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Gender differences in virtual collaboration on a creative design task

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GENDER DIFFERENCES IN VIRTUAL COLLABORATION ON A CREATIVE DESIGN TASK

Research-in-Progress

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Abstract

Collaboration is an important activity in every organization because it fundamentally affects work processes and organizational outcomes. Diversity adds complexity to the mechanism of virtual teams because teams routinely operate virtually by spanning temporal, geographic, national, and cultural boundaries. One important way to decode such complexity is to understand gender differences and their impacts on virtual modes of collaboration. In this research, we examine gender differences and how they influence outcomes and attitudes on virtual collaboration in the context of team gender composition. Phase one of our study involved male-male dyads and female-female dyads that collaborated virtually in Second Life. The preliminary results show that impression management and team effort both have significant positive impacts on team outcomes (trust and satisfaction). Phase two of our study is on dyads of mixed gender.

Keywords: Virtual team, collaboration, gender, dyad, impression management, trust, satisfaction

Introduction

As virtual teams continue to increase in importance in organizations, so has the diversity of the members in these teams. While diversity can be defined along several dimensions, one of the most prominent characteristics of team members is gender. When working on a task, the gender composition of a team can influence how the team members feel about themselves and the way the team functions. Gender has consistently been demonstrated as being an important diffuse characteristic upon which expectations and beliefs about fellow team members are formed (Berger et al. 1977). As such, the gender composition of a team represents an important factor influencing team member behaviors and performance, and offers "theoretical accounts for what we know about gender behavior in interpersonal situations" (Wagner and Berger 1997, p. 3) such as collaborative task performance (Igbaria and Baroudi 1995; Riedl et al. 2010). When people collaborate, they form perceptions of their work partners. For instance, the way females feel about their partners is different from the way males feel about their partners and, in turn, the collaboration process and outcomes are perceived differently (Gefen and Ridings 2005; Hess et al. 2005-2006). These perceptions about gender are also evident in virtual teams (Weber et al. 2009). It is therefore important to understand and manage gender diversity in virtual team collaborations.

The objective of our study is to examine gender differences and their impacts on virtual collaboration. More specifically, we investigate the role of gender in impression management and how this factor influences outcomes and attitudes differently in same-gender and mixed-gender dyadic virtual teams. This research topic is of importance for two primary reasons. First, existing theories and studies suggest that gender differences and impression management play important roles in how team members perceive each other and how they behave. Such roles also carry into virtual teams and virtual collaborations. Second, despite the popularity of gender differences in traditional team studies such as Astin (1977), Lee and Bryk (1986), Baugh and Graen (1997), and Klein and Dologite (2000), very few of them have empirically looked at how the perceptions formed by teams of different gender compositions influence behaviors and outcomes on collaborative task performance, regardless of whether such collaborations are face-to-face or virtual. In this research, we are interested in studying how dyadic teams with varied gender compositions manage virtual team collaborations in order to develop a more in-depth understanding of whether gender composition matters in virtual teams and, if so, in what ways.

Literature Review

Virtual Team Collaboration

Prior IS research has found several factors influencing virtual teams and collaborations. For instance, the communication medium used by virtual teams is a major factor influencing team development, team perceptions, and team performance (Briggs et al. 1998; Fjermestad and Hiltz 1998; Mennecke and Valacich 1998; Nunamaker et al. 1996). In addition, scholars studying virtual teams have identified a number of important antecedents such as the nature of the technology used for collaboration and outcome variables such as trust, cohesion, satisfaction, and performance (Hertel et al. 2005; Majchrzak et al. 2000; Maznevski and Chudoba 2000). For example, trust has been shown to be an important variable influencing team performance and perceptions such as cohesion and satisfaction (Jarvenpaa and Leidner 1999; Jarvenpaa et al. 2004; Kanawattanachai and Yoo 2002). Other research studying collaboration in virtual environments has focused on sense of being in a place and in a body (Benyon et al. 2006; Mennecke et al. 2011), perceptions of presence (Lathrop and M.K. 2005; Sandamas and Foreman 2007), and social presence (Lombard and Ditton 1997; Schroeder 2006).

