

2-24-2014

# Real Projects, Virtual Worlds: Coworkers, their Avatars, and the Trust Conundrum

Michael F. Lohle

*University of Bridgeport*, [mlohle@bridgeport.edu](mailto:mlohle@bridgeport.edu)

Steven R. Terrell

*Nova Southeastern University*, [terrell@nova.edu](mailto:terrell@nova.edu)

Follow this and additional works at: <https://nsuworks.nova.edu/tqr>

 Part of the [Quantitative, Qualitative, Comparative, and Historical Methodologies Commons](#), and the [Social Statistics Commons](#)

---

## Recommended APA Citation

Lohle, M. F., & Terrell, S. R. (2014). Real Projects, Virtual Worlds: Coworkers, their Avatars, and the Trust Conundrum. *The Qualitative Report*, 19(8), 1-35. Retrieved from <https://nsuworks.nova.edu/tqr/vol19/iss8/1>

This Article is brought to you for free and open access by the The Qualitative Report at NSUWorks. It has been accepted for inclusion in The Qualitative Report by an authorized administrator of NSUWorks. For more information, please contact [nsuworks@nova.edu](mailto:nsuworks@nova.edu).

---



**Qualitative Research Graduate Certificate**  
*Indulge in Culture*  
Exclusively Online • 18 Credits  
**LEARN MORE**

NSU  
NOVA SOUTHEASTERN  
UNIVERSITY

NOVA SOUTHEASTERN

## Real Projects, Virtual Worlds: Coworkers, their Avatars, and the Trust Conundrum

### **Abstract**

This qualitative study informs project managers of the impact that the authentic projection of coworker identity via avatars has on trust and potential project management success when teams use virtual worlds to collaborate. By exploring the common experiences and reactions of potential virtual team participants to a demonstration that showed how to customize avatars and use them to communicate with others, it facilitated the development of a grounded theory that confirms whether the projection of authenticity via avatars is an antecedent of team trust and real project management success. Real management success was the main objective, since it is vital for the enterprise to use all means possible for competitive advantage in an ever-expanding technological society.

### **Keywords**

Qualitative, Grounded Theory, Project Management, Virtual Teams, Virtual Worlds, Avatars, Trust, Attitudes, Bias, Identity, Authenticity, Communication

### **Creative Commons License**



This work is licensed under a [Creative Commons Attribution-Noncommercial-Share Alike 4.0 License](https://creativecommons.org/licenses/by-nc-sa/4.0/).

## **Real Projects, Virtual Worlds: Coworkers, their Avatars, and the Trust Conundrum**

Michael F. Lohle

University of Bridgeport, Bridgeport, Connecticut, USA

Steven R. Terrell

Nova Southeastern University, Fort Lauderdale, Florida, USA

---

*This qualitative study informs project managers of the impact that the authentic projection of coworker identity via avatars has on trust and potential project management success when teams use virtual worlds to collaborate. By exploring the common experiences and reactions of potential virtual team participants to a demonstration that showed how to customize avatars and use them to communicate with others, it facilitated the development of a grounded theory that confirms whether the projection of authenticity via avatars is an antecedent of team trust and real project management success. Real management success was the main objective, since it is vital for the enterprise to use all means possible for competitive advantage in an ever-expanding technological society. Keywords: Qualitative, Grounded Theory, Project Management, Virtual Teams, Virtual Worlds, Avatars, Trust, Attitudes, Bias, Identity, Authenticity, Communication*

---

### **Problem Statement**

By providing immersive, three dimensional environments where users can meet and communicate through *avatars*, or their graphical and fully customizable online alter egos, *virtual worlds* can replicate face-to-face meetings (Davis, Murphy, Owens, Khazanchi, & Zigers, 2009; Schultze & Leahy, 2009). Unfortunately, minimal research exists into the application of virtual worlds on virtual project teams for real project management success (Davis, et al., 2009; Kaplan & Haenlein, 2009). This is a concern because virtual worlds present a paradox: they can mimic face-to-face communications to restore the visual cues that foster trust (Cowell & Cowell, 2009; Davis, et al., 2009) but their avatars' identities may diverge from their owners', thus potentially undermining that trust (Galanxhi & Nah, 2007; Wolfendale, 2007). Since virtual team members may never physically meet, it is unclear how this will affect virtual team member trust and project success when avatars are used for project communication.

### **Research Questions**

The researcher addressed these research questions:

1. When the goal is real project success, what impact will communication using avatars have on team trust? If the impact is negative, how might it be improved? If the impact is positive, why?

2. When the goal is real project success, will certain types of avatar personas have more or less effect on the establishment of team trust and why? Will specific personas have more effect, less effect or a neutral effect on team trust?

## Review of Literature

Economic considerations drive companies to distribute project work to places where skills can be procured at lowest cost. However, business best practices confirm co-locating project teams promotes success (The Project Management Institute, 2004). IT industry trends reinforce this comment. For example, with its short development sprints, intense *scrums* of developers, and *story* and *backlog* management, the *Agile* development method requires tight, fluid relationships between developers and users and was designed for co-located teams (Nottonson & DeLong, 2008). The *Agile* development method is gaining acceptance because it helps organizations absorb change so it is not surprising offshore vendors have adapted their processes to fit the approach. Unfortunately, implementing *Agile* in distributed settings requires overhead that saps the responsiveness for which it was designed. For instance, Sureshchandra and Shrinivasavadhani (2008) described a process for distributed software development using *Agile*. Despite their assurances that such arrangements become easier to manage over time, the contrast between the overhead required to implement the *Agile* development method on distributed teams and the lack of overhead required when applying it on co-located teams is striking. Virtual worlds are poised to ease this tension between the pull to co-locate and the push to decentralize project teams by providing a vehicle for simulated co-location. This literature review explores this tension. It covers massively multiplayer online role playing games (MMORPGs) and virtual world research, business and project management, virtual meetings, virtual simulations, virtual social spaces, avatars, trust and identity.

### *MMORPG and Virtual World Research, Business and Project Management*

Virtual world research started with an emphasis on gaming and evolved to consider virtual worlds. Therefore, any assessment of the research literature must consider these two focus areas. MMORPGs and virtual worlds share the same architecture (Alterbosch, Pierce, & Simmons, 2008; Kumar et al., 2008). They differ only in their development approaches, with MMORPGs employing proprietary models and virtual worlds employing open source models (Arakji & Lang, 2007). Since they share the same foundation, findings discovered in one genre are transferrable to the other. This part of the literature review will assert that while considerable effort has been expended in these two research areas, the application of virtual worlds in business project management has received minimal research focus. For example, gaming research abounds with studies comparing game formats to understand if communications degrade when players leave traditional board games and leap into the realm of MMORPGs. Since game engines generate a game's environment, rules and activities, studies have shown gamers are not as verbally expressive online as they are when playing board games. On the other hand, their communication is more task oriented and intense, especially when challenges like battles ensue (Drachen & Smith, 2008; Tychsen, Hitchens, & Brolund, 2008). This type of intensive, task oriented communication is also crucial for effective project teams.

Golub (2010) confirms this. Having spent months playing the MMORPG *World of Warcraft*, Golub became a respected member of a guild, or group of characters sharing a common objective: "raiding." Raiding consists of mounting coordinated attacks to defeat monsters. Mastering different roles and skills, Golub and other guild members worked

together for hours every week to mount attacks and through this experience formed strong, cohesive bonds that fostered enduring real world relationships. Golub found engagement fosters shared purpose among geographically distributed players, players tend to move seamlessly between the real and virtual worlds and these players maintain relationships in the real world that are formed online. These results are transferrable to business projects: players are like project team members, the guild is like the project team and raids are like projects. Likewise, the strong relationships and easy movement between real and virtual worlds Golub describes would be crucial on real world projects. Unfortunately, while these findings can be related to project management, the connection is not explicit.

Most research into virtual worlds is applicable to project management but does not focus on it. For example, in a case study about the effectiveness of virtual worlds as computer mediated learning tools, Brown, Hobbs and Gordon (2008) found virtual worlds are effective collaboration tools whose sophistication and richness tend to divert attention from goals. As with Golub's (2010) study, participant communications also moved seamlessly between the real and virtual worlds. In addition, without prompting, participants engaged in demonstration, discovery and sharing. Finally, researchers were surprised some study participants did not learn enough to complete tasks independently, gravitated toward irrelevant tools and became too preoccupied to finish. Project managers would surely encounter the same challenges using virtual worlds but the article's lack of direct references to project management did not illuminate the connection.

Guest (2008) confirmed constructing and building are core virtual world research themes. When the popular virtual world *Second Life* was first established, Linden Labs, its developer, built a small *island* and encouraged residents to build upon it, charging them for the privilege. Since then, residents have built a multitude of objects and the company has allowed them to own the copyrights, sparking creativity and loyalty. This emphasis on building has led most researchers conducting virtual world based team dynamics studies to include building tasks. For instance, Fors and Jakobsson's (2002) phenomenology included exercises that used blocks resembling *Legos*. They found users feel a sense of rebirth upon entering virtual worlds, group tasks engender strong feelings of ownership and participants become passionate about their designs. For project managers using virtual worlds, coping with the disorientation experienced by first time users will be crucial. Likewise, the passion participants felt would be desirable on project teams but again, this study did not explicitly connect these findings to business project management.

The words "project management" and "business" rarely appear in virtual world research. When they do, it is clear such research is in its infancy. For instance, Owens, Davis, Murphy, Khazanchi and Zigurs (2009) advanced the concepts of *virtual world projects* and *virtual world project management*, which they defined as managing projects using both virtual worlds and traditional environments. Having recruited their study's participants from the ranks of *Second Life* residents, the researchers observed teams tasked to build "Rube Goldberg" machines and found those that collaborated using *Second Life* effectively delivered results. This study did not address whether these findings would be transferrable to real projects requiring real deliverables rather than virtual Rube Goldberg machines.

These studies exemplify research that is focused on project management. Unfortunately, since most studies do not directly reference project management, the connection is difficult to discern. Moreover, the research does not contain field studies or applied concepts. This omission provides an excellent research opportunity to make this virtual and real world connection.

### *Virtual Meetings*

The cornerstone of the *Second Life* virtual user experience is the *simulation*, or *sim*, where residents build environments to live in and engage others (Gollub, 2007). The literature supports the concept that project managers can create meeting places for their teams in these sims. For example, the first virtual worlds resembled simple, windowless conference rooms. Later, a series of large conferences were held online starting in 1998 and continuing until 2003 (Damer, 2008). These days, virtual world researchers and entrepreneurs are providing additional means to support meetings online. For instance, virtual world applications are available that provide online meetings that allow facilitators to pick up where they left off if they need to reconvene later (Spence, 2008). In addition, a variety of enhancements to the meeting experience are now available. These include the ability to capture minutes with automatic annotation and synthesize coherent themes from fragmented proceedings (Reidsma et al., 2007).

Since this study focuses on business project management, it is worthwhile to consider a business virtual world application: *Teleplace*. The company's white paper *Teleplace: A powerful, next-generation solution for virtual teams from Teleplace, Inc.*, (2009) confirmed virtual worlds can be effectively conceived from a business perspective. Sharing content and applications in real time, *Teleplace* provides information visualization, multi-modal communication, sketching and audio via pre-constructed and customizable work spaces. It also applies a persistence model, meaning colleagues can leave and return without loss of continuity, and supports versioning via event recording, storage and point-in-time restoration.

*Teleplace's* (2009) white paper provides an interesting perspective on virtual worlds from the business community. Though *Teleplace* is a virtual world, the paper does not use the term. Instead, it references "virtual online workspaces" and calls *Teleplace* the "ideal collaboration solution." While *Teleplace* is not used in this study, the company's white paper is instructive in creating general research design.

