

**UNDERSTANDING THE RELATIONSHIP BETWEEN
JUSTICE AND TEAM GOAL COMMITMENT IN
VIRTUAL PROJECT TEAMS: THE ROLE OF PARA-
SOCIAL PRESENCE AS A MODERATING CONTEXT**

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Summary

Virtual project teams, with their ability to create IT-based just in time knowledge-sharing coalitions to address dynamic business problems, have become a common phenomenon in today's competitively knowledge-intensive economy. This research attempts to look at the engendering of individual member's team goal commitment within the context of virtual project team as the socio-technical determinant in advancing common performance issues pertinent to such teams. In addition, this study systematically builds upon the rigorous theoretical foundation of the Social Exchange Theory and Psychological Contracts in order to articulate and explicate salient drivers in an effort to formulate a conceptual framework of antecedents leading to the enhancement of individual members' team goal commitment in virtual project teams. Through the synthesis of literature from the various domains mentioned above, this article puts forward a novel approach through the explication of an individual's perception justice within the virtual project team as the psychological motivation towards his/her team goal commitment. Also, by arguing for the sub-dimensions of the construct of Para-Social Presence as the underlying computer-mediated communication moderating context within virtual project teams, this paper further postulates the influence of Connectivity, Sense of understanding, Involvement and Positivity as IT-mediated communication characteristics affecting the relationships between justice and team goal commitment.

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CHAPTER 1 - INTRODUCTION

This thesis advances the concept of team goal commitment as a novel and invaluable resource driving the performance of virtual project teams. Following which, the constructs of distributive, interactional and procedural justice are inducted as crucial antecedents predicting the level of team goal commitment among virtual project team members. The relationships between justice and team goal commitment in virtual project teams are then posited to be moderated by notions of connectivity, sense of understanding, involvement and positivity embodied in the underlying CMC medium, which when taken together, reflects the Para-Social Presence (PSP) of the collaborative technology. Finally, a longitudinal field experimental design is employed to empirically verify the above hypotheses.

1.1 Motivation and Problem Definition

Virtual teams refer to groups of geographically and/or temporally dispersed individuals who have been brought together *via* collaborative technologies (e.g., email, inter-organizational systems and groupware applications) to create IT-based “just-in-time knowledge sharing” networks that assimilate localized expertise and proficiencies without being constrained by the traditional handicap of collocation (Malhotra *et al*, 2001, p. 238; see also Griffith *et al*, 2003; Jarvenpaa and Leidner, 1999; Kock *et al*, 2001; Piccoli and Ives, 2003). By exploiting the spatial and temporal independency of Information and Communication Technologies (ICT), virtual teams allow “individual contributions [to be] melded together without the expense and trouble of relocating members” (Piccoli and Ives, 2003, p. 365; Powell *et al*, 2004). Through the timely adaptation of membership composition in response to dynamic environmental fluctuations, virtual teams can endow an organization with greater strategic flexibility, expanded informational diversity and enhanced responsiveness to counter sporadic market conditions (Griffith and Neale, 2001; Griffith *et al*, 2003; Malhotra *et al*, 2001; Townsend *et al*, 1998).

As Cohen and Bailey (1997) taxonomized, four categories of teams (i.e. work, parallel, project and top management) typically prevail in organizations according to: (1) the *objective* to be accomplished;

(2) the *duration* of the arrangement; (3) the *function* to be served, and; (4) the *structure* governing the dynamics of the group. While each of these team configurations may stand to benefit from virtual migration, the inherent nature of project teams render them exceedingly amenable to the adoption of various ICTs to support computer-mediated communication (CMC) (Dennis and Garfield, 2003). In general, project teams can be characterized as short-term objective-oriented group configurations comprising skilled members who engage in rigorous deliberation to arrive at complex business decisions (Kinney and Panko, 1996). The infusion of ICT into project teams is thus beneficial in boosting the effectiveness of their utilization within organizations by: (1) offering affordable and expanded access to distant experts; (2) providing scalability in coping with the intensity of communication, and; (3) granting social equality in knowledge contributions (Beranek *et al*, 2005; Hung *et al*, 2004; Jarvenpaa and Leidner, 1999; Stangor, 2000). And together with the growing recognition among management that the expertise required for a project undertaking is often scattered across organizations (Majchrzak *et al*, 2004), it is not surprisingly for scholars to deem the proliferation of virtual project teams as an inevitable socio-technological phenomenon (Beranek *et al*, 2005). Such sentiments were also reflected in a study by the 3M Corporation which reported a near quadruple increase in the percentage of remote conferences over a ten-year period (3M Meeting Network, 1998).

Yet, amidst the optimism, the formation of virtual project teams comes with its inherent set of challenges. Notwithstanding the predominant trend whereby business technology executives typically lacked a formal plan for deploying collaborative technologies (Fontaine *et al*, 2004), Chaar *et al* (1996) admitted that social hurdles may prove to be even more daunting than a lack of technical expertise in employing such technologies. Typically, the absence of direct physical contact in CMC significantly reduces communal support, communication synchronicity, social presence and visual cues, thereby rendering it substantially difficult to foster and sustain positive collaborative attitudes among virtual project team members (Powell, 2000). In particular, the deficiency of social gestures in CMC environments may pose a threat to project managers' ability to articulate goals and monitor assigned responsibilities (Kayworth and Leidner, 2000), which in turn may possibly influence the level of

commitment among virtual project team members. Essentially, this study endeavors to answer the following two-part research question:

1. *What are the salient factors driving members' team goal commitment in virtual project teams?*
2. *What role does the underpinning computer-mediated communication medium play in mitigating such relationships?*

1.2 Study Objectives

The notion of commitment has generated burgeoning interest in organizational literature as a driver of employee performance and satisfaction (Iverson and Buttigieg, 1999; Meyer and Allen, 1991). Extrapolating to the context of virtual teams, Powell (2000) also reported identical observations in illustrating a strong correlation between commitment and the dual measures of members' subjective perceptions of goal satisfaction and objective task performance. She demonstrated that commitment is a crucial element driving members' satisfaction with the task outcome and with the virtual team experience as well as the quality of the final product as evaluated on the basis of clarity, creativity and realism (Powell, 2000). Powell's (2000) study therefore offers reasonable justification for the conceptualization of commitment as a hallmark of successful virtual teams.

While we do not dispute the relevance of Powell's (2000) emphasis on team commitment (i.e. a member's psychological bond tying him/her to the team), exclusive contextual characteristics of virtual project teams may warrant an in-depth appreciation of *team goal commitment* as a distinct but equally important concept in advancing the quality of participative decisional outcomes. Virtual project teams are primarily goal-driven group formations that seek to neutralize complicated business problems within a very limited time frame (Kinney and Panko, 1996). Thus, the lack of social bonds based on spontaneous membership composition in addition to nature of short-time collaboration in virtual project teams contributes to their members' apparent focus on team objectives. This thesis hence argues for team goal commitment as a more germane construct specific to virtual project teams.

Locke *et al* (1988) conceived goal commitment as depicting “one’s attachment to or determination to reach a goal, regardless of the goal’s origin” (p. 24), i.e. goal commitment broadly describes the extent to which individuals voluntarily upgrade their desire in the attainment of a goal, whether it is self-imposed, consensually-derived or hierarchically-assigned (Locke *et al*, 1981). Since the complexity of the business problem precludes the formation of a well-defined pre-determined target to be achieved beforehand, virtual project teams are formalized under a broad business objective such that the “general plan and specific sub-decisions [are allowed to slowly] emerge over a series of meetings” (Kinney and Panko, 1996, p. 133). Therefore, goal commitment is especially relevant to virtual project teams because conventional methods of authoritative control in the form of pre-assigned targets are usually substituted by self-induced motivations or group-negotiated consensus (Handy, 1995) such that it becomes extremely easy for members to stray from the core objectives. The cultivation of team goal commitment thus builds rapport among members by channelling and focusing their attention on the pressing issue at hand (Locke *et al*, 1988).

Beranek *et al* (2005) also claimed that the explication of a concise business mission together with the inducement of individual commitment towards this defined team objective are instrumental to project success by aligning expectations among virtual project team members such that the team is unified in the common pursuit of that end. In the absence of goal commitment, it is not unusual for virtual project team members to pursue different priorities in fulfilling their responsibilities to the extent to which conflicts and miscommunication readily manifest themselves in the form of “differing expectations and inconsistent deliverables”, thereby diminishing group efficacies through partisan resource competition (Beranek *et al*, 2005, p. 248). Salancik (1977) aptly stated that “a person who is committed to a goal will try harder to achieve it than if he is not” (p. 27), therefore virtual project team members demonstrating team goal commitment are more likely to participate vigorously in knowledge sharing and creation, a key element leading to a higher probability in generating better project outcomes. In short, team goal commitment is pivotal to the success of virtual project teams as it promotes a communal vision to unite otherwise disparate efforts among members in the achievement of the business objective.

Accordingly, this research endeavours to explore and articulate the salient drivers of team goal commitment in virtual project teams by proposing a research framework grounded in the Social Exchange Theory (SET) (Emerson, 1981). As posited by Tan *et al* (2005), the process of creating and sharing knowledge typically entails the exchange of tangible and intangible social resources among the parties involved because knowledge in itself is a valuable commodity to be ‘traded’ in the modern economy. For instance, knowledge contributions can lead individuals to perceive a loss of control within the organization (Gray, 2001), but concurrently, they may serve to enhance contributors’ image or reputation among peers and colleagues (Ba *et al*, 2001; Kankanhalli *et al*, 2005). Because knowledge creation and sharing resides as the centrepiece of virtual project teams (Griffith *et al.*, 2003), it is viable to further extrapolate that the relationship among members assumes similar forms of resource-based social interactions. Unlike economic transactions however, knowledge exchanges function on the principle of *delayed reciprocation* whereby people do others a favour with an expectation of some future return but with no clear indication of its exact nature (Kankanhalli *et al*, 2005), i.e. participants in a knowledge sharing community will most probably contribute to the best of their capabilities at any instance in time so long as they believe that others will reciprocate in the future when the right time presents itself. Though in such situations, Cook and Emerson (1978) contended that individuals share a tendency to exhibit characteristics of opportunism by manipulating others to acquire partisan gains or resources to the extent to which such exploitations are not constrained by equity or justice mechanisms. The existence of unenforceable psychological contracts (Kissler, 1994; Morrison, 1994; Morrison and Robinson, 1997; Rousseau, 1989) on reciprocal knowledge sharing agreements among individual members of virtual project teams thus invites the manifestation of justice measures to curb the realization of personal agendas within such communities. Our proposed research framework attempts to explain how the presence of distributive, interactional and procedural justice impacts the level of team goal commitment among virtual project team members. In addition, the framework further postulates that in the absence of direct physical contact, the relationships between the three justice dimensions and team goal commitment are likely to be moderated by the PSP of the underlying CMC medium (Kumar and Benbasat, 2002a, b). By rendering the

presence of communicators more salient or more distant to one another, the PSP of the CMC medium will dictate the extent to which a communal identity can be readily forged among virtual project team members. Insofar as members in virtual project teams lack a unified purpose, they tend to pursue partisan interests so long as there is no fear of repercussions, thereby solidifying the relationship between justice and team goal commitment (Beranek *et al*, 2005).

This study proposes a timely and pertinent contribution to contemporary literature by exploring team goal commitment in virtual project teams as an overlooked critical success factor affecting the effectiveness of members' communication and hence, the outcome quality of the resultant collaborative effort. Through the lens of the SET, we construct and test a cognitive perceptual research framework that endeavors to predict how team goal commitment could be influenced by justice measures, having taken into consideration the moderating effect of PSP embedded in the CMC medium. Theoretically, the proposed research framework offers a grounded and intuitive approach in appreciating the intra-group dynamics of virtual project teams. Moreover, by explicating the constituent components of PSP moderating members' perceptions of justice to their corresponding attitudes of team goal commitment, practitioners can also benefit from this investigation by designing collaborative technologies that strengthen such relationships within virtual project communities.

1.3 Methodology

To empirically validate the proposed research framework, a longitudinal field experiment will be conducted on a convenient sample of undergraduate students enrolled in a course on strategic business applications of ICT. As part of their course credit, the students were required to complete a group assignment in which deliberations were only allowed to take place over virtual media across a two-week time period. Data was collected on two separate occasions on a weekly basis in order to assess whether variations to our hypothesized relationships occur over time. Analysis was conducted *via* the Moderated Multiple Regression (MMR) analytical technique. An elaboration on the core findings of this research and their implications are detailed in later sections.

1.4 Thesis Structure

The paper is organized into 5 chapters, inclusive of the introduction. Chapter 2 presents an overview of contemporary literature in the appreciation of virtual project teams and the theoretical significance of incorporating team goal commitment within such a context. It sets the conceptual foundation for the remainder of the discussion by illuminating the contextual features of virtual project teams that warrant the need to consider engendering a sense of team goal commitment among members. Next, the SET is introduced together with the notion of justice. Finally, the concept of PSP is covered in the chapter to explain the potential influence it may exert within the CMC environment of the virtual project team. Chapter 3 provides an in-depth discussion of the different constructs espoused and hypothesizes the relationship of the different types of justice to virtual project team goal commitment. It further elaborates on the PSP sub-dimensions and postulates their potential moderating influence on the relationship between justice and team goal commitment. Chapter 4 describes the operationalization of the longitudinal field experiment as well as the analytical technique by which the collected data is being analyzed. Chapter 5 focuses on the analysis and summary of key results from the longitudinal field experiment. It also provides reasoning behind why certain hypothesized relationships may be unsupported by empirical evidence in the context of this study. The final chapter elaborates on the theoretical and practical implications of this investigation, highlights probable limitations and concludes by suggesting directions for future research.

CHAPTER 2 – LITERATURE REVIEW

The allure of team formation in the accomplishment of a business mission has always been grounded on the presumption that the cross fertilization of ideas and knowledge is a superior procedure over one that is purely dominated by individualistic abilities (Griffith *et al*, 2003). From such premises, the pertinent contribution of collaborative teams in creating synergy for organizations through the formulation of competitive business strategies has been repeatedly emphasized by both practitioners and management scholars (Cohen and Bailey, 1997). As Leavitt (1996) noted, teams can endow organizations with enhanced capability, improved flexibility and increased responsiveness to cope with intensifying uncertainty brought about by globalization in the corporate environment.

Such beliefs, in the sophisticated innovative capacity and task outcome quality which may be derived from the assimilation of individuals possessing distinctive expertise and proficiencies (Malhotra *et al*, 2001), have contributed to the proliferation of group collaborations within organizations. And with the advent of communication technologies such as emails, groupware and instant messaging (Hung *et al*, 2004) as well as the concomitant emergence of collaborative technologies, such team-based cooperative networks have typically migrated to the virtual domain (Qureshi and Zigurs, 2001). Increasingly, organizations have shifted their penchant for team formation onto the digital arena, thereby leading to the prevalence of computer-mediated collaborative group arrangements commonly known as virtual teams (Beranek *et al*, 2005; Hung *et al*, 2004; Jarvenpaa and Leidner, 1999; Kayworth and Leidner, 2000; Stangor, 2000). Yet, as virtual teams continue to gain eminence among managers as a means of strategizing knowledge within businesses, their reliance on the ICT-enabled interface as the *focal* point of contact may, in fact, hinder knowledge sharing among members by creating estranged relational networks, which run contrary to the embellishment of a shared sense of social community (Benbasat and DeSanctis, 2001). This section explores the contextual characteristics of virtual project teams in order to justify our rationale in arguing for the nurturing of team goal commitment as the social glue that binds members during the process of knowledge sharing and creation within such communities.

2.1 Virtual Project Teams: A Review of Basic Characteristics

Amidst the various team categories prevalent within an organization (Cohen and Bailey, 1997), project teams rein as the most prevalent goal-driven group configuration that demands an almost ‘immediate’ assembly of geographically distributed members with diverse specializations to tackle an urgent business problem (Dennis and Garfield, 2003; Kinney and Panko, 1996). Thus, it is not surprisingly for project teams, augmented by digital collaborative technologies, to emerge as the *de facto* virtual team model from which other variants are derived. Based on conventional project team frameworks, scholars such as Griffith *et al* (2003) have recommended three distinct dimensions in defining the key facets of a virtual team: (1) the extent of technical support or usage within the team; (2) the physical distance among team members, and; (3) the percentage of time spent apart on accomplishing the task. Using this generic framework, Griffith *et al* (2003) maintained that it is feasible to classify various categories of virtual teams, which have been mentioned in extant literature, along a spectrum bounded by the pure virtual team model and the traditional face-to-face model on either extreme.

For instance, global virtual teams, depicted in studies as dependent solely on the reliability of ICT for communication and coordination while spending 100% of their time apart on completing the task in different locations of the world, fall into one extreme (see Qureshi and Zigurs, 2001; Jarvenpaa, and Leidner, 1999; Jarvenpaa *et al*, 2001). Whereas on the other extreme, Griffith *et al*, (2003) conceded that face-to-face teams are extremely rare in present-day corporations due to a predominantly socio-technological working atmosphere. They believe that it will be reasonable to presume that a majority of prevailing virtual teams are likely to fall into the hybrid category, which composed of members “who interact over time, according to the needs of the moment, and through media, with the amount of face-to-face contact determined by their own adaptation and structuration of the process” (Griffith *et al*, 2003, p. 268; see also Malhotra *et al*, 2001).

While the generic attributes advocated by Griffith *et al* (2003) offer an intuitive approach to the classification of virtual teams, this study contends that their elevated degree of abstraction renders them

insufficient in conveying the exact group dynamics of virtual project teams. Generally, project teams comprise members who have been assembled to address a specific business purpose through a series of intensive conferences averaging more than one project-related interaction per working day over a limited six-month period (Kinney and Panko, 1996). Often, the task involves the brainstorming and development of blueprints for sophisticated business problems that cannot be resolved simply by a single straightforward decision (Kinney and Panko, 1996). And in the face of mounting dynamism of today's globalized economy, it is inevitable for organizations to place a premium on such cooperative knowledge sharing processes in driving competitive capabilities derived from either creativeness in product design or innovativeness in core operations (Berman *et al*, 2002). Work is performed outside of scheduled meetings when not all participants are present (McGrath, 1991). Project teams also tend to be moderate in size (between 5 and 10 members) and consist mostly of peers, some of whom have already enjoyed long-standing working relations (Kinney and Panko 1996; McGrath 1984). According to the survey by Kinney and Panko (1996), participants of project teams are selected on the basis of skill proficiencies and a fair representation of each affected business sub-unit.

Consequently, virtual project teams, with their adaptive membership composition and time-limited nature, are an intuitive match for organizations clamoring for the cultivation of "just-in-time knowledge sharing" behavior among a network of members with vastly diverse expertise without the customary hurdles of spatial and temporal limitations (Hung *et al*, 2004). This study explicates virtual project teams in a similar fashion as Malhotra *et al* (2001) with slight modifications guided by the unique characteristics of a project team:

1. Main objective of the team is predefined to guide the recruitment of members but a substantial degree of latitude is accorded for the establishment of auxiliary goals as well as for the determination of the means by which to attain these targets;
2. Roles may be assigned at outset but are mostly decided through group dynamics, and;
3. Communication norms and the fostering of shared understanding may be inducted at the beginning but will likely evolve through ongoing computer-mediated social interactions.

To provide a systematic examination of extant literature on virtual project teams, Adaptive Structuration Theory (AST) is espoused as an analytical framework for assessing the prospective benefits and potential ‘dangers’ associated with the adoption of virtual project teams (DeSanctis and Poole, 1994). As Maznevski and Chudoba (2000) commented, in a parallel study of global virtual teams, AST is a “high-level theory explaining the relationship between technology use and social interaction in creating group outcomes in organizational contexts” (p. 476; see also DeSanctis and Poole, 1994). Essentially, AST portrays how the inherent structural characteristics of a particular technology shape interactive patterns without having to determine the interaction in a *definitive* manner (DeSanctis and Poole, 1994). It is grounded in the assumption that the choice of technology serves to craft decision processes such that certain social communication patterns lead to better performance (DeSanctis and Poole, 1994). Four main dimensions have been proposed in AST to examine the merger of technology and people: (1) *Structural Characteristics* which refer to the structural components shaping group processes; (2) *Technology Appropriation* which explores the group’s employment of ICT; (3) *Decision Processes* which describe the interactional processes involved in the generation of ideas, the comparison of alternatives and the selection of a course of action, and; (4) *Decision Outcomes* which is analogous to the consequences to be anticipated from the decision processes (Maznevski and Chudoba, 2000). Based on AST, the next consecutive two sections seek to articulate the pros and cons of virtual project teams in order to substantiate our argument for team goal commitment as an appropriate social mechanism to reconcile many of the performance-related issues plaguing computer-mediated group collaborations.

2.1.1 Virtual Project Teams: Prospective Benefits

It is without question that the growing popularity of virtual project teams across business organizations is by no means a mere coincidence. Indeed, a myriad of prospective benefits, at the group level of analysis, has been highlighted by both management and MIS scholars for the exploration of virtual project teams. AST offers a convenient analytical framework to categorize these advantages according to the dimensions of structural characteristics, technology appropriation, decision processes and decision outcomes (DeSanctis and Poole, 1994).

Structurally, virtual project teams promise lower costs and improved resource allocation, which are normally associated with the logistical difficulties and expenditures of collocating members in an otherwise physical setting (Jarvenpaa and Leidner, 1999). More importantly, the flexibility of virtual project teams to transcend geographical boundaries in member recruitment guarantees the membership composition to be based solely on individual expertise, thereby attesting to the skill relevance of the members and the quality of the resultant group decisions (Beranek *et al*, 2005; Griffith and Neale, 2001). Long-standing temporal constraints in team selection no longer applies as well because the exploitation of networking technologies have facilitated the interaction of team members around the clock regardless of the time zones at which they may be situated (Griffith *et al*, 2003). As Beranek *et al* (2005) noted, in a distributed environment like virtual project teams, “managers can access more people to be team members and are provided with a larger opportunity to choose members whose skills more closely match the requirements of the project at hand” (p. 250). Such observations were also acknowledged by Boh *et al* (2002), who expressed that virtually distributed projects displayed a stronger match of methodological expertise with project requirements as compared to their physically collocated counterparts.

From a technological perspective, the infusion of ICT into virtual collaborative settings allows members to operate in an organized manner (DeSanctis *et al*, 2000) by formalizing a working structure through the systemic channeling of communication and information (McGrath and Bedahl, 1998). Zuboff (1988) reinforced that the effective appropriation of ICT has the facility to “informat” (p. 10) in ways whereby managers are empowered to gain accessibility to obscure work routines where none exists previously. By offering a supplementary layer of information stream over and above the mere automation of group discussion procedures, ICT serve as ‘magnifiers’ that enable virtual project team members to reflect and acquire knowledge methodically. For example, several communication technologies open up the possibility of archiving conversational logs to convenience the revisiting of the decisional process and the post-mortem evaluation of decisional outcomes, thereby speeding up the group negotiation processes among virtual project team members in arriving at a consensual agreement (Beranek *et al*, 2005).

Apart from the aforementioned structural and technical benefits, virtual collaborations have also been credited with the ability to augment decision processes by minimizing the generation of loosely-interpreted social indicators that may possibly lead to discriminatory or prejudicial conduct (e.g., Stangor, 2000), i.e. participants in virtual project teams could be more fairly assessed by their peers on the merit of knowledge contributions rather than the depth of their social acquaintance. Researchers posited that the providence of anonymity under virtual collaborative environments serves the critical purpose of bestowing a sense of social equality in granting members the psychological freedom to exhibit non-confirmatory behaviour (Connolly *et al*, 1990; Siegel *et al*, 1986). As a matter of fact, group polarization—defined as the tendency of individuals to become more diversified in their thinking following team discourses—has been acknowledged to be more pronounced in virtual engagements (Siegel *et al*, 1986). Siegel *et al* (1986) attributed higher degrees of polarization to the apparent lack of social presence in CMC, thereby encouraging uninhibited interactions among team members (Kiesler *et al*, 1985). Sia *et al* (2002), who aggregated the aforementioned dimensions of anonymity, communication cues and social presence into a singular study in order to dissect their impact on the outcome of virtual collaboration, also pinpointed the deficiency of social presence and the inclusion of anonymity as strong predictors of group polarization in allowing team participants to display novelty in idea generation by engaging in “more one-upmanship behavior” (p. 70). Other empirical evidence alluding to the affirmative impact of collaborative technologies on the productivity of virtual teams includes greater satisfaction among members with regards to decision processes (Anson *et al*, 1995; Chidambaram, 1996; Easton *et al*, 1990; Steeb and Johnston, 1981) as well as Miranda and Bostrom’s (1993-1994) observation that virtual teams have considerably less interpersonal but more constructive conflicts as compared to their face-to-face counterparts. Strong proponents for the utilization of virtual project teams for creative tasks have thus quoted unrestrained behavior (Jessup *et al*, 1990) in anonymous virtual collaborations as an exemplar of candid and unbiased communication, which basically acts as a primary pre-requisite in accelerating the process of knowledge creation through the elicitation of insightful opinions (Connolly *et al*, 1990; Tan *et al*, 2005). Valacich *et al* (1994a, b) even put forward the provocative recommendation of totally

eradicating social cues as a means by which unique and high quality ideas may be heard within virtual workgroups.

On the basis of such forthcoming decisional processes caused by the infusion of ICT into group functioning, a number of studies have documented that virtual teams excel in the generation of innovative and novel solutions to complex business problems (Chidambaram and Jones, 1993; Massey and Clapper, 1995; Ocker and Fjermestad, 1998; Ocker *et al*, 1997, 1998; Sharda *et al*, 1988).

2.1.2 Virtual Project Teams: Potential ‘Dangers’

On the flip side, with the obvious deficiency of social components in a virtual project team collaboration, dysfunctions such as absenteeism, role ambiguity, and social loafing often observed in conventional face-to-face project groups may inadvertently be amplified through computer-mediated communication (Harkins, and Szymanski, 1989; Jarvenpaa and Leidner, 1999; Kayworth and Leidner, 2000).