Gender Differences in Team and Virtual Team Collaboration

The theoretical grounding for our study concerns gender differences and their impact on interpersonal behavior (e.g., impression management) and team outcomes (e.g., trust and satisfaction). The concept of gender roles refers to socially and culturally defined behaviors, emotions, activities, and attributes of men and women (Anselmi and Law 1998). Two prominent theories, Gender Schema Theory (Bem 1981) and Social Role Theory (Eagly 1987), can be used to explain gender differences in the context of normative roles and their applications in virtual collaboration. First, Gender Schema Theory (Bem, 1981) defines a

schema as "a cognitive structure, a network of associations that organizes and guides an individual's perception" (p. 354) and postulates that gender schema (a belief about culturally and socially constructed roles of men and women) is formed through the process of "sex typing" where a society "transmutes male and female into masculine and feminine" (p. 354). The second influential theory, Social Role Theory (Eagly, 1987), posits that gender differences are the products of arbitrary socialization experiences. The theory proposes that the expectancies of the social behavior of each gender are instrumental in the development of sexual stereotypes. Accordingly, men and women conform to these expectations, i.e., the stereotypes of their social roles. Males develop traits such as the inclination to be independent, assertive, and competent, while females develop traits that manifest communal or expressive behavior, entailing the tendency to be friendly, unselfish, and expressive (Eagly and Wood 1991). If someone's behavior is consistent with his/her prescribed social roles, he/she is generally viewed favorably; however, if someone's behavior violates acceptable norms for his/her gender, he/she is likely to be viewed negatively.

In the information systems (IS) field, the construct of gender has been examined in a large number of studies. Early work was built on theoretical foundations associated with culture, such as Hofstede's cultural dimensions, and social-psychological theories such as gender stereotypes (e.g., Ahuja 2002; Gefen and Straub 1997; Gorriz and Medusa 2000; Igbaria and Baroudi 1995; Truman and Baroudi 1994; Venkatesh and Morris 2000). While the focus on the deterministic nature of gender-roles has been criticized because of its effect in reinforcing well-known stereotypes and confirming, rather than challenging, gender inequalities (Howcroft and Trauth 2008), much of the literature in IS holds that gender is a moderator influencing behavior and attitudes.

Related to team collaboration, a strand of IS research focuses on the team and organizational context where gender remains a complex topic. It has been widely tested and accepted by IS researchers that gender differences impact the processes and outcomes of team collaboration. Here, gender differences are reflected in the expectations and experiences within work relationships. From the gender stereotypic perspective, men have historically taken a dominating role (i.e., to be practical regarding task completion) with more attention focused on action (e.g., doing the work) whereas women have played a supportive role (i.e., to be caring and supportive of team members) with more emphasis on emotion (e.g., perceiving the feelings) (Awad and Ragowsky 2008; Riedl et al. 2010). In the group and team collaboration context, team members' expectations, actions, and reactions often mirror the gender stereotypes. Men are more task-oriented, tend to focus on the completion of the task, and often dominate the collaboration process. Women, on the other hand, are not only more friendly and agree more with other group members, but they also help in maintaining relationships among team members and try to avoid conflicts (Chattopadhyay et al. 2008). In addition, females are typically more distressed by interpersonal and relational problems compared to males (Crick 1995). Thus, females are more sensitive to the causes of any potential interpersonal problems and tend to pay more attention to acts that improve potentially negative interpersonal conditions such as how others view them (i.e., others' impressions of them).

Despite the amount of work done on gender issues in the IS domain, research examining gender differences in collaborative and distributed work practices such as virtual teams and virtual communities is sparse. Researchers acknowledge that the use of electronic technologies in virtual teams filters out various information and social cues from group communication (Cramton 2001, Daft et al. 1987; Sproull and Kiesler 1986). Some believe that, as a result, gender differences may become less salient when team members are anonymous because females are able to communicate with others without being judged on the basis of their sex (Connolly et al. 1990; Flanagin et al. 2002; Gopal et al. 1997). However, other researchers hold a different point of view (e.g., Gefen and Ridings 2005; Hess et al. 2005-2006; Weber et al. 2009; Nah et al. 2010). Specifically, Gefen and Ridings (2005) found that gender differences such as those reflected in oral discourse "carry over to the asynchronous written environment of virtual communities and affect men's and women's respective perceptions of community quality" (p. 78). Specifically, men communicate to establish superior social standing, while women communicate to offer and receive compassion, rapport, and empathy, and "gender-related undertones were stronger in mostly single-gender as opposed to mixed-gender communities" (p. 89). Other studies also support a similar view that gender influences team behavior. For instance, women were more involved (i.e., socially focused) than men in computer-mediated decision-making (Hess et al. 2005-2006). Further, in a study of motivational gains in computer-mediated groups, females were more motivated by social indispensability and males were more motivated by social competition (Weber et al., 2009). Finally, Nah et al. (2010) found women to be more satisfied with hedonic online experiences than men in a virtual

