertainty in e-commerce transactions (Pavlou, Liang & Xue, 2007), impacts of group size (Roberts, Lowry & Sweeney, 2006), and in massive multiplayer online games (Korsgaard, Picot, Wigand, Welpe & Assmann, 2010). Face-to-face communication has the highest level of social presence, while text-based communication has the least. Media with higher social presence have been found to be preferable for important social tasks (Korsgaard et al., 2010). Since sociability relates to social tasks through technology, we can surmise that media with higher social presence will support higher sociability.

While pertinent to the discussion at hand, social presence theory falls short in an explanation of how social presence (i.e. the awareness of co-presence and engagement with others) occurs (Biocca & Harms, 2001; Biocca et al., 2003). In other words, while we can say something about the sociability of a medium knowing its level of social presence, we do not find an explanation for what influences such sociability. The applicability of social presence theory is primarily in determining “media appropriateness” for social tasks (Rice, 1993), rather than shedding light on what media characteristics, possibly related to its social presence, engender sociability.

Another related theory is that of media richness. Based on information processing theory (Daft & Lengel, 1984), media richness theory posits that media with different capacities are better or worse suited to resolving equivocality and uncertainty in communication. While helpful in comparing media along a dimension of richness so as to predict communication quality, media richness theory falls short of providing an explanation for how sociability is induced.

Based on prior literature, we expect there to be a positive relationship between social presence, media richness, and sociability. However, unlike social presence and media richness, which seek to compare different media based on the appropriateness with the tasks they are used for, sociability represents an individual's desire to socialize, which is satisfied through a specific system that is able to provide those social interactions with others.

In identifying mechanisms that influence sociability, we turn away from particular technological functionalities (e.g., voice, chat, IM), which may bring about differing levels of social presence or media richness, and instead focus on the affordances (Gibson, 1979, 1982) of technologies in enabling social behavior (Pfaffenberger, 1992; Suthers, 2006). In general, social behavior is driven by subjective mental evaluations made by individuals in an environment that has the potential for such behavior (Meyrowitz, 1985; Sonis, 2000). We propose four characteristics of technology-mediated environments that shape and constrain users in a social group; these characteristics, or affordances, are reflective of the extent to which technology supports each of the following: shared activities, shared contexts, shared representations, and shared understanding.

Virtual worlds, representative of recent technological developments in social media, provide each of these affordances. In order to distinguish between affordances provided through technology in general, and affordances provided in a virtual world environment in particular, we refer to each of these affordances as activity support, context support, representation support, and insight support, respectively. Activity theory, situated action model, and distributed cognition theory inform us about each of these affordances (Nardi, 1996). In Section 3.2, we elaborate on each as antecedents of sociability.

3.2. Sociability Supported by Shared Activities

Activity theory describes an activity as composed of subjects, objects, actions, and operations (Kuutti, 1996)[10]. Subjects perform actions on objects, which are transformed through the course of an activity (i.e., task). Objects may refer to physical or virtual artifacts that subjects have access to (Kuutii, 1991). Actions have operational aspects, which represent the way in which an action is carried out. Activity theory holds that objects, actions, and operations of an activity are not fixed, but dynamically change as conditions change (Bødker, 1989). Behaviors by subjects influence this change as an activity progresses. A shared social context around the activity emerges when activities of different subjects engaged together in a set of coordinated actions overlap (Kuutti, 1991). Most literature in IS looks only at activities from the perspective of an individual user divorced from a social group and shared artifacts in environments that support shared activities, but it is also possible to observe interrelated behaviors of subjects that provide evidence of social action (Nardi, 1996).

Based on these ideas, we define "activity support" as a person's sense of access to others in the virtual world environment. This sense of access goes beyond recognizing the mere presence of others[11]; it includes being able to observe others' actions and to reciprocate them appropriately. Such access is possible in technology-mediated environments because people can engage in sustained and prolonged interaction with representations of others (such as in the form of avatars), and they do so as an automatic response (Nardi, 1996).

In engaging with others through inter-related behaviors when performing activities, an individual has a need or desire, which the activity satisfies (Christiansen, 1996). This need may be extrinsic (e.g., arriving at a solution to a problem), or intrinsic (e.g., curiosity about others or about the activity). Because of this need, the individual has the desire to continue to engage in activities with others in this virtual environment, which leads to what we term sociability, which is the desire to socialize with others. Thus, we make the following prediction concerning activity support and sociability in a VW.

Hypothesis 3: *In a VW, activity support is positively correlated with sociability.*

3.3. Sociability Supported by Shared Context

Activities typically occur in a setting, which is reflective of the interaction between subjects and the

[10] In the HCI literature, activities are similar to what has been referred to as tasks by others (e.g., Norman, 1991).
[11] Which has been referred to as "social presence" in prior literature.

environment of their action (Suchman, 1987). This idea is central in situated action models (Lave, 1988; Vera & Simon, 1993). The environment can be a physical or a virtual setting in which the activity takes place (Loomis, Blascovich & Beall, 1999). We define "context support" as a person's sense about his or her situation or where he or she is in a virtual world environment. Our view of context is close in meaning to the real-world meaning of "a place" (Harrison & Dourish, 1996). A place can define a distinct situation because its boundaries limit perception and interaction (Meyrowitz, 1985). As such, there is a natural and an inextricable link between where a person is and the social situation that the person experiences. For example, the words "school" and "home" refer to places where different and specific types of social interactions and behaviors occur among people (Meyrowitz, 1985, p. 116). As a result, individuals will typically have different social experiences in these two places.

Social experiences come from people being in the presence of each other and sharing information in places. Sharing information is the means by which social experiences are realized (Meyrowitz, 1985). Electronic media, like the phone, can eliminate the need for people to be in the same location in order to share information (Meyrowitz, 1985). As a result, they still afford people the opportunity to have social experiences. However, these experiences would be void of the artifacts that are present in a face-to-face encounter and lack a setting or sense of place.

In contrast to traditional electronic media, a VW defines a bounded space in which people can see and manipulate shared virtual artifacts (Gutwin & Greenberg, 2002) as they share information with others. With the appropriate set of artifacts, this environment can afford a metaphorical sense of "place" (Prasolova-Førland, 2008; Goel, Johnson, Junglas & Ives, 2011). By discerning where they are in a technological environment, individuals may form expectations of what can be done there with others. For example, when in a virtual club, individuals might form a desire to have conversations and dance with others (via their avatars); when in a virtual classroom, this setting might create a desire to have pedagogical interactions with teachers and fellow students. These desires of social experiences are representative of sociability. Thus, we make the following prediction concerning the relationship between context support and sociability in a VW.