### *Virtual Simulations*

The three dimensional nature of virtual worlds, their scripting languages and available accessories provide ample opportunities to enhance meetings in ways real world or computer mediated communication (CMC) based meetings cannot. First, team building opportunities become straightforward and inexpensive. For example, "Tringo," a game resembling bingo developed by a *Second Life* resident, can be leveraged as a device to put attendees at ease (Cross, O'Driscoll, & Trondsen, 2011). Likewise, Ellis, Luther Bessiere and Kellogg (2008) designed several games for virtual team building similar to the Rube Goldberg machines described earlier. In addition, virtual worlds can be designed as immersive environments that deepen interaction while providing innovative learning opportunities. For example, Ross and Westermann (2008) described *Arden*, a virtual world developed to immerse university students in the world of Shakespearean plays while providing a research mechanism for psychological studies.

*Arden* exemplifies the use of virtual worlds for simulations. This is not a new concept: the United States military has developed elaborate virtual worlds for combat training over many years (Guest, 2008). Virtual world simulations have also been used in healthcare, where providers have purchased virtual islands and developed realistic hospitals on them populated with complaining patients, medical challenges and even natural disasters (Simon, 2010). Then, consider *OLIVE*, an example of the business opportunities virtual world simulations provide. *OLIVE* is short for the *On-Line Interactive Virtual Environment*.

Marketed by Forterra Systems, it provides tools to help clients in various industries develop virtual worlds for specific purposes. *OLIVE* has been used to simulate hospital environments, help sales executives better manage irate clients and prepare first responders for emergencies (Kushner, 2008; Robbins & Bell, 2008).

In their discussion about the ways residents capture and save pictures in virtual worlds, Neustaedter and Fedorovskaya (2009) described residents' tendency to project pictures on virtual walls when they want to share them publicly. Similarly, virtual team members can project *Microsoft Excel* spreadsheets and other software outputs on *Teleplace's* virtual walls to clarify points (Teleplace, 2009). Finally, Cross et al. (2011) confirmed that virtual world simulations are increasingly used by focus groups to help companies bring participant samples together for new product design. These examples all confirm the ways virtual worlds can enhance meetings. Imagine a contentious discussion whose progress is halted over a controversial process or product design issue. In a virtual meeting, the facilitator could produce a three dimensional model of the product or process in question to clarify the issue and move the discussion forward. Virtual worlds not only provide the ability for distributed attendees to meet in realistic online environments, they also afford opportunities to simulate what they are discussing, making abstract concepts concrete (Reidsma et al., 2008).

### *Virtual Social Spaces*

While virtual worlds can facilitate team building, simulations, and training, Neustaedter and Fedorovskaya (2009) also confirmed they were originally designed for social interaction and to provide realistic spaces for teams to interact in relaxing settings that facilitate informality and sharing. For example, Robbins and Bell (2008) devoted three chapters of their book *Second Life for Dummies* to instructing potential users how to navigate the social challenges of expressing themselves, fostering relationships and establishing comfort zones in *Second Life*. *Teleplace's* (2009) white paper also confirmed geographically distributed colleagues can now engage in informal hallway chats that would not otherwise be possible. Finally, while *third places* like bars and meeting halls that foster feelings of community are crumbling in the real world, they are thriving in virtual worlds. Relationships started in such places are vibrant and often translate into real world relationships, though these connections tend to be shallow (Ducheneaut, Moore, & Nickell, 2007; Steinkuehler & Williams, 2006). Virtual world environments foster informal conversations and impromptu break out areas for virtual colleagues, providing a unique communication mechanism that fosters deeper relationships than were possible with traditional CMCs.

### *Avatars*

Avatars represent a unique state of being and are a cornerstone of the Hindu religion. Goel (2002) confirmed avatars are God in human form who comes to earth to restore higher levels of consciousness when religious values decline. Jensen (2010), Morrison (2009) and others have compared the avatar's reincarnation from deity to human with the act of a user's assuming a new avatar identity in a virtual world. Therefore, Day (2009-2010) confirmed virtual worlds "turn the tables" on Hindu philosophy: users become Gods manifested digitally via their avatars.

As virtual worlds become engines of economic commerce, courts will be compelled to consider treating avatars as persons (Day, 2009-2010). Currently, no constitutional protections exist for avatars and their owners, their only recourse is provided by virtual world providers' Terms of Service. This leaves users at the mercy of service providers who can

rescind access rights on a whim (Guest, 2008). In addition, the absence of governance over virtual worlds can lead to mob rule (Dibbell, 1994). In response, Day argued since avatars are the products of commercial enterprise they should be accorded the same Constitutional rights as corporations. Day's argument acknowledges avatars are gateways to what Jensen (2010) calls "separate spheres" of commerce, parallel worlds where owners assume new identities and even amass "fortunes."

Situating all this in the context of business applications, *Teleplace's* (2009) white paper offers three ways for users to present themselves:

1. They can generate simple avatars as abstracted figures for quick meetings
2. They can generate sophisticated avatars modeled on their real world appearance, or
3. They can leverage video conferencing to project themselves.

Unfortunately, *Teleplace* does not suggest which approach is most effective. It also does not reference the opportunity for users to generate avatars that are incongruent with their real identities. Perhaps the company intended to avoid asking the potentially unsettling questions adopting different personas in business settings might generate. For example, in a virtual world study focused on market research, Parmentier and Rolland (2009) wondered if they could trust their findings. Having sampled participants from the population of residents in *Second Life*, they realized they had no way of verifying participant authenticity and therefore whether participants had been deceitful.

Because users create avatars to serve as their proxies, their ability to convey complex messages, both verbal and nonverbal, is critical. In describing the *Second Life* interface, Robbins and Bell (2008) listed communication options that include text and voice chat, instant messaging (IM), and the ability to affix notes on other avatars for future reference. They also described a variety of gestures, animations and poses available in the basic *Second Life* software and for additional purchase. Unfortunately, despite a variety of available communication options, the literature confirms avatars do not yet realistically convey emotions, though much research is underway toward creating the illusion that they can. For example, Morrison (2009) described efforts to develop avatar responses that generate the projection of empathy through the emulation of human non-verbal gestures. Other issues with avatar communication include the multiplicity of available points of view, the lack of visibility into other avatars' chat content and the fact that most gaming and virtual world environments do not force avatars to take turns talking as they would in the real world (Moore, Ducheneaut, & Nickell, 2007). On the other hand, Bailenson, Yee, Merget and Schroeder (2006) confirmed partners tend to communicate more effectively and reveal more about themselves when conversing through abstracted avatars than when viewing each other over camera feeds. While current technology works to produce the realistic avatars gamers crave, perhaps current levels of avatar realism are sufficient for business use.

*Second Life* also provides another powerful communication vehicle: viewable avatar profiles. As Neustaedter and Fedorovskaya (2009) confirmed, a profile lists an avatar's creation date and groups, contains a photo and biography, confirms whether the avatar has a partner, and lists its owner's favorite places. An avatar profile can also include its owner's picture and biography. Profiles provide a potentially powerful way to convey information because viewing another avatar's profile is easy: one points to another avatar, "right mouse clicks," selects the "view profile" option and the other avatar's profile is presented (Robbins & Bell, 2008). Unfortunately, users tend to insulate their virtual and real world personas by not including real life information in their avatar profiles (Neustaedter & Fedorovskaya, 2009). In addition, many users record outrageous comments there (Skye, 2008). This

tendency to leave real world information out of avatar profiles or to lampoon the information that is included hinders the ability of profiles to foster trust. For instance, Karlova (2011) discussed a resident who led a support group in *Second Life*. To establish legitimacy, she used her avatar's profile to describe her experience with a disease and her leadership of a real world support group. She also included links to news items published about her on her profile. Her real life profile demonstrated she was not role-playing: she truly had a disability and was an authentic leader in her field. Including real world information on her profile helped foster trust in her capabilities.

### *Trust*

Understanding the challenges virtual teams face in establishing trust is a cornerstone of this study. It is therefore illuminating to review Jarvenpaa, Knoll and Leidner's (1998) seminal study about why establishing trust is more difficult for virtual teams than for face-to-face teams. First, they defined virtual teams as geographically dispersed units formed for projects whose members communicate solely via electronic means and never physically meet. Then, they defined trust as one's willingness to be vulnerable to another based on the expectation the other will perform an action that is important to them. Finally, they assessed the impacts of these four antecedents of trust:

1. *Ability*: possessing skills that signal competence
2. *Integrity*: following principles that signal dependability
3. *Benevolence*: displaying a willingness to care for others
4. *Propensity to trust*: expecting trustworthiness in others.

Their findings confirmed integrity and ability are more important than benevolence early in a virtual team's life while benevolence emerges after success is achieved. Surprisingly, they also found that although team building exercises heightened team member awareness of each other these exercises had minimal impact on trust (Jarvenpaa, Knoll & Leidner, 1998). Powell, Galvin, and Piccoli (2006) later explained this by confirming a loss of social cues occurs when colleagues use traditional CMC technology so this renders delivery in sharp focus. Virtual team members only trust their colleagues after confirming they can rely on them to deliver.

These findings led the authors to examine the concept of *swift trust*. Swift trust is related to *attribution theory*. With attribution theory, preexisting expectations, institutional factors and dispositions toward trust tend to bias individuals' information processing, leading them to only process information that is consistent with their expectations (Jarvenpaa, Shaw, & Staples, 2004). Similarly, swift trust occurs because colleagues on short lived teams tend to attribute characteristics about their teammates' anticipated performance from their perceived skills and interests and not through shared experience. Swift trust is fragile: inactivity, poor performance or disappointment will cause it to quickly erode (Jarvenpaa et al., 1998; Kanawattanachai & Yoo, 2002; Piccoli & Ives, 2003).

Gersick (1988) confirmed co-located teams tend to experience two distinct life cycle phases separated by an epiphany at midpoint. The first phase is marked by an exploration of alternatives, the midpoint epiphany is marked by an adjustment to achieve success and the second phase is marked by an intense focus on results. Jarvenpaa et al. (1998) applied Gersick's findings to virtual teams. Their first phase equates with virtual team members' monitoring of delivery, their epiphany occurs with the virtual team's first success or failure and their second phase either moves the team beyond swift trust to benevolence or erodes that trust. Critically, Gersick also asserted that while the opportunity exists for teams to adjust for

success at midpoint, success is not assured. On virtual teams when personnel observe success or failure they either seize the initiative or disengage.

Moving virtual teams from swift trust to benevolence as early as possible is crucial for establishing enduring trust. Most studies refute Kanawattanachai and Yoo (2002), who confirmed it is possible to maintain swift trust for the duration of a virtual team's life. On the contrary, such maintenance is fraught with challenges. For example, Piccoli and Ives (2003) confirmed behavioral controls like project plans and status reports heighten vigilance so failure becomes highly visible. In addition, the frequent communication and feedback recommended by Jarvenpaa et al. (1998) and Montoya-Weiss, Massey and Song (2001) feeds this vigilance. Add the high incidence of incomplete information sharing among colleagues on virtual teams and the conflict this causes (Hinds & Bailey, 2003) and the barriers to trust seem insurmountable. While Chidambaram (1996) confirmed people establish strong social bonds over time despite technical limitations, it is critical that virtual team managers foster these bonds early.

To support their study, Jarvenpaa, et al. (1998) employed a basic, web-based communications hub where participants accessed and stored important documentation. It would have been interesting to see how they could have leveraged virtual worlds to facilitate trust and how avatars might have helped or hindered their efforts. Since Markus (1994) wrestled with the concept of *information richness* to explain senior executives' adoption of then new e-mail technology to the advent of today's virtual worlds that provide a palpable feeling of *social presence* (Davis et al., 2009), researchers have searched for technologies that can transmit the social cues so vital to establishing trust and benevolence. Because they are more immersive than previous CMC technologies, virtual worlds are well positioned to support this.