world. In summary, significant gender differences have been reported in the IS and computer-mediated environments.

Impression Management

Impression management, also referred to as self-presentation, is the process whereby people seek to influence or control the image that others form of them (Goffman 1959; Leary et al. 1994; Rosenfeld et al. 1995). It is widely accepted that people's lives are greatly affected by the impressions others have of them (Leary et al. 1994). The social consequences of being perceived positively differ greatly from the consequences of being regarded negatively (Leary et al. 1994). Thus, people often monitor and attempt to control the impressions they are giving to others through self-presentation or impression management in order to attain valued goals (Goffman 1959; Schlenker 1980). Impression management is a goal-directed process because individuals choose, control, or manipulate behaviors with the purpose of building a desired "public" image (Gardner and Martinko 1988). Impression management thus relates to the purposeful "bending" of the truth to make a favorable perceived impression. For instance, an individual can use a variety of self-presentation tactics to control the image delivered (Bozeman and Kacmar 1997) by avoiding unfavorable information and by emphasizing or even exaggerating positive images.

In the organizational setting, impression management is used with tactical (i.e., short term) or strategic (i.e., long term) intentions. Gardner (1992) explained the strategic use of impression management and implied that managers consciously control and manipulate their impressions to influence organizational and personal success (Gardner and Martinko 1988). This process may involve numerous strategies. For example, Jones and Pittman (1982) identified five distinct impression management strategies that were used proactively by individuals and Greener (2007) found that managers use different impression management tactics in front-stage and outside-stage relationships with other social actors.

Gender differences, not surprisingly, play a role in the execution of impression management tactics and strategies. Guadagno and Cialdini (2007) reviewed ten impression management tactics used by female and male employees. They believe people select different impression management styles to meet certain goals, and females and males use the tactics depending on their gender role expectations. Their predictions were confirmed in that "men report using tactics that are more consistent with the masculine gender role, and women report using of tactics that are more consistent with the feminine gender role" (Guadagno and Cialdini 2007, p. 489). In addition, Bolino and Turnley (2003) studied 76 supervisor-subordinate dyads in a law enforcement agency and showed that if female employees managed their impressions counter-normatively (i.e., against the feminine gender role), their supervisor ratings of likeability decreased. Such a relationship does not exist for males. Similarly, Singh and Vinnicombe (2001) looked at how subordinates signal their commitment to their managers using gendered impression management strategies. They found males use more work-related strategies while females build closer upward relationships, conforming to gender stereotypes in the business environment.

Although many studies have examined impression management in various social and sociological contexts, little is known today about how impressions are managed between dyadic partners in the performance of virtual collaborative tasks. In addition, to the best of our knowledge, no empirical data have been collected on the influences of impression management in same- and mixed-gender dyads working in an immersive virtual environment. Thus, there are both theoretical and practical reasons to examine the role of impression management and its interplay with gender in the context of virtual collaboration.

Research Model and Hypotheses

Dyads

Our hypotheses aim to predict the relationships among the key constructs under study in the context of dyadic virtual collaboration. Dyads are the simplest group form and the minimum unit for communication. Dyads exist in everyday business encounters and play a significant role in organizational structures. In a typical business setting, forty percent of all meeting time in organizations is spent in dyadic communications (i.e., one-to-one dialogues) and dyadic communication takes almost half of all communication time in groups of all sizes (Panko 1992). Researchers have pointed out that despite the actual group size, most relationships in virtual teams were managed as dyads (Lurey 1998). In addition,

some group factors such as trust (Ferrin et al. 2006) and the impacts of members' interactivities (e.g., knowledge transfer) are more immediate and relevant to dyadic members (Hasty et al. 2006) than teams of other sizes. Given that dyads represent an important structure in organizations, it is important and useful to understand whether and how gender influences the behavior of dyadic teams.