On the structural level, two key characteristics of virtual project teams compound onto the challenge of ensuring equal participation among members. First, as emphasized in the preceding section, distributed teams is extremely reliant on membership composition as they share a tendency to recruit members with unique expertise pertaining to the successful completion of the goal (Beranek *et al*, 2005; DeSanctis and Monge, 1999; Mortensen and Hinds, 2002). But it is precisely because of this exclusivity that knowledge overlaps among virtual project team members are minimal or even negligible that it is almost impossible to detect whether individuals are engaging in social loafing behaviors. Additionally, dispersed team functions in a way whereby subgroups are frequently allowed to surface, hence resulting in possible boundary misunderstandings (Espinosa *et al*, 2002) due to reduced interaction and loose coupling within the team (Olsen and Olsen, 2000).

Similarly, the appropriation of technology in virtual project teams is not without its demerits. De Meyer (1991) contested that electronic data cannot be overly emphasized as the main source of information for group communication. In contrast to face-to-face interactions, he countered that CMC among team members across different locations and time zones festers complacency by granting individuals opportunities “to fool themselves and to be satisfied with [their own level of contribution]”

(De Meyer, 1991, p. 56). Over time, such prolonged dependence on CMC will inevitably lead to a downward spiral in members' confidence towards the reciprocity of knowledge contributions by their fellow teammates (De Meyer and Mizushima, 1989).

The intra-group dynamics within virtual team, which is often deterministic towards the optimization of decision processes for these cyber project groups, has also generated substantive controversies among scholars (see Rice, 1993; Siegel *et al*, 1986; and Kiesler *et al*, 1985). Though numerous studies exist to suggest that the effectiveness of virtual teams are very much influenced by managerial efforts in promoting trust, cultivating norms and boosting group affinity among members (Jarvenpaa and Leidner, 1999; Qureshi and Zigurs, 2001; Wiesenfeld *et al*, 1999), the ICT-enabled interface as the *focal* point of contact among participants widens social distance and imposes restraints on virtual teams' ability to cope with both demographic and attitudinal diversity (Griffitt, 1974; Powell, 2000). Researchers have often criticized the apparent absence of direct interactivity in virtual collaborations as a frequent cause of misinterpretation among members (Kock, 1999), which in turn may compound many of the classical textbook 'nuisances' surrounding cooperative networks (Rutkowski *et al*, 2002) such as cultural insensitivity (Kayworth and Leidner, 2000; Triandis, 1994) and interpersonal conflicts (Tan *et al*, 2005). Such miscommunication pervades the decisional processes of virtual project teams in the form of difficulties encountered by managers in institutionalizing a clear business vision among participants (Beranek *et al*, 2005). Communication restrictions imposed by the underlying computer mediated media in virtual project teams frequently culminate in role ambiguities to the extent to which members tend to pursue individualistic priorities in response to differing goal expectations (Beranek *et al*, 2005; Coalter and Hunton, 1999; Lembke and Wilson, 1998). Galegher and Kraut (1994) hence observed that even though members of virtual teams have to work harder and communicate more, they end up being less satisfied with the overall decisional process.

In light of this alternate school of thought, an opposing stream of research has dismissed the positive influence of CMC on the decisional outcomes of team-based collaboration. Archer (1990) established that virtual collaborations tend to generate fewer alternatives as it takes an unnecessarily long

time to arrive at consensual decisions. Likewise, Siegel *et al* (1986) noticed members of virtual teams to be relatively conservative and reserved in their knowledge contribution due to widening social gaps prevalent throughout the decisional process.

2.1.3 Virtual Project Teams: A Summary

Though the genre of virtual project teams may appear to be a preordained trend in the near future due to the host of competitive benefits generated from distributed knowledge sharing, the embedded technological platforms are accompanied by a set of social hurdles to be overcome in optimizing the efficacies of such group formations. Table 1 synthesizes the above discourse according to the four dimensions prescribed by the AST in order to derive a list of challenges to be met by further research.

Table 1: A Summary of Virtual Project Teams			
Dimensions	Prospective Benefits	Potential Weaknesses	Challenges
Structural Characteristics	Ability of virtual project teams to transcend geographical and temporal boundaries caters for a better match between members' proficiencies and the target objective.	Reliance on membership saliency and subgroup formation in virtual project teams serve to encourage social loafing and to induce role confusion among members.	To motivate members in order to eradicate social loafing behaviours while maintaining an optimal structure of skill specialization in response to the business purpose.
Technology Appropriation	Utilization of ICT in virtual project teams opens up new opportunities for knowledge acquisition and consolidation.	Dependency on collaborative technologies in virtual project teams foster complacency among members with regards to their involvement.	To strategize the deployment of technological innovations in a manner that retains members' concentration on the core mission.
Decision Processes	Capacity of computer mediated media to grant anonymity and social equality in virtual project teams facilitates candid and uninhibited discussions.	ICT as the focal point of contact among member in virtual project teams reduces their capability in accommodating demographic and attitudinal diversity.	To shift the emphasis of conferences from subjective social differences to objective goal-driven terms so as to prevent discourses from drifting into uncharted waters.
Decision Outcomes	Virtual project teams tend to arrive at creative resolutions to business problems.	Virtual project teams tend to generate fewer alternatives and expend longer time to reach consensus.	To reconcile existing controversies by focusing on the derivation of outcomes that best address the target objective.

To counteract the challenges faced by virtual project teams as proposed in Table 1, the next section argues for the notion of team goal commitment as an encompassing construct by which all four of the articulated performance-related issues can be addressed in its entirety.

2.2 Goal Commitment in Virtual Project Teams

Within strategic management literature, goals have prevailed as an integral and pervasive construct among modern theories of motivation that emphasize self-regulation (Austin and Vancouver, 1996; Klein *et al*, 1999) including control theory (Klein, 1989) resource allocation theory (e.g., Kanfer and Ackerman, 1989), social cognitive theory (e.g., Bandura, 1986) and task-goal theory (e.g., Locke and Latham, 1990; Locke *et al*, 1988). Amidst these varied theoretical viewpoints, the task-goal theory that illustrates the relationship between task performance and goal setting (Locke and Latham, 1990; Locke *et al*, 1988) seems particularly relevant to the consensual goal-driven nature of virtual project teams.

A fundamental premise of the goal-performance relationship posited by the task-goal theory is that under certain conditions, specific and difficult goals can lead to higher levels of performance relative to vague or easy ones (Locke and Latham, 1990; Salancik, 1977). Consistent evidence from countless experiments and surveys also testifies to the positive correlation between goal setting and improvements in task performance (Burke and Wilcox, 1969; Earley and Lituchy, 1991; Ivancevich, 1977; Latham and Baldes, 1975; Latham and Yukl, 1975a, 1975b; Locke and Latham, 1990; Locke *et al*, 1981; Mento *et al*, 1987; Mone and Baker, 1992). And, for this goal-performance relationship to hold, an individual's "*commitment* to that specific, difficult goal" (Klein *et al*, 1999, p. 885; Locke and Latham, 1990) is a necessary precondition. Additionally, research within the task-goal domain has revealed substantial boosts to productivity under participatory goal setting conditions (Latham *et al*, 1978, 1988; Likert, 1961). Specifically, Steers (1975), Latham and Yukl (1975a) documented that participative goal setting was significantly correlated with increased effort and better performance. Such positive linkages between participative goal setting and enhanced productivity, as argued by Umstot *et al* (1978), resemble a closer alignment between the needs of the individual and the requirements of the collective body, especially if the participatory goal setting process were to be conducted in a mature and sensible manner. On the contrary, in the absence of consensual goals, incongruency may develop such that the individual may "experience frustration, psychological failure, a short-time perspective, and conflict" (Umstot *et al*, 1978,

p. 872; see also Argyris 1973). Therefore, inasmuch as virtual project teams are motivated primarily by consensually derived goals (Kinney and Panko, 1996), the task-goal theory is instrumental in comprehending the complex relationship between team goals and performance.

Goal commitment can be described as “the determination to try for a goal and the persistence in pursuing it over time” (p. 18; Locke *et al*, 1981), implicating that the presence of goal commitment will automatically translate to an unwillingness of an individual to lower or abandon the goal (Campion and Lord, 1982). The theoretical significance of goal commitment is vindicated in the following statement by Locke *et al* (1988), who concluded, from a review of goal commitment literature, that “it is virtually axiomatic that if there is no commitment to goals, then goal setting will not work” (p. 23). At this juncture, it should be further highlighted that the notion of commitment is a distinctive construct from the seemingly synonymous concept of acceptance (Hollenbeck and Klein, 1987; Locke *et al*, 1988). Goal acceptance generally refers to an individual’s agreement with a prescribed course of action whereas goal commitment, as defined above, is conceived as the broader concept depicting one’s attachment or resolution to reach a goal regardless of its origin (Locke *et al*, 1988). As such, commitment accommodates the entire spectrum of goals, whether they are self-imposed, consensually-derived or authoritatively-assigned, while acceptance is reserved specifically for an individual’s implicit consensus towards contributing to a pre-determined objective (Locke *et al*, 1981). Therefore, it is always probable for an individual “to initially accept a difficult goal and yet not demonstrate subsequent commitment to that goal over time” (Hollenbeck and Klein, 1987, p. 212). Summarizing the discussion, acceptance essentially portrays whether an individual opts to invest in the accomplishment of the goal whereas commitment dictates the level of subsequent effort expended for this partaking, which in turn would also imply that goal commitment naturally subsumes the concept of goal acceptance but not vice versa.

This distinction between goal acceptance and goal commitment as well as the pivotal role of the latter in improving performance can be exemplified by the results of Latham and Yukl’s field experiment (1975a): logging crew members who were assigned to the participative goal setting condition yields superior performance and more frequent goal attainment than those in the pre-assigned goal setting

condition. It is also observed that the average goal difficulty level was considerably harder for participative goals in spite of a higher rate of completion. A logical explanation for the observation that goal achievement is more substantial in participative conditions than in assigned conditions despite tougher goals may reside in the theoretical possibility that employees' participation in the goal setting process do indeed transform to a boost in their level of commitment to attaining the goal as compared to mere acceptance in the case of the pre-assigned condition (see Earley, 1985; Hollenbeck and Klein, 1987; Hollenbeck *et al*, 1989; Latham and Yukl, 1975a; Steers and Porter, 1974). Consequently, given the capability of goal commitment in engendering single-minded focus on goal attainment, we define ***team goal commitment*** as *the extent to which an individual member is willing to voluntarily contribute towards the accomplishment of the goal of the collective body to the best of his or her capabilities* and postulate that it may offer a complementary solution to the aforementioned performance-related issues plaguing virtual project teams. Further, our working definition positions team goal commitment as a broader concept that subsumes the idea of goal acceptance, i.e. in line with Locke *et al*'s (1988) argumentation, we maintain that it is unimaginable for an individual member to do his/her best for a group if he/she does not exhibit both intellectual and emotional buy-in of the goals of the collective body.

Reflecting on our discourse in the preceding section, there are certain challenges associated with the performance of virtual project teams and these can be segmented into four key areas, namely structural characteristics, technology appropriation, decision processes and decision outcomes. Structurally, a key dilemma facing managers of virtual project teams is the proper assimilation of diverse expertise and proficiencies in surroundings characterized by membership saliency, role confusion, social unfamiliarity and vast knowledge discrepancies (Beranek *et al*, 2005; DeSanctis and Monge, 1999; Mortensen and Hinds, 2002). While the business mission may be invaluable in prescribing recruitment guidelines for obtaining an optimal structure of skill specializations (Kinney and Panko, 1996), it does not guarantee that members will not engage in social loafing behaviours once recruited (Harkins and Szymanski, 1989). It is possible for virtual project teams to possess an optimally configured skill structure but yet, arrive at satisficing decisions due to relative ease by which goal development may be

compromised through group negotiations—what Salancik (1977) referred to as the *publicness* of the goal setting process. Since virtual project teams are dependent on the configuration of unique knowledge and expertise, it is difficult if not impossible for individual members to be aware, much less evaluate the extent to which others are contributing to the achievement of the goal. Hence, the cultivation of team goal commitment among virtual project team members may serve to moderate social loafing by inducing an inherent reluctance in the individual to lower the goal or to abandon it (Campion and Lord, 1982; Hollenbeck *et al*, 1989).

On the technical side, the strategization of technology in virtual project teams to meet the unique demands of the business objective is a critical consideration. As Beranek *et al* (2005) admitted, “technology requirements vary substantially from project to project, but it is important to factor in procurement, installation, budget, and training early in the project [because] this step is frequently overlooked and can lead to startup delays for some members” (p. 252). But since virtual project teams basically function around a cascading of goals under a broad business mission, their use of communication media can be expected to evolve as new sub-goals emerge. In doing so however, virtual project team members may grow to be overly reliant on pure technological innovations (De Meyer, 1991; De Meyer and Mizushima, 1989) to the extent to which sub-goals are deliberately specified in ways by which they can be readily communicated. In another sense, because business solutions proposed in virtual project teams evolve as a series of negotiated sub-goals guided by an overarching objective, an over-dependence on technology may lead to the compromising of the negotiation process such that members turn to perceived limitations of the CMC media as intrinsic de-motivational excuses for suboptimal knowledge contributions. Team goal commitment thus assists in alleviating this problem by retaining virtual team members’ concentration on the derivation of goals beneficial to the core business purpose (Hollenbeck and Klein, 1987; Hollenbeck *et al*, 1989; Latham and Yukl, 1975a).

Decision processes have a direct impact on the quality of eventual decisional outcomes by offering the ‘*soft*’ guiding principles in structuring remote conferences in order to determine how group consensus should be reached (Beranek *et al*, 2005). While anonymity is a blessing in promoting candid

and uninhibited interactions within decision processes (Siegel *et al*, 1986), its provision may, at the same time, diminish the capacity of virtual project teams in coping with demographic and attitudinal variations across members, thereby leading to the potential manifestation of a variety of social problems (Kock, 1999; Rutkowski *et al*, 2002; Powell, 2000). Particularly, as Tan *et al* (2005) noted, a major concern in virtual collaborations is the predominant trend for comments, which originate as constructive cognitive knowledge conflicts to quickly spiral downwards into emotionally-charged affective knowledge conflicts, due to individuals' tendency to willfully misinterpret others' intentions in an estranged working environment (see also Beranek *et al*, 2005). The engenderment of team goal commitment thus mitigates virtual project team members' propensity for biased misinterpretation by shifting the emphasis of remote meetings from highly subjective social differences to objective goal-oriented terms so as to prevent deliberations from drifting into uncharted waters. In addition, team goal commitment has been demonstrated empirically to possess the added advantage of positive reinforcement in the context of group collaborations whereby an individual's commitment to a goal will act to reciprocate a similar level of goal commitment in others (Bandura, 1977; Earley and Kanfer, 1985), i.e. team goal commitment among members in virtual project teams is tantamount to symmetrical peer motivation towards the achievement of the business mission.

If team goal commitment were to be successfully infused into members of virtual project teams, then it instinctively follows that the resultant decisional outcome likely matches the target purpose. While this may be a fresh argument put forward by this paper, it is not a baseless proposition. From previous paragraphs, it is apparent that there is a certain degree of parallelism in the research domains of virtual project teams and task-goal relationships in that both areas accumulated an abundance of controversial findings on outcome performance, which may be attributable to an obvious disregard for team goal commitment in contemporary studies (Klein *et al*, 1999, p. 885; Locke and Latham, 1990). The pertinence of communicating and institutionalizing team goal commitment among members of virtual project teams is best conveyed by Beranek *et al* (2005) in the following paragraph:

“Team leaders must establish and document both a clear project mission and a priority-level commitment with upper-management and the team participants. All of the team members should understand what constitutes project success and share the common goal of achieving that end. If goal alignment is not formally established among team members, individuals tend to pursue different priorities and virtual projects often fail... For this reason, the Team Leader must look at not only the skills and experience of the potential participants, but should also ensure that the project has been clearly defined and emphasizes the priority of the desired outcomes. After all, a person’s attraction to a group is connected to his/her assessment of the consequences of group participation. That, in turn, is linked to how clearly the nature of the group and its goals were delineated, how likely it is that the goal will be achieved, and how closely the characteristics of the group match the person’s needs and values.” (p. 250-251)

This thesis hence argues for team goal commitment as a robust construct in mediating the eventual performance of virtual project teams. Such robustness resides in the conceptualization of team goal commitment as the overall attitudinal and behavioral outcome derived from an individual’s affective and cognitive responses to the influences of the immediate socio-communication milieu. By subscribing to goal commitment as a proxy to performance in virtual project team, this study aims to explicate underlying social mechanisms, in subsequent sections, that may predict the successful formation of goal commitment.

2.3 Virtual Project Teams as Social Exchanges: The Role of Psychological Contracts

Though the preceding section has outlined our rationale for subscribing to team goal commitment as a determinant affecting the key performance indices of virtual project teams through the accommodation of inherent structural and technological challenges, it is equally important, if not more so, to explicate the salient antecedents, embedded specifically in the underlying socio-technical mechanics of virtual project team functioning, which will impact the extent of team goal commitment among team members. To ensure the rigor of such a conceptual process, it is necessary to situate the elicitation of these antecedent factors within well-established theoretical boundaries to allow a systematic interpretation of how team goal commitment is shaped among members of virtual project teams through CMC media.

The grounding of a study on an acknowledged theoretical perspective is imperative because it offers not only strong justifications for reasoning logically about casual relationships among the constructs embodied within a research framework, but it also provides powerful explanations behind these hypothesized correlations (Sutton and Staw, 1995). As noted by Sutton and Staw (1995), “comparative tests of variables should not be confused with comparative tests of theory...because a predicted relationship must be explained to provide theory; simply listing a set of antecedents does not make a theoretical argument. The key issue is *why* a particular set of variables are expected to be strong predictors” (p. 376) A conceptual anchor will thus assist in illuminating the guidelines that empower the researcher to analyze and categorize the myriad of antecedent factors leading to team goal commitment among virtual team members. This in turn will guarantee logical consistency in both the interpretation of these constructs as well as the eventual research framework derived from their synthesis (Weick, 1979).

2.3.1 The Social Exchange Theory (SET): An Overview

One of the most pervasive theories cited by strategic management scholars in exploring relational interactions among organizational members is the Social Exchange Theory (SET). The SET emphasizes mutual reciprocity among participants as the underlying governance mechanism in any peer-based social community (Thibaut and Kelly, 1959; Tiwana and Bush, 2000); it involves the dynamic exchange of “diffuse, ill-defined obligations in terms of the nature, value, and timing of the benefits rendered and received by the parties” (Organ, 1990, p. 63). As opposed to pure economic transactions in which such obligations are explicitly defined and contractually quantifiable, social exchanges typically function on the principle that “people do others a favour with a general expectation of some future return but no clear expectation of exact future return” (Kankanhalli *et al*, 2005, p. 115). The SET thus offers an intuitive glimpse into the (tangible and intangible) costs and benefits borne by individuals in participating within relational networks (Gefen and Ridings, 2002). According to the SET, any communal interaction inevitably includes an exchange of social resources that can always be structured as the interplay of power among participants where power is normally derived from the accumulation of exclusive social resources (Blau, 1964; Emerson, 1962, 1981).

Social exchange relationships are fertile breeding grounds for opportunistic behavioural tendencies in which individuals may opt to operate in manners that maximize their benefits while concurrently, minimizing their costs (Molm, 1997). Individuals participating in a social exchange must therefore have “faith in the cooperative intentions of the other individuals with whom they are engaging due to the lack of a mechanism that could enforce an equal exchange” (Gefen and Ridings, 2002, p. 51). This belief of symmetrical reciprocation is such a pronounced feature of social exchanges that in its absence, individuals are less likely to *voluntarily* partake in the interaction (Blau, 1964). Empirically, the SET has been extensively utilized to clarify and predict an organizational member’s assessment of his/her interactions with other colleagues (Gefen and Ridings, 2002) such as the individual’s affective affiliation and willingness to remain and participate in specific relational networks (Cook and Emerson, 1978; Rusblut and Farrell, 1983).

Arguably, in the context of virtual project teams where there are almost zero physical interactions and limited relational acquaintance beyond what is achievable via the CMC medium, the application of the SET to explain team goal commitment becomes even more straightforward. Because virtual project teams offer minimal prior frames of reference from which members can formulate behavioural projections of their counterparts, the degree to which a participant voluntarily commits to the attainment of the overarching business objective is more or less dependent on the extent to which the individual possesses confidence in the collective reciprocal intentions of other collaborators participating in the knowledge sharing arrangement (Chatman and Flynn, 2001). Moreover, as described earlier, the peer-based nature of virtual communities generally precludes the explicit articulation and enforceability of terms governing predominant social interactions such as knowledge sharing (Tiwana and Bush, 2000). In this regard, the SET acts as an excellent theoretical anchor for researchers to glean generalizable insights into the dynamics of social exchange processes affecting the continuation and maintenance of cooperative relations within virtual communities (Tiwana and Bush, 2000).

While social exchanges are capricious in their manifestations in reality, Flynn (2005) supplied an excellent taxonomy by delineating their modern forms into three major categories as replicated in Table 2.

Table 2: A Taxonomy of Social Exchanges		
Forms of Social Exchange	Characteristics	Goal/Motivation of the Social Exchange
Negotiated	Negotiated exchange occurs when the terms of the social exchange is discussed openly such that the mutual reciprocation of benefits is direct and often immediate	Negotiated exchanges are driven solely by self-interest, which is derived from feelings of self-worth from the evaluation of personal traits based on self-other comparisons
Reciprocal	Reciprocal exchange refers to dyadic relations in which the terms of the social exchange are implicitly implied such that mutual reciprocation takes place unilaterally in separate episodes	Reciprocal exchanges normally rely on interpersonal identification at a dyadic relational level such that people are not motivated by self-interests, but also work to procure benefits for the other party involved in the social exchange
Generalized	Generalized exchange describes circumstances involving three or more members of a social community in which the terms of the social exchange are implicitly implied in a way whereby reciprocation may be indirect, i.e. it is analogous to the performance of a kind deed such that repayment may not necessarily be made by the original recipient or to the original giver	Generalized exchanges operate at the collective relational level whereby individuals adhere to a collective norm of unilateral giving and a general concern for others' well-being

From Table 2, it is evident that the generalized form of social exchanges is particularly relevant to the context of virtual project teams whereby the relative exclusivity of one's skill expertise makes for a complicated web of task interdependencies (Beranek *et al*, 2005), which may obstruct direct and mutual reciprocation of exchanged benefits. More importantly however, the goal or motivation of the generalized form of social exchange is in sync with our conceptualization of team goal commitment in which the purpose of the interaction is to contribute unilaterally to a 'greater' group-oriented cause without demanding any restitution (Yamagishi and Cook, 1993). As Flynn (2005) noted, repeated exchanges may act to "reinforce a sense of common identity" by leading to perceived mutualism or depersonalization—the extent to which exchange partners share similar interests and values (p. 742). Lawler and Yoon (1993) posited that more frequent social exchanges are often an indication of aligned or compatible objectives. This has led Flynn (2005) to speculate that as participants are exposed to successive episodes of generalized social exchanges, they are more likely to increase their commitment to the collective body. Therefore, in light of the parallelism between team goal commitment and the eventual consequence of repetitive generalized exchanges, this study argues for the SET as a viable theoretical premise for eliciting antecedents to individual members' team goal commitment in virtual project settings.

2.3.2 Psychological Contracts in Virtual Project Teams

Psychological contracts are native to social exchange relationships (Morrison and Robinson, 1997; Rousseau and McLean Parks, 1993). The term psychological contract was initiated by Levinson *et al* (1962) and Schein (1965) to refer to expectations about reciprocal obligations that compose an employee-organization exchange agreement. In its more general form however, a psychological contract is merely a set of beliefs about what each party involved in a social exchange relationship is entitled to receive, and obligated to give, in anticipation of others' contributions (Morrison and Robinson, 1997). Three key aspects of psychological contracts separate them from economic contracts. First, psychological contracts emphasize *perceived promises*, where a promise is defined as any communication of future intent (Rousseau, 1989). Perceived promises in psychological contracts thus entail both formal responsibilities established via proper documentation (e.g., written document, organizational policies) or perceptual obligations arising from informal means (e.g., oral discussion, organizational routines) (Rousseau and Greller, 1994; Rousseau and McLean Parks, 1993). Accordingly, if a perceived promise is not accompanied by the belief that a promise has been conveyed (e.g., if the perceived promise is based solely on past experiences in a similar relationship), then it does not constitute a psychological contract¹ (McLean Parks and Schmedemann, 1994; Rousseau and Greller, 1994; Shore and Tetrick, 1994). Because of this perceptual and idiosyncratic nature of psychological contracts, expectations of perceived promises held by an individual may or may not be shared by others involved in the social exchange relationship. This is in sharp contrast to explicit or economic contracts, which are founded on consensual or commonly acknowledged terms of governance (Lucero and Allen, 1994; McLean Parks and Schmedemann, 1994; Rousseau, 1989; Shore and Tetrick, 1994). Finally, psychological contracts can be transactional or relational in character (Morrison and Robinson, 1997) whereas economic contracts are essentially focused on the former. Transactional psychological contracts are composed of "specific, short-term, and

¹ Such a conceptualization of psychological contract implies that perceived promises must originate from some form of prior communication among parties involved in a social exchange relationship on the roles and responsibilities of each participant. Conversely, if participants' expectations about obligations are derived primarily from previous membership in a similar relationship, they do not constitute a psychological contract.

monetizable obligations entailing limited participation of the parties” whereas relational psychological contracts encompasses “broad, open-ended, and long-term obligations [involving] the exchange of not only monetizable elements but also socio-emotional components such as support and loyalty” (Morrison and Robinson, 1997, p. 229; Rousseau and McLean Parks, 1993). In light of the aforementioned features, empirical evidence suggests that the reinforcement and sustenance of psychological contracts prevents negativism, social loafing and the premature exit of members from social exchange relationships (Robinson *et al*, 1994; Robinson and Morrison, 1995; Robinson and Rousseau, 1994).