### *Identity*

Despite the promise virtual worlds hold for fostering virtual team trust, avatars threaten to undermine that trust. For example, avatar design can degrade professionalism. With companies establishing presences in virtual worlds like *Second Life* and recruiting and hiring for positions in both the virtual and real worlds, this is a problem. Since colleagues can tailor their avatars to look however they want, meetings can degenerate into a parade of motley characters that distract attendees or worse, push the bounds of decorum. To address this situation, many companies now require employees to use avatars that adhere to corporate dress codes and resemble their owners at work and furthermore suggest they create separate avatars for afterhours use (Junglas, Johnson, Steel, Abraham, & MacLoughlin, 2007; McArthur, 2008).

These challenges to professionalism are not surprising. Since virtual worlds provide new opportunities for exploring one's identity (Wolfendale, 2007) the act of designing an avatar becomes intensely personal (Davis et al., 2009; Kaplan & Haenlein, 2009; Yee & Bailenson, 2007). As a result, avatars become extensions of their owners' identities that enable them to coexist in virtual worlds, identities that may best represent their owners' true essence and empower them to thrive (Davis et al., 2009; Kaplan & Haenlein, 2009; Schultze & Leahy, 2009; Wolfendale, 2007). Most people also tend to design their avatars as more attractive than they are in the real world and this makes them more confident (Messinger et al., 2008; Schultze & Leahy, 2009). For example, people who own tall avatars tend to be better online negotiators (Schultze & Leahy, 2009; Yee & Bailenson, 2007). Then, avatars embolden their owners to take risks they would not otherwise take in the real world (Messinger et al., 2008; Yee & Bailenson, 2007). Finally, because their avatars are enhanced,

people tend to experiment with them, taking the best of what they experience back to the real world and vice versa (Bittarello, 2008; Messinger, et al., 2008).

At their worst, avatars are often compared to “masks” worn to hide their owners’ true identities (Galanxhi & Nah, 2007; Schultze & Leahy, 2009). Because people can present themselves differently, avatars provide ample opportunity for abuse and fraud (Davis et al., 2009; Galanxhi & Nah, 2007; Schultze & Leahy, 2009; Wolfendale, 2007). For example, avatar on avatar violence, from extreme cases of killing to fraud and deceit, leaves real victims with emotional pain (Wolfendale, 2007). As troubling, many virtual world denizens own multiple avatars, their main avatars and alternates, or *alts* (Schultze & Leahy, 2009). Finally, since it is difficult to maintain identities that are incongruent with one’s own, users often discard their avatars and it could cripple a virtual team if one of its members suddenly ceased to exist (Messinger et al., 2008).

*Griefing* is an excellent example of the way people can abuse others from behind their avatar masks. Griefing is the act of intentionally harming others in virtual worlds and *griefers* are virtual world criminals (Girard, 2007). For example, Guest (2008) described the exploits of *Second Life*’s mafia, which conducts all the rituals of the real world Cosa Nostra. In a vivid anecdote he described his “Godfather’s” virtual “whacking” of a nineteen year old world racketeer by revealing the young “criminal’s” age to Linden Labs and having his access revoked. This on line “murder” was possible because players must be twenty one or older to enter *Second Life*. Similarly, Warner and Raiter (2005) described a popular griefing technique in the MMORPG *World of Warcraft* referred to as “corpse camping.” When corpse camping, griefers stay near other players’ corpses and kill them again when once they are resuscitated. Even The Walt Disney Company, known for its wholesome, family image was not immune to griefing. In *Toontown*, the company’s child oriented virtual world, griefers engaged in on line bullying: they followed new players and denigrated their skills to foster miserable experiences for the site’s young visitors (Warner & Raiter, 2005).

Griefing can also assume a more sinister tone. For instance, Girard (2007) related a traumatic encounter in the wake of the Virginia Tech shootings. After the tragedy a visiting avatar entered the university’s *Second Life* campus toting a gun and shot at students. While the bullets were virtual the fear, pain and offensiveness of the act were very real. Then, consider Dibbell’s (1994) landmark article about the nature of harms, retribution and governance in a *Multi User Dimension (MUD)*. Precursors of virtual worlds, *MUDs* presented “pictures” via text descriptions. One evening a griever entered a popular *MUD* dressed as a perverted clown and publicly “raped” two players while others were forced to “watch.” Upon interviewing the victims Dibbell realized that although they felt violated, they were unsure how to perceive what had occurred because the offense assaulted their psyches, not their bodies. Unfortunately, the damage is not always purely psychological; real bodily harm has also resulted from griefing. For instance, Warner and Raiter (2005) confirmed the Chinese government limited the amount of time players can spend in MMORPGs after a man murdered a fellow player who had stolen his virtual sword. Clearly, damage can be wrought when users hide behind their avatars with the intent to cause harm.

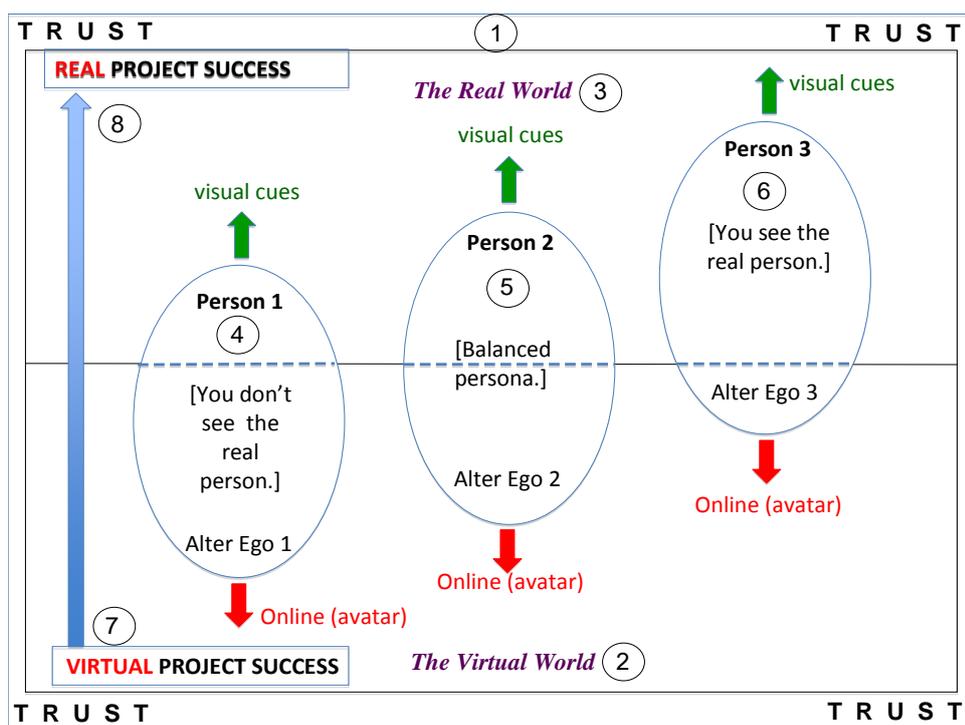
While griefing highlights the ethical issues of avatar use, other examples exhibit how avatars help people become their best selves. For example, Cabiria (2008) generated grounded theory focused on identity exploration and concluded *Second Life* is an effective therapeutic tool that provides homosexuals a safe harbor that allows them to live their true selves. The positive emotions generated by these experiences were transferrable back to participants’ real world personas and helped them to live more authentic lives. Similarly, Guest (2008) described the experience of a *Second Life* avatar that represented a group of nine people with cerebral palsy. Through making friends, opening an on line gift shop, maintaining a virtual island, constructing objects and shapes and holding real-time

conversations without being misunderstood and dismissed the group gained confidence in both the virtual and the real worlds. Likewise, Karlova (2011) shared the example of a multiple sclerosis victim who encountered logistical, physical and emotional challenges when forced to leave her real world home. In *Second Life* this person thrived, supplementing her income through real estate investments and as a weekend disc jockey, two careers her real world disability rendered very difficult to pursue. More innocuously, Reed and Fitzpatrick (2008) described a grandmother's use of her garishly designed avatar to entice her grandchildren who resided at a distance to communicate with her more often. Finally, prominent Stanford University researcher Nick Bailenson and his team studied whether people are more active after viewing their avatars running on virtual treadmills or more motivated to work out if they witness their avatars losing weight along with them (Platoni, 2008).

Boon and Sinclair (2009) concluded a requirement to use *Second Life* during a college course fostered feelings of disquiet because students were uncomfortable with how to portray themselves. Since it was impossible to discern the authenticity of user identity in virtual worlds they confirmed people could not be trusted. Consider this: in each example discussed here avatars emboldened their owners to either do harm or good. When colleagues collaborate with team members represented by avatars whose identities probably differ from their real world personas and who may be motivated to act differently than they would in real life, how is team trust impacted?

### Research Model

The researcher designed a model to synthesize the themes from this review of literature. As Glaser and Strauss (1967) confirmed, grounded theory studies are not designed to confirm hypotheses, their intent is to allow theory to emerge from the data. The resulting theory "fits" the data. The researcher used this model to structure his research, focusing his effort within available time while providing a flexible framework that allowed a grounded theory to emerge. Its key components are numbered and described below:



**Figure 1.** Research Model: Avatar personas, trust and project success.

1. *Trust* bounds the model. Without trust, virtual project teams will not achieve success.

The model is divided in half:

2. *The Virtual World* comprises the bottom half and
3. *The Real World* comprises the top half.

Until now, most avatar research has focused on the bottom, or virtual world, half of the model. This study shifted the research focus to the top, real world, half of the model. The blue arrow represents this shift.

The model portrays three avatar personas whose visual cues project two extremes with a midpoint:

4. *Person 1* portrays *Alter Ego 1*, positioned primarily in the virtual world. *Alter Ego 1* represents people who depict their avatars as having another gender, race or more outlandish characteristics.
5. *Person 2* portrays *Alter Ego 2*, a balanced persona positioned equally within the real and virtual worlds. *Alter Ego 2* represents people who design their avatars to look like themselves with minor modifications, such as presenting themselves in a more flattering light.
6. *Person 3* portrays *Alter Ego 3*, positioned primarily in the real world. *Alter Ego 3* appears identical to its owner.

Finally, the model depicts two types of project success:

7. *Virtual Project Success* has received considerable research emphasis. This type of success is achieved when teams communicate via avatars in online games and building tasks conducted solely in the virtual context.
8. *Real Project Success* has seen minimal research focus. This type of success is achieved when projects critical for business or society are successfully delivered.

In discussing a grounded theory study based upon a colleague's experiences as a cab driver while in graduate school, Glaser and Strauss (1967) confirmed cultivating personal experiences provides an effective springboard for the development of grounded theory. In this spirit it is relevant to consider the researchers' context within this study. The principal investigator (hereafter referred to as the "researcher") is a project manager with extensive industrial experience managing information technology projects requiring collaboration via virtual teams. Having observed the physical toll and high cost of travel to facilitate project delivery in such situations, he wanted to find a more effective approach to virtual project team management, an approach that combines the benefits of "face time" with the savings of computer mediated communication tools. Since this study was the researcher's capstone deliverable in a doctorate course of study with Nova Southeastern University, his time investment was considerable. Moreover, as he mounted his study he became convinced its findings would yield practical benefits for project managers who lead virtual teams. The coauthor of this article was the researcher's Ph.D. dissertation advisor. A seasoned Professor of qualitative search methods at Nova Southeastern University, he advised the researcher on his study design, research method and the content of his dissertation and this article.

## Methodology

Because the virtual world research community has not emphasized the impact of avatar authenticity on trust and real project success, this study employed a qualitative design. A qualitative approach was appropriate for several reasons. First, since this study was exploratory understanding participant perceptions about trust in real project settings was required. Achieving this understanding also required a view into participant feelings and perspectives about communicating via avatars. Therefore, detailed feedback from participants provided the insight required to answer the research questions (Creswell, 2008).

Since it was assumed the research questions had not previously been addressed, this study employed a *grounded theory* approach. With this approach, data collected from the field and focused via the research model “grounded,” or supported, the proposal of a viable theory. Participants experienced a demonstration that showed them what it is like to customize avatars in virtual worlds and use these avatars in real project communications. They then assessed the impact this mode of communication would have on participant trust in collaboration using virtual worlds when the goal is real project success. Participant feedback was coded and saturated with sufficient data to provide the foundation necessary to generate a theoretical model (Creswell, 2007; Glaser & Strauss, 1967).