Gender Differences in Impression Management

Impression management has been shown to have an important role influencing interpersonal behaviors during team interactions (Leary and Kowalski 1990) and this includes virtual teamwork. During team collaboration, impression management drives individuals to act in a more favorable, socially accepted direction in order to present a better image or social identity in front of other team members (Wayne and Liden 1995). These favorable behaviors include acting more proactively, taking on more responsibilities, being more optimistic and supportive, and being more devoted to the common task (e.g., spending more effort and time working on the task). As a result, when team members engage in positive impression management behaviors, other team members are more likely to develop a more positive impression of their teammate and, in turn, make trust evaluations based on the behaviors exhibited. In a group context, the trustor-trustee relationship is developed based on the expectations of other team members' performance (Hill 1990; Lewis and Weigert 1985). Prior research has found positive relationships between trust and team behaviors such as proactive action, optimistic team spirit, and dynamic leadership in virtual teams (Jarvenpaa et al. 1998). For instance, Rousseau et al. (1998) pointed out that trust functions as "a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another" (p. 395). In another study, Nguyen et al. (2008) examined a few hundred participants in a workgroup setting and found that impression management can increase others' perceptions of liking for a team member. Therefore, a "lifted" impression of team members is formed through "heightened" team behavior and collaboration due to impression management. This improved image can then be used to construct positive expectations of others, which in turn, leads to a higher level of trusting beliefs toward other team members.

Gender composition in teams has significant influence on impression management in virtual collaboration. Specifically, the gender of the interacting partner is an important determinant of the level of interpersonal affect developed in social behavior and in groups (Athenstaedt et al. 2004). Researchers have observed increased social interaction and satisfaction in mixed-gender teams (Fields and Blum 1997). Similarly, mixed-gender teams experience a positive relationship between group efficiency and task performance and cohesion (Lee and Farh 2004). Scholars also suggested that in the long run, members in mixed-gender teams are likely to be more satisfied than those in same-gender teams (Furumo and Pearson 2007). More importantly, compared to same-gender teams, members in mixed-gender teams are more actively engaged in impression management, partially due to opposite-sex attractiveness and the desire to impress the opposite sex (Karremans et al. 2009). When interacting with the opposite sex, team members often have higher self-presentation concerns (Bruch et al. 1989; Russell et al. 1986), and they try to make a favorable impression on the opposite-sex partner. Similarly, Karremans et al. (2009) found a much higher level of impression management in mixed-gender teams than in same-gender teams. Therefore, we hypothesize that:

H1: In virtual team collaboration, members in mixed-gender dyads will report greater impression management than those in same-gender dyads.

Previous research has shown that in same-gender groups, gender differences are more prominent and behaviors are more gender stereotyped than in mixed-gender groups (Aries 1996; Hess and Bourgeois 2010; Maccoby 1990, 1998). For instance, women in same-gender groups value socio-emotional cues and adjust their behaviors to their female partners more so than men do in male groups (Deaux and LaFrance 1998), thus intensifying the effect of socio-emotional behaviors on team outcomes. In addition, in same-gender dyads, competition between two women is much lower than the competition between two men because of the value and importance that women attribute to impression management (i.e., females maintain socially supportive and positive impressions to achieve positive team outcomes) (Singleton and Vacca 2007).

Among many relevant variables, the affective dimension of gender is particularly relevant to the understanding and interpretation of gender differences and their effects in social behaviors such as impression management and trust (Brody and Hall 2000). Affective factors largely refer to emotions and