Reflecting on our earlier discourse on the resemblance between virtual project teams and social exchange relationships, we can infer that psychological contracts form the cornerstone of virtual project teams in much the same way. Fundamentally, virtual project teams are peer-based knowledge-sharing arrangements designed to bridge geographical distance in assimilating localized proficiencies to solve unstructured business problems (Beranek *et al*, 2005). But it is precisely due to this flexible configuration and knowledge-interdependent task architecture that the performance of virtual project teams is bonded to the congruency of the psychological contracts implicitly held by each individual member. Because it is practically impossible to quantify knowledge contribution in a project setting due to the relative exclusivity of each participant’s domain of expertise (Beranek *et al*, 2005), continued excellence in a virtual project team is only guaranteed to the extent to which there exists unanimous psychological contracts among members, providing them with the confidence that uncensored participation on their part at any instance will be rewarded in kind by others as and when the right opportunity surfaces in the future.

Because the research objective of this study is to shed light on the antecedents leading to team goal commitment, the next logical step is to explore how psychological contract can surface in reality so as to derive probable social mechanisms that are useful in promoting such occurrences.

2.4 A Social Exchange Perspective of Justice in Strengthening and Sustaining Psychological Contracts within Virtual Project Teams

From a social exchange perspective, virtual project team members will continue to exhibit team goal commitment so long as he/she perceives unequivocal contribution by other participants towards the broader group objective, i.e. insofar as virtual project team members believes that psychological contracts governing reciprocal knowledge sharing are still in effect, uncensored proactive participation can be maintained. Naturally, it is not uncommon for social exchange relationships to include the exploitation (whether consciously or subconsciously) by participants to dictate unreasonable terms and manipulate others within the group for his/her advantage to the extent to which he/she manages to get away with such conduct without the fear of sanctions from others (Organ, 1990; Cook and Emerson, 1978). These trends are especially pronounced within virtual communities, which function predominantly on estranged social exchange processes (Tiwana and Bush, 2000) where partisan interests and perceptually induced frames of references serve little to encourage empathy among participants (Griffin and Rose, 1991). To strengthen and sustain psychological contracts within virtual project teams so as to minimize probable disruptions caused by exploitative treatment in social exchanges, a paradoxical strategy involving the installment of procedural controls and the promotion of candid communication is necessary.

Procedural controls, as covered in management literature, have often been credited with the ability to fashion behaviors and actions in ways that encourage compliance among stakeholders for the achievement of the business goals of the organization (Sia and Neo, 1997). Through the employment of controls, the viability of attaining pre-specified objectives becomes more foreseeable and manageable, thereby rendering outcomes to be more certain (Das and Teng, 1998). Therefore, the enforcement of procedural controls can to a large extent, curtail the manifestation of partisan interests that conflict with the mission of the collective body (Tan and Lim, 2005). Procedural controls are invaluable in providing structural guidance from which members within a virtual project team can turn to for assurance of the acceptable behaviors in terms of constructive engagement during formal project workings and discussions.

The inducement of open and structural communication is also imperative in bridging perceptual gaps by minimizing the ‘false consensus effect’ whereby people conveniently presume that they share the same perceptions regarding given stimuli (Ross *et al*, 1977). Morrison and Robinson (1997) also echoed

that the facilitation of accurate and truthful communication among participants in social exchange relationships augments underlying psychological contracts. Granted that the dual mechanisms of control and communication are pivotal to the nurturing of psychological contracts, we maintain that team goal commitment among virtual project team members is intimately linked to individual perceptions of justice embedded in communal interactions (Colquitt *et al*, 2001; Masterson *et al*, 2000).

Masterson *et al* (2000) recommend the induction of justice measures to govern the derivation of outcomes within social exchange relationships. The concept of justice has been popularized by managerial scholars as a means by which to induce perceptions of fairness in individuals through shaping one's thoughts, feelings and actions (Tyler, 2000; Tyler *et al*, 1997; Tyler and Smith, 1997). As appropriately summarized by Tyler and Blader (2003), "justice has an impact; it is substantial in magnitude; it is consistently found across a wide variety of group and organizational contexts; and it is distinct from judgments of self-interest or personal/group gain [such that] information about justice is central to people's evaluations of social situations" (p. 349; see also Van den Bos and Lind, 2002). Investigative evidence has pegged justice as a predictor to a variety of positive outcomes such as organizational citizenship, satisfaction, commitment and group cooperation (Folger and Konovsky, 1989; Moorman, 1991; Tyler and Blader, 2003); the very behaviors psychological contracts seek to encourage (Fisher and Baron, 1982; Greenberg, 1990; Robinson and Bennett, 1997; Robinson *et al*, 1994; Robinson and Morrison, 1995; Robinson and Rousseau, 1994; Tripp and Bies, 1997). Such findings have led Tyler and Blader (2003) to further hypothesize that justice is positively correlated with individuals' *collective self*—the social identity linked to group memberships—to the extent to which it dictates people's willingness to cooperate with their fellow group members (see also Sedikides and Brewer, 2001), a proposition yet to be empirically validated. Reflecting on our preceding discourse in which we allude to members' social identity (or collective self) in a virtual project team as more or less an affiliation with the broader business objective founded on intrinsic psychological contracts, it follows logically that Tyler and Blader's (2003) proposition should be adapted to this research to explore the impact of justice on team goal commitment in virtual collaborative settings.

2.5 The Moderating Effect of Para Social Presence in Virtual Collaborative Settings

While the preceding sections theorize virtual project teams as comprising a sophisticated web of social exchange relationships grounded in psychological contracts and identify the concept of justice as a principal determinant influencing the engenderment of team goal commitment among members, this study duly acknowledges that such collaborations are invariably technological in nature such that IT-mediated characteristics of the underlying CMC medium will inevitably influence the manner by which participants' formulation of justice perceptions translate to corresponding attitudes of team goal commitment. Conceivably, the hunt for an appropriate moderator to situate the relationship between justice and team goal commitment within virtual project teams in its IT-mediated context is another explicit undertaking of this study (Carte and Russell, 2003).

A comprehensive review of contemporary literature by Walter and Parks (2002) yielded six predominant CMC theories that endeavor to explain the dynamics of human-computer interactions (refer to Appendix B). Amidst these theories, the Media Richness Theory (MRT) (Daft and Lengel, 1984, 1986), the Media Synchronicity Theory (MST) (Dennis *et al*, 1998; Dennis and Valacich, 1999) and the Social Presence Theory (SPT) (Short *et al*, 1976) can be categorized under 'Trait Theories of Media Selection' for the similarity of their strategies to media selection (see Carlson and Davis, 1998). Whereas the MRT and the MST subscribes to a more task-oriented approach to media selection, the SPT undertakes a relational perspective towards comprehending users' choice of CMC technologies (Kumar and Benbasat, 2002a, b; Rice, 1993). For this reason, the SPT has traditionally been utilized to assess the degree to which a specific communication medium allows a user to initiate personal connections with others (Hiltz *et al*, 1986; Short *et al*, 1976; Sia *et al*, 2002). According to the SPT, CMC media characteristics have the ability to render the presence of communicators more salient or more distant to one another (Short *et al*, 1976). The saliency of social presence in turn, has an impact on the orientation of discussion in group processes, i.e. CMC media with low bandwidth (e.g., text-based systems) tend to lead to perceptions of

low social presence, which serves to promote task-centric functions at the expense of reduced group consensus and vice versa for CMC media with high bandwidth (Hiltz *et al*, 1986).

Similar conclusions were also reported by Sia *et al* (2002), who observed that group polarization (i.e., taking more extreme actions) is significantly stronger when visual and verbal cues are removed in communications because the absence of such social cues leads to low social presence, which in turn encourages one-upmanship behavior (tendency of individuals to try and outperform one another in the socially valued direction) but discourages pluralistic balance (desire of individuals to achieve a compromise b/w their preferred positions and the positions thought to be favored by others). In other words, the trail of empirical evidence reveals that the saliency of social presence in CMC is dependent on the social context of the interaction, the characteristics of the online communication format and whether there is a need for social cohesion (Gunawardena, 1995; Tu and McIssac, 2002). Therefore, since the congruency of psychological contracts act as the social glue binding members of virtual project teams, this study posits that the SPT offers the most interesting and pertinent support for how the relationship between perceived justice and team goal commitment within virtual project teams may be affected by the underlying characteristics of CMC media. We maintain that the saliency of social presence plays a crucial role in *moderating* social exchange relationships within virtual project teams such that they lean towards either transactional (i.e. task-oriented) or relational psychological contracts, which in turn dictates the likelihood whereby these implicit agreements are likely to be fulfilled (McLean Parks and Kidder, 1994; McLean Parks and Schmedemann, 1994; Morrison and Robinson, 1997). Lombard and Ditton (1997) taxonomized presence into six different categories as tabulated in Table 3 below:

Table 3: A Taxonomy of Presence [as adapted from Lombard and Ditton (1997)]	
Presence as...	Characteristics
Social Richness	Presumably the most prevalent form of conceptualization among researchers in media selection, presence is defined as the extent to which communicators can convey verbal and non-verbal cues (Burke and Chidambaram, 1999; Carlson and Davis, 1998)
Realism	Defined as the degree to which a medium can produce realistic representations of the entities one is interested in, this conceptualization of presence has been widely employed in the field of graphics and animation (e.g., perceptual vs. social realism)
Transportation	Analogous with sensations of 'you-are-there', 'it-is-here' and 'we-are-together', this

	conceptualization of presence is primarily concerned with whether users share a feeling of being transported to the artificial reality (Millerson, 1969)
Immersion	To evaluate the extent to which a virtual environment immerses users perceptually and/or psychologically, this conceptualization of presence distinguishes between psychophysical responses (i.e., perceptual immersion) and deeper participation (i.e., psychological immersion) (Biocca and Delaney, 1993; Heeter, 1995)
Social Actor within Medium	Addresses social responses of users to entities within particular media, this conceptualization of presence seeks to discern users' reactions to interpersonal distant cues from across the medium and/or virtual actors
Medium as a Social Actor	Captures social responses of users to cues provided by particular media, this conceptualization of presence is interested in users' reactions to social cues exhibited by the medium as though it were a social actor (Nass <i>et al</i> , 1995a, 1995b; Nass and Steur, 1994)

From Table 3, it is clear that the last two categories of presence are particularly amenable to virtual project teams as aptly surmised by Kumar and Benbasat (2002b): “When two social actors communicate in a mediated environment, these actors get used to this mediated environment over time and ascribe characteristics to media that might increase or decrease the richness of the medium [such that] it is more elegant and parsimonious to concentrate purely on psychological rather than psychophysical dimensions” (p. 12). Kumar and Benbasat (2002a, b) thus postulated that it is imperative and viable to integrate these two categories of presence to generate the improved construct of Para-Social Presence (PSP), which encapsulates both social attributions of CMC media within a wider range of social contexts as well as the growing movement towards the dual inclusion of synchronous and asynchronous communication contexts among Management Information Systems (MIS) scholars (e.g., Burke and Chidambaram, 1999; Karahanna and Straub, 1999). Differences between PSP and the traditional construct of social presence are summarized in Table 4 below:

Table 4: A Summary of Differences between Social Presence and Para-Social Presence [as reproduced from Kumar and Benbasat (2002)]		
Traditional Social Presence		Para-Social Presence
Synchronous Communication	→	Synchronous and Asynchronous Communication
Organization Settings	→	Organization Settings and More
Entities Involved—Two or more people and a medium of interaction		Entities Involved—Should they be humans? (Blurring of Media and Interface)
Virtual Teams		Virtual Teams and Communities
Are the users connected through the medium, for a specific purpose, pre-determined?		Manner in which the web can bring together people with similar goals and interests (connectivity)

Unidimensional	→	Multidimensional
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From Table 4, it is evident that the PSP construct is a broader, overarching concept as compared to traditional social presence construct and as such, it will be espoused as the principal moderator of interest in lieu of the latter.

CHAPTER 3 – HYPOTHESES AND RESEARCH MODEL

Having reviewed the dominant influence of justice and PSP on team goal commitment within virtual project team settings, the backdrop is set for the theorization of our research framework together with testable hypotheses to discern the antecedent effects of discrete facets of justice on team goal commitment within the moderating context of PSP.

3.1 Justice and Team Goal Commitment

Justice is a multi-dimensional construct and will be treated as such in this thesis. Three conceptually distinct dimensions of justice typically prevail within contemporary strategic management literature, namely *distributive*, *interactional*, and *procedural* justice (Colquitt *et al*, 2001; Masterson *et al*, 2000). Adapting these concepts to virtual project teams, we define: (1) distributive justice defines as the extent to which an individual perceives outcome allocation among group members to be comparable to the amount of effort put in by each colleague; (2) interactional justice as the extent to which an individual perceives he/she has been fairly treated by other group members, and; (3) procedural justice as the extent to which an individual perceives that structural controls are in place to ensure democracy in deliberations among group members (Colquitt *et al*, 2001).

Before we proceed with further elaboration on how these three justice dimensions relate to team goal commitment within the broader framework of psychological contracts in social exchange relationships, we should highlight that there are substantial controversies concerning their orthogonality (Barling and Phillips, 1993; Colquitt, 2001; Colquitt *et al*, 2001; Masterson *et al*, 2000; Skarlicki and Folger, 1997). We hence reviewed literature to arrive at studies that examine at least two out of the three justice dimensions (refer to Table 1 of Appendix A). Our theoretical excursion produces mixed results with each of the three justice dimensions displaying construct validity and saliency under different conditions. More interestingly however, Colquitt *et al*'s (2001) meta-analytical review of 183 empirical studies suggests that the occasionally high correlation among the three justice dimensions is essentially a function of their operationalization. Since these three dimensions of justice appear to be conceptually

distinguishable, we opt to retain distributive, interactional and procedural justice as separate dimensions for this study.

3.1.1 Distributive Justice and Team Goal Commitment

Distributive justice dominated the study of justice prior to mid-seventies (Colquitt *et al*, 2001). Much of this pioneering research was extended from the seminal work of Adams (1965), who utilized a social exchange framework to evaluate fairness. According to Adams (1965), people are less concerned with the absolute magnitude of outcomes per se but more particular about the commensuration of those outcomes relative to one's contributions (see also Samah, 2006; Schminke *et al*, 1997). Whereas Adams (1965) advocated an equity principle to outcome allocation, other rules have also been recommended such as those based on equality or needs (Leventhal, 1976). Studies have further demonstrated that different contexts (e.g., work vs. family), different goals (e.g., group harmony vs. productivity) and different personal motives (e.g., self-interest vs. altruism) can activate the primacy of different outcome allocation rules (Deutsch, 1975). But despite whatever outcome allocation rules are being employed, they have as their primary objective, the attainment of distribution fairness (Colquitt *et al*, 2001). Naturally, the presence of distributive justice may have a pre-emptive effect on settling initial worries among virtual project team members on the possible ambiguity with regards to reimbursements associated with team and individual performances i.e. if participants are led to believe that reimbursements are accorded in accordance with the level of contribution, there is greater confidence in the enforcement and fulfillment of psychological contracts within the virtual project team over the course of the assignment. Such contentions are also consistent with the proposition of the Expectancy Theory (ET), which holds that intrinsic motivation is shaped by the extent to which an individual perceives: (1) one's effort will lead to desired performance (i.e. effort-performance expectancy); (2) the achievement of performance standards will be rewarded in kind as compensation for one's effort (performance-outcome instrumentality), and; (3) the reward is commensurable with one's expectations (outcome valences) (Lim *et al*, 2005; Scholl, 1981; Vroom, 1964). Support for the ET has been verified in a variety of managerial and Management Information Systems (MIS) adoption scenarios (Burton *et al.*, 1993; Campbell and Pritchard, 1976;

DeSanctis, 1983; Lawler, 1973; Melone, 1990; Mitchell and Albright, 1972; Mitchell and Knudsen, 1973). Similarly, Farh *et al* (1997) documented a positive relationship between distributive justice and citizenship behavior. Empirical evidence from Samah (2006), McFarlin and Sweeny (1992) purported an even straightforward linkage between distributive justice and commitment. We thus propose that,

Hypothesis 1: An individual member's team goal commitment in a virtual project team is positively correlated with his/her perceived distributive justice of the group.

3.1.2 Interactional Justice and Team Goal Commitment

Bies and Moag (1986) hypothesized that individuals' judgment of fairness is also founded on the quality of interpersonal treatment received during the execution of procedures—a notion they labeled as interactional justice. Contrary to Bies and Moag's (1986) proposal however, critics have contested that interactional justice should be encompassed in the broader construct of procedural justice, arguing either that interactional components, like structural elements, impact procedural justice (Cropanzano and Greenburg, 1997) or that interpersonal and structural variables are complementary and thus inseparable (Tyler and Bies, 1990). But as countered by Masterson *et al* (2000), individuals' "attributions for the source of interactional justice perceptions tend to generalize to the person carrying out the interpersonal treatment, and that procedural justice perceptions tend to generalize to the entity to which the procedures are attributable" (p. 739). In an environment with high level of interpersonal empathy, it is likely that there will be a correspondingly high level of tolerance for individual mistakes or failures, common in any virtual project team. Without such tolerance, a full-blown confrontation among virtual project team members remains the mostly likely of all outcomes.

Interpersonal empathy is therefore a valuable commodity in virtual project teams to bridge estranged social relationships (Beranek *et al*, 2005). It fosters awareness and mutual understanding of the constraints confronting individual members such that existing psychological contracts can be sustained, especially when adverse circumstances beyond the control of the individuals were to surface. Nonetheless, interpersonal empathy can only be bred through respect and congeniality, which calls into question the influence of interactional justice. In other words, interactional justice should have a positive influence on

team goal commitment in virtual project teams by nurturing interpersonal empathy to countervail the impact of negative attribution on psychological contracts among virtual project team members. Existing empirical studies also offer reinforcing evidence of the applicability of interactional justice measures in the prediction of commitment tendencies. Research findings from Malatesta and Byrne (1997) as well as Masterson and Taylor (1996) revealed that interactional justice perceptions are suited to predicting outcomes of commitment directed at peer-to-peer or supervisor-subordinate relationship. We thus propose that,

Hypothesis 2: An individual member's team goal commitment in a virtual project team is positively correlated with his/her perceived interactional justice of the group.

3.1.3 Procedural Justice and Team Goal Commitment

Procedural justice, as originally conceptualized by Thibaut and Walker (1975), refers to structural elements such as process control and opportunities for voice as major deterrents against exploitative power utilization in order to cultivate a perceived sense of equality among individuals. Schroth and Shah (2000) suggest that “people look to procedures to assess their value by the group, organization, or authority using the authority” (p. 463). Consequently, fair procedures lead to positive feelings about oneself because they signify respect by the group or authority which enacts the procedure whereas unfair procedures will lead to negative feelings about oneself for they indicate low regard by the group or authority (Lind and Tyler, 1988). Schroth and Shah (2000) also postulated that unfair procedures diminish one's self-esteem by possibly creating unjustified situations in which an individual cannot deny responsibility for failure or accept credit for success. In this sense, Lane (1988) proposed that procedural justice is often interpreted by the individual as an implicit evaluation of his/her worth by the collective body. Clearly, procedural justice is applicable to psychological contracts in virtual project teams where promises assume the form of knowledge contributions, which are hardly quantifiable. Not only does procedural justice offer some sort of assurance that members' individualistic contributions are not being neglected by the virtual project team (Lind and Tyler, 1988; Schroth and Shah, 2000), it also clarifies, to a certain degree, the complexities and ambiguities surrounding obligations in psychological contracts by

enhancing the visibility of one's effort towards accomplishing the mission of the collective body. This in turn should build confidence among virtual project team members in engaging in psychological contracts. Moreover, empirical findings illustrated that individual perceptions of procedural justice were positively related to commitment as well (Malatesta and Byrne, 1997; Masterson and Taylor, 1996). We thus propose that,

Hypothesis 3: An individual member's team goal commitment in a virtual project team is positively correlated with his/her perceived procedural justice of the group.

Arguably from above, justice is an intuitive and instrumental antecedent to the determination of team goal commitment in virtual project teams, therefore the three dimensions of distributive, interactional and procedural justice will be espoused as key predictors leading to team goal commitment behavior among members.

3.2 PSP in Virtual Project Teams: The Moderating Effects of Connectivity, Sense of Understanding, Involvement and Positivity

As a multi-dimensional construct, Kumar and Benbasat (2002a, b) delineated the concept of PSP into five constituent dimensions, namely, *immediacy/intimacy*, *sense of understanding*, *positivity*, *involvement*, *dominance*. Amongst these five dimensions, dominance was dropped because Kumar and Benbasat's (2002a, b) conceptualization of dominance relates to the capacity of the medium to subjugate the user, which may be applicable in the context of e-commerce but to a much lesser extent, relevant to virtual project teams where domination is exercised by the correspondent across the medium and not the medium per se. This study also employed the term connectivity in place of immediacy/intimacy as it is a more accurate reflection of the ability of a medium to bring together people with common goals or interests.

3.2.1 Connectivity

Connectivity, as conceptualized by Kumar and Benbasat (2002a, b), refers to the extent to which a specific CMC medium creates a sense of community (establishment of shared goals and objectives) among correspondents. CMC media with high connectivity are therefore those that offer functionalities allowing correspondents to arrive at consensus in a speedier fashion (e.g., e-calendars, shared folders). As

Grudin (1994) noted, while collaborative technologies never offers the precise same benefits to each and every group member, individuals can still stand to benefit from collective usage. Ehrlich (1987) substantiates the above statement with an empirical study of electronic calendar systems. An interesting discovery by Ehrlich (1987) is that while the direct beneficiaries of electronic calendars are conference conveners (e.g., managers or secretaries); every member of the group is motivated to maintain a personal calendar for which it is not a habitual practice. Grudin (1994) offers another example in the form of a distributed project management system that covers the scheduling and chronicling of activities, the creation of and evaluation of plans and schedules, the management of product versions and changes, and the monitoring of resources and responsibilities. Grudin (1994) maintained that while the primary beneficiaries for such an application are typically the project managers, other members of the team also stand to gain from being kept updated about the progress of others as well as that of the collective body (see also McCracken and Akscyn, 1984). In much the same way, connectivity is vital to virtual project team in blurring individual boundaries to attain general consensus on agenda items that are pertinent to the collective body. We thus hypothesize that the connectivity of the CMC media underlying virtual project teams will strengthen: (1) the positive relationship between distributive justice and team goal commitment by ensuring a consensual understanding of outcome allocation; (2) the positive relationship between interactional justice and team goal commitment by improving awareness of one another's situation, thereby preventing affective disagreements from surfacing, and; (3) the positive relationship between procedural justice and team goal commitment by structuring the team agenda around the collective body and not based on any single individual such that it precludes the realization of personal influence.

Hypothesis 4A: The positive relationship between a virtual project team member's perceptions of distributive justice and team goal commitment is strengthened [positively moderated] by the connectivity of the underlying group collaborative technology.

Hypothesis 4B: The positive relationship between a virtual project team member's perceptions of interactional justice and team goal commitment is strengthened [positively moderated] by the connectivity of the underlying group collaborative technology.

Hypothesis 4C: The positive relationship between a virtual project team member's perceptions of procedural justice and team goal commitment is strengthened [positively moderated] by the connectivity of the underlying group collaborative technology.

3.2.2 Sense of Understanding

Sense of understanding, as defined in this thesis, is the extent to which a specific CMC medium conveys accurately and completely, correspondents' thoughts and ideas to facilitate mutual understanding. As remarked by Reeves and Nass (2000), "in all computer-mediated communication, including teleconferencing and other technologies that enable two or more people to sense each other using technology as an intermediary...the perceptions of other people and objects may change because stimulus information about them is filtered through the representational capabilities of a machine" (p. 66). They hence postulated that the larger the number of representational facilities accessible from the CMC medium, the higher is the probability that the complete range of social cues can be conveyed from the sender and interpreted correctly by the recipient (Reeves and Nass, 2000). For instance, video-conferencing technology possesses an edge over its teleconferencing counterpart because with the addition of video images, it opens up a whole new spectrum of visual cues such as facial expressions and body languages that empowers correspondents with greater expressiveness. In the words of Reeves and Nass (2000), video-conferencing will thus boast of better *perceptual bandwidth* than teleconferencing by increasing the number of human senses that can be employed by individuals to infer communicated messages. Bickmore (2004) echoed similar sentiments in stating that "body language and familiar silent signals are as much a part of social experience as the conversation [such that] building systems to recognize and respond to such moves will propel interface technology to the next horizon" (p. 38). Conversely, CMC media can be deployed in ways (whether knowingly or unknowingly) that do not reflect reality, thereby misleading correspondents in the interpretation of communicated messages. An

excellent example is in the choice of 3D avatars where the tone and texture of digital voices as well as the appearance of 3D avatars do impose salient effects on individuals' perceptions even though they may or may not reflect the actual personality of the user; a deeper voice with a formal appearance may express more authority than one whose speech is sharper and dresses casually (Qiu and Benbasat, 2005a, b). As such, we argue that the sense of understanding embedded within the CMC media underlying virtual project teams will strengthen: (1) the positive relationship between distributive justice and team goal commitment by guaranteeing the undistortion of individual contributions such that outcome allocation is more likely to be weighted accordingly; (2) the positive relationship between interactional justice and team goal commitment by reducing the possibility of misunderstandings arising from communication distortions, and; (3) the positive relationship between procedural justice and team goal commitment by diminishing chances that dominating and/or free-riding behaviors could be chalked up to a misinterpretation of communicated messages.

Hypothesis 5A: The positive relationship between a virtual project team member's perceptions of distributive justice and team goal commitment is strengthened [positively moderated] by the sense of understanding of the underlying group collaborative technology.

Hypothesis 5B: The positive relationship between a virtual project team member's perceptions of interactional justice and team goal commitment is strengthened [positively moderated] by the sense of understanding of the underlying group collaborative technology.

Hypothesis 5C: The positive relationship between a virtual project team member's perceptions of procedural justice and team goal commitment is strengthened [positively moderated] by the sense of understanding of the underlying group collaborative technology.