### Procedures

This study employed one-on-one interviews, the primary data capture method used in grounded theory studies (Creswell, 2007). This study’s interview protocol is included in Appendix A. Pilot interviews were conducted with two participants, a subset of the study sample, to ensure the interview approach and content yielded effective results (Locke, Spirduso, & Silverman, 2007). Data captured during these interviews was included with the final research. Each interview was conducted in less than one hour.



**Figure 2.** Sample avatars and their owners.

At the beginning of each interview a brief demonstration of the virtual world application *Second Life* was provided with descriptions about how to customize an avatar, how colleagues would meet and communicate in a virtual world, the ease with which users can

assume other identities using avatars, examples of avatars representing Alter Ego 1, Alter Ego 2 and Alter Ego 3 and the use of profiles. Figure 2 presents the pictures displayed at the end of the demonstration depicting these three sample avatars and their owners.

Glaser and Strauss (1967) describe the concept of “saturation,” where observed instances become repetitive, indicating no additional insight will be gained with further inquiry. For this study, a participant sample was interviewed and the results were evaluated. They provided sufficient information to “saturate,” or fully answer, the research questions and enabled the researcher to organize that information into a theoretical model, so the data capture effort ceased.

### *Materials*

The following resources were required for this study:

1. *Conference Rooms*: Meeting rooms where demonstrations and interviews were conducted.
2. *Personal Computer*: A desktop or laptop.
3. *A Virtual World Application*: Access to the *Second Life* virtual world application.
4. *Data Recording Devices and Storage*:
  - a. Blank copies of the interview protocol.
  - b. A voice recorder.
  - c. A safe place to store copies of research notes for disaster recovery.
5. *Site and Personnel Access*: The researcher’s employer supported the engagement of personnel and access to conference rooms for this study.
6. *Gaming Video Capture Software and Movie Playback Capability*: The *Second Life* demonstration was captured in a movie format with narration using *FRAPS* real time video and benchmarking software. These recordings were combined with an introduction by the researcher and a picture of the sample avatars via Microsoft’s *Windows Live Movie Maker* software. This movie was then played back during the interviews using *Windows Media Player* software.
7. *Recordable DVDs*: For remote demonstrations, the researcher stored the demonstration movie on recordable DVDs and sent them to remote participants via interoffice mail. Recipients then played the demonstration on their DVDs prior to meeting and the researcher interviewed them over a teleconference bridge via speaker phone.

### *Sample*

To achieve a viable sample, the researcher conducted sampling at his employer, an insurance company. Creswell (2007) confirmed to procure enough feedback to support a grounded theory, sample sizes of between twenty and sixty participants may be required. A sample size of twenty-one participants was engaged. Since the researcher’s employer supported this study meetings were conducted at two of the company’s facilities, personnel were provided and participants were located at either office. Finally, the ethical treatment of participants and participant anonymity were maintained following IRB guidelines and approved by the Nova Southeastern University Institutional Review Board.

### *Data Analysis*

The researcher employed *triangulation* in analyzing data and ensuring validity. Triangulation employs information sourced from different groups to corroborate findings (Creswell & Miller, 2000). The researcher segmented participants into groups, coded their feedback and reviewed it for common themes. Because various stakeholder groups tend to view the same situation from different points of view, triangulation holds if participants share the same observations those observations are probably true (Creswell & Miller, 2000).

### *Data Capture*

The researcher conducted pilot interviews with Participants 1 and 2 to confirm whether the demonstration and interview protocol would satisfy the study's purpose. The researcher assessed the interview feedback, decided no modifications were required for either the demonstration or the interview protocol and conducted nineteen additional interviews. After completing twenty one interviews the researcher was satisfied the responses sufficiently saturated the interview protocol's questions (Creswell, 2007; Glaser & Strauss, 1967) and completed the interview cycle. Interview data were stored on the researcher's personal computer and backup copies of each file were taken.

### *Demographic Analysis*

The researcher read the transcripts three times to understand overall content (Creswell, 2007). To facilitate analysis, he then created a *Microsoft Excel* spreadsheet with a tab entitled "Demographic Analysis" where he recorded the participant sample's demographic information. This provided a quick understanding of the participant data set and allowed the researcher to leverage *Excel's* "auto filter" feature to segment the data. The researcher's theoretical sample (Glaser & Strauss, 1967) covered twenty one participants from two age cohorts: the Baby Boom Generation, consisting of participants born between the years 1946 and 1964, and Generation X, or participants born between 1965 and 1980 (Hammill, 2005). Ten males and eleven females participated from two offices of a large insurance company. Participants hailed from several roles within the organization: developers were participants who develop technical solutions, analysts were participants whose primary responsibility was analysis and managers were participants whose primary responsibility was management. Seven participants had previous experience with using virtual worlds while fourteen participants did not. Participants were numbered sequentially from one to twenty one. For the remainder of this report, participants are referenced by number.

While Participants 1 and 6 consented to the inclusion of their feedback with this study's findings, neither agreed to having their interviews recorded. Upon review, the researcher concluded their interview transcripts were less detailed than comparable recorded feedback and removed them from the findings. Since everyone else consented to recording this analysis covers feedback from nineteen participants.

### *Data Coding*

Glaser and Strauss (1967) describe theoretical coding procedures that entail the "jotting" of notes in the margins of interview transcripts and coding them to isolate core

theoretical concepts. They also espouse the concept of constant comparison between data “slices” to facilitate the emergence of theory from the data. Creswell (2007) described such coding as a process that proceeds in three steps, from *open codes* that constitute general concepts to *axial codes* where open codes are grouped by common themes to *selective codes* chosen as the primary focus. Following Glaser, Strauss and Creswell’s suggestions, after initial data analysis the researcher recorded margin notes on the interview transcripts. These were translated to 119 open codes grouped into three axial codes. The first axial code highlighted participants’ confirmation of the opportunities for enhanced expression and project facilitation virtual worlds and their avatars provide. The second axial code focused on participants’ perceived issues with virtual worlds and avatars and their recommendations for addressing them to provide comfort in the medium. The third axial code captured participant attitudes toward others’ avatar designs. Since this third axial code comprised the largest number of open codes and described the study’s central phenomenon (Creswell, 2007), the contradiction between participants’ stated desire to work with authentic avatars and their subsequent bias upon viewing sample avatars, it was chosen as the selective code. Throughout this process, data “slices” from the various groups within the theoretical sample were constantly compared. Comparisons were made between demographic cohorts, across the various roles, between genders, between those who had previous experience with virtual worlds and those who did not and between respondents from different physical locations (Glaser & Strauss, 1967). Appendix B depicts this study’s coding analysis.

The next sections present this study’s findings and conclusions. While the selective code is emphasized, focusing on this code would not fully address this study’s research questions. Doing so requires an understanding of the impacts of both comfort with virtual worlds and attitudes toward avatar design on trust. In addition, the impact of trust on the opportunities virtual worlds provide is considered. The findings section covers opportunities, comfort and attitudes and the discussion section derives a theoretical model comprised of these components.

## Findings

This section discusses the opportunities virtual worlds present, recommendations to foster comfort with virtual worlds on real projects and attitudes toward avatar design. It provides evidence that shows how a grounded theory emerged to fit the data through the “voices” of the participants (Glaser & Strauss, 1967).

### *Opportunities*

Several participants compared virtual world conferences with telephone and video conferences and concluded viewing visual representations of others would foster heightened engagement and remind them colleagues were in attendance. For example, Participant 4 confirmed:

*I think it would have you more engaged in conversation. If you’re just talking on a telephone or on a teleconference then you can be doing many other things. But if you’re actually in a virtual experience you’re more likely to pay attention to the entire thing and you’re more likely to have people really be listening so I think that would enhance the trust aspect.*

Some also thought interacting with colleagues via their avatars in lieu of physically meeting would bridge gaps. For example, Participant 19 shared a relevant anecdote. For

several months, she reported to a manager in another office. During this time, she remotely attended a team building videoconference facilitated from the manager's location. As the session progressed, Participant 19 had difficulty following her colleagues' discussion and viewing the flip charts. Interrupting the facilitator, Participant 19 asked the others to place the flip chart before the camera so she could view what they saw. Reflecting on this Participant 19 confirmed:

*I can see where you could use this especially with all the videoconferencing that we do here...I'd see what you're seeing and I'd feel part of the team vs. you know I'm back here and...it was just difficult for me to interact.*

Four participants provided feedback discussing the benefits of virtual worlds compared to other CMC applications.

Participants also thought virtual worlds provide opportunities for enhanced personal expression. Most thought the way colleagues portray themselves using their avatars would provide a window into their true selves and foster trust. Some even confirmed the avatar that most resembled its real world owner, Alter Ego 3, missed this opportunity. Participant 7 summarized:

*The...purpose of...having an avatar...in an environment like Second Life...is to have something that represents who you actually are, or how you actually feel about something vs. to try to perfectly replicate your physical appearance...Number 3 [Alter Ego 3] is...a warning sign that they're not going to be very forthcoming.*

The theme of colleagues using their avatars to honestly convey their true selves pervaded such responses. Participant 5 exemplified this when in perceiving Alter Ego 2's slightly enhanced avatar as the most trustworthy of the three he stated he had no issue with this avatar's long hair because its owner was conveying who he was, "take it or leave it." For such participants, using avatars seemed to provide a "short hand" for presenting their true selves. This reinforces the concept of swift trust advanced in the literature review: it would be interesting to see if transmitting visual cues to others might be an additional component of swift trust (Jarvenpaa & Leidner, (1999).

None of the participants expressed hesitation or concern about participating in an anonymous environment. On the contrary, a prominent theme was using avatars to "level the playing field" among team members. By honestly portraying their true selves via their avatars, participants expected more forthright communication and thought this would foster the confidence to speak more effectively, lessen introverted colleagues' inhibitions and foster idea sharing. They also perceived an opportunity to reduce the impact of strong personalities for balanced discourse and better decisions. Participant 5 summarized:

*The interesting thing is, you can make everyone not necessarily similar but the differences we all have as people in type A's and shy people, if you made them all very similar it... takes some stuff out, so a shy person might actually talk more because of who their avatar is and even on a voice call they wouldn't do it and obviously on a video or in a room they may not do it. That's interesting.*

This echoes virtual world features Reidsma et al. (2007) discussed that allow participants to influence how others perceive them and distribute equal power and influence throughout the group.

Several participants also thought using avatars to collaborate would facilitate project goals by emphasizing tasks and focusing team members on content instead of politics. Participant 10 noted:

*Knowing that this is the nature of how people are communicating in the project environment...you kind of know the playing field's changed so...I think I would be less inclined to let it phase me and...put my head in the game that this is...about the work and focus on the words and the work vs. what the persona is... I think it's a different environment... I would look to wrap my head around the work...You'd have to consciously get a mindset...to say forget the looks just focus on the words.*

Extending this, participants also thought avatars should be designed to facilitate specific results. For example, wrestling with the dissonance he would experience if a colleague portrayed his or her avatar as a “biker” before emerging as the subject matter expert of a complex topic, Participant 12 realized Alter Ego 2's avatar expressed a youthful image that might be best suited for engaging younger associates. Noting doctors tend to wear white and financial advisors gray flannel and people tend to associate garb with certain roles, this participant concluded avatars should be designed for specific purposes. Others agreed. For instance, Participant 3 confirmed if he used virtual worlds on projects he would design his avatar to enhance his leadership stature, increasing its height, age, dress or other relevant characteristics to reinforce his authority. Six respondents advanced the concept that virtual worlds and avatars provide opportunities for enhancing project facilitation.