emotion-related factors (Krathwohl et al. 1964) that are expressed as emotional behaviors (e.g., crying or smiling) or self-reports of emotional feelings (Briton and Hal 1995; Hess and Bourgeios 2010). Stereotypes are pervasive suggesting that females are more emotional than males and these views are reflected in most social and psychological research (Lewis et al. 2008). For example, Expressivity Demand Theory (LaFrance and Hecht 2000) and Approach/Inhibition Theory of Power (Keltner et al. 2003) both suggest that females are more emotionally intense and expressive than males. Empirical research provides support for many aspects of these theories. For instance, women rated themselves more emotionally expressive than men reported themselves to be and women reported higher affective intensity (Lewis et al. 2008). As a result, gender differences in affective factors such as emotions are important in influencing interpersonal behavior (Varma and Stroh 2001). In a social context, members form expectations of their team partners based on existing stereotypes of males and females and whether and how team members behave in relation to these culturally defined gender role expectations (Bem 1981; Eagly 1987). Prior research demonstrates that women are often more emotional, communal, and socially sensitive than men and they have greater sensitivity to and feel more responsibility for the communication acts of others (Eagly and Karau 1991; Snodgrass 1992; Street and Murphy 1987). Thus, we propose that the value that women would associate with behaviors that influence impression management would be higher compared to the value that men would associate with these behaviors.

Based on the above discussions, we hold that impression management takes on a more important role in female dyads than in male dyads. The emphasis on impression management in female dyads creates a unique psychological closeness and will encourage stronger psychological ties than in male dyads, thereby producing positive team outcomes such as trust in the team. Therefore, we propose that:

H2: In virtual team collaboration, the influence of impression management on team trust will be greater in female dyads than in male dyads.

Impression management has been found to have a direct positive effect on attitudinal and perceptual outcomes (Gardner and Martinko 1998; Roberts 2005; Wayne and Liden 1995). When team members carry out impression management and develop a favorable impression of each other, the positive image helps to increase team rapport and support, as well as lead to more frequent and open communications and feedback within the team (Kacmar and Carlson 1999). The positive and supportive atmosphere encourages members to perform better, which increases satisfaction with team outcomes. For instance, Roberts (2005) developed a model of professional image construction in diverse organizational settings, where she proposes that impression management can lead to workgroup cohesion, which in turn, increases group performance. By contrast, when team members form unfavorable impressions of each other, a lack of optimism, excitement, and initiative can arise, which can hinder communication and result in lower satisfaction with the team's solution (Nguyen et al. 2008; Roberts 2005).

The gender of the interacting partner also plays an influential role on the relationship between impression management and satisfaction with the team solution. Defined by gender stereotypes, women are far more sensitive and emotional than men. When interacting with others of the same gender, the effects on emotional sharing among women are higher than that with men interacting with other men (Deaux and LaFrance 1998). In other words, women value impression management because it results in higher emotional compensation such as satisfaction. To women, a good impression formed of each other can lift their sense of satisfaction (Singh and Vinnicombe 2001). As for men, because affective factors are less salient, their satisfaction would not be as sensitive to impression management compared to female dyads. Therefore, we expect impression management to have a greater impact on satisfaction with the team solution in female dyads compared to male dyads.

H3: In virtual team collaboration, the influence of impression management on satisfaction with the team solution will be greater in female dyads than in male dyads.

Gender Differences in Team Effort

Team effort is defined as the extent to which team members devote their resources (i.e., energy, attention, time) to executing team tasks (Yeo and Neal 2004). Montoya et al. (2011) found that coordination of task efforts among team members in virtual worlds contribute to team performance. To understand gender differences in effort and team outcomes, motivational factors are relevant. Males and females exhibit different motives and goals in collaboration, which are believed to result from the differences in men's

and women's efforts devoted to team performance (Knapp and Daly 2002). Males and females hold different values on social motives, such as the needs for intimacy for females versus the needs for control for males. In fact, men tend to present themselves more favorably on attributes related to competence and effort, whereas women are more aware of and concerned with self-presentation and tend to present themselves more positively on interpersonal and socioemotional attributes (Leary et al. 1986).

Relating to team collaboration through interaction with others, both men and women tend to manage their efforts differently. Motivated by different goals, females and males utilize different regulation strategies. For instance, females have the tendency to make an effort to regulate emotions and feelings to avoid conflicts between interacting partners, whereas males attempt to take extra effort to exhibit competence to their partner and maintain control to make progress toward task completion (Zeman and Shipman 1998). Furthermore, in performing collaborative tasks and exercises, men tend to use their efforts for problem-solving and behavioral regulation (Brody et al. 2002; Cramer 2002; Gross and John 2003) while women tend to focus more on social support and emotional-focused strategies such as focusing attention on defusing conflicts versus taking active steps toward the completion of the task (Cramer 2002; Nolen-Hoeksema and Jackson 2001; Thayer et al. 1994). Such differences in behavioral regulation and strategies are observed from children at a young age and they persist in adulthood. For instance, Charlesworth and Dzur (1987) found that in a group problem-solving situation, girls tend to use more verbal behavior whereas boys engage in significantly more physical behavior. In another study, when given puzzles or sorting tasks, girls mostly demonstrated sensitivity to their partner and produced extensive verbalization, whereas the boys centered on the physical aspects of the task (i.e., doing the work) (Bensalah 1992).