Hypothesis 4: *In a VW, context support is positively correlated with sociability.*

3.4. Sociability Supported by Shared Representations

Situated action models also focus on the artifacts in a bounded space that are shared by a group. These artifacts serve as mediators in information sharing with others (Brown, Collins & Duguid, 1989; Wilson & Myers, 2000). Such artifacts may be real or symbolic (Bødker & Pedersen, 1991; Vera & Simon, 1993). In the broadest sense, culture or language may be considered artifacts (Bødker & Pedersen, 1991). In a virtual world, artifacts that are virtual representations of real-world objects serve to convey meaning that they carry from their real-world existence. For example, an individual who sees a car in a virtual world would expect to be able to seat their avatar in it and ride in it as they would a real car because such meanings are socially constructed and generally associated with certain characteristics of artifacts (Berger & Luckman, 1966; Verillon & Rabardel, 1993). Having artifacts that many individuals can attach similar meanings to enables social interactions around those artifacts.

We define "representation support" as a person's sense about the meaning of artifacts in a virtual world environment. When artifacts in a virtual world environment lend themselves to assignment of meanings of what they are about, and what can be done with them, individuals will find it easy to structure interactions with others around the common meanings. For example, when avatars are in a virtual classroom that has a podium and multiple chairs, the students will usually sit in the chairs and leave the podium for the presenter as they would in the real world. The higher the ease at which meanings can be assigned to artifacts in the environment, the more likely it is that individuals know how to socially engage with others, and the more likely it is that social interactions will happen. We thus hypothesize that:

Hypothesis 5: *In a VW, representation support is positively correlated with sociability.*

3.5. Sociability Supported by Shared Understanding

The distributed cognition perspective focuses on coordination among individuals and artifacts such that a shared understanding emerges from the interactions (Hollan, Hutchins & Kirsch, 2000). When we have this understanding, we can also understand others by attributing motivational forces to their actions, thoughts, or behavior (Thompson & Fine, 1999). Thus, what we see of others' actions and behaviors can give us insight about them.

We define "insight support" as the sense an individual has about what others mean when communicating in a virtual world. Virtual humans in the form of avatars are said to be simulations of not just others' bodies but also of their minds (Davies & Stone, 1995). When people interact in a VW, they are able to have their own perspective of the situation and can make an informed guess of the same situation from others' perspectives by thinking of themselves as if they were others (Biocca & Harms, 2001; Biocca et al., 2003).

Various features of a VW help us to gain such insight about others. In a VW, we can observe how multiple parties interact with each other through their avatars. Such interaction involves verbal and non-verbal communication from which we can make inferences. For example, we can infer how happy a person is based on the message from their avatar or from the expressions of the avatar. Our inference would come from our own understanding of the meaning of such a message and expressions. In a VW, we can also see how animated a person can be through the actions of their avatar. As a person's avatar expresses joy and animation, it can stimulate our desire to seek out the company of the person behind the avatar in order to be a part of those social experiences. As we express joy and act animated through our own avatars in return, we share these values with others, too.

Virtual artifacts can also be used as mediators for insights to develop. How an avatar interacts with artifacts such as objects, tools, or ornaments in a virtual world may provide insight about the avatar. For example, when discussing the works of a sculptor, an avatar may introduce to the scene a 3D representation of a sculpture to show what was meant. Similarly, observing an avatar build a virtual structure may provide insight about their skills and abilities. Such understanding or insight about others guides individuals' interactions with others. For example, an individual may be curious to know more about a particular subject from someone that they regard as knowledgeable or skilled in the subject. We thus predict the following:

Hypothesis 6: *In a VW, insight support will be positively associated with sociability.*

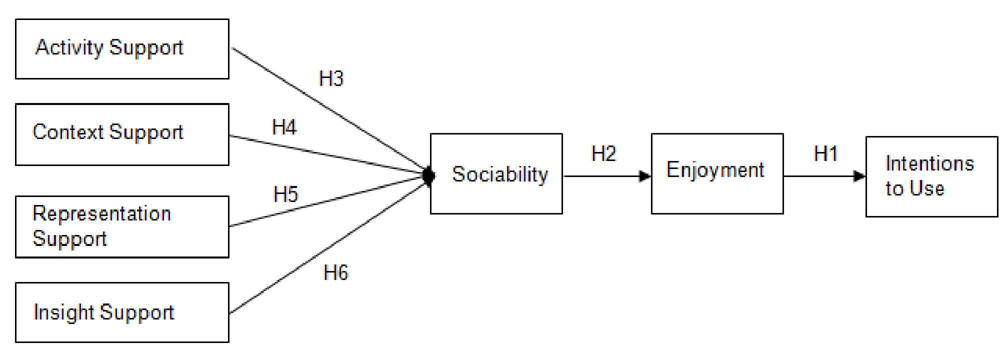


Figure 1. Proposed Research Model

4. Research Method and Nomological Setup

Our research model (see Figure 1) was tested as a laboratory controlled survey. We ran the study within a controlled environment (i.e., Second Life (SL)) using a survey methodology. We chose virtual worlds in general because they represent relatively recent technology developments that are able to mimic human interaction to the best extent possible; we chose Second Life in particular because it is one of the most prominent virtual environments.

In order to establish the conceptual and empirical validity of sociability in explaining IS usage intentions, we selected the approach of a nomological validation network (similar to the one used by Straub, Limayem, & Karahanna-Evaristo, 1995; Agarwal & Karahanna, 2000). Nomological validity represents the extent to which constructs and their respective measures demonstrate a suitable behavior in the context of well-established models (Cronbach & Meehl, 1955; Bagozzi, 1981). Because the proposed model is different enough from existing literature, yet links with existing literature on one of the most studied variables in the IS field, intention to use, a nomological network has the advantage of situating the newly proposed model into the vast body of extant knowledge. It also exemplifies the robustness of the newly proposed model within a validated context.

Wixom and Todd (2005) propose one of the more prominent models that links technology acceptance with IS success models. They distinguish between two main components—or branches—that affect an individual's intention to use a technology: an information component that captures as its object the information that an information system processes, and a system component that captures the characteristics of the system itself (see Figure 2). They found that system-specific antecedents, such as the completeness, accuracy, format, or currency of the system, influenced perceptions of system quality and system satisfaction, which in turn impacted perceptions of how easy it is to use the system. In the same vein, characteristics of the information processed, such as its reliability, flexibility, integration, accessibility and timeliness, influenced perceptions of information quality and information satisfaction, which in turn impacted perceptions of how useful an individual perceived the technology to be. By doing so, Wixom and Todd (2005) combine acceptance models that base their origin on socio-cognitive processes, forming beliefs and intentions, with models of user satisfaction. Analogously, we propose a third component, termed the social component, that precedes enjoyment perceptions by relying on a set of social-specific antecedents, including activity support, context support, representation support, and insight support (see Figure 1).