This discourse with Participant 11 reinforces these opportunities:

*Participant 11: I think that it's really cool when you have avenue where you're promoting digital sphere more and more especially to the corporate world. We do have net meetings where we don't...see anybody's face... We have seen instances where people yelling on somebody else over the phone...but if you have some sort of visual effect...I think it will help enhance productivity. With anything that you can relate to, that you can feel close to, you tend to gain more comfort...You tend to gain more faith or trust...So only with voice is one thing, but if you add a visual effect to it, it's always going to help. It doesn't have to be...your own true image, it can be avatar. I believe with avatar people feel more confident...I would feel more confident with avatar.*

*Interviewer: Why?*

*Participant 11: Because again I don't have to be scared or inhibited about anything...I won't be influenced by other people's presence...I think that is one of the factors that people sometimes get...less confident.*

## *Issues*

Several participants confirmed the inability to view colleagues' real body language would negatively impact their potential trust in collaborating via virtual worlds and avatars and they were uncomfortable with the possibility others might be reacting to them without their knowledge. Participant 5 confirmed:

*Being able to see people and see what they do is a huge part of what we do so would I be able to trust them? I think it would take a little longer to trust them than if they're sitting in the room. Just 'cause you can't read them...in an office environment...its easier to read someone if you're talking and you can see that... they're reading their Blackberry, they're elsewhere...They either don't care or...if you say something you see someone wide eyed that either they've never heard it before or they're not happy about what you just said. Avatars are not gonna do that.*

None of these participants had previous experience with virtual worlds so perhaps training in the medium would mitigate their concerns.

*Second Life's* voice feature also created discomfort. For instance, during the demonstration most participants were unconcerned with hearing the researcher's male voice emanating from his female avatar as Alter Ego 1. On the other hand, Participant 12 confirmed he would find it difficult to engage colleagues in virtual worlds because of this. Then, although *Second Life's* voice feature is similar to a telephone with the addition of a visual image, Participant 5 perceived the researcher's voice as a monotone and confirmed he could "read voices" more effectively over the telephone. Unless speakers consciously express themselves in monotone, voices are modulated and transmitted via *Second Life* like they are over a telephone. Finally, several participants thought the avatar's body movements were not synchronized to what was said and confirmed better alignment of word and movement would improve their trust. For example, Participant 16 stated:

*I struggled with the body language and the gestures... that I was seeing on the screen...[In] our real life meetings I think you get a lot [from] reading body language and I think that while...the avatar was trying to mimic that I don't know that it was. Maybe the technology isn't there yet where it was exact so it was...a little distracting. There's a lot of eye movements and there was a lot of...quick gestures that... didn't sync up to exactly the way somebody might move their body...It was a little bit distracting.*

As with participants who cited an inability to view others' body language as a problem, the participants who cited discomfort with *Second Life's* voice feature did not have previous experience with virtual worlds.

### *Recommended Improvements*

Each participant suggested ways to facilitate trust with using virtual worlds and avatars to communicate on real projects. One thought previous experience with team members would reinforce trust. This suggestion was problematic because such history might not exist between geographically disbursed team members convened for specific projects and then disbanded. Others concluded establishing trust in virtual worlds would be no different than doing so in real environments: as they received what they needed from colleagues their trust would deepen until, as Participant 7 stated, over time their avatars would "fade into the background" and "nobody would care" how their owners presented themselves. This echoes the concept of benevolence as a state teams reach upon achieving mutual success after an initial emphasis on ability and integrity when they first convene (Jarvenpaa, Knoll & Leidner, 1998). Finally, Participant 21 suggested having project managers establish feedback loops with virtual team members, probing to both understand and improve their comfort with the technology while leveraging these interactions to further facilitate trust. Four respondents

discussed leveraging previous history with colleagues, developing trust through shared experience.

Many participants also suggested including a profile and picture of real life owners with their avatars to foster trust among virtual project team members, while some also recommended meeting in person before project initiation to foster positive interpersonal relationships during execution, as Participant 8 confirmed:

*If I could see a profile, if I'd met the person at least once then I'd be fine...if you know someone's personality then...I think...it would make it a little bit easier but if you never met the person and you have no idea if what you're looking at is real...I still don't think it gets that human connection.*

Adding profiles, pictures and meeting colleagues before engaging in virtual worlds was suggested by eight participants.

Finally, a handful of participants cited defining norms for avatar design and use following corporate etiquette and standards as critical for fostering trust. For instance, Participant 14 said he would question the judgment of a colleague who presented a displeasing or “off the wall” avatar, asserting professionalism must be maintained. Likewise, Participant 17, an individual with previous experience using virtual worlds in corporate settings, affirmed:

*There needs to be a set of norms associated with this...and those norms should be based on the policy of the company that's utilizing this...If there are...acceptable norms about [how] you interact in the office there should be the same norms in the virtual world. How you dress or how you represent yourself...How the company expects you to represent yourself should be the same in the virtual world...I think if those common expectations are set and met and followed then... that would lend itself more toward trust.*

### *Attitudes Toward Avatar Design*

During this study's interviews, a recurring theme emerged that might lead observers to conclude a single, straightforward step is all that is required to establish team member trust in communicating via avatars on real projects: design avatars that look like their owners. Fifteen participants explicitly confirmed they were more inclined to trust avatars that authentically depicted their owners than avatars that did not because they were concerned colleagues who presented themselves inaccurately would either be hiding something or dishonest. Several also said they would be uneasy interacting with inauthentic avatars because they would question why colleagues chose divergent personas throughout their interaction with them. Participant 17 stated:

*There's a chance where you can move quickly away from trust if you find out that...this person is presenting himself as X but they're really Y.”*

Participant 21 summarized it this way:

*I mean, the 'true persona' [Alter Ego 3] is...hey, here's me, here's who I am, take it or leave it. The 'enhanced persona' [Alter Ego 2] is here's how I perceive myself but then a 'false persona' [Alter Ego 1]...what are you*

*hiding? Why are you hiding behind a false persona when you can either enhance or be your true self?*

Since fifteen participants echoed these sentiments, it seems reasonable to conclude an authentic representation via one's avatar is an antecedent of virtual team trust.

Further examination belies this conclusion. While a handful of participants proceeded to choose the most authentic avatar, Alter Ego 3, as the one they would most trust, most did not. For instance, after confirming avatar authenticity was required to earn her trust, Participant 20 then contradicted herself, saying she would trust the persona that most differed from its owner, Alter Ego 1, instead because she perceived this avatar as the most professional:

*Alter Ego 1, if I just look at the avatar, seems like the more trustable person... Now obviously I'm conflicting with what I said before, it's the farthest representation of any of the actual individuals.*

Having chosen Alter Ego 1 for similar reasons, Participant 15 reacted viscerally to her own choice:

*I'm kind of upset with myself... that I would put such a premium on what somebody looks like. That...bothers me 'cause...if you were to ask me before this...would [I] care about what somebody looked like, does that change your trust value of them, I would say no but now I'm saying that's not true because...it definitely swayed me when looking at these three characters or avatars.*

This contradiction defines this study's central phenomenon: while participants confirmed they would trust an authentic avatar, most then chose otherwise after viewing the samples. The cause of this phenomenon seems to be participants' biased attitudes toward others' avatar designs.

Bias and stereotyping appeared throughout the feedback. For instance, Participant 12 said:

*I don't want to sound racist by saying this but you can often...tell where somebody is from and sometimes even their ethnicity simply by how they talk and it has nothing to do with education level, it's just the tone of the voice, things like that.*

Participant 10 echoed this:

*I would be lying if I said I don't naturally have any biases when looks and age and...ethnic [background] and...the way people dress...come into play when you're...taking in information and...understanding and...assimilating when someone's talking and what they're presenting and what they're doing...in real life...I can't say I'm above that 'cause I think it just happens.*

Participant 3 suggested reckoning with this phenomenon by designing avatars with features and dress that local colleagues are accustomed to. He even asked whether *Second Life* has a language translation function with its voice feature so what was said could be translated into the receivers' local language to complete the illusion and foster trust.

Five participants explicitly stated bias and stereotypical attitudes in their responses. Others implied such attitudes. For example, consider these participant reactions to Alter Ego 3, the most authentic avatar, after seeing it for the first time. Participants described Alter Ego 3 as part of a police lineup (Participant 5), disturbing and disconcerting (Participant 4), spooky (Participant 13), shifty (Participant 9), scary (Participant 9, Participant 21), creepy (Participant 21) and a gangster and a thug (Participant 9, Participant 15). While ethnicity and race was not systematically studied, it is instructive that this feedback was provided primarily by female participants. In addition, all participants who provided this feedback were white while Alter Ego 3 is male and looks like he may be of Asian descent.

When choosing Alter Ego 3 as the least trustworthy of the three sample avatars, Participant 20 provided this feedback:

*The facial expressions and the image that...they seem to be projecting seems...like its...not smiling or not...showing...friendliness in their face. I guess [that] would...lend me to maybe not trust them.*

This need for amiability, agreement and receptiveness in avatar design was echoed by others and seemed an important determinant of trust. Alter Ego 2, the “enhanced persona,” was beneficiary of this. For example, Participants 4 and 5 both said Alter Ego 2 was the most “fun” and that made this avatar trustworthy. Likewise, Participant 2 found Alter Ego 2’s avatar “close and trustworthy” and “saw something in common” with it. Finally, Participant 19 perceived this persona as “easy to get along with.” Six respondents cited amiability as triggering their trust.

Finally, considering Alter Ego 3, Participant 14 stated:

*I suppose you can call it stereotyping, but the initial impression of the...avatar is not necessarily...professional...It doesn't most closely resemble the appearance of people I work with...in a professional environment.*

This quote highlights a trend: several participants chose Alter Ego 1 as the most trustworthy though it also differed most from its owner because for them it portrayed the most professional image. Participant 9’s summation of the three sample avatars provides additional insight and a good summary:

*I probably trust Alter Ego 1 more than the other two because to me she just looks a little more professional, a little more clean cut...Alter Ego 3 looks mean and a little bit scary...he doesn't look like anybody I really want to deal with [laughs]... Alter Ego 2 would probably be my second choice just because he's obviously enhanced it's a little more...teenager, kinda skateboardish, which is fine, but if I'm dealing with someone on a project or in a working environment my perception is...you want to deal with someone who you think is professional and visual is obviously part of the package so I'd go with Number 1 [Alter Ego 1].*

For these participants, a professional persona was an antecedent of team trust, whether or not that persona resembled its owner.

### *Implicit Attitudes: A Possible Cause*

When he observed his participants' discomfort with Alter Ego 3, the researcher was perplexed because as he prepared for this study's demonstration, he had carefully selected pictures of Alter Ego 3's avatar and owner after considering two alternatives that depicted white men and their avatars. He chose the images used for Alter Ego 3 because their composition most closely resembled the images used for Alter Egos 1 and 2. Neither race nor ethnicity played a part in this choice so the researcher never anticipated Alter Ego 3 would trigger negative responses and adversely impact trust. Instead, he expected the majority to choose Alter Ego 3 as the most trustworthy because it was the most authentic. What triggered this contradiction? Glaser and Strauss (1967) discuss serendipitous "accidents" that illuminate theoretical research. As the researcher strove to answer this question, he recalled a phenomenon he had read about several years earlier and realized it may have been the root cause of his participants' reactions. Greenwald, McGhee and Schwartz (1998) confirmed *implicit attitudes* are perceptions, judgments or attitudes cultivated by past experience which foster unfavorable or favorable thoughts, actions or feelings. Implicit attitudes are triggered without their owners' awareness and contrast with *explicit attitudes* which are known or stated perceptions, judgments or attitudes.