The gender of the interacting partner also plays a central role in determining the perceived team effort devoted to the task and its effects on team outcomes. Prior research found that team gender composition had an influence on the actual team performance (Wood 1987). Although moderated by task, the gender composition of the team seems to have a strong influence on the perceptions of partners and the actual effort expended on task activities (Bowers et al. 2000). Prior studies also found that compared to women interacting with women, men interacting with men were more concerned about appearing competent and putting effort into the task activity (Derlega et al. 1993; Leary et al. 1994). Therefore, male dyads and female dyads have different criteria for successful teamwork. For example, Tous Saint-Marc (1981) observed that boys focused more attention than the girls on executing the task while the girls valued and exhibited more expressive behaviors and verbal exchanges with the partner. As a result, males and females prioritize and value the dimensions of task effort differently for success in team outcomes.

Gender-related motives in team performance are highly related to the liking of others, the capacity for intimacy, and interpersonal trust (Knapp and Daly 2002). The effort that one devotes to the team task influences one's perceptions toward the team (e.g., team trust will be positively related to effort). Team members who expend greater effort and work harder on the task are more likely to develop positive feelings toward each other. Such positive feelings contribute toward a greater sense of psychological closeness (Zack 1993) and stronger psychological ties (Wiesenfeld et al. 1999), both of which lead to a higher level of trust. As discussed earlier, in male dyads, task effort is expected to be emphasized and valued at a much greater level when compared to that in female dyads. Thus, the effect of task effort on team trust should be significantly higher in male dyads than in female dyads. Therefore, we propose that:

H4: In virtual team collaboration, the influence of task effort on team trust will be greater in male dyads than female dyads.

Similarly, the amount of effort that team members contribute toward task performance can increase their satisfaction with their solution. Working hard on team tasks helps to enhance team output and performance (De Jong and Elfring 2010) and effective teamwork triggers affective bonds among team members (Bennett and Kidwell 2001), which leads to a sense of satisfaction toward the team and its solution (Brown and Leigh 1996). In addition, theories on collective work motivation suggest that effort is motivated by norms and affect (Kidwell and Bennett 1993). Because males tend to value effort spent on the task more than females, we expect the impact of task effort on satisfaction with the team's solution to be higher in male dyads than in female dyads. Therefore, we propose that:

H5: In virtual team collaboration, the influence of task effort on satisfaction with the team solution will be greater in male dyads than female dyads.

Figure 1 shows the research model.