In our nomological net model, sociability takes on the same significance as the constructs of information quality/satisfaction and system quality/satisfaction respectively. This approach is legitimate for the following reasons. First, both quality and satisfaction are object based (i.e., they are geared toward the technological artifact). Sociability, per definition, is also directed toward the technology at hand. Second, even though quality is understood as a belief and satisfaction as an attitude, there is only a fine line when the correspondence principle is followed (i.e., when time, target, and context is the same) (Fishbein & Ajzen, 1975) as the case in our study. Third, similarly to usefulness and ease of use, enjoyment is considered a behavioral belief (Holbrook & Hirschman, 1982) (i.e., a belief about the degree to which a user experiences fun when using the system) (van der Heijden, 2004). And fourth, because previous research has shown that ease of use influences the enjoyment an individual perceives (van der Heijden, 2004), we incorporated this link into our nomological net, and thus propose that the system component has an influence on the social component.

4.1. Measurements and Their Development

For the information and system component of the model, we mirrored the measures as applied by Wixom and Todd (2005). More specifically, measures for information and system quality and information and system satisfaction were taken directly from their study; measures for usefulness, ease of use, and intentions originate from Davis et al. (1989); enjoyment measures were taken from van der Heijden (2004).

Due to the novelty of the constructs of sociability, activity support, context support, insight support, and representation support, we applied a strategy as proposed by Moore and Benbasat (1991). We conducted two pre-studies, including a qualitative and a quantitative pilot, over an eight month-period prior to actual data collection. The qualitative pre-study comprised open-ended interviews with eight individuals currently using SL; it was partly conducted in SL and partly in face-to-face settings. We asked questions related to activity support, context support, representation support, and insight support. Feedback from the qualitative study helped researchers to refine themes suggested by the literature and to lay the foundation for a thorough quantitative measurement development.

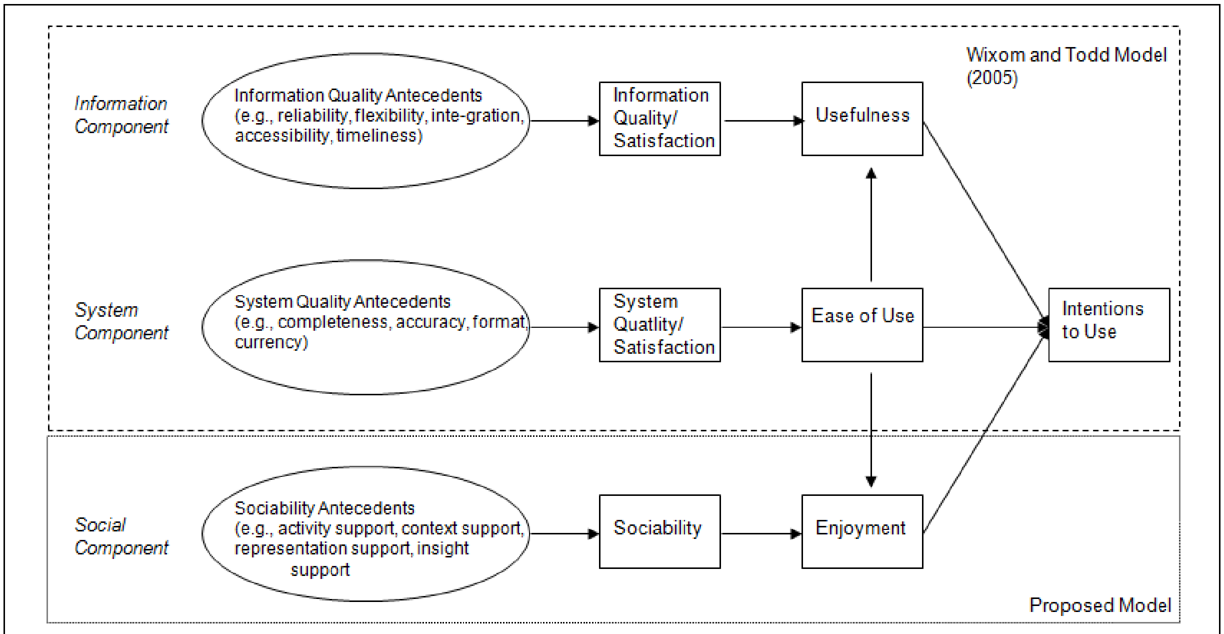


Figure 2. Theoretical Model Embedded in Nomological Network

For the quantitative measurement development, we compiled a list of items based on prior literature in the respective realm of each construct. We then tested an initial version of the items among 28 students. We removed poorly worded and ambiguous items. While not statistically meaningful due to the small sample size, we realized that the Wixom and Todd (2005) measures for quality and satisfaction might not be sufficiently discriminatory for all three components. We therefore re-tested a modified version of the questionnaire with 83 undergraduate and graduate business students, which substantiatied our suspicion. In our pre- and pilot study, an individual was not able to differentiate between the quality of the information received and the satisfaction he got out of the information. The same applies for the system. An individual was not able to differentiate between the quality of the system and the satisfaction that he gained from the system. This observation could have two potential reasons. From a statistical perspective, and by looking at the original study of Wixom and Todd (2005), there seems to be a close relationship between both constructs. For example, the correlation between information quality and satisfaction was 0.77 and the respective path coefficient 0.43; the correlation between system quality and system satisfaction was 0.75 and its respective path coefficient 0.73, which indicates a high overlap in variance. From a theoretical perspective, and as alluded to earlier already, there is only a fine line between quality as an object-based belief and satisfaction as an object-based attitude when the correspondence principle is followed (i.e., when time, target, and context is the same) (Fishbein & Ajzen, 1975). By using a virtual world as our environment, we deliberately controlled for each of these variables, making them practically indistinguishable. As a consequence, we combined quality and satisfaction measures for both, the information and system component, which resulted in an instrument that displayed sufficient validity and reliability (seeAppendix). Each item of the questionnaire was measured on a 7-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree).

4.2. Sample and Task

Our sample consisted of 380 undergraduate students enrolled in an introductory IS class that participated in the study. We obtained only 263 usable responses due to incomplete data sets. Subjects received extra credit for their participation. Their average age was 21 years (STD=2.6), almost evenly split between males and females. More than 93 percent considered themselves very or extremely familiar with computers (M=6.22); 58 percent considered themselves familiar or extremely familiar with 3D computer games such as The Sims or World of Warcraft (M=4.67); 15 percent had used SL before the experiment.

We collected data over three months from teams of subjects that varied in sizes of three, four, and five. Subjects were randomly assigned to a team based on time slots available. The sample characteristics allowed control for random heterogeneity of respondents such that there would be minimal difference between respondents within groups, and hence higher internal validity (Cook & Campbell, 1979; Scandura & Williams, 2000).