Greenwald, et al. (1998) developed the *implicit attitude test (IAT)* to explore this. This test leverages software to capture favorable and unfavorable responses to word combinations, allowing researchers to chart participants' implicit attitudes. In the IAT, one computer key is set to correspond with a favorable word combination. A second key is set to correspond with an unfavorable word combination. During the test, word combinations that participants have positive reactions to trigger the selection of the associated key while word combinations that participants have negative reactions to trigger the selection of the other key. When the IAT is administered, word combinations that participants are "hard wired" to react positively or negatively toward elicit a faster response. On the other hand, word combinations participants are unaccustomed to seeing elicit a slower response. Depending upon how the test is designed, fast responses indicate the presence of positive implicit attitudes while slow responses indicate the presence of negative implicit attitudes. For example, if participants encounter the words "spider" and the phrase "pest reduction" together they might hesitate because they may be unaccustomed to conceptualizing spiders juxtaposed with the positive outcome of pest reduction. This delay would reveal the presence of a negative implicit attitude toward spiders. On the other hand, the combination of "bumble bee" with "pollination" would probably elicit faster response because most of us learn about the positive relationship between bees and pollination in helping flowers bloom at a young age. This response would reveal the presence of a positive implicit attitude toward bumble bees.

Greenwald, et al. (1998) conducted three experiments to test the effectiveness of their IAT. First, they tested response times for words describing music and flowers and response times for words describing guns and insects. The results confirmed participants held positive implicit attitudes toward music and flowers and negative implicit attitudes toward guns and insects. Then, the researchers tested the enmity between the Korean and Japanese communities. While relative immersion in their respective cultures affected the strength of the results, the researchers found participants from each community displayed negative implicit attitudes toward each other. Interestingly, these attitudes were not correlated with their explicit views since both confirmed positive perceptions of the other group. Finally, the researchers tested the attitudes of a sample of white participants toward the black community to assess whether they harbored negative implicit attitudes toward blacks. While participants explicitly confirmed they possessed positive attitudes toward the black community, the IAT confirmed their implicit attitudes were negative. Moreover, the gap between their explicit and

implicit attitudes was wide. Parallels can be drawn between Greenwald, et al.'s work and this study. Here, fifteen participants explicitly confirmed they would trust the most authentic avatar. Then they selected other avatar designs because they probably harbored negative implicit attitudes toward the most authentic avatar.

The literature is replete with anecdotes describing implicit attitudes and their impacts. For instance, while advancing a theoretical model to test the impact of height on success and income at work, Judge and Cable (2004) confirmed tall males make an average of \$5,525 more annually, roughly \$166,000 over thirty years, than their shorter counterparts. They also found this windfall does not apply for females. On the contrary, they found tall women tend to be penalized. These findings reinforced the conclusion that tall male managers are rewarded by society's positive implicit attitudes toward tall men. Likewise, after letting his hair grow long, Gladwell (2005), an acclaimed *New Yorker* staff writer of British and Jamaican descent, described being interrogated by police during a manhunt for a rapist they thought fit his description though he looked nothing like their composite sketch. He concluded their actions resulted from negative implicit attitudes toward the image he portrayed. Gladwell also recounted the story of President Warren G. Harding, a man elected to the Presidency of the United States largely because he "looked presidential" and despite a dearth of credentials. Harding served two ineffective years before dying unexpectedly in office, the beneficiary of the electorate's positive implicit attitudes toward him. Finally, he described the 1999 case of Amadou Diallo. In this case, New York City policemen shot forty one bullets into a hallway and Diallo, a black immigrant whom they saw standing on the steps outside his apartment after returning home from work one evening. On the wings of their negative implicit attitudes toward both black males and the drug ridden area where Diallo lived, the policemen concluded he was loitering while committing or aiding the commitment of a crime. Their attitudes were reinforced as they exited their vehicles, ordered Diallo to halt and he retreated into his apartment building. Killing him as he reached for an object they perceived to be a gun, they discovered Diallo had instead reached for his wallet to prove his identity as they stood over his lifeless corpse.

While these examples describe how implicit attitudes can affect people in the real world, the "Proteus Effect" implies they also affect the residents of virtual worlds. Yee and Bailenson (2007) contended people easily adopt alternative personas within virtual worlds and avatars provide mechanisms for adopting new identities and set new expectations for social engagement. They also affirmed when people adopt avatar personas their actions tend to align with their new avatars' images. In several experiments, they provided avatars to students and asked them to interact with others in virtual settings. They found participants whose avatars wore black behaved more mischievously than avatars wearing white, attractive avatars revealed more about themselves and were more forward than unattractive avatars, short avatars were taken advantage of more often than taller avatars and tall avatars assumed more powerful negotiating positions and became more effective negotiators than their shorter counterparts, a result similar to Judge and Cable's (2004) findings in the real world. In addition, the Proteus Effect may have further implications for this study because it implies the male owner of stylish and, per several participants, more professional and very female Alter Ego 1 may soon assume her traits while the owner of fun "skateboarder" Alter Ego 2 will also assume that avatar's traits.

Fortunately, the literature confirms negative implicit attitudes can be adjusted. For instance, Dasgupta and Greenwald (2001) cited previous research that posited implicit attitudes are shaped by people's accumulated information. They hypothesized such attitudes are malleable and conducted two experiments to test their hypothesis. In the first, they wanted to understand whether exposure to positive examples from the black community would adjust participants' negative implicit attitudes toward blacks and if this could have a lasting effect.

They juxtaposed pictures of revered black Americans with pictures of notorious white Americans and combined these with positive and negative word combinations via an IAT that tested participants' implicit attitudes. Then the same participant sample was tested twenty four hours later. The first day participants shown the positive images of African Americans assumed a more positive attitude toward the black community than those who were not. The second day's test confirmed these positive perceptions persisted. In the second experiment, the researchers tested whether age bias could be adjusted. Pictures of exemplary elderly people were shown alongside pictures of notorious young people and an IAT was conducted. The results were similar to those in the first experiment: exposure to positive examples of older people improved participants' implicit attitudes toward this age group.

Blair, Ma and Lenton (2001) also conducted five experiments using the IAT and similar tests to assess whether negative implicit attitudes are inevitable. The researchers employed *mental imagery* to trigger perceptions of *counter stereotypes*. Mental imagery is the act of picturing something or someone in the "mind's eye," thereby approximating real experience. The researchers hypothesized that since mental imagery affects cognitive processes it is also possible that it adjusts implicit attitudes, potentially altering biased response. Each experiment employed positive, strong images of women to counteract stereotypical weak portrayals. The results confirmed mental imagery moderates negative implicit attitudes even when this imagery is presented in contexts participants do not perceive to be related with an experiment. Concluding their findings displayed external validity, the researchers recommended replacing traditional stereotype suppression techniques with mental imagery because the former are difficult to manage and may have unintended side effects. They also confirmed considering group diversity by actively fostering positive mental imagery should effectively mitigate negative implicit stereotypes.

## Discussion

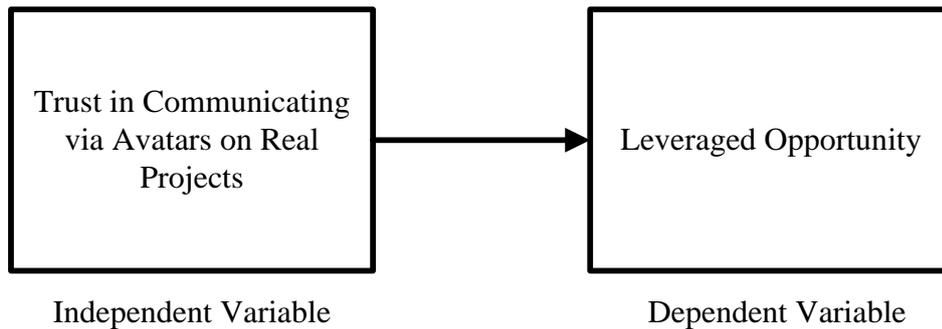
In contrast with the prevailing sociological trends of their day that emphasized proving previously confirmed "grand theory," Glaser and Strauss (1967) described grounded theory as theory that fits its data. This study adopted Glaser and Strauss' approach: the researcher did not attempt to prove predefined hypotheses, instead he looked for answers to questions that impact his profession. He then focused his efforts using a research model, coded his findings and compared data slices from across his theoretical sample. General properties and relations between them emerged, providing a foundation for the integrated theoretical model described in this section.

### *Building a Theoretical Model*

A goal of grounded theory studies is to generate theoretical models that can be tested by subsequent researchers (Creswell, 2007). This study's findings indicate relationships that can be modeled and this section presents a theoretical model that describes these relationships. It begins by describing several component models and then consolidates these into a comprehensive model. Three variable types are referenced: *dependent variables* are items of primary interest, *independent variables* positively or negatively affect dependent variables and *moderating variables* modify relationships between independent and dependent variables (Sekaran, 2003).

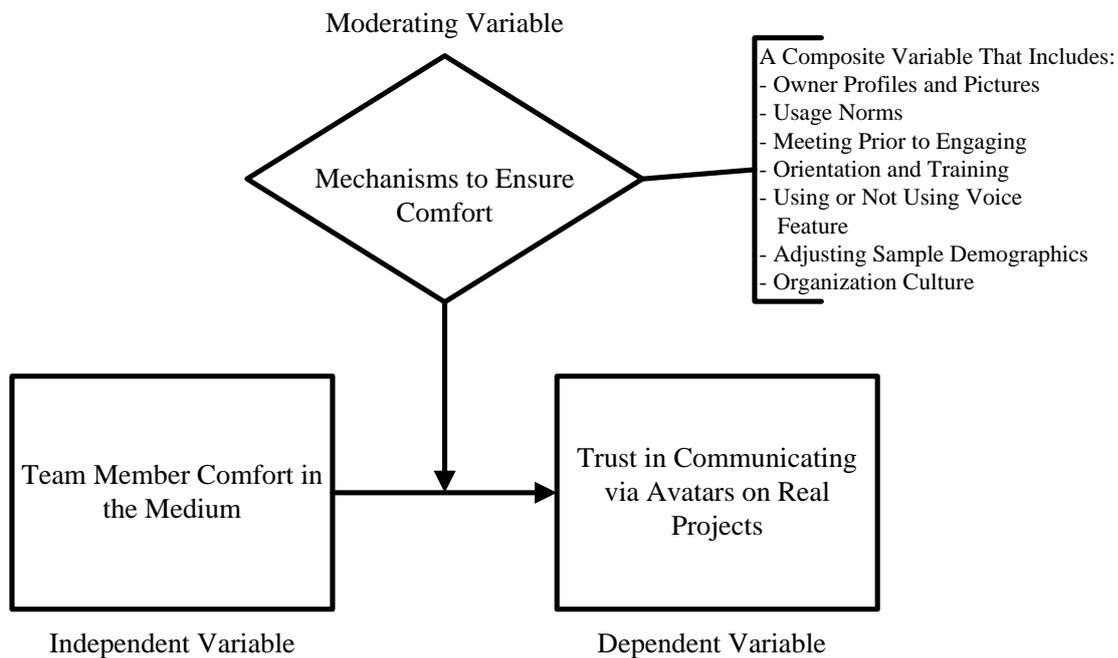
The first component model describes the relationship between trust in the medium of virtual worlds and the opportunities these environments provide. It includes a single dependent variable and a single independent variable. The dependent variable is the successful leveraging of opportunity. The independent variable is the establishment of trust in

communicating via avatars on real projects. The model implies if trust is successfully established the potential for leveraging opportunity increases, as shown in Figure 3.