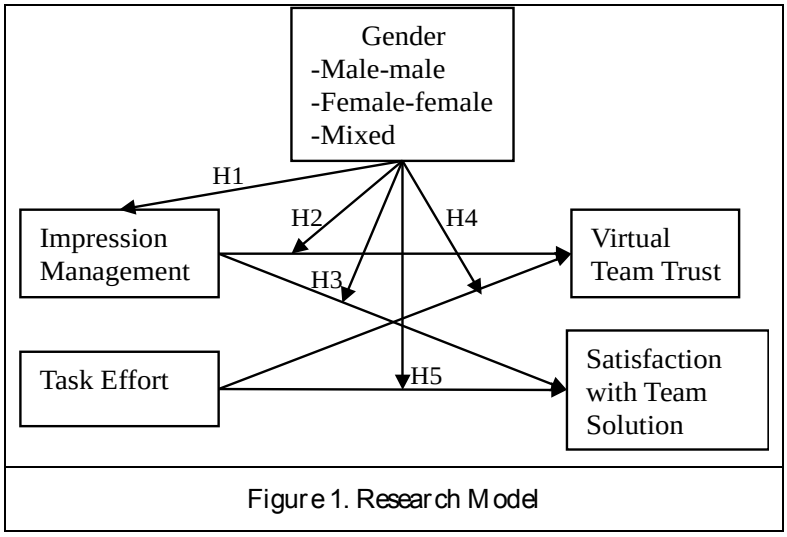

Figure 1. Research Model

Methodology

To examine the role of gender in virtual collaboration, an experimental study is underway in which participants work in either same-gender or opposite-gender dyadic teams to perform a collaborative design task in Second Life, a 3D virtual world. Each virtual team is instructed to represent an IT/IS concept (such as cloud computing, a server farm, etc.) in a 3D creative design. In phase one of the study, 190 participants were randomly paired with a partner of the same gender and they carried out the creative design task through virtual collaboration. Phase two is in progress where participants are being recruited and paired with an opposite-gender partner to perform the same type of creative design task. For both studies, pre- and post-test surveys are administered to collect data. Measurement of team trust is adapted from Jarvenpaa et al. (1998) and Pearce et al. (1992; 1994). To measure satisfaction with the team's solution, we use three items adapted from Green and Taber (1980). Measurement items for task effort and impression management were developed by the authors due to the lack of relevant measures in prior studies. Task effort was measured by three items including "I tried hard to do a good job on this project", "I paid attention to this project", and "I worked hard on this project". A four-item measurement was used for impression management and these items include "I worked hard to make a good impression on my teammate", "I acted in a way that I hoped would give my teammate a good impression of me", When working on the task, I tried to put my best foot forward", and "I wanted my teammate to think I was a good partner". Before we adopted these new measures, we pilot tested them in a similar research design where data from thirty-two participants indicated satisfactory reliability and validity.

Preliminary Results

The responses from 43 male-male dyads and 28 female-female dyads in phase one were analyzed using structural equation modeling (SEM) and multi-group analysis. Preliminary results show significant differences in the relationships between female and male dyads. Compared to male dyads, female dyads reported more task effort ($F=4.936$, $p<0.05$) and developed higher levels of trust ($F=4.333$, $p<0.05$). Further, impression management has significant effects on team trust (path coefficient $\beta=0.863$, $p<0.01$) and team satisfaction ($\beta=0.456$, $p<0.01$) in female dyads but not in male dyads (i.e., n.s. for both links). In addition, there is a significant relationship between team effort and team trust in male dyads ($\beta=1.082$, $p<0.05$); however, such a relationship is not significant in female dyads. The link between team effort and team satisfaction is positive and significant in both male and female dyads, with a higher value (more influential) in male dyads ($\beta=1.135$, $p<0.01$) than in female dyads ($\beta=0.382$, $p<0.01$). Data are now being collected in phase two where participants carry out virtual collaboration in mixed-gender dyads.

By contrasting female dyads with male dyads as well as same-gender and mixed-gender dyads, we hope to develop a more robust understanding of how impression management and effort will be manifested based on the gender diversity of teams. Our preliminary findings show that in male dyads, effort devoted to task performance has a significant positive impact on team trust and satisfaction. However, the effect of impression management is non-significant in male dyads. In female dyads, impression management has a significant influence on team outcomes, whereas effort toward task performance has an impact on team satisfaction but not on team trust. In other words, impression management plays an important role in female dyads while effort is of primary importance in male dyads.

Future Research and Contribution

Our research highlights key gender differences between men and women in the way they collaborate in virtual teams and the important role that gender differences have in virtual team collaboration, particularly in relation to the interplay of impression management, effort, and team outcomes. At this point, our future research plan is two-fold: 1) to continue data collection in mixed-gender teams in the same research context to carry out further data analysis, and 2) to expand our study to include a comparison of key constructs with a face-to-face team collaboration design. The findings are expected to provide important implications for research and practice involving collaboration in virtual teams and in the virtual worlds. First, our research is a useful starting point in laying the groundwork for understanding gender effects in individual and team behaviors when participants are engaged in virtual collaborative activities. In addition, for organizations that are managing virtual teams or are doing business in a virtual world environment, it is important to acknowledge that impression management plays a critical role in forming team trust and satisfaction. Given the lack of social and non-verbal cues in the virtual environment, team members need to pay even more attention to the interplay of impression management and gender differences between men and women in the ways they collaborate to maximize team outcomes.

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