3.2.3 Involvement

Involvement is the extent to which a specific CMC medium sustains correspondents' attention and interests in interacting with one another. Inherently, communication via CMC media does not depart from the social environment in which interaction takes place. While technological designs may be neutral, their reception is confounded by distinctions that already prevail in the immediate social system (Grudin, 1994). Grudin (1994) testified to the tendency of system users to attach socially constructed meanings in the utilization of collaborative technologies. Quoting the example of emails, Grudin (1994) noted that while developers view the utilization of emails as a distinction between sender and receiver, its actual usage in the workplace normally emphasizes the distinction between supervisor and subordinate (see also Perin, 1991). CMC media promoting high involvement would thus entail functionalities that project, as much as possible, feelings of being engaged in actual face-to-face conversation among correspondents. As professed by Fish *et al* (1993), "insofar as audio and video communication mimics the features of face-to-face communication in being expressive, interactive, and focusing attention on personal attributes, it should function as face-to-face communication" (p. 50). In the same vein, involvement is a crucial component of successful virtual project team by closing the virtual distance among members such that interactions resemble almost face-to-face communication. We thus hypothesize that the involvement of the CMC media underlying virtual project teams will strengthen: (1) the positive relationship between distributive justice and team goal commitment by strengthening relational ties among members such that there is an extra social component driving the equity of outcome allocation; (2) the positive relationship between interactional justice and team goal commitment by eliminating the likelihood that members will be dismissive of one another, thereby giving rise to fairer interpersonal treatment and; (3) the positive relationship between procedural justice and team goal commitment by making sure that participants' acknowledgement of being a member of a peer-based relational network will act as a disincentive to stray from the objectives of the collective body.

Hypothesis 6A: The positive relationship between a virtual project team member's perceptions of distributive justice and team goal commitment is strengthened [positively moderated] by the involvement of the underlying group collaborative technology.

Hypothesis 6B: The positive relationship between a virtual project team member's perceptions of interactional justice and team goal commitment is strengthened [positively moderated] by the involvement of the underlying group collaborative technology.

Hypothesis 6C: The positive relationship between a virtual project team member's perceptions of procedural justice and team goal commitment is strengthened [positively moderated] by the involvement of the underlying group collaborative technology.

3.2.4 Positivity

Positivity is the extent to which a specific CMC medium induces a sense of comfort and relaxation among correspondents when interacting with one another. As postulated by Jasperson *et al* (2002), communication is intrinsically a political process whereby “sensemaking is not only the product of mutually shared assumptions and interpretative procedures, but also a political dialog through which actors influence the perceptions, decisions and behaviour of others” (p. 412), i.e. whoever dominates the social dialog and regulates its flow will dictate the formation of subjective meanings, ultimately determining outcomes. To control meanings within dialogues, individuals or collectives turn to the use of language and symbols to reconstruct social reality regarding what are appropriate decisions, structures, and goals (Jasperson *et al*, 2002). Such practices are especially prominent in situations whereby the absence of formalized structure presents opportunities for individuals or collectives to install personalized language and symbols which improve their influence over others (Newman and Noble, 1990). This is also reinforced by Kling and Iacono's (1984) study of IT function developers in which they, lacking formal authority, create a social construction of the methodology and the IT professionals who implement it such that over time, the value of the IT professionals' work culminates in power shifts. The same can be said of virtual project teams where the absence of rigid controls may easily breed political dialogues within the group such that members are always under pressure during discussions. CMC media with high positivity must therefore be able to break down the political overtone of group discourses (e.g., emoticons). However, it should also be emphasized that the utilization of these functionalities may in itself be part of a political manoeuvre to induce false perceptions of comfort and relaxation among correspondents. We

thus hypothesize that the positivity of the CMC media underlying virtual project teams will strengthen: (1) the positive relationship between distributive justice and team goal commitment by inducing contentment among members such that participants are more likely to perceive equity in outcome allocation, and; (2) the positive relationship between interactional justice and team goal commitment by making members feel more at ease during discussions, thereby keeping abusive comments and opinions to a minimum, but at the same time, it may attenuate the positive relationship between procedural justice and team goal commitment by cultivating complacency among members such that participants display behavioral tendencies to ignore structural controls calling for proactive contributions.

Hypothesis 7A: The positive relationship between a virtual project team member’s perceptions of distributive justice and team goal commitment is strengthened [positively moderated] by the positivity of the underlying group collaborative technology.

Hypothesis 7B: The positive relationship between a virtual project team member’s perceptions of interactional justice and team goal commitment is strengthened [positively moderated] by the positivity of the underlying group collaborative technology.

Hypothesis 7C: The positive relationship between a virtual project team member’s perceptions of procedural justice and team goal commitment is attenuated [negatively moderated] by the positivity of the underlying group collaborative technology.

Based on the testable propositions outlined above and summarized in Table 5 below, we arrive at an integrated research framework (see Figure 1) that seeks to explain how constituent dimensions of PSP moderate the relationships between facets of justice and corresponding attitudes of team goal commitment within virtual collaborative settings.

Table 5: A Tabulated Summary of Testable Propositions	
Hypotheses	Rationale
<i>Main Effects</i>	
H1: A member’s perception of distributive justice within the virtual project team is positively related to his/her team goal commitment	Distributive justice may have a pre-emptive effect of settling initial worries on possible ambiguities surrounding reimbursements associated with individual performance; it increases the willingness of participants to fulfill promised obligations within psychological contracts if they are led to

	believe that reward allocation is likely to be commensurable with one's contribution
H2: A member's perception of interactional justice within the virtual project team is positively related to his/her team goal commitment	Interactional justice nurtures interpersonal empathy to buffer probable negative influence of inevitable individual constraints and failures such that psychological contracts can be sustained
H3: A member's perception of procedural justice within the virtual project team is positively related to his/her team goal commitment	Procedural justice not only offers some form of assurance that members' individualistic contributions are not being neglected by the virtual project team, it also clarifies, to a certain degree, the complexities and ambiguities surrounding obligations in psychological contracts
Moderating Effects	
H4A: The positive relationship between a virtual project team member's perceptions of distributive justice and team goal commitment is strengthened [positively moderated] by the connectivity of the underlying group collaborative technology	Because connectivity fosters a sense of community among participants, it ensures a consensual understanding of outcome allocation
H4B: The positive relationship between a virtual project team member's perceptions of interactional justice and team goal commitment is strengthened [positively moderated] by the connectivity of the underlying group collaborative technology	Because connectivity fosters a sense of community among participants, it improves awareness of one another's situation, thereby preventing affective disagreements from surfacing
H4C: The positive relationship between a virtual project team member's perceptions of procedural justice and team goal commitment is strengthened [positively moderated] by the connectivity of the underlying group collaborative technology	Because connectivity fosters a sense of community among participants, it structures the team agenda around the collective body and not based on any single individual such that it precludes the realization of personal influence
H5A: The positive relationship between a virtual project team member's perceptions of distributive justice and team goal commitment is strengthened [positively moderated] by the sense of understanding of the underlying group collaborative technology	Because sense of understanding pertains to the accurate conveyance of communication messages among participants, it guarantees undistortion of individual contributions such that outcome allocation is more likely to be weighted accordingly
H5B: The positive relationship between a virtual project team member's perceptions of interactional justice and team goal commitment is strengthened [positively moderated] by the sense of understanding of the underlying group collaborative technology	Because sense of understanding pertains to the accurate conveyance of communication messages among participants, it reduces the possibility of misunderstandings arising from communication distortions
H5C: The positive relationship between a virtual project team member's perceptions of procedural justice and team goal commitment is strengthened [positively moderated] by the sense of understanding of the underlying group collaborative technology	Because sense of understanding pertains to the accurate conveyance of communication messages among participants, it diminishes chances that dominating and/or free-riding behaviours could be chalked up to a misinterpretation of communicated messages
H6A: The positive relationship between a virtual project team member's perceptions of distributive justice and team goal commitment is strengthened [positively moderated] by the involvement of the underlying group collaborative technology	Because involvement is directed at motivating and sustaining participants' attention and interest in their interactions, it strengthens relational ties among members such that there is an extra social component driving the equity of outcome allocation
H6B: The positive relationship between a virtual	Because involvement is directed at motivating and

<p>project team member's perceptions of interactional justice and team goal commitment is strengthened [positively moderated] by the involvement of the underlying group collaborative technology</p>	<p>sustaining participants' attention and interest in their interactions, it eliminates the likelihood that members will be dismissive of one another, thereby giving rise to fairer interpersonal treatment</p>
<p>H6C: The positive relationship between a virtual project team member's perceptions of procedural justice and team goal commitment is strengthened [positively moderated] by the involvement of the underlying group collaborative technology</p>	<p>Because involvement is directed at motivating and sustaining participants' attention and interest in their interactions, members' acknowledgement of being in a peer-based relational network will act as a disincentive to stray from the objectives of the collective body</p>
<p>H7A: The positive relationship between a virtual project team member's perceptions of distributive justice and team goal commitment is strengthened [positively moderated] by the positivity of the underlying group collaborative technology</p>	<p>Because positivity is intended to cultivate a comfortable and relaxed interactional environment, it induces contentment among members such that participants are more likely to perceive equity in outcome allocation</p>
<p>H7B: The positive relationship between a virtual project team member's perceptions of interactional justice and team goal commitment is strengthened [positively moderated] by the positivity of the underlying group collaborative technology</p>	<p>Because positivity is intended to cultivate a comfortable and relaxed interactional environment, team members are more likely to feel at ease during discussion such that abusive comments and opinions can be kept to a minimum</p>
<p>H7C: The positive relationship between a virtual project team member's perceptions of procedural justice and team goal commitment is attenuated [negatively moderated] by the positivity of the underlying group collaborative technology</p>	<p>Because positivity is intended to cultivate a comfortable and relaxed interactional environment, it cultivates complacency among members such that participants display behavioral tendencies to ignore structural controls calling for proactive contributions</p>

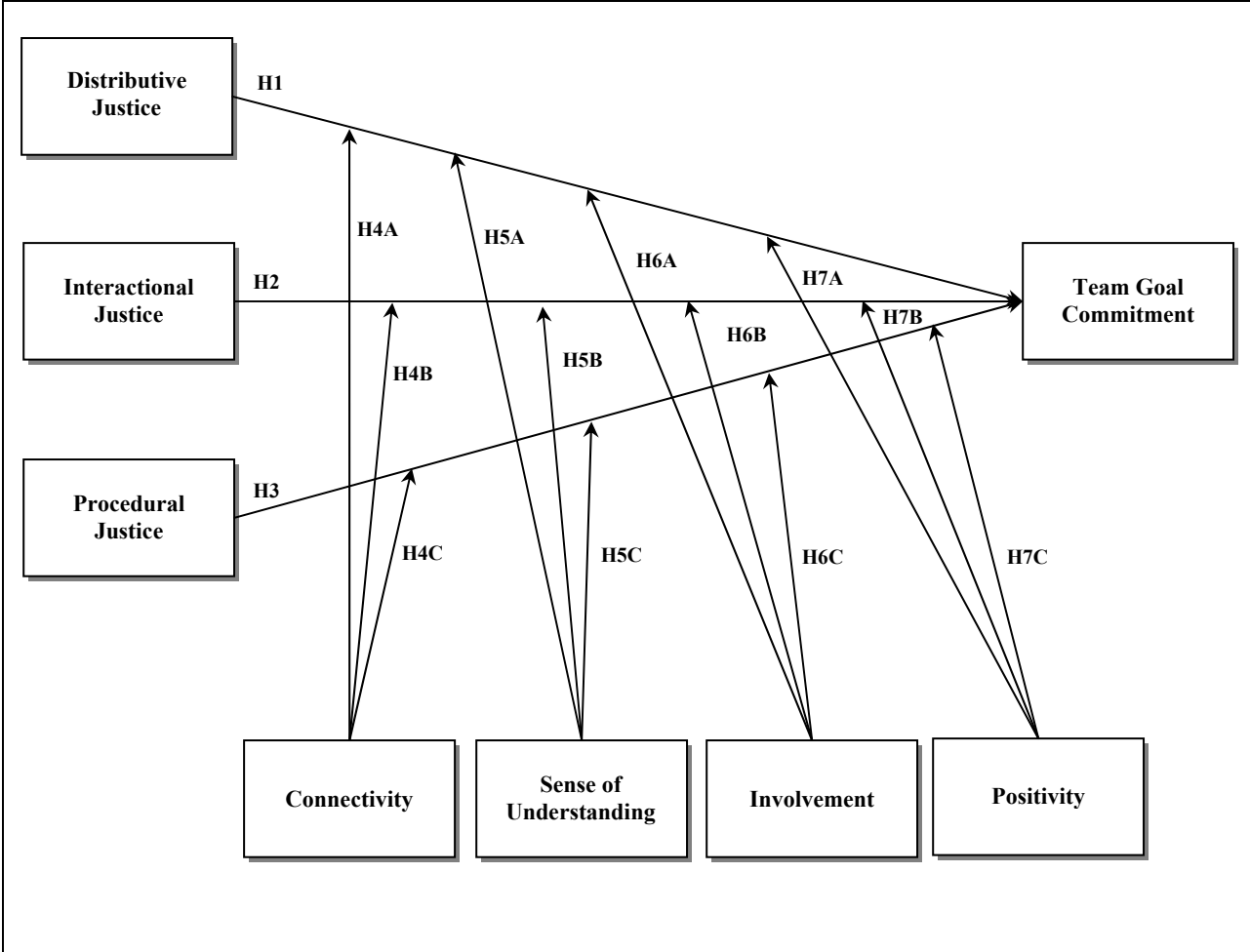


Figure 1: Proposed Research Model

CHAPTER 4 – RESEARCH METHODOLOGY

This study tests the proposed research model in a longitudinal field experimental setting for several reasons. First, as Cooper and Schindler (1998) noted, experimentation studies involve an intervention by the researcher that goes beyond what is required for measurement. Specifically, the value of field experimentation techniques to MIS research is that it enables the development of models based on data collected in natural, and hence more generalizable, settings for studying phenomena that could not easily be replicated in a laboratory setting (Zmud *et al*, 1990). Furthermore, the research design offers a limited degree of experimental control, which might be useful for theory testing (Zmud *et al*, 1990). Simon *et al* (1996) echoed similar sentiments in suggesting that field experimental methodologies “permits the researcher a higher degree of external validity than the laboratory experiment [and] allows the researcher to systematically manipulate the variables under investigation” (p. 473). This is an important impetus for this investigation as the pragmatism of virtual project teams warrants a fitting investigative strategy in order to derive more insightful intuition into how justice perceptions and the PSP of the underpinning CMC media blend to influence the dependent variable of team goal commitment (Simon *et al*, 1996). Furthermore, because time may alter the relationship among variables (Ancona *et al*, 2001; Bluedorn and Denhardt, 1988; Clark, 1985; Mitchell and James, 2001), we opt for a longitudinal design to this research to examine the temporal validity of our hypotheses. Nevertheless, it should be emphasized that this study does not explicitly hypothesize the impact of time because as postulated by Ancona *et al* (2001), “research on time is still in the initial period of experimentation, and a dominant paradigm has yet to be developed” (p. 512; see also Abernathy and Utterback, 1988; Tushman and Anderson, 1986).

The longitudinal field experiment was conducted in conjunction with a class project for the module, CS3253 – Management of Information Systems, offered by the School of Computing (SoC) in the National University of Singapore (NUS). The module accentuates strategic applications of ICT and is a compulsory course offered to undergraduates pursuing a degree in MIS. As part of the course credit, enrolled students are expected to complete a group assignment that necessitates the application of

concepts and theories introduced in the module to solve various business problems. Further, it is a mandatory course requirement that this assignment was to be tackled in an anonymous virtual project team environment over a two-week period in order to expose students to the constraints and realities of working in today's modern companies. Such a setting in turn, is palatable to the context and purpose of this study. The experimental procedures employed for this investigation are outlined in Table 6 and described in subsequent sections.

Table 6: Summary of Field Experimental Procedures	
Phase 1 – Measurement Development	
a.	Measurement items are adapted from contemporary literature
b.	Sorting is conducted for the measurement items of justice dimensions, team goal commitment and the constituent dimensions of PSP
Phase 2 – Pre-testing Activities	
a.	Coding of CMC media based on the PSP framework
b.	Pre-test is conducted to validate measurement items and manipulation of treatments
Phase 3 – Experimental Preparations	
a.	Necessary accounts (i.e. Hotmail, Windows Live Messenger and IVLE) are created
b.	Virtual project team guidelines and rules together with introduction packets for collaborative technologies are drafted
c.	Initial briefing of experimental subjects
Phase 4 – Experiment	
a.	Cases together with questions are distributed and the experiment commences
b.	1 st online survey administered after the first group deliverable has been submitted
c.	2 nd online survey administered when the second and final group deliverable has been submitted
d.	Peer-evaluations forms are collected
e.	Experimental subjects are de-briefed

4.1 Measurement Development

Scale items extracted from extant literature were utilized to measure the various constructs hypothesized in this study with minor adaptations made whenever necessary. Measurements for cognitive constructs (i.e., team goal commitment together with the three dimensions of distributive, interactional and procedural justice) were elicited from extant literature with specific emphasis on items that demonstrated good psychometric properties (Nunnally and Bernstein, 1994), i.e. the scale only incorporated measurements which exhibit adequate reliability [Cronbach's $\alpha > .80$] and sufficient construct validity in

prior empirical inquiries (Allen and Meyer, 1990; Bies and Moag, 1986; Bishop and Scott, 2000; Bishop *et al*, 2000; Colquitt, 2001; Leventhal, 1976, 1980; Mowday *et al*, 1979; Shapiro *et al*, 1994; Thibaut and Walker, 1975). Conversely, as per our theorization of the PSP construct, it is basically a composite reflection of the four constituent dimensions of connectivity, sense of understanding, involvement and positivity. While there has yet to be a systematic empirical verification of these PSP sub-dimensions, Kumar and Benbasat (2002a) supplied a comprehensive list of recommended measurement items, which we have adapted to our cause. All measurement items were phrased as perceptual statements and anchored on a seven-point Likert scale ranging from (1) ‘strongly disagree’ to (7) ‘strongly agree’.

To verify construct validity and evaluate the extent to which the elicited measurement items adequately tap on their corresponding latent variables, a round of labelled card sorting was conducted with a panel of selected judges comprising 5 postgraduate students who are either familiar with the topic of virtual project teams or, at the very least, have done research in the realm of MIS (Moore and Benbasat, 1991). Each judge was presented with the 8 primary constructs and their definitions together with a randomly sorted list of reflective items. The judges were then instructed to assign each item to one of the constructs or to an ‘ambiguous’ category if they were unsure of its placement. At the end of the session, a table was generated to compare the measurement items sorted into each category against the target classification scheme (Moore and Benbasat, 1991). As can be deduced from Appendix D, the average hit rating of **87.27%** is a good indication of reasonable construct validity for the adapted measurement items. Moreover, as a follow-up to the sorting exercise, the judges were subsequently interviewed to comprehend their interpretation of the measurements and glean insights into why certain items were sorted incorrectly. This feedback in turn, assists us in refining our survey instrument by re-wording ambiguous items and eliminating what the judges deemed to be redundant or repetitive measurements.

4.2 Pre-Testing Activities

A critical challenge to field experiments lies in the manipulation of constructs of interests in ways that are unobtrusive and preserve the realism of the situation because otherwise, it might be preferable to embark

on an artificial experimental setting right from the beginning whereby investigators can enforce more stringent control of confounding variables (Zmud *et al*, 1990).

4.2.1 Justice Manipulations

Given our research context, manipulating low perceptions of justice among members would defeat the purpose of embracing a field experimental methodology because it is inconceivable for organizations to initiate virtual project teams with little regard for intra-group impartiality (Beranek *et al*, 2005). Instead, we opt to concentrate our efforts towards the inducement of high perceptions of justice among members so as to establish a formal basis for verifying our primary hypotheses.

For the manipulation of high procedural justice, distinction was made between general working and conflict resolution guidelines in keeping with Leventhal's (1980) criteria, i.e. the prescribed general working and conflict resolution guidelines should: (a) be applied consistently across people and time; (b) be free of biases; (c) ensure that accurate information is collected and utilized in making decisions; (d) enclose mechanisms to correct flawed or inaccurate decisions; (e) conform to personal or prevailing standards of ethics or morality, and; (f) offer assurance that the opinions of parties affected by the decision have been accorded due attention (see also Leventhal *et al*, 1980). Whereas the general guidelines for working as a virtual project team govern the format of discussion, conflict resolution guidelines offer structured instructions on the sequence of steps to be taken in managing disagreements and reconciling dissenting opinions within the community (Beranek *et al*, 2005). As for the manipulation of high interactional justice, a set of communication etiquette was advocated to encourage a congenial and deferential interactional environment (Bies and Moag, 1986; Colquitt, 2001; Shapiro *et al*, 1994). Finally, for the manipulation of high distributive justice, project grading was partitioned into individual and group components. Concise grading criteria were meted out to offer virtual project team members with a comprehensible synopsis of how group-level assessments will be gauged by a panel of independent judges assembled from both academic and practitioner circles (Colquitt, 2001; Leventhal, 1976). Additionally, virtual project team members were made aware that confidential peer-evaluation forms will be distributed upon project completion to enable participants to assess each of their peers on the quality of

his/her contribution towards the accomplishment of the group mission and that responses from these peer-evaluation forms will be utilized to adjust the grades students receive for the project. Appendixes E and H presents the guidelines and instructions that have been manipulated to induce perceptions of distributive, interactional and procedural justice.

To validate our manipulations, the manipulated instructions together with the measurement items for the justice dimensions were combined to create an online survey instrument for pre-testing purposes. Given the predominantly Internet-savvy target audience, an electronic survey would be the most suitable option (Stanton and Rogelberg, 2001). Undergraduate and graduate students, who are not registered for the CS3253 module, were recruited and promised a reward of SGD \$5.00 in compensation for their assistance in the pre-test. In total, 20 pre-test subjects were solicited and for each respondent, he/she was instructed to go through the guidelines contrived for the various justice manipulations before responding to the measurement items. Because an online questionnaire is also planned for the actual field experiment in light of the anonymity of virtual project teams, these pre-test subjects serve a dual role in affirming the clarity of the survey instructions because there will not be any face-to-face communication between the researcher and the target audience. Furthermore, the proper functioning of the online survey questionnaire can be assessed across the variety of browser platforms (e.g., Microsoft Internet Explorer, Netscape and Mozilla Firefox), display resolutions and hardware systems (e.g., Pentium PCs, Macintoshes). From the pre-test, our justice manipulations appear to be substantiated with reported means of above **5.0** and standard deviations hovering around **1.0**, i.e. in general, the pre-test respondents agree that the prescribed guidelines induce perceptions of justice with tolerable fluctuation in opinions as exemplified by the relatively small standard deviation. Feedbacks from the pre-test subjects were utilized to make minor refinements to the measurement items such that they synchronize with our justice manipulations.

4.2.2 PSP Manipulations

Concurrent with manipulations of justice, this study is also keen to examine the PSP construct as a potential moderator of the relationship between justice and team goal commitment in virtual collaborations. We aim to explore how collaborative technologies differing along dimensions of

connectivity, sense of understanding, involvement and positivity may impact the relationship between justice and team goal commitment. As compared to justice perceptions where high levels of perceived justice are deemed as the ubiquitous pragmatic standard, it is not uncommon for different virtual project teams to subscribe to relatively different collaborative technologies, thereby offering greater latitude for manipulations of PSP. To decide on the collaborative technologies which are amenable to our research objectives, a rigorous coding exercise was conducted to rank prevalent CMC media along the constituent dimensions of PSP, namely connectivity, sense of understanding, involvement and positivity. Each of these four PSP sub-dimensions is then further delineated into effectiveness and efficiency in coding a comprehensive list of capabilities and output, which are generically applicable across a majority of collaborative technologies (refer to Appendix F). Based on this coding scheme, probable collaborative technologies were appraised to arrive at their comparative effectiveness and efficiency along the four constituent dimensions of PSP (refer to Appendix G). As can be inferred from the comparison in Appendix G, the Integrated Virtual Learning Environment (IVLE) implemented by the NUS and Microsoft's Windows Live Messenger exist as polar opposites in terms of PSP. It should be noted that the sources of discrepancies in the level of PSP stem mainly from the capacity of the Windows Live Messenger to transmit interactive and customizable message content *via* synchronous chat and video conferencing functionalities. Inevitably, in comparison to the IVLE, the Windows Live Messenger is bolstered in the two PSP sub-dimensions of *involvement* and *positivity*. Since both collaborative technologies can be regarded as predominant software applications that are familiar and readily accessible to the experimental subjects in this study, they were espoused as manipulative treatments for generating perceptual variations in connectivity, sense of understanding, involvement and positivity of the interactional environment.

Again, a pre-test was initiated to verify that the IVLE and the Windows Live Messenger indeed differ with respect to the constituent dimensions of PSP. Identical to the pre-test procedures for validating our justice manipulations, a convenient sample of 20 voluntary pre-test subjects composing of MIS undergraduate and graduate students was enlisted. These 20 pre-test subjects were equally and randomly

split into two groups based on whether they were evaluating the IVLE or the Windows Live Messenger. Depending on the assigned group, the researcher then demonstrated CMC functionalities embedded in either the IVLE or the Windows Live Messenger to each of the pre-test subjects individually. Following which, the pre-test subjects were allowed an extra time of approximately 15 minutes to familiarize themselves with these functionalities before responding to an online survey questionnaire consisting of the measurement items for the four constituent dimensions of PSP. By conducting a one-way ANOVA test on the collected data, we observed statistically significant differences between the IVLE and Windows Live Messenger along the PSP sub-dimensions of involvement [$F_{(1, 18)} = 7.170$, $p = .015$ ($< .05$)] and positivity [$F_{(1, 18)} = 10.445$, $p = .005$ ($< .01$)]. Though there is no statistical significance difference between the IVLE and the Windows Live Messenger for the PSP sub-dimension of connectivity and sense of understanding, it is not surprising because as explained before, both collaborative technologies boast of a comprehensive arsenal of CMC functionalities designed to aid correspondents in cognitive group-oriented deliberations. Still, despite the insignificance of connectivity and sense of understanding, overall PSP is statistically significant between the IVLE and the Windows Live Messenger [$F_{(1, 18)} = 7.465$, $p = .014$ ($< .05$)], thereby lending weight to the credibility of our coding in Appendix G. Comments on the measurements for the four PSP sub-dimensions were also gathered to make slight adjustments to the phrasing of the items.