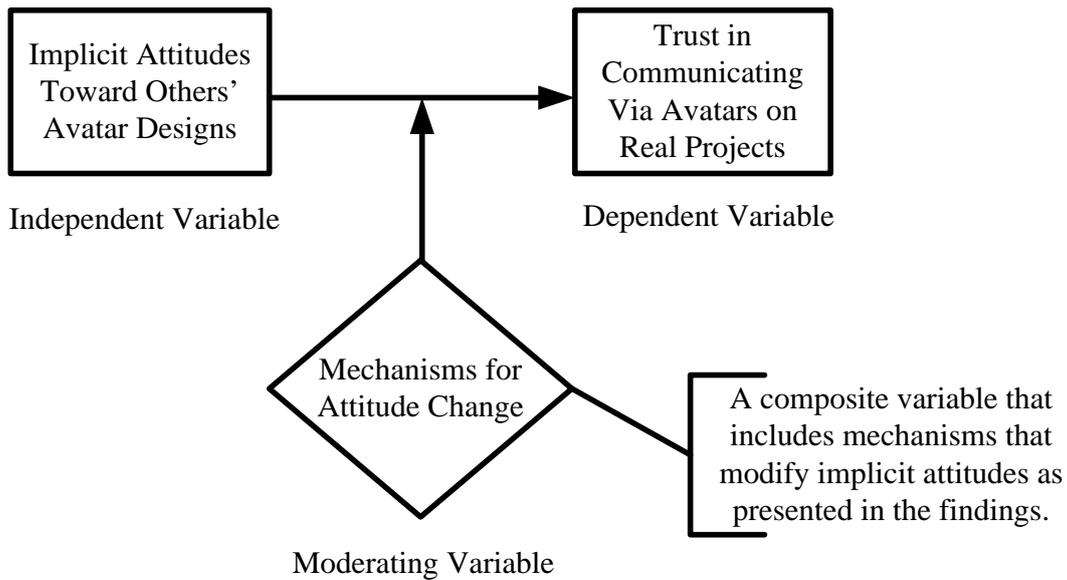
**Figure 3:** The impact of trust in avatar communications on opportunity.

The second component model reassigns the first model’s independent variable, trust, as its criterion. It then introduces a new predictor, team member comfort in the medium of virtual worlds. This model also introduces a composite moderating variable entitled “Mechanisms to Ensure Comfort.” This variable is composed of the mechanisms suggested in the findings: associating owner profiles and pictures with their avatars, setting corporate usage norms, conducting meetings to introduce team members to one another prior to engaging, conducting orientation and training and using or not using *Second Life’s* voice feature or an analogous feature in other virtual worlds.



**Figure 4.** Trust in communicating through avatars via team member comfort.

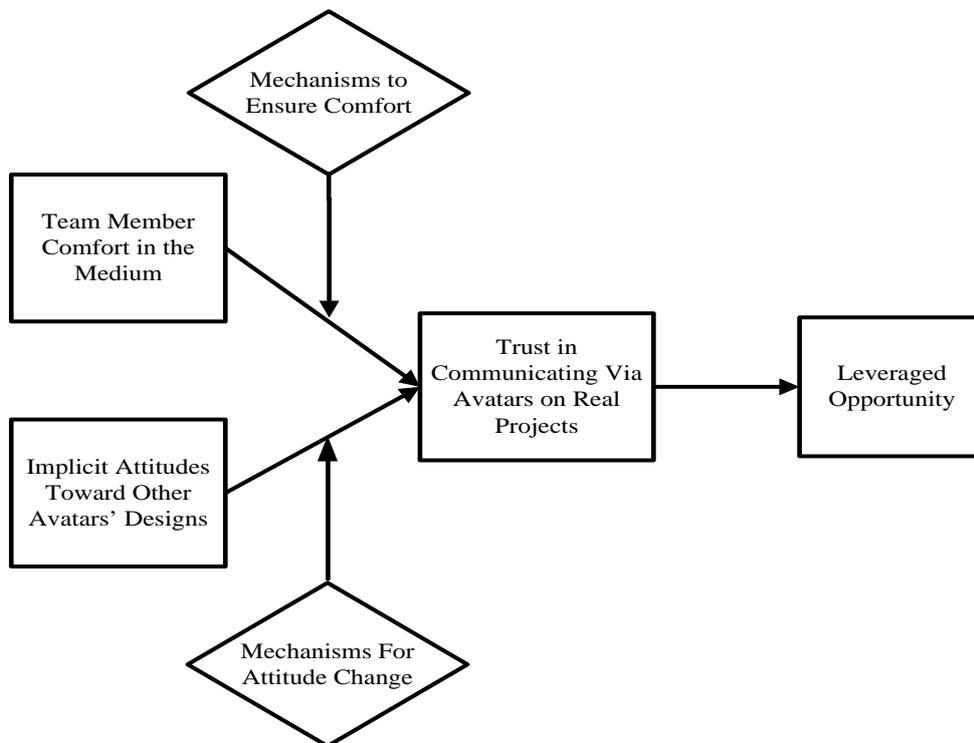
Figure 5 displays the third component model, which also sets trust as its criterion and introduces a new predictor, “Implicit Attitudes Toward Others’ Avatar Designs.”



**Figure 5.** Attitudes toward team members’ avatar designs and trust in communicating via avatars.

The model also sets “Mechanisms for Attitude Change” as its moderating variable. Another composite variable, its purpose is to introduce mechanisms that modify implicit attitudes like those employed in the studies discussed in the findings.

Figure 6 presents a comprehensive theoretical model derived from these component models.



**Figure 6.** The impact of team member comfort and attitudes on avatar trust and the ability to leverage virtual world opportunities.

This model provides many avenues for exploration. First, researchers can focus on its components. Consider the “comfort” portion, starting with the leftmost process box entitled “Team Member Comfort in the Medium.” Since this section’s moderating variables are clearly defined, devoting resources to testing it should yield concrete results relatively quickly. Now consider the “attitudes” portion of the model, starting with the leftmost process box entitled “Implicit Attitudes Toward Others’ Avatar Designs.” Because they are not clearly defined, testing the impact of these moderating variables on trust may be more difficult and more resources and effort may be required. Then, researchers may choose to stop with assessments of team member trust or test through to the rightmost process box to understand how all this impacts whether opportunities are leveraged. Component studies may be performed in isolation or together see if interdependencies exist between comfort, attitudes, trust and opportunity. Finally, the entire model can be tested to learn how the system works. While studying this theoretical model by completing component studies and then building upon them may be more feasible than mounting a “big bang” approach, this strategic decision is left to subsequent researchers.

### References

- Alterbosch, L., Pierce, R., & Simmons, G. (2008). Massively multiplayer online role playing games, the past, present and future. *ACM Computers in Entertainment*, 5(4). Retrieved from <http://www.cs.vu.nl/~eliens/stud/research/projects/local/cie/a9-achterbosch.pdf>
- Arakji, R. Y., & Lang, K. R. (2007). The virtual cathedral and the virtual bazaar. *SIGMIS Database*, 38(4), 32-39.
- Bailenson, J. N., Yee, N., Merget, D., & Schroeder, R. (2006). The effect of behavioral realism and form realism of real-time avatar faces on verbal disclosure, nonverbal disclosure, emotion recognition, and copresence in dyadic interaction. *Presence: Teleoperators & Virtual Environments*, 15(4), 359-372.
- Bittarello, M. B. (2008). Another time, another space: Virtual worlds, myths and imagination. *Journal of Virtual Worlds Research*, 1(1), 1-18.
- Blair, I. V., Ma, J. E., & Lenton, A. P. (2001). Imagining stereotypes away: The moderation of implicit stereotypes through mental imagery. *Journal of Personality and Social Psychology*, 81(5), 828-841.
- Boon, S., & Sinclair, C. (2009). A world I don't inhabit: Disquiet and identity in Second Life and Facebook. *Educational Media Journal*, 46(2), 99-110.
- Brown, E., Hobbs, M., & Gordon, M. (2008). A virtual world environment for group work. *International Journal of Web-Based Learning and Teaching Technologies*, 3(1), 1-11.
- Cabiria, J. (2008). Benefits of virtual world engagement: Implications for marginalized gay and lesbian people. *Media Psychology Review*, 1(1).
- Chidambaram, L. (1996). Relational development in computer-supported groups. *MIS Quarterly*, 20(2), 143-165.
- Cowell, A. J., & Cowell, A. K. (2009). *Avatars in analytical gaming*. Paper presented at the 2009 International Conference on Computational Science and Engineering.
- Creswell, J. W. (2007). *Qualitative inquiry and research design: Choosing among five approaches* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.
- Creswell, J. W. (2008). *Educational research: Planning, conducting and evaluating quantitative and qualitative research* (3rd ed.). Saddle River, NJ: Pearson/Merrill Prentice Hall
- Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory into Practice*, 39(3), 124-130.

- Cross, J., O'Driscoll, T., & Trondsen, E. (2011). Another life: Virtual worlds as tools for learning. *eLearn Magazine*. Retrieved from <http://www.elearnmag.org/subpage.cfm?searchterm=teachers&article=44-1&section=articles>
- Damer, B. (2008). Meeting in the ether: A brief history of virtual worlds as a medium for user-created events. *Journal of Virtual Worlds Research*, 1(1), 1-17.
- Dasgupta, N., & Greenwald, A. G. (2001). On the malleability of automatic attitudes: Combating automatic prejudice with images of admired and disliked individuals. *Journal of Personality and Social Psychology*, 81(5), 800-814.
- Davis, A., Murphy, J., Owens, D., Khazanchi, D., & Zigers, I. (2009). Avatars, people, and virtual worlds: Foundations for research in metaverses. *Journal of the Association for Information Systems*, 10(2), 90-117.
- Day, T. (2009-2010). Avatar rights in a constitutionless world. *Hastings Entertainment and Law Journal*, 21(1), 137-156.
- Dibbell, J. (1994). A rape in cyberspace or how an evil clown, a Haitian trickster spirit, two wizards, and a cast of dozens turned a database into a society. *N.Y.U. Annual Survey of American Law*, 471-489.
- Drachen, A., & Smith, J. H. (2008). Player talk - the functions of communication in multiplayer role-playing games. *Computers in Entertainment*, 6(4), 1-36.
- Ducheneaut, N., Moore, R. J., & Nickell, E. (2007). Virtual third places: A case study of sociability in massively multiplayer games. [Article]. *Computer Supported Cooperative Work: The Journal of Collaborative Computing*, 16, 129-166.
- Ellis, J. B., Luther, K., Bessiere, K., & Kellogg, W. A. (2008). *Games for Virtual Team Building*. Paper presented at the Proceedings of the 7th ACM conference on Designing Interactive Systems.
- Fors, A. C., & Jakobsson, M. (2002). Beyond use and design: The dialectics of being in virtual worlds. *Digital Creativity*, 13(1), 1-14.
- Galanxhi, H., & Nah, F. F.-H. (2007). Deception in cyberspace: A comparison of text-only vs. avatar-supported medium. *International Journal of Human-Computer Studies*, 65(9), 770-783.
- Gersick, C. J. G. (1988). Time and transition in work teams: Toward a new model of group development. *Academy of Management Journal*, 31(1), 9-41.
- Girard, N. (2007). Griefer madness: Terrorizing virtual worlds. *LinuxInsider*. Retrieved from <http://www.linuxinsider.com/story/59401.html>
- Gladwell, M. (2005). *Blink: The power of thinking without thinking* (1st ed.). New York, NY: Little, Brown and Company.
- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago, IL: Aldine Publishing Company.
- Goel, M. L. (2002). *Religions tolerance and Hinduism*. Paper presented at the Asian Values Conference, Florida Atlantic University.
- Gollub, R. (2007). Second life and education. *Crossroads*, 14(1), 1-8.
- Golub, A. (2010). Being in the world (of warcraft): Raiding, realism and knowledge production in a massively multiplayer online game. *Anthropological Quarterly*, 83(1), 17-46.
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The implicit association test. *Journal of Personality and Social Psychology*, 74(6), 1464-1480.
- Guest, T. (2008). *Second lives: A journey through virtual worlds*: Random House.
- A guide to the project management body of knowledge*. (2004). (3rd ed.). Newtown Square, PA: The Project Mangement Institute.