Each of these teams worked on the same task in SL. The task chosen was a complex cognitive one (Campbell, 1988) that combined utilitarian and non-utilitarian aspects. Unlike simple tasks with a single solution, complex tasks can have multiple solutions and multiple ways to achieve a solution (Campbell, 1988). Our task involved a team cooperating inside a virtual "telecommunications lab", a lab exclusively built for the purpose of this study on a private island in SL. The task involved the design and build of a network typology that conformed to pre-specified rules. The task was chosen so that interactions between participants were salient to all involved and relevant to the course they were enrolled in.

Prior to starting their task in SL, subjects were given a questionnaire to complete. Subjects were then directed to log on to SL and gather in the welcome room of the virtual "telecommunications lab". From this step forward, all communications and social interactions were done "in-world". Subjects were allowed to spend as much time as they needed, typically fifteen to twenty minutes, to interact with others and to get comfortable with in-world behaviors, such as moving around, communicating via chat, and changing their avatars' appearances. All subjects, without exception, were able to walk and chat in the first 10-15 minutes of logging on to SL.

In a next step, and after the technical familiarization phase was finished, subjects' avatars were led by the administrator's avatar into a foyer. Subjects were then presented with their task in the form of notecards[12] pre-stored in their SL inventory[13]. One notecard contained the actual task description; other notecards contained definitions and textual cues regarding different types of network typologies. Additional artifacts representing network components, in the form of text and virtual objects, were also presented in the virtual lab, including, for example, virtual routers and cables, and pictorial representations of the various network topologies.

In a last step, and after subjects had been allowed a few minutes to interact with one another, the administrator's avatar led them to the actual virtual network lab. During task execution, one researcher stayed in the virtual room, but stayed out of view and was therefore not easily seen, if at all, by subjects. After the group of subjects completed its task, which typically occurred after another 20 minutes, their avatars were led back to the welcome room and they were instructed to exit SL and complete a survey based on their experiences. Thus, the experiment enabled the study of sociable orientations associated with technology use within the virtual environment.

5. Analysis

We analyzed the data using structural equation modeling, more specifically partial least square (PLS) version 3 (Chin, 1998; Gefen, Straub, & Boudreau, 2000). PLS differentiates between a measurement and a structural model. Whereas the measurement model analyzes the relationship between the latent constructs and their associated items by scrutinizing their internal, convergentm and discriminant validity, the structural model estimates the strengths of the relationship between latent constructs by providing estimates for path coefficients and variance explained[14].

[12] Notecards are simple text documents that one can create and share in Second Life. Notecards are accessible in an avatar's inventory.

[13] Inventories are virtual storage areas where avatars can store things such as clothing items, notecards, or objects that the avatar owns. The inventory can be organized using folders and it is virtually unlimited in size. Items are automatically placed in folders based on type.

[14] In order to statistically triangulate our results, we also conducted the same analysis using AMOS, resulting in the same findings.

5.1. Measurement Model

In order to establish convergent validity for each construct, we examined their item loadings, their composite reliabilities, and their average variance extracted (AVE). As Table 1 demonstrates, each item loads above 0.7 on its respective construct, and all constructs display sufficient composite reliabilities above 0.8 (Gefen et al., 2000). Also, all constructs display an AVE above a suggested level of 0.5 (Fornell & Larcker, 1981). In order to establish discriminant validity, the average variance extracted (AVE) has to be greater than the squared correlations (i.e., shared variance) for each construct (Chin, 1998). In addition, the calculated loadings and cross-loadings should demonstrate that items load higher on their respective construct than on any other construct (see Appendix). In sum, all measurements appear to be statistically sound and exhibit an adequate level of statistical validity.

Table 1. Measurement Model

Construct	Variable name	Factor loadings	Items per construct	Composite reliability	AVE	Mean	Standard deviation
Intentions to use	Int1	0.75	6	0.945	0.743	4.12	1.59
	Int2	0.85					
	Int3	0.90					
	Int4	0.90					
	Int5	0.85					
	Int6	0.90					
Usefulness	Use1	0.91	4	0.959	0.854	4.54	1.57
	Use2	0.94					
	Use3	0.94					
	Use4	0.90					
Ease of use	Eou1	0.93	3	0.960	0.889	5.24	1.50
	Eou2	0.95					
	Eou3	0.95					
Enjoyment	Enj1	0.98	3	0.980	0.943	5.35	1.56
	Enj2	0.97					
	Enj3	0.97					
Information	Inf1	0.94	5	0.975	0.885	4.83	1.51
	Inf2	0.92					
	Inf3	0.94					
	Inf4	0.95					
	Inf5	0.95					
	InsS2	0.87					
	InsS3	0.80					

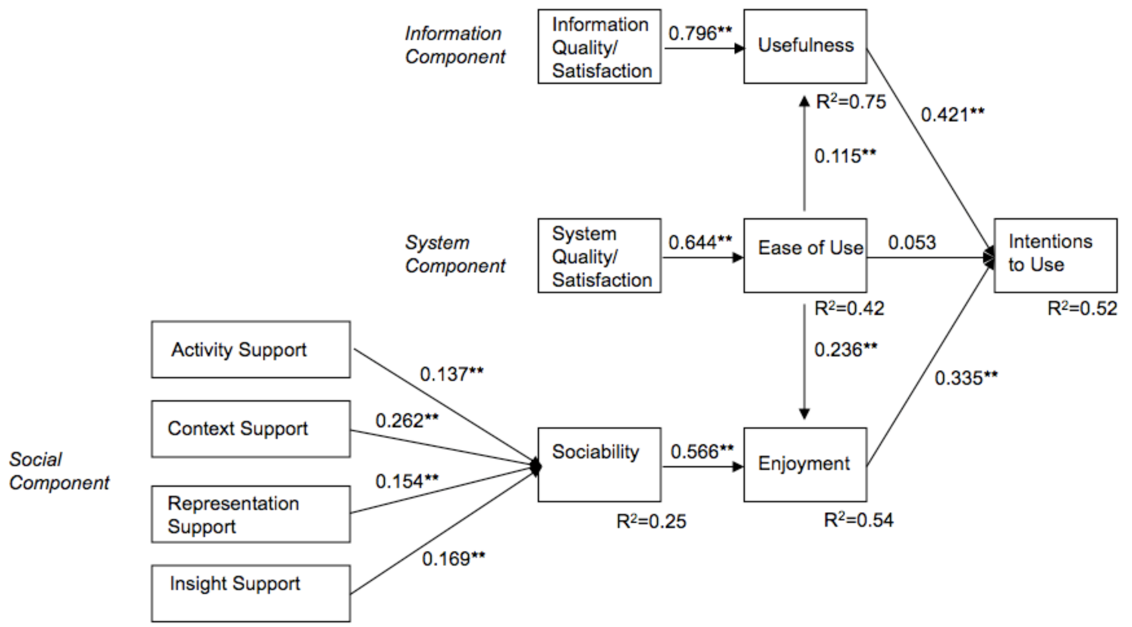
Table 1. Measurement Model (cont.)							
Construct	**Variable name**	**Factor loadings**	**Items per construct**	**Composite reliability**	**AVE**	**Mean**	**Standard deviation**
System	Sys1	0.95	5	0.977	0.894	4.93	1.53
	Sys2	0.93					
	Sys3	0.95					
	Sys4	0.95					
	Sys5	0.95					
Sociability	Soc1	0.85	8	0.976	0.834	5.10	1.48
	Soc2	0.87					
	Soc3	0.91					
	Soc4	0.94					
	Soc5	0.95					
	Soc6	0.95					
	Soc7	0.93					
	Soc8	0.90					
Context support	ConS1	0.83	4	0.932	0.775	5.30	1.37
	ConS2	0.89					
	ConS3	0.93					
	ConS4	0.87					
Activity support	ActS1	0.78	4	0.864	0.614	4.20	1.15
	ActS2	0.83					
	ActS3	0.79					
	ActS4	0.74					
Representation support	RepS1	0.90	4	0.942	0.803	4.79	1.56
	RepS2	0.89					
	RepS3	0.90					
	RepS4	0.90					
Insight support	InsS1	0.87	3	0.881	0.712	5.25	1.16
	InsS2	0.87					
	InsS3	0.80					