Table 7 depicts the resultant list of measurement items for the three justice constructs, team goal commitment and the four constituent dimensions of PSP. Construct reliabilities from prior research were shown alongside wherever available.

Table 7: List of Measurement Items	
S/NO	Measurement Items
<i>Procedural Justice</i> [as adapted from Colquitt, 2001; Thibaut and Walker, 1975; Leventhal, 1980] $\alpha > .90$	
1	In the past week, the General Guidelines for Working as a Virtual Project Team were consistently adhered to by my team members.
2	In the past week, the General Guidelines for Working as a Virtual Project Team allowed me to play a role in our team decision-making process.
3	In the past week, the General Guidelines for Working as a Virtual Project Team allow me to have fair opportunities to express my opinions to the team during the decision-making process.

4	The General Guidelines for Working as a Virtual Project Team meet most ethical and moral standards.
5	The General Guidelines for Working as a Virtual Project Team addressed my concerns about the how we carried out our team discussions.
6	The General Guidelines for Working as a Virtual Project Team are free of biases.
7	In the past week, the Guidelines for Conflict Resolution were consistently adhered to by my team members.
8	In the past week, the Guidelines for Conflict Resolution allowed me to have fair opportunities to express my side of views to the team when we tried to resolve our disagreements.
9	In the past week, the Guidelines for Conflict Resolution allowed me to better manage the resolution of our decisional conflicts.
10	The Guidelines for Conflict Resolution meet most ethical and moral standards.
11	The Guidelines for Conflict Resolution were able to address my concerns regarding how we resolve decisional conflicts.
12	The Guidelines for Conflict Resolution are free of biases.
Interactional Justice [as adapted from Bies and Moag, 1986; Colquitt, 2001; Shapiro et al, 1994] $\alpha > .90$	
1	In the past week, the communications between me and my team members were conducted in a candid manner.
2	In the past week, I did not encounter any improper comments or remarks in my communications with my team members.
3	In the past week, I was treated in a congenial manner in my communications with my team members.
4	In the past week, my team members took into consideration how I feel when communicating with me.
5	In the past week, I was treated with dignity in my communications with my team members.
6	In the past week, I was treated with respect in my communications with my team members.
7	In the past week, I was able to receive timely responses from my team members.
8	In the past week, I was able to reason with my team members in a friendly manner.
Distributive Justice [as adapted from Colquitt, 2001; Leventhal, 1976] $\alpha > .90$	
1	I believe that the competition results for this case competition will reflect the effort that our team has put into the work.
2	I believe that the competition results for this case competition will reflect the quality of work our team has accomplished.
3	I believe that the competition results for this case competition will reflect how much I have contributed to the project.
4	I believe that the grade I am going to receive for this case competition will reflect the effort that I have put into our work.
5	I believe that the grade I am going to receive for this case competition will reflect the quality of work our team has accomplished.
6	I believe that the grade I am going to receive for this case competition will reflect how much I have contributed to the project.
Team Goal Commitment [as adapted from Colquitt, 2001; Thibaut and Walker, 1975; Leventhal, 1980] $\alpha > .90$	
1	In the past week, I committed a major chunk of my time on achieving our team goals.
2	In the past week, I was very happy to spend a major chunk of my time working towards our team goals.
3	In the past week, I enjoyed discussing our team goals with my friends outside the team.

4	In the past week, I had to sacrifice other activities so that our team would be able to accomplish our team goals.
5	I identified strongly with our team goals.
6	In the past week, I was proud to show others that I was working hard towards our team goals.
7	The team goals really inspired me to contribute to the best of my ability during our team discussion last week.
8	I was committed to the goals our team chose to focus on achieving.
9	Whether we achieved our team goals means a lot to me.
Constituent Dimensions of Para Social Presence [as adapted from Kumar and Benbasat, 2002a, b]	
<i>Connectivity</i>	
1	In the past week, it was easy to establish shared goals and objectives with my team using the assigned Virtual Team Communication Software.
2	In the past week, it was easy to determine a common direction on how we should proceed with the project using the assigned Virtual Team Communication Software.
3	In the past week, I was able to establish a unified vision with my team when using the assigned Virtual Team Communication Medium to work on our project.
<i>Sense of Understanding</i>	
1	In the past week, I was able to make my points properly understood using the Virtual Team Communication Software.
2	In the past week, I was able to clearly express my thoughts to my team members using the Virtual Team Communication Software.
3	In the past week, I was able to express my emotional state to my team members using the Virtual Team Communication Software.
4	In the past week, I was able to understand my team members' ideas easily using the Virtual Team Communication Software.
<i>Involvement</i>	
1	In the past week, the use of the Virtual Team Communication Software encouraged me to be more engaged in our team discussion.
2	In the past week, I found it interesting to interact with my team members using the Virtual Team Communication Software.
3	In the past week, I was always keen to interact with my team members using the Virtual Team Communication Software.
4	In the past week, I was able to feel a sense of involvement when interacting with my team members using the Virtual Team Communication Software.
<i>Positivity</i>	
1	In the past week, the use of the Virtual Team Communication Software did not made me feel any significant pressure from the communication with my team members.
2	In the past week, I felt positive when communicating with my team members using the Virtual Team Communication Software.
3	In the past week, I was able to interact with my team members in a relaxed manner using the Virtual Team Communication Software.
4	In the past week, the use of Virtual Team Communication Software made me feel comfortable in communicating with my team members.

4.3 Experimental Preparations

The lack of anonymity may be a potential confound in our proposed research model. As described in the previous chapter, the fostering of team goal commitment via justice mechanisms may serve to mitigate delinquent behaviours among members within virtual project teams by inducing single-minded focus on group objectives despite the predominance of estranged relationships (Campion and Lord, 1982; Hollenbeck *et al*, 1989). Nonetheless, if members were to be acquainted with one another prior to the formation of virtual project teams, the successful accomplishment of the group mission may be relationally driven to the extent to which neither team goal commitment nor justice mechanisms are likely to be instrumental to its achievement. Therefore, to prevent virtual project team members from initiating face-to-face contact in a collocated environment, a series of measures were undertaken. First, the experimental subjects were randomly assigned to one of two groups distinguishable by whether the requisite collaborative technology to be utilized for team conferences is the IVLE or the Windows Live Messenger. In addition, dummy hotmail accounts were created to be assigned to each subject when the experiment commences. These hotmail accounts were intended specifically for correspondences among virtual project team members with regards to any project-related matters. The necessary number of IVLE and Windows Live Messenger accounts was also created for subsequent assignment to experimental subjects, whose designated CMC medium matches either the former or the latter. To ensure that virtual project team members will not come to recognize one another via transmissions of audio and/or visual cues, CMC functionalities facilitating synchronous voice conversations and video conferences were striped from the IVLE whereas users of the Windows Live Messenger were disallowed from utilizing such features.

Pre-experimental documentation was concomitantly prepared at this point in time (refer to Appendix H). A general introduction package was drafted to explain the rationale behind the prevalence of virtual project teams for group-oriented decision making and problem solving. It highlights the principal learning objectives targeted for imposing such collaborative arrangements in tackling the course

assignment and outlines the time schedule for the entire project together with key milestones and group deliverables clearly sketched out on the timetable. While experimental subjects were assumed to possess knowledge of both collaborative technologies, separate user manuals catering to either the IVLE or the Windows Live Messenger were tailored to refresh virtual project team members on the basics of these collaborative technologies (refer to Appendix H). To round off our pre-experimental preparations, an initial contact session was initiated between the researcher and the subjects prior to the commencement of the experiment in order to brief the latter on the layout of the virtual project team assignment and to answer any queries that they may have with the prescribed procedures.

4.4 Experimental Proper

To complement the course credit as a motivational factor in driving virtual project team members to derive quality solutions, the course assignment was simultaneously structured as a case competition in which the top three groups with the highest grade, as unanimously assessed by the panel of judges who are independent of the research, stood to win cash prizes of SGD \$30.00, SGD \$20.00 and SGD \$10.00 for each participant respectively. Due to time constraints imposed by the module, it is imperative to ensure that the experimental subjects are well-equipped for group discussions the minute the virtual project teams convene. Consequently, the experiment must be organized in a manner that compels individual subjects to perform autonomous research into the business problem before convening with other virtual project team members. This will guarantee that whenever the virtual project teams convene, the time allocated will not be wasted on unprepared members. The experiment commenced on 18 September 2006 with the delivery of a unique member identification number [Member ID] to each subject's school email address. This Member ID is exclusive in the sense that it uniquely identifies each experimental subject for the virtual project team case competition. At the same time, a unique IVLE Guest Account and the corresponding IVLE Password to log into the dummy module **GVT3253** are also provided. Contained within the IVLE account were: (1) a detailed case competition timeline; (2) general

working and conflict resolution guidelines (refer to Appendix E); (3) first segment of the business case (refer to Appendix I), and; (3) discussion questions for the individual report (refer to Appendix I).

Upon submission of a one-page individual report that is due by midnight on 2 October 2006, the subjects were furnished with: (1) the Member IDs of his/her teammates, and; (2) a unique Hotmail account together with the corresponding Hotmail password. Using the same IVLE account for **GVT3253**, experimental subjects were granted access to: (1) the user manual for their assigned virtual team communication software (refer to Appendix H), and; (2) the discussion questions for the first group report (refer to Appendix I). Each virtual project team was then instructed to conduct a team building exercise the very next day (3 October 2006) whereby it served to implant psychological contracts among members. Upon submission of the five-page group report which was due by midnight on 9 October 2006, subjects were directed to an URL containing the online survey questionnaire. Participation in the online survey is completely voluntary, but completion will count toward one tutorial attendance for the module. On the very next day (10 October 2006), subjects were distributed the second segment of the business case and discussion questions for the final group report (refer to Appendix I). Upon submission of the second and final five-page Group Report which was due by midnight on 16 October 2006, the URL for the second online survey questionnaire was announced to the subjects. As was the practice with the first survey, completion of the voluntary online questionnaire counts towards another tutorial attendance for the course. Peer-Evaluation forms were also made available to the virtual project team members (refer to Appendix I) and subjects were instructed to return them to the researcher by 5:00 PM on 18 October 2006. A de-brief was conducted approximately one month later on 16 November 2006 to present key findings of the experiment to the students enrolled for the module and to award winners with the appropriate prizes.

CHAPTER 5 – DATA ANALYSIS

A total of 76 students participated in the experiment [Sample N = 76] with 37 of these subjects being randomly assigned to the treatment cell of IVLE and the remainder being allocated to the treatment cell of Windows Live Messenger. Within each cell, experimental subjects were further broken up into virtual project teams consisting of 4-5 members. All 76 subjects completed the experiment and answered both online survey questionnaires, thereby eliminating potential biases due to either attrition or non-responses. For both online surveys, repeated and homogeneous responses were removed, yielding an eventual sample of 76 and 71 data points for analysis. Descriptive statistics for the indicator variables are illustrated in Appendix J whereas inter-item correlation matrices² are depicted in Appendix K.

Exploratory Factor Analysis (EFA) was performed to examine the construct validity of the indicator variables for the combined sample of 147 data points³. From the EFA, indicator variables displaying exceedingly high inter-item correlation and relatively equal loadings across multiple extracted common factors (i.e., latent constructs) were dropped. Data analysis was conducted with the Multivariate Moderated Regression (MMR) analytical technique on *standardized* scores for the *remaining* indicator variables. Standardized latent variable scores were computed by averaging equally weighted standardized indicator scores whereas standardized moderator variable scores were calculated by cross-multiplying standardized indicator scores from the independent and moderating constructs (Chin *et al*, 1996). To test our hypotheses, we performed multivariate regression analysis in which hypothesized effects were regressed onto team goal commitment for both survey data sets. Further, longitudinal validation of main effects was accomplished by conducting identical analysis on within-subject differences across sample

² Because it is impossible to compress the inter-item correlation matrix for the entire range of indicator variables, it is split into two separate tables with one focusing on justice measurements and the other, a combination of items from team goal commitment and the four constituent dimensions of PSP.

³ As validated in the pre-tests, since the indicator variables reveal good psychometric properties in tapping on the latent constructs of interests underlying humans' cognitive processes, it is reasonable to presume that these measures will remain stable over time (Ajzen, 1991; Ajzen and Fishbein, 1980; Nunnally and Bernstein, 1994). For parsimony, it is sensible to merge data points from both online survey questionnaires for EFA.

over time⁴ (e.g., Dawson *et al*, 1996). Multicollinearity was not a concern because: (1) none of the bivariate correlations were above .90 (refer to Appendix N) (Tabachnick and Fidell, 2001); (2) tolerance values averaged more than .50, and; (3) the maximum variance inflation factor (VIF) was 3.00 and well below the prescriptive diagnostic of 5.0 or 10.0 (Hair *et al*, 1998; Mathieson *et al*, 2001).

5.1 Exploratory Factor Analysis (EFA)

EFA was conducted with the statistical software application, SPSS 13.0 for Windows, employing *Maximum Likelihood* (ML) estimation with *varimax* and *promax* rotation for justice and PSP dimensions respectively. Though Principal Components Analysis (PCA) is a pervasive analytical approach in applied social science research, its interchangeability with EFA in contemporary literature has confounded factor analysis results (Fabrigar *et al*, 1999; Floyd and Widaman, 1995). Conceptually and mathematically, the components derived from PCA are distinct from the notion of factors in EFA (e.g., maximum likelihood, principal axis factoring) as aptly surmised by Preacher and MacCallum (2003) in the following paragraph:

“EFA is a method of identifying unobservable LVs [Latent Variables] that account for the (co)variances among MVs [Measured Variables]. In the common factor model, variance can be partitioned into common variance (variance accounted for by common factors) and unique variance (variance not accounted for by common factors). Unique variance can be further subdivided into specific and error components, representing sources of systematic variance specific to individual MVs and random error of measurement, respectively. Common and unique sources of variance are estimated separately in factor analysis, explicitly recognizing the presence of error. Common factors are LVs that account for common variance only as well as for covariances among MVs...The utility of PCA, on the other hand, lies in data reduction. PCA yields observable composite variables (components), which account for a mixture of common and unique sources of variance (including random error). The distinction between common and unique variance is not recognized in PCA, and no attempt is made to separate unique variance from the factors being extracted.” (p. 20)

⁴ Because 5 records were removed from the second survey to due to homogeneous responses, longitudinal variation in variable scores were obtained by computing within-subject differences between the first and second surveys to yield a temporally consistent sample of 71 data points for multivariate regression analysis.

Our choice of the promax rotation is also a product of theoretical concerns. The purpose of factor analysis is to arrive at a *simple factorial structure* (i.e. a factor solution characterized by high loadings for non-overlapping subsets of indicator variables and low loadings otherwise) that facilitates meaningful interpretation (Thurstone, 1935, 1947). Given a collection of indicators, an infinite number of factor loading matrices exists that could account for the variances and covariances among the measured variables. Rotation methods are therefore essential in sifting through this infinitely large set of alternatives to derive an easily interpretable factor solution, which exhibits the simplest factorial structure. Whereas *orthogonal* rotations (e.g., varimax) restrict factors to be uncorrelated, *oblique* methods make no such restriction (e.g. promax), thereby rendering oblique rotation techniques more amenable to the social science discipline whereby it is presumptuous to assume orthogonal factors in dealing with cognitive concepts (Preacher and MacCullum, 2003). Moreover, if the optimal simple factorial structure is to be exhibited by orthogonal factors, an obliquely rotated solution will yield exactly the same result (Floyd and Widaman, 1995).

Based on EFA with ML estimation and promax rotation, 11 items were dropped (refer to Appendix J). We can infer from the factor matrices in Appendix L that the remaining indicator variables exhibit sufficient convergent and discriminant validity across different data sets. Descriptive statistics for the latent constructs are reported in Appendix M and it is evident from the table that the dropped items do not cause too much variation to the means and standard deviations. Further, as depicted in the inter-construct correlation matrices in Appendix N, the reliabilities for the latent constructs are deemed to be acceptable as they exceed **.80**. Confirmatory factor analysis (CFA) was also conducted using the Partial Least Square (PLS) analytical technique to examine factor loadings of indicator variables and as deducible from Appendix O, indicators load higher on their designated latent construct as compared to other constructs.

5.2 Experimental Manipulation

Experimental manipulation is partially consistent with our pre-test results. By conducting a one-way ANOVA test on the responses between the two treatment cells on both survey occasions, we fail to observe statistically significant differences for any of the PSP sub-dimensions. As established in our pre-test, there should not be any statistical significance differences between the IVLE and the Windows Live Messenger along the PSP sub-dimensions of connectivity and sense of understanding because both collaborative technologies are equally equipped with the requisite CMC functionalities to accommodate group communication activities. The more interesting question is why the PSP sub-dimensions of involvement and positivity do not register perceptual variations among users of the IVLE versus the Windows Live Messenger because demographic data collected for subjects reported no statistically significant differences between the two treatment cells in terms of age, gender, working experience as well as familiarity and frequency of usage for the IT-mediated functionalities of chatroom, shared repository, forum and email. Two probable reasons come to mind. First, due to our experimental restriction of anonymity, virtual project team members being assigned to the Windows Live Messenger were prohibited from utilizing its signature functions such as synchronous chat and video conferencing. But as expressed in Chapter 3, CMC media promoting high involvement should entail functionalities that project, as much as possible, feelings of being engaged in actual face-to-face conversation among correspondents whereas those fostering high positivity must encompass tools, which demolish the formalism of task-oriented conferences (Fish *et al*, 1993; Jasperson *et al*, 2002). Therefore, the preclusion of audio and visual capabilities for the Windows Live Messenger may have demoted it to the rank of the IVLE in terms of involvement and positivity. Another possibility can be attributed to the scenario described in the Channel Expansion Theory (CET) (Carlson, 1995; Carlson and Zmud, 1994, 1999), which postulated that media richness is influenced by a set of evolving, knowledge-based experiential factors, i.e. although the abilities of a user may act as an initial barrier to the exploitation of the entire spectrum of functionalities embedded in a CMC medium, this limitation may pose less of a constraint over time as the user becomes more knowledgeable with the operation of these functionalities. In other words, as virtual project team members grow more familiar with the functionalities embodied in the IVLE

and the Windows Live Messenger, pre-existing technological discrepancies may cease to exist as subjects were able to devise ways of circumventing functional weaknesses to the extent to which the two CMC media converge in interactive communication performance (i.e., PSP).

Unsuccessful experimental manipulation however, does not disrupt the capacity of the four PSP sub-dimensions to be moderators of the relationship between justice and team goal commitment because a moderating variable is one that “affects the direction and/or strength of the relationship between an independent or predictor variable and a dependent or criterion variable” (Baron and Kenny, 1986, p. 1174). Insofar as variance exists in virtual project team members’ perceptions of a specific PSP sub-dimension such that the relationship between justice and team goal commitment is a function of this PSP sub-dimension, it qualifies as a moderator (James and Brett, 1984). From Appendix M, it can be inferred that the variance for the four PSP sub dimensions exhibit reasonable variance with as evidenced by values averaging greater than 1.2 standard deviation.

5.3 Analysis and Discussion of Main Effects

Table 8 summarizes the analytical results for our hypothesized main effects.

Table 8: Summary of Analytical Results for Main Effects						
Hypotheses	Week 1 [Sample Size N = 76]		Week 2 [Sample Size N = 71]		Within-Subject Differences [Sample Size N = 71]	
Main Effects	$R^2 = .248$ $[F_{(3, 72)} = 7.929, p = .000]$		$R^2 = .368$ $[F_{(3, 67)} = 12.987, p = .000]$		$R^2 = .259$ $[F_{(3, 72)} = 7.791, p = .000]$	
	Beta	Support	Beta	Support	Beta	Support
Procedural Justice	-.094	Not Supported	-.009	Not Supported	-.300	Not Supported
Interactional Justice	.154	Not Supported	.401*	Supported	.291[†]	Supported
Distributive Justice	.342**	Supported	.301**	Supported	.324**	Supported

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

† Correlation is significant at the 0.10 level (2-tailed).

5.3.1 Effect of Procedural Justice on Team Goal Commitment

From Table 9, the effect of procedural justice on team goal commitment is not statistically significant for any of the data sets. This is counter-intuitive to extant justice literature in which there is substantial

evidence sustaining the pivotal function of procedural justice in fostering commitment within collective communities (e.g., Malatesta and Byrne, 1997; Masterson and Taylor, 1996; Masterson *et al*, 2000; Samad, 2006). Numerous studies have alluded to the applicability of procedural justice under circumstances whereby the phenomenon of interest centers on system-referenced outcomes (e.g., commitment) (Colquitt *et al*, 2001; McFarlin and Sweeney, 1992; Sweeney and McFarlin, 1993). Tyler and Blader's (2003) Group Engagement Model (GEM) echoed the exact same sentiments in postulating that procedural justice is the dominant predictor of collectivistic attitudes, values and behaviors within group settings by carrying structural elements, which enforce the most pertinent social identity for the community. Therefore, contrary to the overwhelming support for a positive relationship between procedural justice and commitment, this research reveals that procedural justice may not significantly alter members' team goal commitment in virtual project teams.

A plausible reason for this contradictory finding may be traced to the inherent nature of virtual project teams. As outlined in Chapter 2, virtual project teams are just-in-time knowledge sharing networks that emphasize adaptability through spatial and temporal independency (Beranek *et al*, 2005). Indeed, virtual project teams are characterized by members working under autonomous conditions interspaced with sporadic episodes of intense group discussions, which rely heavily on ICT for communication and coordination (see Qureshi and Zigurs, 2001; Jarvenpaa, and Leidner, 1999; Jarvenpaa *et al*, 1998). Consequently, the institutionalization of structural controls may impose a layer of rigidity that undermines the flexibility of virtual project teams to accommodate individual constraints, thereby accounting for the absence of a statistically significant relationship between procedural justice and team goal commitment. In other words, there is the distinct possibility that the prescribed procedures were too stringent and have been inflated beyond the "optimal level" necessary for maintaining democracy within virtual project teams without sacrificing flexibility. The enforcement of overbearing external requirements for virtual project teams may hence decrease members' willingness to engage in psychological contracts by instilling stiff circumstantial restrictions that shrink the amount of resources (e.g., time) they could allocate to the task (Morrison and Robinson, 1997). For instance, in the context of this investigation,

students attend courses beyond just this particular module such that instilling procedure controls (e.g., weekly schedules) may actually conflict with the sensitivity of virtual project teams to individual timetables in accomplishing the collaborative group assignment.

5.3.2 Effect of Interactional Justice on Team Goal Commitment

As deducible from Table 9, the relationship between interactional justice and team goal commitment is not statistically significant for the first survey but becomes statistically significant afterwards, thereby suggesting that the positive influence of interactional justice on team goal commitment increases in strength over time. This deduction can also be corroborated by the statistically significant positive relationship between interactional justice and team goal commitment for within-subject differences, i.e. temporal variations in members' team goal commitment can be attributed to corresponding changes in perceptions of interactional justice over time. Finding a positive relationship between interactional justice and team goal commitment is not a surprising discovery for this investigation given the pre-existence of prior research, which substantiated the impact of interactional justice on team goal commitment (e.g., Malatesta and Byrne, 1997; Masterson and Taylor, 1996). What is fascinating from our research is the observation that the effect of interactional justice on team goal commitment only becomes salient over time, i.e. virtual project team members tend to attach greater importance to the need for congeniality and respect as the project draws nearer to its designated deadline. Another way of interpreting the analytical results for within-subject differences is that deferential treatment in virtual project teams deteriorates temporally, thereby causing members to appeal for congeniality during group discussions.

Lim and Tan (2005) hinted at a logical explanation for this phenomenon in positing that individuals possess an intrinsic character of *conflict avoidance* to the extent to which participants collaborating on group-oriented tasks share a stronger preference for self-censorship behavior at initial phases of cooperation (see also Tan *et al*, 2005). Automatically, such desires for conflict avoidance nurture a cordial atmosphere for interaction, which may nullified the role of interactional justice. But as rightfully pointed out by Lim and Tan (2005), self-censorship behavior comprises the quality of knowledge contribution, which may become more of a hindrance to the fulfillment of psychological

contracts as the deadline for solving the problem approaches (see also Tan *et al*, 2005). Arguably, as the project completion deadline looms, virtual project team members could be pressured to perform such that they are less conscientious of their reactions when communicating with others. Furthermore, the short lifespan of typical virtual project team setup may not have allowed members to achieve consensus in their interpretation of the prescribed communication protocols and etiquette (Kinney and Panko, 1996). Consequently, the quality of interpersonal treatment may suffer, thereby prompting virtual project team members to place greater emphasis on interactional justice as evidenced by its statistically significant relationship with team goal commitment for within-subject differences.