- Hammill, G. (2005). Mixing and managing four generations of employees. *FDU Magazine*, 12.
- Hinds, P. J., & Bailey, D. E. (2003). Out of sight, out of sync: Understanding conflict in distributed teams. *Organization Science*, 14(6), 615-632.
- Jarvenpaa, S. L., Knoll, K., & Leidner, D. E. (1998). Is anybody out there? Antecedents of trust in global virtual teams. *Journal of Management Information Systems*, 14(4), 29-64.
- Jarvenpaa, S. L., & Leidner, D. E. (1999). Communication and trust in global virtual teams. *Organization Science*, 10(6), 791-815.
- Jarvenpaa, S. L., Shaw, T. R., & Staples, D. S. (2004). Toward contextualized theories of trust: The role of trust in global virtual teams. *Information Systems Research*, 15(3), 250-267.
- Jensen, S. S. (2010). *Shadows cast on the screen?* Paper presented at the ECREA pre-conference: Avatars and Humans. Representing Users in Digital Games, Hamburg.
- Judge, T., & Cable, D. M. (2004). The effect of physical height on workplace success and income: Preliminary test of a theoretical model *Journal of Applied Psychology*, 89(3), 428-441.
- Junglas, I. A., Johnson, N. A., Steel, D. J., Abraham, D. C., & MacLoughlin, P. (2007). Identity formation, learning styles and trust in virtual worlds. *SIGMIS Database*, 38(4), 90-96.
- Kanawattanachai, P., & Yoo, Y. (2002). Dynamic nature of trust in virtual teams. *The Journal of Strategic Information Systems*, 11(3-4), 187-213.
- Kaplan, A. M., & Haenlein, M. (2009). The fairyland of Second Life: Virtual social worlds and how to use them. *Business Horizons*, 52(6), 563-572.
- Karlova, N. (2011). Research spotlight: Virtual worlds, avatars and trust. *CGP: Critical Gaming Project*. Retrieved from <https://depts.washington.edu/critgame/wordpress/2011/01/research-spotlight-virtual-worlds-avatars-and-trust/>
- Kumar, S., Chhugani, J., Changkyu, K., Daehyun, H., Nguyen, A., Dubey, P., et al. (2008). Second Life and the new generation of virtual worlds. *Computer*, 46-52.
- Kushner, D. (2008). Winner: Make your very own virtual world with OLIVE. *IEEE Spectrum*. Retrieved from <http://spectrum.ieee.org/telecom/internet/winner-make-your-very-own-virtual-world-with-olive>
- Locke, L. F., Spirduso, W. W., & Silverman, S. J. (2007). *Proposals that work: A guide for planning dissertations and grant proposals* (5th ed.). Thousand Oaks, CA: Sage Publications, Inc.
- Markus, M. L. (1994). Electronic mail as the medium of managerial choice. *Organization Science*, 5(4), 502-527.
- McArthur, V. (2008). *Real ethics in a virtual world*. Paper presented at the CHI '08 extended abstracts on Human factors in computing systems.
- Messinger, P. R., Ge, X., Stroulia, E., Lyons, K., Smirnov, K., & Bone, M. (2008). On the relationship between my avatar and myself. *Journal of Virtual Worlds Research*, 1(2), 1-17.
- Montoya-Weiss, M. M., Massey, A. P., & Song, M. (2001). Getting it together: Temporal coordination and conflict management in global virtual teams. *Academy of Management Journal*, 44(6), 1251-1262.
- Moore, R., Ducheneaut, N., & Nickell, E. (2007). Doing virtually nothing: Awareness and accountability in massively multiplayer online worlds. [Article]. *Computer Supported Cooperative Work: The Journal of Collaborative Computing*, 16, 265-305.

- Morrison, R. (2009). Empathy from avatars: Propositions for improving trust development in pseudo-social relationships with avatars. *European Journal of Social Sciences*, 12(2), 298 - 309.
- Neustaedter, C., & Fedorovskaya, E. (2009). *Capturing and sharing memories in a virtual world*. Paper presented at the CHI 2009 Conference.
- Nottonson, K., & DeLong, K. (2008). Baby steps: Agile transformation at babycenter.com. *IT Pro*, 59 - 62.
- Owens, D., Davis, A., Murphy, J. D., Khazanchi, D., & Zigurs, I. (2009). Real-world opportunities for virtual project management. *IT Pro*, 34-41.
- Parmentier, G., & Rolland, S. (2009). Consumers in virtual worlds: Identity building and consuming experience in Second Life. *Recherche et Applications en Marketing*, 24(3), 43-55.
- Piccoli, G., & Ives, B. (2003). Trust and the unintended effects of behavior control in virtual teams. *MIS Quarterly*, 27(3), 365-395.
- Platoni, K. (2008). Seeing is Believing. *Stanford Magazine* Retrieved from <http://www.stanfordalumni.org/news/magazine/2008/janfeb/features/virtual.html>
- Powell, A., Galvin, J., & Piccoli, G. (2006). Antecedents to team member commitment from near and far. *Information Technology & People*, 19(4), 299-322.
- Reed, D. J., & Fitzpatrick, G. (2008). Acting your age in Second Life. *Fun and Games*, 5294, 158-169.
- Reidsma, D., op den Akker, R., Rienks, R., Poppe, R., Nijholt, A., Heylen, D., et al. (2007). Virtual meeting rooms: From observation to simulation. [Article]. *AI & Society*, 22, 133-144.
- Robbins, S., & Bell, M. (2008). *Second Life for dummies*. Indianapolis, IN: Wiley Publishing, Inc.
- Ross, T., & Westermann, U. (2008). Constructing arden: Life inside the machine. *IEEE Multimedia*, 15, 4-9.
- Schultze, U., & Leahy, M. M. (2009). *The avatar-self relationship: Enacting presence in Second Life*. Paper presented at the International Conference on Information Systems (ICIS), Phoenix, AZ.
- Sekaran, U. (2003). *Research methods for business: A skill building approach* (4th ed. vol. ). Hoboken, NJ: John Wiley and Sons, Inc.
- Simon, S. (2010). Avatar II: The hospital. Retrieved from <http://online.wsj.com/article/SB10001424052748703909804575124470868041204.html#articleTabs%3Darticle>
- Skye, S. (2008). Annoying Second Life profiles. <http://slfix.com/?p=166>
- Spence, J. (2008). Demographics of virtual worlds. *Journal of Virtual Worlds Research*, 1(2), 1-45.
- Steinkuehler, C. A., & Williams, D. (2006). Where everybody knows your (screen) name: Online games as "third places". *Journal of Computer-Mediated Communication*, 11(4), 885-909.
- Sureshchandra, K., & Shrinivasavadhani, J. (2008). *Adopting agile in distributed development*. Paper presented at the IEEE Conference on Global Software Engineering.
- Teleplace: A powerful, next-generation solution for virtual teams from Teleplace, Inc.* (2009). Redwood City: Teleplace, Inc.
- Tychsen, A., Hitchens, M., & Brolund, T. (2008). Character play: The use of game characters in multi-player role-playing games across platforms. *Computers in Entertainment*, 6(2), 1-24.

- Warner, D. E., & Raiter, M. (2005). Social context in massively-multiplayer online games (MMOGs): Ethical questions in shared space. *International Review of Information Ethics*, 5, 46-52.
- Wolfendale, J. (2007). My avatar, my self: Virtual harm and attachment. *Ethics and Information Technology*, 9(2), 111.
- Yee, N., & Bailenson, J. N. (2007). The proteus effect: The effect of transformed self-representation on behavior. *Human Communication Research*, 33(3), 271-290.

## Appendix A Interview Protocol

### **Interview Protocol - Implications for Real Project Management Success: A Study of Avatar Identity as an Antecedent of Virtual Team Trust**

Time of Interview:

Date of Interview:

Participant Number:

Age of Interviewee:

Previous Virtual World Experience:

### **Questions**

1. If you were asked to collaborate on a project using virtual worlds, what impact, if any, would communicating with colleagues via avatars have on whether or not you trust them?
2. If communicating via avatars would positively impact your trust in colleagues, why is that? If the impact would be negative, why? In the negative case, how might trust be improved?
3. Asked to work with distributed colleagues on a project requiring communication via avatars in virtual worlds, which of the three avatar personas would you most trust: Alter Ego 1, Alter Ego 2 or Alter Ego 3? Why?
4. Asked to work on a project with distributed colleagues requiring communication via avatars in virtual worlds, which of the three avatar personas would you least trust: Alter Ego 1, Alter Ego 2 or Alter Ego 3? Why?
5. Of the three avatar personas, Alter Ego 1, Alter Ego 2 and Alter Ego 3, consider the persona you had the most neutral reaction to. Why?

Appendix B  
Coding Analysis

Axial Code	Sub Category	Open Code	Totals Per Open Code	Totals by Axial Code	
Opportunity	Expression	Aspiration	3		
		Bridging	2		
		Confidence	3		
		Dishonesty	1		
		Level Playing Field	4		
	Facilitation	True Self	6		
		Content Focus	2		
		Growth	1		
		Influence	1		
		Tailor for Goal	3	26	
Issues & Improvements	Improvements	Accuracy	1		
		Feedback	1		
		Meeting Beforehand	1		
		Norms	2		
		Picture	3		
		Previous Acquaintance	5		
		Previous Familiarity	1		
		Professionalism	1		
		Profile	2		
		Voice Required	1		
		Issue	Dissonance	1	
			Lack of Body Language	5	
			Lack of Value	1	
	Misunderstanding the				
	Medium		2		
	No human interaction		1		
	Only a Game		1		
	Voice Feature: Inaccurate				
	Movements		3		
	Voice Required		1		
	Previous Experience	Common Experience	3		
		Previous Experience	2		
	Pros of v.w.	Swift Trust	1		
Engagement		3			
	Situating	1	43		

Axial Code	Sub Category	Open Code	Totals Per Open Code	Totals by Axial Code		
Avatar Design & Trust	Amiable	Accessibility	1			
		Accommodation	1			
		Commonality	1			
		Easygoing	1			
		Fun	2			
		Trustworthiness	1			
		Unfriendly	1			
	Bias	First Impression	1			
		Shared Background	3			
		Stereotyping	3			
	Design	Not Refined	1			
		Revulsion	7			
	Professionalism	Appeal	1			
		Normalcy	1			
		Professionalism	4			
		Trustworthiness	1			
	X -> X, X -> Y	Accuracy	1			
		Authenticity	7			
		Believability	1			
		Dishonesty	2			
		Dissonance	4			
		Hiding	4			
		True Self	1	50		
		Grand Total Open:			119	119

### Author Note

Dr. Mike Lohle holds a Ph.D. in Information Systems from Nova Southeastern University and is a certified Project Management Professional (PMP) with twenty five years of project, program and portfolio management experience in the financial services, insurance, reinsurance, IT services, pharmaceuticals and consumer products industries. Dr. Lohle is an Adjunct Professor at University of Bridgeport and serves on University of Bridgeport's School of Business Advisory Board. He also serves on dissertation committees for Nova Southeastern University's Graduate School of Computer and Information Science and has published articles in the International Journal of Case Method and Application and the Southwest Decision Sciences Institute's annual conference proceedings. Any correspondence can be made to the following: Phone: 203-770-3854; E-mail: [mlohle@bridgeport.edu](mailto:mlohle@bridgeport.edu).

Dr. Steve Terrell teaches quantitative and qualitative research methodology and statistics at Nova Southeastern University's Graduate School of Computer and Information Science. He has graduate degrees in higher education, counseling and business and is an active member of the American Counseling Association, the American Psychological Association and the American Educational Research Association where he served as chair of the Online Teaching and Learning Special Interest Group. Dr. Terrell serves on the editorial board of several national and international journals and is the author of *Statistics Translated: A Step-by-Step Guide to Analyzing and Interpreting Data* as well as over 120 journal articles, book chapters, conference papers and presentations. Any correspondence can be made to the following: Phone: 954-262-2084; E-mail: [Terrell@nova.edu](mailto:Terrell@nova.edu).

Copyright 2014: Michael F. Lohle, Steven R. Terrell, and Nova Southeastern University.

**Article Citation**

Lohle, M. F., & Terrell, S. R. (2014). Real projects, virtual worlds: Coworkers, their avatars and the trust conundrum. *The Qualitative Report*, 19(15), 1-35. Retrieved from <http://www.nova.edu/ssss/QR/QR19/lohle15.pdf>

---