5.2. Structural Model

Figure 3 displays the results of the structural model. Overall, the model explains 52 percent of the variance in intentions to use virtual worlds. Usefulness was still the strongest predictor of intentions (path coefficient of 0.421), followed by enjoyment (0.335), and lastly by ease of use (0.053), whose path coefficient was not significant.

The relationship between sociability and enjoyment was significant (path coefficient of 0.566) and predicts 54 percent of the variance in enjoyment; and each of the proposed antecedents to sociability, (i.e., activity, context, representation, and insight support) was positively associated with sociability, explaining 25 percent of its variance. While the path coefficient for context support was 0.262, insight support was 0.169, representation support was 0.154, and activity support was 0.137, respectively.

As part of our analysis, we also examined if sociability mediates the effects between each of the proposed antecedents to sociability and perceived enjoyment. A direct model was tested in which all four antecedents were directly linked to perceptions of enjoyment (following the steps suggested by Baron and Kenny (1986), and Judd and Kenny (1981)). Our results indicate that perceptions of enjoyment are fully mediated by sociability. This finding is also in accordance with our results from the measurement model (such as cross-loadings or AVEs as shown in Tables A-2 and A-3 in the appendix).



** p < 0.01, N = 263

Figure 3. Structural Model

6. Discussion

This paper takes a social-hedonic perspective in trying to elaborate on the factors that contribute to the adoption and acceptance of information systems. We have argued that humans derive pleasure from socializing with others and that current technology is now able to fulfill this urge. In this perspective, individuals are not viewed as solitary information processors—a perspective that, up to now, has dominated most IS adoption and success models—but rather as social seekers that derive pleasure from interacting with others, mediated by technology. While we do not dispute that an individual is able to derive pleasure from using a system in solitude, our paper focuses on the pleasure one can achieve from interacting and socializing with others through the system, which we term sociability. Sociability is supported by affordances of the system. In particular, these affordances include: activity support, context support, representation support and insight support. As this study shows, maximizing each of the four antecedents can increase sociability. In other words, maximizing the extent to which a technology is able to provide activity support, context support, representation support, and insight support will most likely appease an individual in their desire to socialize with others.

Activity support is a person's sense of access to others in the virtual world environment. It goes beyond the sense of presence of others (as captured by social presence theory) to encompass observation and reciprocation of their actions. This affordance of technological environments has also been referred to as negotiation potentials (Suthers, 2006). Activity support has been shown as prevalent in virtual worlds due to embodiment and non-verbal cues. For example, Mennecke, Triplett, Hassall, Jordan, and Heer (2011) introduce a framework called "embodied social presence" to capture the higher level of perceptual engagement of users in activities done in virtual worlds. Similarly, Goel et al. (2011) identify social cues in a virtual world environment that enable meaningful interactions between users. Kohler, Fueller, Matzler, & Stieger (2011) expand on how the activity of co-creation is supported in virtual worlds. Nowak and Biocca (2003) attribute the sense of access to others to anthropomorphism and perceived agency in virtual environments. Context support is a person's sense about his or her situation or where he or she is in a virtual environment. This affordance has been studied as location awareness in technologies (Goel et al., 2011). Context support has been shown as salient in virtual worlds due to the sense of place that they afford (Saunders, Rutkowski, Genuchten, Vogel & Orrego, 2011). Representation support is a person's sense about the meaning of artifacts in a virtual world environment. This technological affordance has also been termed referential resource (Suthers, 2006). Insight support is the sense that an individual has about what others mean when communicating in a virtual world. Vosinakis and Papakakis (2011) attribute shared insights to the enhanced semantic and social navigation offered by virtual worlds as compared to traditional web-based systems.

Not all technologies afford all four antecedents of sociability and thereby provide the same level of sociability. An indicator of this fact is the varying levels of "social presence" (i.e., the way individuals represent themselves in their online environment) or "media richness" (i.e., the perceived richness of the media carrying content as well as symbolic information).

Overall—and albeit in the limited context of virtual worlds—sociability has shown to be an important precursor to IS acceptance in this study. As part of the social component in our nomological framework (Figure 2), it has demonstrated its significance on an individual's usage intentions, almost comparable in size with the information component that comprises constructs such as usefulness, information satisfaction, and quality. In contrast, the system component that includes constructs like ease of use, system quality and satisfaction, transpired to be the weakest predictor in determining usage intentions. While some IS scholars have demonstrated that ease of use has little predictive ability after initial usage (e.g., Chau, 1996; Davis et al., 1989; Zmud & Apple, 1992), our study shows that it had no effect at all. The majority of subjects were classified as "infrequent" users of SL—yet, the system's ease of use did not play a role in forming their intentions. Interestingly, some scholars have proposed that ease of use could be replaced by measures of enjoyment (Li et al., 2005). They argue that user-friendliness has evolved over time and is now an inherent part of technology.