5.3.3 Effect of Distributive Justice on Team Goal Commitment

The positive relationship between distributive justice and team goal commitment is statistically significant for all three data sets, which implies that distributive justice is a strong predictor of team goal commitment across time. Nevertheless, the predictive power of distributive justice on team goal commitment is not a temporal constant. As illustrated by the statistically significant relationship between distributive justice and team goal commitment for within-subject differences, longitudinal disparities in team goal commitment levels can be traced to perceptual variations in distributive justice over time, i.e. the criticality of distributive justice increases in saliency as the project nears completion. To a certain extent, our findings coincide with pre-existing empirical evidence advocating a positive relationship between distributive justice and commitment (e.g., Farh *et al*, 1997; McFarlin and Sweeney, 1992; Samad, 2006). Interestingly enough, while McFarlin and Sweeney (1992) acknowledged the impact of distributive justice on team goal commitment, they maintained that distributive justice is inferior to procedural justice in predicting collective outcomes whereas the reverse is true for personal ones (Sweeney and McFarlin, 1993). Naturally, this begs the question as to why we witness a statistically significant relationship between distributive justice and team goal commitment despite the statistically insignificant effect of procedural justice. Perhaps the rationale for this observation resides in the delineation of the compensatory reward (i.e. project grade) into personal and group components such that the presence of distributive justice will guarantee an equitable outcome distribution, which not only

reflects the quality of collaboration for the virtual project team, but also resonates with one's individual contribution (Lim *et al*, 2005; Morrison and Robinson, 1997; Scholl, 1981; Vroom, 1964). Also, as virtual project teams are task-oriented and hence outcome-driven (Beranek *et al*, 2005), the emphasis by members on the equity of the payoff structure may be especially salient in shaping their team goal commitment. Whereas procedural justice dissuades virtual project team members from engaging in psychological contracts by imposing environmental restrains, distributive justice builds confidence in psychological contracts by securing commensurable compensation for every participant. Besides, it can be inferred from the increasing emphasis on distributive justice that virtual project team members were probably better informed in gauging their individual contribution to the accomplishment of the task and thus, could adjust their commitment to psychological contracts accordingly.

5.4 Analysis and Discussion of Moderating Effects

Table 9 summarizes the empirical findings for our proposed moderators.

Table 9: Summary of Empirical Findings for Moderating Hypotheses								
Relationships	Hypothesis Support							
	Connectivity		Sense of Understanding		Involvement		Positivity	
	Week 1	Week 2	Week 1	Week 2	Week 1	Week 2	Week 1	Week 2
Distributive Justice → Team Goal Commitment	Supported	Supported	Supported	Supported	Not Supported	Supported	Supported	Not Supported
Interactional Justice → Team Goal Commitment	Supported	Not Supported	Supported	Not Supported	Not Supported	Not Supported	Not Supported	Not Supported
Procedural Justice → Team Goal Commitment	Not Supported	Supported	Not Supported	Supported	Not Supported	Supported	Not Supported	Not Supported

Table 10 tabulates the analytical results for our hypothesized moderating effects. Furthermore it illustrates our utilization of ⁵Cohen's f^2 to compare R^2 values between the main and interaction effects

⁵ Cohen's $f^2 = R^2$ (interaction model) – R^2 (main effects model) / [1 – R^2 (main effects model)] (Refer to Chin *et al*, 2003)

(Carte and Russell, 2003). The resultant effect sizes reinforce the validity of statistically significant moderating effects (Chin *et al*, 2003).

Table 10: Summary of Analytical Results for Moderating Effects						
Hypotheses	Week 1 [Sample Size N = 76]			Week 2 [Sample Size N = 71]		
	Beta	Cohen's f²	Effect Size	Beta	Cohen's f²	Effect Size
Distributive Justice * Connectivity	.061*	.057	Medium	.134**	.137	Large
Interactional Justice * Connectivity	.110*	.069	Medium	.065	N/A	N/A
Procedural Justice * Connectivity	-.004	N/A	N/A	.131**	.111	Large
Distributive Justice * Sense of Understanding	.083*	.083	Medium	.099*	.082	Medium
Interactional Justice * Sense of Understanding	.089†	.047	Small	.095	N/A	N/A
Procedural Justice * Sense of Understanding	.045	N/A	N/A	.109*	.073	Medium
Distributive Justice * Involvement	.000	N/A	N/A	.108**	.112	Large
Interactional Justice * Involvement	.057	N/A	N/A	.027	N/A	N/A
Procedural Justice * Involvement	.026	N/A	N/A	.081†	.043	Small
Distributive Justice * Positivity	.061*	.055	Medium	.014	N/A	N/A
Interactional Justice * Positivity	.063	N/A	N/A	-.080	N/A	N/A
Procedural Justice * Positivity	-.069	N/A	N/A	.025	N/A	N/A

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

† Correlation is significant at the 0.10 level (2-tailed).

5.4.1 Moderating Effect of Connectivity on the Relationship between Justice and Team Goal Commitment

Clearly, empirical evidence from this investigation supports our hypothesis that the connectivity of the underlying CMC medium strengthens the positive relationship between distributive justice and team goal commitment in virtual project teams. As explained in Chapter 3, the connectivity of the CMC medium inculcates a sense of community among correspondents by overcoming individual boundaries to create collective consciousness (Kumar and Benbasat, 2002a, b). By boosting mutual understanding among virtual project team members, the relationship between distributive justice and team goal commitment is obviously strengthened via a CMC medium with high connectivity because participants will be in a better position to assess one another's contribution and thus the equity of outcome allocation (Grudin, 1994; McCracken and Akscyn, 1984). In turn, this improved appreciation of outcome distribution complements members' desire to engage in psychological contracts, thereby affecting team goal commitment.

The connectivity of the CMC medium has a strengthening effect on the relationship between interactional justice and team goal commitment at the initial phases of the project, but this impact trails off over time. As explained in the previous section, interactional justice may not be statistically significant at the beginning due to members' inherent preference for conflict avoidance (Lim and Tan, 2005; Tan *et al*, 2005). Therefore, the connectivity of the CMC medium may have a pronounced moderating effect by amplifying the cordiality embedded within interactive exchanges such that team goal commitment can be bolstered. Our investigation suggests that the moderating influence of connectivity evaporates with greater emphasis on interactional justice over time. A possible reason for this observation may be that with mounting pressure, communication among virtual project team members becomes highly disruptive such that CMC functionalities facilitating group consensus may be rendered inefficacious.

The moderation of connectivity on the relationship between procedural justice and team goal commitment is the exact opposite of that for interactional justice, i.e. even though connectivity does not show signs of an interaction effect with procedural justice at the outset, it does so towards the later stages of the project. A viable explanation can be derived from Lim and Tan (2005), who noted that people tend to exhibit collectivistic behavior during initiation into a collaborative body, but as time progresses and members grew more familiar with one another, they may shift gears to an individualistic mode of operation (see also Tan *et al*, 2005). In this sense, an initial burst of collectivism among virtual project team members may negate the need for CMC functionalities that aid in consensual decision making whereas the gradual emergence of individualism may fuel a corresponding demand for such functionalities to organize group agendas around collective interests rather than partisan gains.

5.4.2 Moderating Effect of Sense of Understanding on the Relationship between Justice and Team Goal Commitment

Again, the sense of understanding embodied with the CMC medium strengthens the positive relationship between distributive justice and team goal commitment in virtual project teams. Irrefutably, CMC media with higher sense of understanding embed technological functionalities that broaden the expressiveness of

the communication channel to ensure the accurate conveyance of messages among correspondents (Bickmore, 2004; Reeves and Nass, 2000). Since a major hurdle to distributive justice within virtual project teams stems from the complications imposed by the relative exclusivity of expertise among members on an unbiased assessment of individual contribution (Beranek *et al*, 2005; Griffith *et al*, 2003; Jarvenpaa and Leidner, 1999; Malhotra *et al*, 2001), the provision of CMC medium with high sense of understanding will reduce message distortion and increase the likelihood with which outcome allocation can be weighted in an equitable fashion.

The sense of understanding of the CMC medium has a strengthening impact on the relationship between interactional justice and team goal commitment at the initial phases of the project, but this influence disappears over time. Such an observation could be due to the amplification effects caused by CMC media with high sense of understanding on the congenial interaction among virtual project team members in the beginning stages of group collaboration (Lim and Tan, 2005; Tan *et al*, 2005). But as the quality of interpersonal treatment erodes temporally, functionalities guaranteeing communication accuracy may become more of a liability than an asset in mitigating the positive relationship of interactional justice and team goal commitment.

While the sense of understanding of the CMC medium does not exert any influence on the positive relationship between procedural justice and team goal commitment at the start, the moderating effect gains in saliency over time. Similar to our explanation from the previous section, even though the relationship between procedural justice and team goal commitment is not shown to be statistically significant in virtual project teams, the shift from collectivistic to individualistic behavior during group collaborations (Lim and Tan, 2005; Tan *et al*, 2005) may render structural controls more salient at later stages. Enforcement of these procedural jurisdictions will thus be easier when communicated messages are being conveyed in an errorless manner such that it is less likely for virtual project team members to credit miscommunication as an excuse for breaking group cooperation protocols (i.e., psychological contracts).

5.4.3 Moderating Effect of Involvement on the Relationship between Justice and Team Goal Commitment

Although the involvement of the CMC medium does not report a statistically significant impact on the positive relationship between distributive justice and team goal commitment at the beginning, the moderation effect increases in strength over time. This is interesting because it implies that the presence of CMC functionalities that mirror face-to-face interactions magnify the extent to which perceptions of equitable outcome distribution will lead to team goal commitment only when the project completion deadline draws near. At the initial outset of the collaboration when task completion is still in its infancy stages, virtual project team members should possess less information on outcome allocation even though it may still act the primary motivational driver. CMC functionalities promoting high involvement may thus be rendered useless because reward dissemination is far from being certain. However, as the project nears completion, the payoff structure becomes evident such that CMC functionalities, which sustain relational ties among members, may be more salient in preventing negative attitudes from developing over perceived inequity in the distribution of compensation.

The involvement of the CMC medium has no impact on the positive relationship between interactional justice and team goal commitment. On the surface, this may appear to be counter-intuitive in that interactional justice pertains specifically to interpersonal communication and CMC functionalities promoting relational attachments should, to a certain extent, exert some degree of influence on this form of justice. But considering the tendency of virtual project team interactions to degenerate from affability to disrupting (Lim and Tan, 2005; Tan *et al*, 2005), it is not difficult to imagine that the unfamiliarity among correspondents at the start of the collaboration will invalidate the usability of relational functionalities whereas the rapid deterioration of relationships at later stages serve little to encourage subsequent usage of such functionalities.

Identical to the preceding section, the involvement of the CMC medium does not exert any impact on the positive relationship between procedural justice and team goal commitment at the start but steadily increases in strength over time. Collectivistic behavioral tendencies at initial phases of the

collaboration may nullify the role of high involvement functionalities in establishing relationships among virtual project team members. But when individualistic urges begin to filter into the collaborative community, CMC functionalities sustaining relational ties among correspondents may take effect by creating communal awareness of an individual's role and responsibility relative to that of the collective body.

5.4.4 Moderating Effect of Positivity on the Relationship between Justice and Team Goal Commitment

The positivity of the CMC medium has a strengthening effect on the relationship between distributive justice and team goal commitment at the initial phases of the project, but this impact dissipates over time. As discussed earlier, a plausible rationale behind this finding could be due to the degree of information asymmetry about the equity of outcome allocation. In the beginning where precise information on reward distribution is still scarce, virtual project team members will most probably be apprehensive and uncertain as to whether compensation is likely to be commensurable with one's effort. The existence of CMC functionalities that foster a conducive atmosphere for interaction will therefore play an instrumental role in mitigating the relationship between distributive justice and team goal commitment. But with more work being completed on the assigned task, virtual project team members are better informed to make an accurate evaluation of outcome distribution, thereby annulling the demand for high positivity functionalities.

The positivity of the CMC medium has no impact on the positive relationship between interactional justice and team goal commitment. Arguably, unfamiliarity among virtual project team members at the start of the collaborative process (Lim and Tan, 2005; Tan *et al*, 2005) may preclude the effectiveness of CMC functionalities, which seek to cultivate a comfortable and relaxed environment for discussion. But as the project progresses towards the final day of the competition, non-constructive exchanges and worsening relationships among virtual project team members, as the generic presence of the initial congeniality crumples with time, may destroy the demand for such functionalities as well.

Identical to the case for interactional justice, the positivity of the CMC medium has no influence on the relationship between procedural justice and team goal commitment. Virtual project teams function best under autonomous conditions whereby members are tasked to work independently on individual segments of the assignment and only come together for intense deliberations whenever necessary (see Qureshi and Zigurs, 2001; Jarvenpaa, and Leidner, 1999; Jarvenpaa *et al*, 1998). Therefore, as postulated above, the installation of structural controls may impose a layer of rigidity that compromises the adaptability of virtual project teams, thereby suggesting the possibility of the existence of a reverse *negative* relationship between procedural justice and team goal commitment. In light of this negative relationship between procedural justice and team goal commitment, CMC functionalities fostering a conducive interactional climate may thus play a strengthening role instead by attenuating the impact of stiff structural guidelines.

5.5 Summary

The empirical investigation yields mixed support for our hypothesized main and moderating effects. And as highlighted throughout the chapter, there are a number of interesting conclusions that may be inferred from our results. Additionally, we embark on a preliminary attempt to interpret temporal effects for our main and moderation hypotheses. But taking into account that research into time is still in its exploratory and thus adolescent stages (Abernathy and Utterback, 1988; Ancona *et al*, 2001; Tushman and Anderson, 1986), we cannot claim our interpretations to be definitive. Rather, they serve as pioneering efforts to break new grounds into temporal research in the realm of MIS. Last but not least, the differential statistically significant results for both main and moderating hypotheses further validates our delineation of the three dimensions of justice and the four PSP sub-dimensions as distinguishable concepts with their own methods of operationalization in the conceptualization of the antecedents of team goal commitment within virtual project teams.

CHAPTER 6 – DISCUSSION

With the advancement of CMC technologies, virtual project teams have emerged to become a pre-eminent and integral component of modern organizations (Beranek *et al*, 2005). But despite the well-celebrated benefits of virtual project teams in transcending spatial and temporal boundaries to assimilate localized expertise in tackling unstructured business problems (Boh *et al*, 2002; Griffith *et al*, 2003), its over-reliance on technologically facilitated communication significantly reduces the richness of the interactional cues available for interpretation by correspondents (Kock, 1999). This deficiency in social gestures in turn, may exacerbate many of the classical nuisances plaguing cooperative networks (Rutkowski *et al*, 2002) such as cultural insensitivity (Kayworth and Leidner, 2000; Triandis, 1994), interpersonal conflicts (Tan *et al*, 2005) and social loafing (Jarvenpaa and Leidner, 1999; Kayworth and Leidner, 2000).

In response to the socio-technical challenges faced by virtual project teams, this study puts forward the notion of team goal commitment as the social glue binding what is otherwise a loosely bonded and temporary coalition (Kinney and Panko, 1996). By arguing for team goal commitment among individual members as a determinant of successful virtual project teams, this thesis sets out to address a two-part research question: what are the salient antecedents driving members' team goal commitment in virtual project teams and what role does the underpinning computer-mediated communication medium play in mitigating such relationships?

6.1 Theoretical Contributions

This study proposes a pertinent contribution to extant literature in virtual project teams on four fronts. First, we introduce the concept of team goal commitment as a neglected critical success factor of virtual project teams. Because virtual project teams primarily comprise socially distant experts who have been assembled temporarily to innovate and solve a complicated business problem (Beranek *et al*, 2005), we maintain that members' commitment to team goal is likely to overshadow any other forms of social

obligation under such circumstances. Espousing the AST as our analytical framework (Maznevski and Chudoba, 2000), we scrutinize and taxonomize the strengths and weaknesses of virtual project teams according to the dimensions of structural characteristics, technology appropriation, decision processes and decision outcome so as to offer theoretical justification for our contention that team goal commitment may act to circumvent much of the performance-related problems associated with such computer-mediated collaborative arrangements.

Second, to gain an appreciation of how team goal commitment is realized in virtual project teams, we subscribe to the SET (Tiwana and Bush, 2000) as the theoretical lens in yielding antecedents to team goal commitment. And as discussed above, in many aspects, virtual project teams are synonymous with social exchanges whereby knowledge is voluntarily contributed by members with no prior formal agreement of reciprocation (Flynn, 2005). Grounded in the SET, this study establishes conceptual linkages between facets of justice and team goal commitment in proposing a series of testable hypotheses to be empirically validated in our longitudinal field experimental investigation.

Third, because virtual project teams are manifestations of ICT-mediated social exchange relationships, the underpinning CMC medium will naturally mitigate the manner by which members' perceptions of justice translate to corresponding attitudes of team goal commitment. Consequently, this thesis undertakes another responsibility in recognizing PSP (Kumar and Benbasat, 2002a, b) and its constituent dimensions (i.e., connectivity, sense of understanding, involvement and positivity) as matching moderators that situate the relationship between justice and team goal commitment within virtual project teams in its proper technologically mediated context (Carte and Russell, 2003). We then developed a total of 12 testable hypotheses linking the moderating influence of PSP sub-dimensions to the relationship between justice and team goal commitment. Together with the testable hypotheses for the main effects, this study proposes an integrated research framework that endeavors to explain and predict the development of team goal commitment among members in virtual project team settings.

Finally, we test our integrated research framework in a longitudinal field experimental setting. The empirical evidence yields mixed support for our proposed main and moderating hypotheses. From the

results, a number of interesting deductions can be drawn to offer realistic insights into why the nurturing of team goal commitment in virtual project teams may be distinct from that elaborated in contemporary literature on organizational management. Further, in structuring our investigative efforts as an exploratory longitudinal study, we endeavor to break new grounds into temporal research in the domain of MIS by making a preliminary attempt to interpret temporal effects for our main and moderating hypotheses. While we do not claim our investigation to be exemplary of temporal research, it does emphasize an impending need to go beyond single ‘snapshot’ style of empirical inquiries in order to capture the impact of evolving group dynamics on social exchange relationships in virtual project teams.

6.2 Practical Implications

This thesis represents a foremost endeavor to direct management’s attention to the importance of team goal commitment in virtual project teams. While numerous studies have embraced the need to build positive affect among virtual team members in order to cultivate a sense of social congeniality conducive to knowledge sharing (Jarvenpaa and Leidner, 1999; Powell, 2000; Qureshi and Zigurs, 2001; Wiesenfeld *et al*, 1999), our research suggests that the short-term, mission-based nature of virtual project teams may render the engendering of team goal commitment a more viable option for managers.

Our research further explicates the three dimensions of distributive, interactional and procedural justice as antecedents to the cultivation of team goal commitment among members within virtual project team settings. Though procedural justice exhibits little influence on team goal commitment, managers should still be cautious in imposing too much structural restrictions on the individual members in virtual project teams, which may ultimately undermine participants’ adaptive ability to overcome obstacles in their own ways. Additionally, our empirical evidence suggests that the effect of interactional justice only becomes salient after sufficient time has passed, which may work against the short lifespan typical of virtual project teams (Kinney and Panko, 1996). Since distributive justice appears to be exceedingly prominent in task-oriented virtual project teams (Beranek *et al*, 2005), it might be optimal to focus organizational resources in ensuring the equity of outcome allocation as the primary driver for team goal

commitment and to simply allow the initial interactional congeniality inherent among members (Tan *et al*, 2005) to carry the project through.

Furthermore, through the synthesis of the SET and the concept of PSP, we arrive at an explanatory framework of how team goal commitment may be nurtured in virtual collaborative settings. Our empirically tested model thus informs practitioners in scrutinizing existing virtual project teams to determine if members are committed to the achievement of the overarching business objective and to pinpoint plausible causes of the problem if they are not. Moreover, by articulating the spectrum of CMC functionalities which mitigate the relationship between justice and team goal commitment in virtual project teams, developers of collaborative technologies can benefit from this investigation by designing technological features that strengthen the positive influences of justice.

Based on our empirical findings, the deployment of CMC functionalities supporting connectivity, sense of understanding and positivity is of vital importance in strengthening the positive influence for all three forms of justice on team goal commitment at the start of a project. This recommendation is supplemented by observations from previous literature claiming that virtual project team members' interactions tend to be congenial at the beginning and eventually deteriorates over time (Lim and Tan, 2005; Tan *et al*, 2005). Conversely, considering the initial cordial communication behavior coupled with unfamiliarity among members in gauging their own standing within the virtual project team, the inducement of face-to-face interaction among virtual project team members (through high involvement CMC functionalities) may be irrelevant in affecting the strength of relationship between justice and team goal commitment.

The deployment of CMC functionalities facilitating connectivity, sense of understanding, and involvement becomes crucial in maximizing the influence of all three justices on team goal commitment towards the end of the project. In this scenario, the capacity to create a conducive communication environment among virtual project team members (through high positivity CMC functionalities) becomes less relevant in affecting the strength of relationship between justice and team goal commitment due to

the increasingly disruptive and individualistic behavior of individual team members (Lim and Tan, 2005; Tan *et al*, 2005) as well as the accrual of experience to evaluate the outcome distribution.

Lastly, a word of caution must be issued to practitioners based on our empirical evidence. A crucial lesson to be learnt from this study is that no matter how well CMC functionalities may be designed in reality, complementary managerial measures aimed at promoting various facets of justice must be simultaneously enforced for team goal commitment to be infused within virtual project team members.

6.3 Limitations and Future Research

Two caveats exist pertaining to the conceptualization and operationalization of our research objectives. First, the sample pool of undergraduate students recruited for this study restricts the external validity of our empirical findings to virtual project teams in pragmatic corporate settings. Though we try to circumvent this challenge by subscribing to the field experiment methodology coupled with strong incentives for inducing personal attachment to the designated task, future investigations are still necessary to replicate and verify our empirical results for virtual project teams, which manifest in realistic organizational milieu.

Second, the longitudinal field experimental design employed in this thesis spans across a short duration of only two weeks, which may limit our interpretation of temporal effects. Because group dynamics is a constantly evolving phenomenon, the longer the period of data collection, the more stable and insightful will be the eventual empirical results (see Abernathy and Utterback, 1988; Ancona *et al*, 2001; Tushman and Anderson, 1986). Subsequent investigations which extend the duration of observation and data elicitation are therefore preferable in gleaning deeper insights into the consequential impacts of group dynamics within virtual project teams.

Beyond the restrictions of the current study articulated above, we believe that the potential of this research can be extended in the following ways. Firstly, the core premise of the SET rests on the intuition that any social exchange relationships will invariably involve the employment of coercive and

exploitative means (e.g. the abuse of power) by participants to dictate unreasonable terms and manipulate others within the group for his/her advantage to the extent to which he/she manages to get away with such conduct without the fear of sanctions from others (Organ, 1990; Cook and Emerson, 1978). As such, the theory predicts that the perceptual equality of contribution among members of virtual communities, which function predominantly on social exchange processes (Tiwana and Bush, 2000), is derived directly from the interplay of individual perceptions of power (Cook and Emerson, 1978) and justice (Masterson et al., 2000) embedded in the communal interactions. From such premises of the SET, it is not totally unusual for goal competition to manifest between personal and team goals in virtual project teams, the incorporation the different dimensions of power into the current research model, as mitigated by computer-mediated media, on team goal commitment could warrant attention in future empirical investigations.

Also, within organizational literature, Meyer and Allen (1991) captured the idea of commitment as a multi-faceted construct that appropriately reflects its constituent cognitive and affective components. More specifically, the general attitude of interest has been conceptualized to be made up of the sub-components of affective, continuance and normative commitment. Since Meyer and Allen's (1991) conceptualization mirrors an individual's cognitive and affective orientations towards commitment intentions (see also Iverson and Buttigieg, 1999), it could be potentially interesting and insightful to expand the current research model to include the separate team goal commitment constructs into the corresponding components of affective-, continuance- and normative- commitment and to analyze the possible different outcomes these different dimensions may have on the dynamics and performance of virtual project team.

6.4 Concluding Remarks

In summary, while virtual project teams have become part and parcel of modern-day management, there is still much to learn regarding how to efficaciously structure the group to optimize its performance. This study offers a preliminary glimpse into an alternate source of intrinsic motivation that may be

harnessed by corporate management to attain the aforementioned objective. Though goal commitment is not unfamiliar to strategic management, its application to virtual collaboration has been rare if not non-existence. This thesis is thus founded on the conviction that team goal commitment, together with other forms of social motivation presented by past researchers, may bring organizations one step closer to maximizing the merits of virtual collaboration while simultaneously, avoiding the social pitfalls stemming from its inadequacy of interactional gestures.