In sum, our results indicate that, apart from an information and system component, future IS research should consider the inclusion of a social component into its utilization and acceptance models. While Bostrom and Heinen (1977) foreshadowed this aspect in their socio-technical systems theory, subsequent IS researchers have mostly paid attention to the technical system, rather than the social system. A utilitarian focus rightfully took center stage over the past decades. Writing computer programs to increase personal and organizational productivity and efficiency were important milestones to achieve. In this paper, we argue that while we are skilled in the utilitarian use of technology, what we are increasingly facing now is the need to create technology that appeases the non-utilitarian needs of individuals, particularly the aspect of individuals as social beings. We argue that the urge of individuals to socialize has only recently been matched or supported by technologies. With that, the objective of some information systems has changed: it is now as much about fulfilling social needs as it is about work productivity.

6.1. Utilitarianism vs. Hedonism in Sociability

As introduced earlier, this paper takes a strong hedonic stance in explicating sociability. We have chosen this approach to conform to Simmel's definition of sociability—he deems interactions between individuals as sociable only as long as they are not utilitarian and as long as they are "contingent upon the joy of others" (p. 257). For the purpose of this paper, we therefore exclude any utilitarian motive in our discussion. However, as much as it is "difficult to imagine any situation [that] is purely cognitive, devoid of emotions, social meaning, social interaction and social residues in the form of inherited roles or tools" (Levine, Resnick & Higgins, 1993, p. 604), it might be equally difficult to imagine situations that are devoid of utilitarian objectives. Social capital theory, for example, argues exactly that. It claims that individuals socialize with others in order to obtain economic benefits (Coleman, 1988; Granovetter, 1973; Putnam, 1993). Accordingly, social capital is the derived benefit from the preferential and reciprocal treatment prevalent inside the group. In a similar vein, social network theory argues that value is derived from being part of a network (Granovetter, 1973; Milgram, 1967). In this context, individual attributes are considered less important—more important are the number of relationships individuals are able to form with one another.

While it is outside the definition used in this paper, one could possibly broaden the definition of sociability and allow a utilitarian component to be considered. For the model in Figure 2 and 3, this would mean that enjoyment might not be the only variable influenced by sociability. Usefulness, for example, defined as “the degree to which a person believes that using a particular system would enhance his or her job performance” (Davis, 1989, p. 320) and reflective of the utilitarian aspect of a system, might be equally affected. Sociability, if defined more broadly using something such as social capital theory, is conceivable to have an impact on an individual’s perceptions of usefulness. Only if an individual believes that being sociable will also lead to an increase in job performance is it likely that they will partake in this behavior. Our model, however, did not show this support statistically. A calculated relationship between sociability and usefulness yielded a non-significant result (path coefficient = 0.141, t = 1.31). Likewise, sociability could also have an impact on the ease of use, or the “the degree to which a person believes that using a particular system would be free of effort” (Davis, 1989, p. 320) as part of a broadened definition. Getting things done with the least amount of effort might be easier achievable through the help of social networks than doing it by oneself.

6.2. Sociability at its Extremes—The Social Seeker vs. the Social Recluse

The concept of sociability, as defined in this paper, is the fusion of sociological and technological considerations. It is based on the fundamental sociological idea, which captures the desire of individuals to seek out the company of others to have social experiences. To this idea, we add the role of technology as an enabler (or appeaser) of this urge. Hence, sociability represents an individual’s state of mind in which his desire to socialize is satisfied through a system that is able to provide those social interactions with others.

From a pure sociological perspective, it is possible to imagine extremities in the scale of sociability, from social seekers to social recluses. A social seeker would always strive to maximize social experiences whereas social recluses would always seek to avoid them. On adding the technological consideration, a social seeker could encounter technology that either supports his desire in the utmost possible way, thus maximizing his achievable sociability level, or not at all. Technologies, such as massively multiplayer online games (MMOGs), social networking sites such as Facebook, or virtual worlds such as Second Life, can easily be viewed as examples that might produce such a maximum social experience. The high sociability has been substantiated by literature on the (almost) addictive experiences in such environments. However, Lazzaro (2004) contends: “It’s the people that are addictive, not the game”. The technologies serve as facilitators to appease the inherent drive of individuals to socialize (Abraham, Boudreau, Junglas, & Watson, 2012).

Note that not all technologies afford all four antecedents of sociability and thereby provide the same social experience. An indicator of this is varying “social presence” or “media richness” levels of different technological media. In case a technology is not available to support a social seeker, the individual is left to his own devices—which essentially represents the world that we used to know before mobile phones and social networks emerged.

A social recluse, on the other hand and per definition, will always strive to avoid social interactions. Not having technology available that enables social interactions is therefore his preferred choice—but if it is, it might have different effects. A series of well-founded studies exist (such as Stanford’s institute for the Quantitative Study of Society (SIQSS), or PEW’s Internet and American Life Project) that arrive at starkly different conclusions about the social repercussions of technologies. On the one hand, technology has been touted as a social disabler, shielding individuals that, let’s say have an average urge to socialize, from their existing social network. One study showed, for example, that the use of social networking services reduced neighborhood involvement (Hampton, Sessions, Her & Rainie, 2009). However, the same study also reports that social isolation has hardly changed over a 15-year period, despite the increase in number and functionality of available technology. In fact, it shows that those owning a mobile phone maintained larger and more diverse "discussion networks", a term signifying the number of people that are considered most important to the individual in their social network. Interestingly, the study also found that frequent Internet users, and those who maintain a blog, were much more likely to confide in someone who is of another race, and that those who share photos online are more likely to report that they discuss important matters with someone who is a member of another political party.

While these findings are not conclusive and indicate that further research is necessary, they hint toward the possibility that technology might widen an individual's willingness to socialize with a broader audience. In other words, those individuals that exhibit an average desire to socialize might be prompted to expand their social circles simply because the technology is available. In support of this assumption are the latest results by PEW that found a dramatic usage increase (by approximately 30 percentage points over the last five years of social networking sites among older generations (i.e., ages 46 and above) (Zickuhr, 2010).

Sociability is a trait that not only unearths itself in personal settings, but in organizational settings, too. Research has shown that a social work environment is conducive to a better climate, which in turn decreases employee turnover rates (e.g., Downey, Hellrigel & Slocum, 1975; Payne & Mansfield, 1973).

6.3. Limitations

A laboratory-controlled survey comes with certain advantages and disadvantages. Advantages include the high level of internal validity and the credence we can give to the measures established and analyzed; however, one of the major disadvantages includes that of generalizability. Our intention in this paper was not to contrast virtual worlds with other technologies in terms of the sociability they afford; rather, we explored sociability as a precursor to system usage intentions. Thus, the transfer of these findings to other types of information systems is limited. Virtual worlds afford characteristics that are not necessarily present in other technologies. Context support, for example, is rather difficult to find in other current technologies, whereas activity support is present in instant messaging technologies. A status indicator suggests an individual is currently available and open to be socially approached. As different technologies start to display varying degrees of activity, context, representation, and insight support, the more this research study will be generalizable to other technologies. It is therefore likely that future research will be able to compare different types of information systems by looking at differences in the impact on system usage intentions based on the sociability afforded. In addition, and keeping in line with the laboratory controlled survey design, we relied on random differences in perceptions of the four affordances and their degree of influence on sociability. Future studies can manipulate these factors to see what their varying effects are.