7. REFERENCES

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Appendix A: A Review of Research on the Orthogonality of Distributive, Interactional and Procedural Justice

A Review of Justice Research Involving at Least Two of the Three Dimensions of Distributive, Interactional and Procedural Justice					
Author(s)	Motivation of Study	Primary Contention(s)	Major Construct(s)	Finding(s)	Implication(s)
Farh <i>et al</i> (1997)	To examine the relationship between citizenship behaviors and organizational justice in the Chinese context	Although organizational justice (distributive and procedural) has been demonstrated to be a key determinant of citizenship behavior and related outcomes such as satisfaction and commitment, but at the same time, studies in citizenship behavior have also proposed that differences in perceptions arising from people's cultural values and gender may have a profound impact on how citizenship behavior is viewed and operates in relation to other constructs.	<p><i>Organizational Justice</i> – Extent to which outcome allocation and procedures used in distributing outcomes is fair and just</p> <p><i>Traditionality</i> – Culture characterized by an emphasis on expressive ties among people of values such as respect for authority, filial piety, ancestor worship, male-domination, fatalism, and a general sense of powerlessness</p> <p><i>Modernity</i> – Culture characterized by an emphasis on egalitarianism, open-mindedness, optimism, assertiveness, affective hedonism, sexual equality, and self-reliance</p> <p><i>Gender</i> – Male or female</p>	Organizational justice (distributive and procedural) is most strongly related to citizenship behavior for individuals who endorse less traditional, or high modernity, values. In addition, the relationship between organizational justice and citizenship behavior is stronger for males than for females.	Organizational justice is positively related to citizenship behavior, but it may be difficult to distinguish between distributive and procedural justice.
Hauenstein <i>et al</i> (2001)	To conduct meta-analysis to estimate the relationship between distributive and procedural justice as well as to assess the extent to which this relationship is context sensitive	The study argues that although numerous studies have utilized the constructs of distributive and procedural justice, most tend to ignore the implications of the bivariate relationship between these two constructs, which in turn calls for further investigation into the interdependency between distributive and	<p><i>Distributive Justice</i> – Perceived fairness of the distribution of outcomes</p> <p><i>Procedural Justice</i> – Perceived fairness of decision-making procedures in distribution of outcomes</p>	There is evidence of a strong relationship between distributive and procedural justice. However, this relationship was moderated by research context and even then, there was substantial variability.	The strong interdependency between distributive and procedural justice suggests that it may be difficult to delineate them as distinguishable constructs.

		procedural justice.			
Joy and Witt (1992)	To examine whether distributive and procedural justice are positively related	The study seeks to empirically verify the proposition that distributive and procedural justice is positively related in the context of managerial decisions as employees are concerned with both decisional outcomes and the means by which these decisions were made, especially when the relationship is moderated by the duration of delay in gratification.	<p><i>Distributive Justice</i> – Extent to which individuals perceive job assignments and performance evaluations to be fair</p> <p><i>Procedural Justice</i> – Extent to which individuals have a voice in job assignments and performance evaluations</p> <p><i>Delay in Gratification</i> – Extent to which individuals expect delays in gratification</p>	Procedural and distributive are positively related in the sense that when individuals perceive fairness in how decisions are made, they are likely to perceive the outcome as fair and vice versa. Additionally, this relationship is moderated by individuals' perceptions of delayed gratification.	It may be difficult to tease apart procedural and distributive justice. In addition, the salience of procedural justice in the development of distributive justice perceptions may be affected by individual disposition to delay gratification.
Lind et al (1990)	To explore the effects of instrumental and non-instrumental participation on distributive and procedural fairness judgments	Ongoing debate between instrumental and non-instrumental studies of procedural justice suggest that participation (i.e., voice or process control) can only influence fairness judgments when they are driven by instrumental, self-interest concerns or non-instrumental group-value concerns, which in turn calls for further empirical research into whether participation effects can manifest in situations whereby it is clear that the exercise of voice cannot influence the procedure.	<p><i>Distributive Justice</i> – Extent to which individuals perceive the fairness of the assigned goal</p> <p><i>Procedural Justice</i> – Extent to which individuals perceive goal-setting procedures to be fair</p> <p><i>Control</i> – Influence individuals have over the goal</p> <p><i>Voice</i> – Opportunity for individuals to present information about the goal</p>	Both pre- and post-decision voice led to higher procedural and outcome fairness judgments than no voice, with pre-decision voice having a greater impact. In addition, relevant information also enhanced fairness perceptions and mediation analyses demonstrated that control perceptions account for some, but not all, of the voice-enhancing effects on procedural justice.	Instrumental and non-instrumental concerns through participation impact procedural and distributive fairness judgments.
Loi et al (2006)	To examine the effects of distributive and procedural justice on employees' organizational commitment and intention	Arguing from a social exchange perspective, the study contends that fitting rewards and corporate actions deemed	<i>Distributive Justice</i> – Extent to which individuals perceive input-output ratio to be equal as compared to a referent	Both distributive and procedural justice contributed to the development of perceived organizational support,	Distributive and procedural justice serves as crucial social resources in exchange relationships between

	to leave as mediated by their perceptions of organizational support	to be discretionary by employees may enhance perceptions of distributive and procedural justice, which in turn acts as important resources in social exchanges by influencing employees' evaluation of the quality of reciprocation in exchange relationships with their organization.	other <i>Procedural Justice</i> – Extent to which individuals perceive organizational procedures to be discretionary by allowing employees' voice in decision-making <i>Organizational Commitment</i> – Extent to which there is an affective or emotional attachment to the organization such that the strongly committed individual identifies with, is involved in, and enjoys membership in the organization <i>Intention to Leave</i> – Extent to which individuals exhibit turnover behavior <i>Perceived Organizational Support</i> – Employees' global beliefs concerning the extent to which the organization values their contributions and cares about their well-being	which in turn mediated their positive and negative effects on organizational commitment and intention to leave respectively.	employees and organizations.
McFarlin and Sweeny (1992)	To examine the differential effects of distributive and procedural justice on personal and organizational outcomes	Because distributive justice is outcome-oriented by referring to the perceived fairness of compensation received whereas procedural justice is process-oriented by referring to the perceived fairness of the means through which compensation is determined, the study argues that distributive	<i>Distributive Justice</i> – Extent to which individuals perceive fairness in the amount of compensation received <i>Procedural Justice</i> – Extent to which individuals perceive fairness in the means by which compensation amounts are determined <i>Pay Satisfaction</i> – Extent	Distributive justice was found to be a stronger predictor of personal outcomes than procedural justice as measured by pay and job satisfaction whereas the reverse is true for organizational outcomes as evaluated by organizational commitment and subordinates' evaluation of supervisors.	Distributive justice should be adapted to contexts in which the phenomena of interest pertains more to personal outcomes whereas procedural justice is more applicable in situations whereby the phenomena of interest center on organizational outcomes.

		justice is a more significant predictor of personal outcomes whereas procedural justice is a more significant predictor of organizational outcomes.	to which individuals feel satisfied with the pay received <i>Job Satisfaction</i> – Extent to which individuals feel satisfied with the job requirements <i>Organizational Commitment</i> – Extent to which individuals perceive themselves to be a part of the organization <i>Subordinates' Evaluation of Supervisors</i> – Extent to which individuals feel satisfied with their supervisor's performance	Procedural and distribute also interacted in predicting organizational outcomes.	
Samad (2006)	To investigate the differential effects of procedural and distributive justice on organizational commitment and job satisfaction	Because procedural justice emphasizes the fairness of the decision-making process whereas distributive justice relates to the fairness of resource allocation, the study contends that both forms of justice will have positive impact on job satisfaction and organizational commitment.	<i>Distributive Justice</i> – Extent to which resources (outcomes received) are fairly allocated <i>Procedural Justice</i> – Extent to which decision-making procedures (means by which outcomes are determined) are fair <i>Job Satisfaction</i> – Extent to which employees feel positively towards their jobs <i>Organizational Commitment</i> – Extent to which employees feel bonded to their organization	Both procedural and distributive justice had positive and significant effects on job satisfaction and organizational commitment. In addition, both procedural and distributive justice was observed to be more positively related to job satisfaction than organizational commitment with distributive justice having a greater impact than procedural justice.	Perceptions of procedural and distributive justice will lead to positive affect of job satisfaction and organizational commitment.
Schappe (1998)	To establish the impact of distributive and procedural justice on job satisfaction	While studies have proliferated in examining how distributive and procedural justice affect job satisfaction, the assessment of the	<i>Distributive Justice</i> – Extent to which individuals perceive to have been fairly rewarded in light of their job	Though all three justice perceptions significantly predict job satisfaction, interpersonal procedural justice and distributive justice were better	Interpersonal and structural elements of decision-making processes should be delineated in examining the impact of justice

		procedural justice construct does not differentiate between interpersonal and structural components, which in turn calls for more comprehensive empirical investigation regarding the impact of interpersonal procedural justice, structural procedural justice and distributive justice on job satisfaction.	responsibilities <i>Interpersonal Procedural Justice</i> – Extent to which individuals perceive quality in interpersonal treatment and adequacy of explanations decision makers offer with regards to corporate decisions <i>Structural Procedural Justice</i> – Extent to which individuals perceive formalized organizational decision-making procedures to be fair <i>Job Satisfaction</i> – Extent to which individuals' requirements are fulfilled by the work environment	predictors with distributive justice exhibiting the strongest relationship of all.	perceptions on corresponding attitudes, beliefs and values.
Schminke et al (1997)	To examine the influence of individuals' ethical framework on perceptions of organizational justice	While organizational justice and normative ethics endeavor to address the common question of what is right, few research integrates them. The study thus endeavors to appreciate how distributive and procedural justice affects utilitarian (outcome-based) and formalist (rules- or process-based) decisions.	<i>Distributive Justice</i> – Extent to which individuals perceive fairness in the distribution of organizational outcomes <i>Procedural Justice</i> – Extent to which individuals perceive fairness in the organizational procedures <i>Ethical Formalism</i> – An ethical approach in which individuals subscribe to a set of rules or principles for guiding behavior <i>Ethical Utilitarianism</i> – An ethical approach in which individuals define actions as those that create the greatest net social good	Ethical formalists were more sensitive to distributive justice issues whereas ethical utilitarians were more sensitive to procedural justice.	Individual ethical frameworks of decision making create important differences in understanding their reactions to organizational actions and their subsequent justice perceptions.
Stecher and	To investigate whether interactional justice can	While interactional and procedural justice has	<i>Distributive Justice</i> – Extent of equity (i.e.	Both distributive and interactional justice	Findings from the study suggest that the negative

Rosse (2005)	generate effects similar to distributive justice, and to distinguish those effects from those attributed to procedural causes	increasingly been empirically validated to be distinct constructs, the study contends that interactional injustice can evoke the emotional and retaliatory reactions associated with unjust workplace distributions of a more tangible, economic nature as research has suggested that the quality of interpersonal treatment may factor directly into the equity judgment by altering or supplanting the equity ratio.	input-outcome ratio) <i>Procedural Justice</i> – Accuracy and representativeness of rules <i>Interactional Justice</i> – Extent of interpersonal sensitivity and the presence of rude treatment <i>Emotions</i> – Existence of negative affective reactions and intentions to respond in either a constructive and destructive manner	produced significant main effects on negative emotions, as well as destructive intentions with interactional injustice producing even stronger negative reactions than those created by distributive injustice. However, these effects did not emerge for procedural justice.	effects of distributive justice may be overshadowed by interactional justice when forming equity-based judgments.
Tyler and Blader (2003)	To propose the group engagement model in explaining why procedural justice shapes cooperation in groups, organizations and societies	Arguing from the social identity perspective, the group engagement model hypothesizes that procedural elements carry the most relevant social identity, which in turn influences people's attitudes, values and behaviors within groups. In particular, the study notes that in group settings whereby individuals are better informed of decision-making processes, procedural justice judgments play the major role in shaping people's reactions.	<i>Distributive Justice</i> – Extent to which individuals perceive themselves to be deserving of more favorable outcomes than others <i>Procedural Justice</i> – Extent to which individuals perceive the fairness of procedures governing social interactions <i>Social Identity</i> – Degree to which individuals cognitively merge their sense of self and evaluations of self-worth with their judgments of characteristics and status of their groups <i>Group Engagement</i> – Extent to which individuals hold positive attitudes and values	Not Applicable	Procedural justice appears to be a better predictor than distributive justice in social interactive situations whereby individuals possess knowledge of group procedures

			towards the group as well as are willing to engage in both mandatory and discretionary cooperative behaviors		
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Appendix B: A Comparison of Computer-Mediated Communication (CMC) Theories

A Comparison of Computer-Mediated Communication (CMC) Theories [Walther and Parks, 2002]				
Theory	Key Proposition(s)	Implication(s) for CMC	Finding(s)	Construct(s)
MRT	There is an optimal match between the equivocality (i.e., extent of personal and/or emotional attachment) of the interactional tasks and the communication media among which one may choose, i.e. the more equivocal the interactional task, the richer must be the selected communication medium in order to improve the <i>efficiency</i> of the exchange	<ul style="list-style-type: none"> To explain preferences among communication media for tasks with different equivocality 	<ul style="list-style-type: none"> Leaner communication media do not lend themselves to efficient communication of emotionally complex matters Managers attaining successful match between equivocality and richness of communication media tend to perform better in their organization 	<p>Multiplicity of Cues – No of communication cue systems conveyed by a communication medium</p> <p>Immediacy of Feedback – Extent to which the communication medium offers full interruptibility</p> <p>Message Personalization – Extent to which communication messages can be tailored to a specific individual</p> <p>Language Variety – Extent to which communication media supports natural language</p>
MST	Extent to which individuals work together on the same activity at the same time (i.e., shared focus) will influence the choice of communication media in terms of their synchronizing capabilities	<ul style="list-style-type: none"> To explain preferences among communication media for tasks requiring different levels of interactional synchronicity 	<ul style="list-style-type: none"> Communication media with low synchronicity is preferred for conveyance (i.e., the exchange of information followed by deliberation on its meaning) whereas communication media with high synchronicity is preferred for convergence (i.e., development of shared meaning for exchanged information) 	<p>Immediacy of Feedback – Extent to which a medium enables users to give rapid feedback on the communication they receive</p> <p>Symbol Variety – Number of ways by which information may be communicated</p> <p>Parallelism – Number of simultaneous conversations that can co-exist effectively</p> <p>Rehearsability – Extent to which a medium enables the sender to rehearse or fine-tune the message before sending</p> <p>Reprocessability – Extent to which a medium facilitates the reexamination or reprocessing of a message within the context of the communication event</p>
SIP	Instead of viewing the absence of nonverbal cues in CMC as a restriction on communicators'	<ul style="list-style-type: none"> To explain why relational communication levels in CMC may increase over time and 	<ul style="list-style-type: none"> F2F participants are able to form fully developed impressions of one another 	<p>Chronemics – The manner by which one perceive, structure and react to time and nonverbal codes</p>

	capability to exchange individualized information, communicators are just as motivated to reduce interpersonal uncertainty and develop affinity by adapting their expression of social information to the cues available via the electronic communication medium	even converge with those of F2F settings	sooner than their counterparts in CMC, but the impressions of CMC participants continue to develop over time until they achieve similar levels with those in F2F settings <ul style="list-style-type: none"> ▪ CMC tend to generate more interactive information seeking strategies in accomplishing interpersonal functions as compared to F2F settings in that CMC participants employed a greater proportion of self-disclosures and questions with significantly more depth than did F2F partners 	that are embedded in the messages we interpret Chronemic Codes – Nonverbal cues that affect the subjective interpretation of time and messages (e.g., time-stamp and emoticons)
SIT	Lack of nonverbal cues in CMC will tend to place greater emphasis on contextual cues that indicate common social categories, thereby leading to enhanced group identification and self-categorization among members due to their interpretation of message content as signals creating or reinforcing group norms	<ul style="list-style-type: none"> ▪ To explain why the richness of the communication media affects the interpretation of messages by causing over-attributions of similarity and group norms 	<ul style="list-style-type: none"> ▪ Visually anonymous text-based communication medium users developed greater group-based self-categorization as compared to video-conferencing 	Interpersonal Cues – Individualizing information that personalizes impressions Social Cues – Contextual information that reveals the social structural elements of a group
SPT	Nonverbal cues render the presence of communicators more salient to each other such that it enhances the warmth and friendliness of the interaction	<ul style="list-style-type: none"> ▪ To explain the effects of CMC on group discussion and; ▪ To predict preferences among communication media alternatives for various tasks 	<ul style="list-style-type: none"> ▪ Low bandwidth CMC media (e.g., text-based systems) tend to result in low social presence, which in turn increases task orientation and facilitate group discussion ▪ Lack of non-verbal cues (i.e. low bandwidth) and low social presence make it more difficult for leadership to emerge and for groups to reach consensus in socio-emotional terms due to an indifferent and hostile environment 	Bandwidth – No of communication cue systems conveyed by a communication medium Social Presence – Perceptual proximity among communicators involved in an interaction

TEP	The fewer one's choices of communication media, the more psychological closeness one will experience from employing even a low-bandwidth channel	<ul style="list-style-type: none"> ▪ To explain why people frequently make effective use of lean communication media to accomplish high equivocal tasks, i.e. actual media choices often do not match normative expectations (on the basis of optimal efficiency) 	<ul style="list-style-type: none"> ▪ No confirmatory evidence on whether electronic propinquity is a consequence of limited media choices or the ability of one-self to accommodate and expand the otherwise limited bandwidth of the medium through greater effort, better application of communication skills and reduction of formality 	<p>Media Richness - No of communication cue systems conveyed by a communication medium</p> <p>Electronic Propinquity – Psychological proximity one feels towards an electronic communication medium</p>
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Note: MRT – Media Richness Theory; MST – Media Synchronicity Theory; SIP – Social Information Processing Theory; SIT – Social Identity Theory; SPT – Social Presence Theory; TEP – Theory of Electronic Propinquity

Appendix C: A Review of the Application of Social Presence Theory to Computer-Mediated Communication (CMC) Contexts

A Review of the Application of Social Presence Theory to Computer-Mediated Communication (CMC) Contexts					
Author(s)	Motivation of Study	Primary Contention(s)	Construct(s)	Finding(s)	Implication(s)
Gunawardena (1995)	To examine the implications of social presence on CMC	While CMC, with its lack of nonverbal communication cues, is posited to be low in social presence, it is unclear whether social presence is an attribute of the underlying medium or a consequence of behavioral alteration based on users' perception of the medium, thereby warranting further research.	<i>Social Presence</i> – Degree of salience of the other person in the interaction and consequent salience of the interpersonal relationship	Despite CMC being deemed to be weak in its ability to convey social presence, the degree of social cohesion can affect the extent to which individuals perceive the medium to be interactive, active and socially constructive	It is the kind of interactions that occur among participants and the sense of community created which impacts individuals' perceptions of CMC as a social medium.
Hiltz <i>et al</i> (1986)	To explore the effect of social presence on group processes between face-to-face versus computerized conferences	Social presence—the feeling that a medium is personal, warm, and sociable rather than impersonal, cold, and unsociable—impacts group communications to the extent to which it supports task-oriented functions as opposed to social-emotional functions	<i>Qualitative Interactional Process Analysis</i> to determine: <i>Equality of Participation</i> – Number of speaking turns for face-to-face or number of comments for computerized conferences <i>Presence of Group Leader</i> – Individual share of interaction exceeds 33% <i>Quality of Decision</i> – Deviation from correct solution to problem as measured by absolute quality of the reported group decision; percentage improvement in the group decision as compared to the mean of individual choices before	As compared to face-to-face groups, participants in computerized conferences: (1) spend less time on communication; (2) focus more on task-oriented communication; (3) interact in a manner supporting high-quality decisions but diminishes team agreement, and; (4) communicate in a fashion preventing domination by any one member	The absence of social presence in group communications serves to orient discussion towards task-centric functions at the expense of reduced consensus.

			the discussion; and the best individual decision before discussion <i>Agreement</i> – Perceived agreement with reported group solution to problem		
Rice (1993)	To employ social presence as the theoretical lens in assessing media appropriateness for a variety of organizational communication activities utilizing different media	Social presence—the degree to which a medium is perceived as conveying the presence of the communicating participants—affects choice of media as individuals aware of a medium’s social presence may choose appropriate media in order to achieve a better media-task match and experience better communication or work performance	<i>Perceived Satisfactoriness or Appropriateness of a Particular Media w/respect to exchanging information, problem solving and making decisions, exchanging opinions, generating ideas, persuasion, getting the other on one’s side of an argument, resolving disagreements or conflicts, maintaining friendly relations/staying in touch, bargaining, and getting to know someone</i>	Based on social presence theory, media can, in general, be delineated into two dimensions: information exchange (less equivocal) and socio-emotional relations (more equivocal)	Social presence theory, as indicated by the media appropriateness scale, appears to provide a useful, consistent, meaningful, stable, and discriminating way to characterize media.
Richardson and Swan (2003)	To explore the role of social presence in online learning environments and its relationship to students’ perceptions of learning and satisfaction with the instructor	The effectiveness of online learning is brought under question by critics for its lack of face-to-face interactions and hence diminishing social presence, which in turn calls for further research into the impact of perceived social presence on perceived learning and perceived satisfaction with the instructor.	<i>Social Presence</i> – Degree of salience of the other person in the interaction and consequent salience of the interpersonal relationship <i>Perceived Learning</i> – Perception of benefits associated with course activities <i>Perceived Satisfaction with Instructor</i> – Perception of contentment with instructional training	High perceptions of social presence is a significant predictor of perceived learning and perceived satisfaction with instructor	Social presence not only affects learning outcomes, but also students’ perceptions of learning benefits and satisfaction with a course, thereby suggesting that instructor immediacy behaviors and the presence of others are crucial in the delivery of online education.
Rourke et al (2001)	To assess an instrument for measuring social presence in	Though CMC has been alleged to lack the capacity to support social	<i>Social Presence</i> – Communication Behaviors that enhance	The instrument appears to be relatively reliable as a measurement for social	Social presence density calculation offers a critical quantitative

	asynchronous text-based computer conferencing	and affective interaction, it may be the case that filtered-cues render CMC media hyper-personal rather than predicted impersonal such that experienced users can employ CMC media in manners which are as rich if not richer than their physical counterparts, which in turn demonstrates promise for content analysis in understanding the role of social presence in CMC settings	<p>closeness to and nonverbal interaction with another</p> <p><i>Affective Response</i> – Expression of emotion, feelings and mood</p> <p><i>Interactive Response</i> – Willingness to build, sustain and prolong relationship as well as tacit indication of interpersonal support, encouragement and acceptance of the initiator</p> <p><i>Cohesive Response</i> – Activities aimed at building and sustaining a sense of group commitment</p>	presence density in asynchronous text-based computer conferencing	description of computer conferencing environment to the extent to which it allows for the formation and testing of hypotheses in which social presence is employed as a dependent or independent variable.
Sia <i>et al</i> (2002)	To understand the effect of social presence on group polarization in CMC settings	Group polarization occurs because people are motivated to present themselves in a socially desirable light during discussion such that fluctuations in the level of social presence can affect the extent to which participants perceive that a change of opinion is likely to result in a <i>loss of face</i> : a reduction in social presence may lead to the pursuit of self rather than group interests, thereby resulting in greater extent of opinion change and difficulties in arriving at consensual decisions.	<p><i>Choice Shift</i> – Difference b/w the average pre-meeting position of every participant and the final collective position</p> <p><i>Preference Change</i> – Average difference b/w the pre-meeting and post-meeting positions of each participant</p> <p><i>Social Presence</i> – Degree to which people establish warm and personal connections with one another in a communication setting</p> <p><i>Verbal Cues</i> – Information conveyed vocally, including tone, loudness of voice and rate of speech</p> <p><i>Visual Cues</i> – Visual orientation, facial</p>	<p>Choice shift and preference change is significantly stronger in a dispersed CMC setting (electronic textual cues) than either face-to-face CMC (visual and textual cues) or unsupported settings (verbal, visual and textual cues)</p> <p>There is no significant difference in choice shift and preference change b/w face-to-face CMC (visual and textual cues) and unsupported settings (verbal, visual and textual cues)</p>	The findings indicate that group polarization is significantly stronger when visual and verbal cues are removed in communications because the absence of such social cues leads to low social presence, which in turn encourages one-upmanship behavior (tendency of individuals to try and outperform one another in the socially valued direction) but discourages pluralistic balance (desire of individuals to achieve a compromise b/w their preferred positions and the positions thought to be favored by others).

			expressions and any other types of body language <i>Textual Cues</i> – Information embodied in written and/or printed text and graphics		
Sia <i>et al</i> (2002)	To understand the impact of content anonymity on social presence and group polarization in CMC settings	Content anonymity creates a communication environment that renders individuals incapable of associating comments to contributors, thereby lowering social presence	<i>Choice Shift</i> – Difference b/w the average pre-meeting position of every participant and the final collective position <i>Preference Change</i> – Average difference b/w the pre-meeting and post-meeting positions of each participant <i>Social Presence</i> – Degree to which people establish warm and personal connections with one another in a communication setting <i>Verbal Cues</i> – Information conveyed vocally, including tone, loudness of voice and rate of speech <i>Visual Cues</i> – Visual orientation, facial expressions and any other types of body language <i>Textual Cues</i> – Information embodied in written and/or printed text and graphics	Choice shift and preference change is significantly stronger in an identified dispersed CMC setting than in an identified face-to-face CMC setting There is no significant difference in choice shift and preference change b/w an anonymous dispersed CMC setting and an anonymous face-to-face CMC setting Choice shift and preference change is significantly stronger in an anonymous face-to-face CMC setting than in an identified face-to-face CMC setting There is no significant difference in choice shift and preference change b/w an anonymous dispersed CMC setting and an identified dispersed CMC setting	<ol style="list-style-type: none"> 1. Under the identified condition, the absence of verbal and visual cues in the dispersed CMC setting resulted in stronger group polarization by lowering social presence. 2. For the face-to-face CMC setting, the provision of anonymity led to significantly stronger group polarization by lowering social presence through the masking of identities. 3. The provision of anonymity did not further impact group polarization in the dispersed CMC setting, thereby suggesting that the impact of removing communication cues on lowering social presence is not additive but substitutive.
Stein and Wanstreet (2003)	To explore the role of social presence on perceived knowledge	The greater the perception of social presence, the better the	<i>Social Presence</i> – Ability of individuals to be perceived as real, three-	There is no statistical significance in perceived social presence b/w	Social presence may not be a crucial factor in determining users' choice

	gained in a distance learning environment	ability of the group to substitute telecommunications media for face-to-face encounters and still achieve the desired collaborative outcome	dimensional beings despite not communicating face-to-face	online versus face-to-face collaboration	of distance learning format.
Tu (2002)	To derive a measurement tool of social presence in an online learning environment	Although social presence is a significant factor in improving instructional effectiveness, the intertwining of user perceptions and media characteristics in CMC settings render the measurement of online social presence complicated for current instruments, thereby suggesting the need for a refined measurement tool aimed at capturing the intricacies of social presence	<p><i>Social Context</i> – Extent to which interaction is task-oriented</p> <p><i>Online Communication</i> – Attributes of language being employed online and the application of online language</p> <p><i>Interactivity</i> – Activities in which CMC users engage and the communication styles they utilize</p> <p><i>System Privacy</i> – Extent to which the underlying medium is technically reliable in support confidential communication</p> <p><i>Privacy</i> – Extent to which communication is perceived to be public by the communicators</p>	Social context, online communication and interactivity positively influence the perceived level of social presence whereas privacy is weakly correlated with social presence and system privacy is not significantly correlated with social presence	Social presence in an online context comprises the three dimensions of social context, online communication and interactivity.
Tu and Mclsaac (2002)	To evaluate the impact of social presence on online interaction in CMC settings	Social presence—defined as the degree of awareness of another person in an interaction and the consequent appreciation of an interpersonal relationship—positively influences online interaction	<p><i>Social Context</i> – Extent to which interaction is task-oriented</p> <p><i>Online Communication</i> – Attributes of language being employed online and the application of online language</p> <p><i>Interactivity</i> – Activities in which CMC users engage and the communication styles</p>	Social context, online communication and interactivity positively influence the perceived level of social presence whereas privacy is not significantly correlated with social presence	Increasing social presence in online interaction hinges on the social context of the conversation, the manner of online communication and the interactivity of the exchange.

			they utilize <i>Privacy</i> – Extent to which communication is perceived to be public by the communicators		
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Appendix D: Results of Labeled Sorting

		Actual Category [Sample N = 5]									Total	%
		PJ	IJ	DJ	TGC	PSP-C	PSP-U	PSP-I	PSP-P	N.A.		
Target Category	PJ	40	5	0	3	0	0	0	0	2	50	80.00%
	IJ	1	41	0	0	0	2	0	0	1	45	91.11%
	DJ	0	0	55	3	1	0	0	0	1	60	91.67%
	TGC	1	0	0	41	1	0	0	0	2	45	91.11%
	PSP-C	0	0	0	0	11	1	1	2	0	15	73.33%
	PSP-U	1	0	0	0	0	16	1	2	0	20	80.00%
	PSP-I	0	0	0	0	0	0	17	3	0	20	85.00%
	PSP-P	0	0	0	0	1	0	0	19	0	20	95.00%
	N.A.	0	0	0	0	0	0	0	0	0	0	0.00%
		40	41	55	41	11	16	17	19	0	275	87.27%
Total Hits: 240												

Legend:-

- DJ – Distributive Justice
- IJ – Interactional Justice
- PJ – Procedural Justice
- TGC – Team Goal Commitment
- PSP-C – Connectivity
- PSP-U – Sense of Understanding
- PSP-I – Involvement
- PSP-P – Positivity
- N.A. – Not Applicable

CS3253 Virtual Team Case Competition Participation Guidelines & Rules

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If you have any questions or experience any problems, please contact case competition coordinator immediately!