Further, our sample was drawn from students enrolled in introductory business courses. While the current sample may generalize to a population comfortable with virtual environments that is entering the workforce, it creates an inherent limitation to the extent of our external validity.

Another limitation relates to our focus on a complex cognitive task. Our rationale for choosing this task was to be able to generalize to group learning activities. However, often groups may get together for tasks that are simple in nature that have single possible outcomes and less activity. Similarly, other real-world activities done by groups may be of considerable greater complexity. Hence. the effects of our model should be re-examined in tasks of differing levels of complexity. For example, in a simple task, there may be less influence of representation support, but a greater degree of influence of insight support. Similarly, other task-related characteristics such as group size and task duration might be manipulated.

The task itself was modeled on decision making when multiple “correct” options exist. But many social interactions do not require any sort of decisions to be made, or have decisions that are too trivial to merit attention. What may be of interest to IS designers and practitioners are other types of tasks. Tasks have been classified in prior literature as utilitarian versus hedonic. We were hesitant to classify our task as a purely utilitarian (or purely hedonic) one because there is little theoretical support on the differences between the two. Literature in neuroscience demonstrates that participation in learning is linked with that part of the brain that is activated in a hedonic experience (Babin, Darden & Griffin,1994; Kringelbach, 2005). However, if a continuum between the two extreme types of tasks can be imagined, there could be other tasks along the continuum that can be retested in this context.

6. Conclusion

Long viewed by information system researchers as solitary information processors, system users are also social beings that need and often crave social interaction with others. Technological developments in social media have experienced rapid growth because they support individuals and their tendencies to socialize. Sociability, or the degree to which a human’s desire to socialize with others can be met through the use of technology, is the focus of this study. We demonstrate, albeit in this limited context, that sociability impacts enjoyment, which, in turn, is nearly as important as usefulness and far more important than ease of use in predicting intentions to use. The paper has used an affordance perspective to identify antecedents of sociability. Overall, we argue that IS technology acceptance and adoption models need to be more finely focused so as to incorporate the sociability of the individual.

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Appendix

Table A-1. Questionnaire Items

Construct	Variable name	Questionnaire item
Intention to use	Int1	If given the opportunity, I would like to participate in a similar learning task in SL
	Int2	I intend to use SL to learn about different topics
	Int3	I intend to return to SL again
	Int4	I intend to use SL over the next year
	Int5	I intend to use SL at every opportunity over the next year
	Int6	I plan to increase my use of SL over the next year
Information quality / satisfaction	Inf1	Overall, I would give the information provided in SL high marks
	Inf 2	Overall, I would give the information provided in SL a high rating in terms of quality
	Inf 3	In general, SL provided me with high-quality information
	Inf4	Overall, the information that I got in SL was very satisfying
	Inf5	I am very satisfied with the information I receive in SL
Usefulness	Use1	Using SL improved my decision-making abilities when doing the task
	Use2	SL allowed me to understand the task problem more quickly
	Use3	Using SL enhanced my problem-solving behavior for the task
	Use4	I found SL useful
System quality / satisfaction	Sys1	In terms of the system, I would rate SL of high quality
	Sys2	Overall, the SL was of high quality
	Sys3	Overall, I would give the system quality of SL a high rating
	Sys4	All things considered, I am very satisfied with the SL system
	Sys5	Overall, my interaction with the SL system was very satisfying
Ease of use	Eou1	SL was easy to use
	Eou2	It was easy to get SL to do what I want it to do
	Eou3	SL was easy to operate
	Eou4	My interaction with SL was clear and understandable
Enjoyment	Enj1	I had fun using SL
	Enj2	I enjoyed interacting with SL
	Enj3	I felt a sense of enjoyment using SL

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Table A-1. Questionnaire Items (cont.)		
Construct	**Variable name**	**Questionnaire item**
Sociability	Soc1	In terms of social aspects supported, I would rate SL highly
	Soc2	Overall, I think SL was of high social quality
	Soc3	In general, I think that SL strongly facilitates social interactions
	Soc4	The quality of social interactions in SL is high
	Soc5	Overall, I am very satisfied with the social aspects of SL
	Soc6	Overall, social interaction in SL are very satisfying
	Soc7	The level of social interaction that took place in SL were satisfying
	Soc8	Being social in SL is an aspect that I find very satisfying
Context support	ConS1	I was aware of my surroundings in the telecommunications lab
	ConS2	I was aware of the location of objects related to the networking task, such as cables and computers, in the virtual environment
	ConS3	I was aware of the objects in the telecommunications lab in SL related to computer networking
	ConS4	I was conscious of elements in the telecommunications lab around me.
Insight support	InsS2	It was easy to understand my partners
	InsS2	My partners found it easy to understand me
	InsS3	My partners had difficulty understanding me (R)
Activity support	ActS1	I reciprocated my partners' actions
	ActS2	My partners reciprocated my actions
	ActS3	My partners' behavior was closely tied to my behavior
	ActS4	My behavior was closely tied to my partners' behavior
Representation support	RepS1	The textual and visual cues in the environment helped me do the task
	RepS2	Visual and textual information provided in the telecommunications lab supported me in the understanding and completing the topology task
	RepS3	There were cues in the environment that made completing the task easy
	RepS4	The information given in the environment helped me understand, or explain to others, the task better.

Table A-2: Correlation Matrix

	Intentions to Use	Useful	Information	Ease of use	System	Enjoyment	Sociability	Context support	Insight support	Activity support	Representation support
Intentions to Use	**0.862**										
Useful	0.672	**0.924**									
Information	0.631	0.860	**0.941**								
Ease of use	0.484	0.561	0.560	**0.943**							
System	0.665	0.840	0.861	0.644	**0.946**						
Enjoyment	0.644	0.661	0.667	0.583	0.713	**0.971**					
Sociability	0.611	0.716	0.728	0.613	0.741	0.711	**0.913**				
Context support	0.215	0.379	0.411	0.405	0.358	0.354	0.410	**0.880**			
Insight support	0.219	0.364	0.414	0.436	0.388	0.291	0.340	0.330	**0.844**		
Activity support	0.178	0.162	0.138	0.100	0.123	0.084	0.180	0.035	0.145	**0.784**	
Representation Support	0.270	0.529	0.514	0.468	0.415	0.301	0.381	0.567	0.418	0.058	**0.896**

Table A-3. Crossloadings

	Intentions to use	Information	System	Usefulness	Ease of use	Enjoyment	Sociability	Context support	Insight support	Representation support	Activity support
Int1	**0.755**	0.664	0.660	0.626	0.519	0.616	0.604	0.362	0.301	0.348	0.171
Int2	**0.892**	0.553	0.558	0.545	0.387	0.507	0.503	0.185	0.199	0.253	0.306
Int3	**0.891**	0.632	0.664	0.605	0.440	0.553	0.571	0.057	0.214	0.246	0.222
Int4	**0.918**	0.499	0.552	0.583	0.385	0.570	0.497	0.115	0.107	0.167	0.260
Int5	**0.918**	0.499	0.552	0.583	0.385	0.570	0.045	0.115	0.107	0.167	0.320
Int6	**0.934**	0.515	0.550	0.583	0.392	0.560	0.512	0.142	0.154	0.226	0.337
Inf1	0.711	**0.939**	0.825	0.831	0.581	0.667	0.730	0.382	0.409	0.530	0.154
Inf2	0.695	**0.917**	0.807	0.738	0.519	0.595	0.672	0.366	0.407	0.429	0.133
Inf3	0.664	**0.953**	0.863	0.853	0.482	0.629	0.714	0.350	0.314	0.427	0.122
Inf4	0.686	**0.952**	0.814	0.830	0.529	0.654	0.697	0.419	0.385	0.514	0.111
Inf5	0.669	**0.951**	0.789	0.821	0.505	0.599	0.656	0.390	0.371	0.503	0.133
Sys1	0.762	0.825	**0.947**	0.787	0.589	0.679	0.696	0.337	0.386	0.384	0.176
Sys2	0.712	0.810	**0.950**	0.782	0.584	0.669	0.678	0.342	0.380	0.381	0.217
Sys3	0.730	0.801	**0.948**	0.773	0.587	0.662	0.705	0.331	0.340	0.355	0.146
Sys4	0.676	0.820	**0.954**	0.804	0.630	0.666	0.699	0.354	0.384	0.421	0.145
Sys5	0.711	0.863	**0.949**	0.876	0.590	0.618	0.688	0.257	0.339	0.465	0.150
Use1	0.708	0.761	0.707	**0.912**	0.417	0.553	0.620	0.324	0.301	0.467	0.176
Use2	0.577	0.777	0.750	**0.941**	0.517	0.573	0.618	0.328	0.331	0.533	0.128
Use3	0.664	0.788	0.780	**0.943**	0.527	0.595	0.673	0.362	0.335	0.482	0.136
Use4	0.753	0.844	0.854	**0.899**	0.598	0.709	0.726	0.381	0.374	0.472	0.117
Eou1	0.468	0.506	0.567	0.507	**0.920**	0.479	0.500	0.364	0.398	0.441	0.146
Eou2	0.481	0.508	0.617	0.509	**0.937**	0.562	0.578	0.350	0.404	0.386	0.236
Eou3	0.462	0.439	0.515	0.439	**0.927**	0.483	0.593	0.323	0.397	0.338	0.114
Eou4	0.536	0.563	0.627	0.567	**0.935**	0.573	0.595	0.412	0.450	0.488	0.060
Enj1	0.583	0.643	0.692	0.634	0.554	**0.975**	0.693	0.359	0.288	0.297	0.062
Enj2	0.621	0.622	0.660	0.620	0.576	**0.971**	0.692	0.326	0.273	0.291	0.090
Enj3	0.620	0.679	0.725	0.671	0.568	**0.968**	0.686	0.347	0.286	0.290	0.113

Table A-3. Crossloadings (cont.)

	Intentions to use	Information	System	Usefulness	Ease of use	Enjoyment	Sociability	Context support	Insight support	Representation support	Activity support
Soc1	0.559	0.666	0.748	0.659	0.682	0.672	**0.855**	0.452	0.354	0.399	0.166
Soc2	0.546	0.669	0.728	0.678	0.619	0.677	**0.874**	0.426	0.336	0.353	0.178
Soc3	0.560	0.627	0.617	0.595	0.546	0.597	**0.912**	0.322	0.291	0.312	0.049
Soc4	0.596	0.694	0.644	0.644	0.496	0.650	**0.935**	0.294	0.190	0.344	0.073
Soc5	0.626	0.684	0.670	0.662	0.549	0.663	**0.946**	0.367	0.320	0.350	0.050
Soc6	0.618	0.683	0.693	0.674	0.535	0.678	**0.950**	0.378	0.336	0.346	0.060
Soc7	0.587	0.681	0.667	0.678	0.497	0.642	**0.928**	0.352	0.293	0.348	0.123
Soc8	0.656	0.645	0.639	0.647	0.502	0.625	**0.898**	0.326	0.239	0.332	0.103
ConS1	0.027	0.370	0.338	0.340	0.345	0.331	0.350	**0.830**	0.265	0.463	-0.123
ConS2	0.153	0.358	0.299	0.334	0.364	0.289	0.334	**0.890**	0.301	0.537	-0.002
ConS3	0.149	0.363	0.311	0.344	0.370	0.332	0.398	**0.928**	0.272	0.532	-0.063
ConS4	0.116	0.258	0.275	0.223	0.276	0.277	0.339	**0.828**	0.307	0.418	0.064
InsS1	0.300	0.425	0.411	0.379	0.428	0.328	0.348	0.260	**0.865**	0.370	0.097
InsS2	0.094	0.311	0.280	0.265	0.329	0.180	0.270	0.308	**0.872**	0.355	0.139
InsS3	0.125	0.280	0.257	0.252	0.327	0.199	0.214	0.277	**0.793**	0.330	0.125
RepS1	0.412	0.486	0.420	0.503	0.468	0.297	0.384	0.479	0.389	**0.896**	0.163
RepS2	0.226	0.445	0.369	0.484	0.415	0.257	0.299	0.523	0.368	**0.893**	0.006
RepS3	0.118	0.424	0.312	0.429	0.352	0.205	0.274	0.500	0.358	**0.897**	0.028
RepS4	0.278	0.388	0.318	0.429	0.314	0.350	0.377	0.510	0.303	**0.884**	0.049
ActS1	0.172	0.062	0.028	0.102	-0.033	0.031	0.023	-0.204	0.066	-0.015	**0.789**
ActS2	0.298	0.163	0.144	0.169	0.130	0.088	0.141	0.112	0.178	0.107	**0.783**
ActS3	0.206	0.111	0.101	0.112	0.091	0.079	0.190	0.029	0.114	0.020	**0.824**
ActS4	0.289	0.085	0.076	0.130	0.055	0.044	0.102	0.004	0.054	0.064	**0.711**

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