GENERAL GUIDELINES FOR WORKING AS A VIRUTAL PROJECT TEAM

Weekly Team Building Exercises

On the days you receive your cases and group discussion questions (**3 October, 2006 & 10 October, 2006**), you and your team members are **REQUIRED** to “meet” in your assigned communication environment for **TEAM BUILDING EXERCISES (Week#1 Team Building Exercise & Week#2 Team Building Exercise)**. During this meeting, your team needs to:

1. **Decide a name for your team.**
2. **Articulate at least two goals** your team wishes to accomplish during this week. **State your goals as clear and detail as possible.**

Importance of Team Goals:

- Often, due to individual constraints, special circumstances and diverse strengths within each team, the desired goals to be achieved by one team group may not always be the same as the next.
- For example, one team may choose to focus on speed because of heavy workload from other commitments or another team may focus on creativity because of the flair possessed by different team members.
- As such, it is often possible for teams to strive towards specific goals to alleviate their problems or to display their unique talent that differentiate themselves from others.
- These goals articulated are meant to guide the team in a consistent direction and to create better understanding among members.
- Their articulation will not lead to any penalties or affect the grading of the group report in anyway but will provide the coordinator better understanding of the uniqueness in individual teams.

3. **Determine the communication and coordination rules** your team agrees to comply for effective project coordination.

Suggested areas on which the rules should touch on:

- Set a *schedule or timeline* for tracking the progress of the project.
- Allocation of *duties and responsibilities* to individual member. The allocation of duties and responsibilities should be **equally distributed** across team members.

- *Expected time duration* for acknowledging the receiving of an e-mail or a message, for replying and responding each other's views, opinions, or concerns, or for resolving disagreements and conflicts.
4. **Consolidate your team name, team goals and communication & coordination rules including the responsibilities allocated to each member. Put them in writing. Upload your document in your team repository** (e.g., workbin, shared folder).

Weekly Online Progress Meetings

During each week of your virtual team collaboration, you and your team are **REQUIRED** to schedule **at least ONE ONLINE PROGRESS MEETING** to report the progress on your assigned tasks, discuss issues, and resolve difficulties encountered. **Logs of your meeting proceedings must be saved and uploaded to your team repository** (e.g., workbin, shared folder).

IMPORTANT! ALL team communication correspondences including e-mails, postings, chat room sessions, and shared documents MUST be saved and stored for references.

GUIDELINES FOR EFFECTIVE CONFLICT RESOLUTION

Disagreements and conflicts are common in any kind of group collaboration. If they are not properly managed, it may seriously impede the progress of your project and influence your team performance. The following guidelines provide **a suggested procedure** for you to **better manage disagreements and conflicts** within your team.

1. Conflicting parties must first determine and clearly put forward the issue being disputed to give other members an understanding of the problem. Members who are not directly involved in the conflict should NOT take sides at this point.
2. Conflicting parties with opposing perspectives are then required to put forward logical arguments and credible evidences to support his/her/their stance in the argument.
 - a. Avoid taunting statements such as "What a dumb idea" and "Utter Rubbish!"
 - b. Avoid statements based on gut feelings, intuitions or personal experiences such as "I just don't think/feel that will work", "From my own experience..." as they do not contribute to resolution of conflicts.
3. Each side is allowed to present his/her/their arguments and supporting evidence in a continuous fashion and no interruptions are allowed until the party has finished.
4. Arguments should focus on supporting one's position rather than disproving what the other party is saying.
5. Both sides can concede to the other side's argument at any point of time and the conflict will be considered resolved and no further debate on the same issue should be brought up again in the future as indictment of other members' performance.
6. However, if an impasse persists with neither side conceding, the issue will thus be put to a vote based on the arguments and supporting evidence put forth, the team will then proceed in the direction voted by the majority (No abstainer by any member is allowed).
7. Members who are not initially involved in the debate can now given the option of putting forth their reasoning for voting in either direction.

IMPORTANT! Conflict resolution, as for any of the communication with the team, has to **utilize the communication software prescribed** and the entire process **must be logged, saved, and store in your team repository** (e.g., workbin, shared folder).

GUIDELINES FOR MEMBER INTERACTION

1. You should treat your team members with respect, courtesy and dignity.
2. You are required to behave and communicate with your team members in a professional and civil manner throughout the duration of the project. For example, you should not let your emotional feelings toward your fellow teammates interfere with your work relationships.
3. Derogatory/discriminatory statements and opinions are strictly prohibited.
4. You are expected to be truthful in matters pertaining to the project when communicating with your team members.
5. Take into consideration individual differences in work styles, personal strengths and weaknesses, and potential unforeseen personal events when you communicate with your team members.
6. You should communicate your personal constraints that may influence the scheduling and coordinating of project work with your team members as early as possible so your team will have ample time to make adjustments.

END OF PROJECT EVALUATIONS

Weekly Online Surveys

To gain a better understanding of your experience with the virtual team exercise, you will be asked to complete two **ONLINE SURVEYS**. The URLs of the surveys will be distributed at the end of each project week (**9 October, 2006** and **16 October, 2006**). The completion of these **two surveys** counts towards your **(two) tutorial attendances**. Your response to the surveys will be kept confidential and only accessible by the lecturer and case competition coordinator.

Peer Evaluation

At the end of the case competition, you will be given a **PEER EVALUATION FORM** in which you are expected to evaluate each of your team members based on their contribution to the project, their work ethic, and their adherence to the above stated guidelines. Your evaluations should be **an independent effort** and you should NOT communicate with your team members about your evaluations. Your evaluations will be kept confidential and will only be accessible by the lecturer and the case competition coordinator.

The aggregate results of evaluations from your team members will serve as an indicator **for adjusting** the **group component (60%)** of the grade you will receive for this project.

Appendix F: Coding of Generic Collaborative Technological Capabilities and Outputs along Sub-Dimensions of PSP

Modified Definitions of PSP Sub-Dimensions:

Assuming that the user is inclined to establish high connectivity, high sense of understanding, high involvement and high positivity with other group members:

Efficiency: Extent to which the technical capacity of a particular technological artifact can **minimize the manifestation of obstacles to the communication behavior**, which is likely to induce high perceptions for each PSP sub-dimensions.

Effectiveness: Extent to which the technical capacity of a particular technological artifact can **complement or enhance the type of communication behavior**, which is likely to induce high perceptions for each PSP sub-dimensions.

Connectivity: Extent to which a specific technological artifact can **create a sense of community (establishment of shared goals and objectives)** among correspondents.

Type of Communication Behavior - Focused Communication

- **Efficiency:** Immediacy of Feedback (+1); Parallelism (+1)
- **Effectiveness:** Communication structural specification (+1); Reprocessability (+1)

Sense of Understanding: Extent to which a specific technological artifact **conveys accurately and completely, correspondents' thoughts and ideas** to achieve mutual understanding.

Type of Communication Behavior - Comprehensible Communication

1. Communication conveyance between user and other members – The extent to which messages can be transmitted speedily.

- **Efficiency:** Immediacy of Feedback (+1)

2. Communication convergence between user and other members – The extent by which the messages sent by the user can be understood by the members as intended.

- **Effectiveness:** Diversity of social and communication cues available (Output capacity for diverse social cues) (+1), Rehearsability (+1), Reprocessability (+1)

Involvement: Extent to which a specific technological artifact **sustains correspondents' attention and interests** in interacting with one another.

Type of Communication Behavior - Interactive Communication

- **Efficiency:** Immediacy of Feedback (+1)
- **Effectiveness:** Immediacy of Feedback (+1), Diversity of social and communication cues available (Output capacity for diverse social cues) (+1), Diversity in communication output (Appearance) (+1)

Positivity:

Extent to which a specific technological artifact **induces a sense of comfort and relaxation** among correspondents when interacting with one another.

Type of Communication Behavior - Personalized Communication

- **Efficiency:** Rehearsability (+1)
- **Effectiveness:** Diversity in communication output (Appearance) (+1)

All technological elements in the communication software being coded comprise two essential components, namely:-

1. Capability → Action
2. Primary Output (Object of Action)

Both components ultimately influence the extent of specific communication behaviors that will lead to higher probability of achieving 4 perceptions of connectivity, sense of understanding, involvement and positivity i.e. PSP.

		Connectivity (Sense of Community)	Sense of Understanding	Involvement	Positivity (Positive Affect)	Total
Coding of Collaborative Technological Capabilities along Sub-Dimensions of PSP						
1	Online Sending of Communication Content	- Immediacy of Feedback - Parallelism (NA) Efficiency: +1 - Structural Specification (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback Efficiency: +1 - Cue Diversity (NA) - Rehearsability (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback Efficiency: +1 - Immediacy of Feedback - Cue Diversity (NA) - Diversity of Output Forms (NA) Effectiveness: +1	- Rehearsability (NA) Efficiency: 0 - Diversity of Output Forms (NA) Effectiveness: 0	+3
						+1
2	Offline Sending of Communication Content	- Low Immediacy of Feedback - Parallelism (NA) Efficiency: -1 - Structural Specification (NA) - Reprocessability (NA) Effectiveness: 0	- Low Immediacy of Feedback Efficiency: -1 - Cue Diversity (NA) - Rehearsability (NA) - Reprocessability (NA) Effectiveness: 0	- Low Immediacy of Feedback Efficiency: -1 - Low Immediacy of Feedback - Cue Diversity (NA) - Diversity of Output Forms (NA) Effectiveness: 0	- Rehearsability (NA) Efficiency: 0 - Diversity of Output Forms (NA) Effectiveness: 0	-3
						0
3	Reprocessability of Communication Content	- Immediacy of Feedback (NA) - Parallelism (NA) Efficiency: 0 - Structural Specification (NA) - Reprocessability Effectiveness: 1	- Immediacy of Feedback (NA) Efficiency: 0 - Cue Diversity (NA) - Rehearsability (NA) - Reprocessability Effectiveness: 1	- Immediacy of Feedback (NA) Efficiency: 0 - Immediacy of Feedback (NA) - Cue Diversity (NA) - Diversity of Output Forms (NA) Effectiveness: 0	- Rehearsability (NA) Efficiency: 0 - Diversity of Output Forms (NA) Effectiveness: 0	0
						+2
4	Rehearsability of Communication Content to be Sent	- Immediacy of Feedback (NA) - Parallelism (NA) Efficiency: 0	- Immediacy of Feedback (NA) Efficiency: 0 - Cue Diversity (NA)	- Immediacy of Feedback (NA) Efficiency: 0 - Immediacy of Feedback	- Rehearsability Efficiency: 1 - Diversity of Output Forms (NA)	+1

		- Structural Specification (NA) - Reprocessability (NA) Effectiveness: 0	- Rehearsability - Reprocessability (NA) Effectiveness: 1	(NA) - Cue Diversity (NA) - Diversity of Output Forms (NA) Effectiveness: 0	Effectiveness: 0	+1
5	Communication Structure Specification	- Immediacy of Feedback (NA) - Parallelism (NA) Efficiency: 0 - Structural Specification (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback (NA) Efficiency: 0 - Cue Diversity (NA) - Rehearsability (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback (NA) Efficiency: 0 - Immediacy of Feedback (NA) - Cue Diversity (NA) - Diversity of Output Forms (NA) Effectiveness: 0	- Rehearsability (NA) Efficiency: 0 - Diversity of Output Forms (NA) Effectiveness: 0	0
						+1
6	Formatting Capability of Communication Content	- Immediacy of Feedback (NA) - Parallelism (NA) Efficiency: 0 - Structural Specification (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback (NA) Efficiency: 0 - Cue Diversity (NA) - Rehearsability (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback (NA) Efficiency: 0 - Immediacy of Feedback (NA) - Cue Diversity (NA) - Diversity of Output Forms Effectiveness: 1	- Rehearsability (NA) Efficiency: 0 - Diversity of Output Forms Effectiveness: 1	0
						+2
7	Creating New Forms of Communication Content by Combining Different Communication Contents (Multi-media)	- Immediacy of Feedback (NA) - Parallelism (NA) Efficiency: 0 - Structural Specification (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback (NA) Efficiency: 0 - Cue Diversity (NA) - Rehearsability (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback (NA) Efficiency: 0 - Immediacy of Feedback (NA) - Cue Diversity (NA) - Diversity of Output Forms Effectiveness: 1	- Rehearsability (NA) Efficiency: 0 - Diversity of Output Forms Effectiveness: 1	0
						+2

8	Parallelism	- Immediacy of Feedback (NA) - Parallelism Efficiency: 1 - Structural Specification (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback (NA) Efficiency: 0 - Cue Diversity (NA) - Rehearsability (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback (NA) Efficiency: 0 - Immediacy of Feedback (NA) - Cue Diversity (NA) - Diversity of Output Forms (NA) Effectiveness: 0	- Rehearsability (NA) Efficiency: 0 - Diversity of Output Forms (NA) Effectiveness: 0	+1
						0
Coding of Collaborative Technological Outputs along Sub-Dimensions of PSP						
1	Text	- Immediacy of Feedback (NA) - Parallelism (NA) Efficiency: 0 - Structural Specification (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback (NA) Efficiency: 0 - No Cue Diversity - Rehearsability (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback (NA) Efficiency: 0 - Immediacy of Feedback (NA) - Low Cue Diversity - Diversity of Output Forms (NA) Effectiveness: 0	- Rehearsability (NA) Efficiency: 0 - Diversity of Output Forms (NA) Effectiveness: 0	0
						0
2	Action/Animation (Communication Content in terms of Movement/Programs)	- Immediacy of Feedback (NA) - Parallelism (NA) Efficiency: 0 - Structural Specification (NA) - Reprocessability (NA) Effectiveness: 0	- Immediacy of Feedback (NA) Efficiency: 0 - Cue Diversity - Rehearsability (NA) - Reprocessability (NA) Effectiveness: 1	- Immediacy of Feedback (NA) Efficiency: 0 - Immediacy of Feedback (NA) - Cue Diversity - Diversity of Output Forms (NA) Effectiveness: 1	- Rehearsability (NA) Efficiency: 0 - Diversity of Output Forms (NA) Effectiveness: 0	0
						+2
3	Audio	- Immediacy of Feedback (NA) - Parallelism (NA) Efficiency: 0	- Immediacy of Feedback (NA) Efficiency: 0 - Cue Diversity	- Immediacy of Feedback (NA) Efficiency: 0 - Immediacy of Feedback	- Rehearsability (NA) Efficiency: 0 - Diversity of Output Forms (NA)	0

		<ul style="list-style-type: none"> - Structural Specification (NA) - Reprocessability (NA) <p>Effectiveness: 0</p>	<ul style="list-style-type: none"> - Rehearsability (NA) - Reprocessability (NA) <p>Effectiveness: 1</p>	<ul style="list-style-type: none"> (NA) - Cue Diversity - Diversity of Output Forms (NA) <p>Effectiveness: 1</p>	<p>Effectiveness: 0</p>	<p>+2</p>
4	Image	<ul style="list-style-type: none"> - Immediacy of Feedback (NA) - Parallelism (NA) <p>Efficiency: 0</p>	<ul style="list-style-type: none"> - Immediacy of Feedback (NA) <p>Efficiency: 0</p>	<ul style="list-style-type: none"> - Immediacy of Feedback (NA) <p>Efficiency: 0</p>	<ul style="list-style-type: none"> - Rehearsability (NA) <p>Efficiency: 0</p>	<p>0</p>
		<ul style="list-style-type: none"> - Structural Specification (NA) - Reprocessability (NA) <p>Effectiveness: 0</p>	<ul style="list-style-type: none"> - Cue Diversity - Rehearsability (NA) - Reprocessability (NA) <p>Effectiveness: 1</p>	<ul style="list-style-type: none"> - Immediacy of Feedback (NA) - Cue Diversity - Diversity of Output Forms (NA) <p>Effectiveness: 1</p>		<ul style="list-style-type: none"> - Diversity of Output Forms (NA) <p>Effectiveness: 0</p>

Appendix G: Coding of Actual Collaborative Technologies along Sub-Dimensions of PSP

	Capability								Output			
	Online Sending	Offline Sending	Reprocessability	Rehearsability	Structure Specification	Formatting	Combining Different Communication Contents	Parallelism	Text	Action/ Animation	Audio	Image
Windows Live Messenger	(+3) (+1)	(-3) (0)	(0) (+2)	(+1) (+1)	(0) (+1)	(0) (+2)	(0) (+2)	(+1) (0)	(0) (0)	(0) (+2)	(0) (+2)	(0) (+2)
Text Messaging (Text + Simple Emoticons)	X	X	X	X		X	X	X	X	X		X
Audio Messaging	X		X					X			X	
Multi Media Greetings (Complex Animations)	X		X	X				X	X	X	X	X
Voice Conferencing	X							X			X	
Video Conferencing	X							X		X		X
File Sharing	X	X	X	X				X	X	X	X	X
Group Activity Features (e.g. Co-Editing, Group Planning)	X				X	X	X	X	X	X	X	X
Personal Profile	X	X	X	X		X	X		X	X		X
Individual Web Space (Blog)		X	X	X		X	X		X	X	X	X
Public Web Space (Web Forum/Bulletin)												
Automatic Reminder/Alerts	X	X			X		X	X	X	X	X	X
E-Cards Sending												
Sending SMS												
Online Multimedia Streaming												
Efficiency	27	-15	0	5	0	0	0	8	0	0	0	0
Effectiveness	9	0	12	5	2	8	10	0	0	16	14	16

Yahoo Messenger	Capability								Output			
	Online Sending	Offline Sending	Reprocessability	Rehearsability	Structure Specification	Formatting	Combining Different Communication Contents	Parallelism	Text	Action/ Animation	Audio	Image
	(+3) (+1)	(-3) (0)	(0) (+2)	(+1) (+1)	(0) (+1)	(0) (+2)	(0) (+2)	(+1) (0)	(0) (0)	(0) (+2)	(0) (+2)	(0) (+2)
Text Messaging (Text + Simple Emoticons)	X	X	X	X		X	X	X	X	X		X
Audio Messaging		X	X					X			X	
Multi Media Greetings (Complex Animations)	X		X	X				X	X	X	X	X
Voice Conferencing	X							X			X	
Video Conferencing	X							X		X		X
File Sharing	X	X	X	X				X	X	X	X	X
Group Activity Features (e.g. Co-Editing, Group Planning)	X	X	X	X	X		X	X	X	X		X
Personal Profile	X	X	X	X		X	X	X	X	X		X
Individual Web Space (Blog)		X	X	X		X	X	X	X	X	X	X
Public Web Space (Web Forum/Bulletin)												
Automatic Reminder/Alerts	X	X			X		X	X	X	X	X	X
E-Cards Sending												
Sending SMS		X	X	X				X	X			
Online Multimedia Streaming												
Efficiency	24	-24	0	7	0	0	0	11	0	0	0	0
Effectiveness	8	0	16	7	2	6	10	0	0	16	12	16

ICQ	Capability								Output			
	Online Sending	Offline Sending	Reprocessability	Rehearsability	Structure Specification	Formatting	Combining Different Communication Contents	Parallelism	Text	Action/ Animation	Audio	Image
	(+3) (+1)	(-3) (0)	(0) (+2)	(+1) (+1)	(0) (+1)	(0) (+2)	(0) (+2)	(+1) (0)	(0) (0)	(0) (+2)	(0) (+2)	(0) (+2)
Text Messaging (Text + Simple Emoticons)	X	X	X	X		X	X	X	X	X		X
Audio Messaging	X							X			X	
Multi Media Greetings (Complex Animations)	X		X	X				X	X	X	X	X
Voice Conferencing	X							X			X	
Video Conferencing	X							X		X		X
File Sharing	X		X	X				X	X	X	X	X
Group Activity Features (e.g. Co-Editing, Group Planning)												
Personal Profile	X	X	X	X		X	X	X	X	X		X
Individual Web Space (Blog)												
Public Web Space (Web Forum/Bulletin)												
Automatic Reminder/Alerts	X	X			X		X	X	X	X	X	X
E-Cards Sending	X	X	X	X			X	X	X	X	X	X
Sending SMS		X	X	X				X	X			
Online Multimedia Streaming												
Efficiency	27	-15	0	6	0	0	0	10	0	0	0	0
Effectiveness	9	0	12	6	1	4	8	0	0	14	12	14

IVLE	Capability								Output			
	Online Sending	Offline Sending	Reprocessability	Rehearsability	Structure Specification	Formatting	Combining Different Communication Contents	Parallelism	Text	Action/ Animation	Audio	Image
	(+3) (+1)	(-3) (0)	(0) (+2)	(+1) (+1)	(0) (+1)	(0) (+2)	(0) (+2)	(+1) (0)	(0) (0)	(0) (+2)	(0) (+2)	(0) (+2)
Text Messaging (Text + Simple Emoticons)	X	X	X	X					X			
Audio Messaging												
Multi Media Greetings (Complex Animations)												
Voice Conferencing												
Video Conferencing												
File Sharing		X	X	X				X	X	X	X	X
Group Activity Features (e.g. Co-Editing, Group Planning)												
Personal Profile	X	X	X	X		X	X	X	X	X		X
Individual Web Space (Blog)		X	X	X		X	X	X	X	X	X	X
Public Web Space (Web Forum/Bulletin)		X	X	X	X	X	X	X	X	X		X
Automatic Reminder/Alerts	X	X			X			X	X			
E-Cards Sending												
Sending SMS												
Online Multimedia Streaming												
Efficiency	9	-18	0	5	0	0	0	5	0	0	0	0
Effectiveness	3	0	10	5	2	6	6	0	0	8	4	8

AOL IM (AIM)	Capability								Output			
	Online Sending	Offline Sending	Reprocessability	Rehearsability	Structure Specification	Formatting	Combining Different Communication Contents	Parallelism	Text	Action/ Animation	Audio	Image
	(+3) (+1)	(-3) (0)	(0) (+2)	(+1) (+1)	(0) (+1)	(0) (+2)	(0) (+2)	(+1) (0)	(0) (0)	(0) (+2)	(0) (+2)	(0) (+2)
Text Messaging (Text + Simple Emoticons)	X	X	X	X		X	X	X	X	X	X	X
Audio Messaging												
Multi Media Greetings (Complex Animations)												
Voice Conferencing	X							X			X	
Video Conferencing	X							X		X		X
File Sharing	X		X	X				X	X	X	X	X
Group Activity Features (e.g. Co-Editing, Group Planning)												
Personal Profile	X	X	X	X		X	X	X	X	X		X
Individual Web Space (Blog)		X	X	X		X	X	X	X	X	X	X
Public Web Space (Web Forum/Bulletin)												
Automatic Reminder/Alerts	X				X		X	X	X	X	X	X
E-Cards Sending												
Sending SMS												
Online Multimedia Streaming												
Efficiency	18	-9	0	4	0	0	0	7	0	0	0	0
Effectiveness	6	0	8	4	1	6	8	0	0	6	10	12

Groove	Capability								Output			
	Online Sending	Offline Sending	Reprocessability	Rehearsability	Structure Specification	Formatting	Combining Different Communication Contents	Parallelism	Text	Action/ Animation	Audio	Image
	(+3) (+1)	(-3) (0)	(0) (+2)	(+1) (+1)	(0) (+1)	(0) (+2)	(0) (+2)	(+1) (0)	(0) (0)	(0) (+2)	(0) (+2)	(0) (+2)
Text Messaging (Text + Simple Emoticons)	X	X	X	X		X		X	X			
Audio Messaging	X	X	X	X		X	X	X	X		X	
Multi Media Greetings (Complex Animations)												
Voice Conferencing	X							X			X	
Video Conferencing												
File Sharing	X	X	X	X				X	X	X	X	X
Group Activity Features (e.g. Co-Editing, Group Planning)	X	X	X	X	X	X	X	X	X	X	X	X
Personal Profile	X	X	X	X				X	X			
Individual Web Space (Blog)												
Public Web Space (Web Forum/Bulletin)		X	X	X	X	X	X	X	X	X	X	X
Automatic Reminder/Alerts	X	X			X			X	X		X	
E-Cards Sending												
Sending SMS												
Online Multimedia Streaming												
Efficiency	21	-21	0	1	0	0	0	8	0	0	0	0
Effectiveness	7	0	12	1	3	8	6	0	0	6	12	6

Breeze Live	Capability								Output			
	Online Sending	Offline Sending	Reprocessability	Rehearsability	Structure Specification	Formatting	Combining Different Communication Contents	Parallelism	Text	Action/ Animation	Audio	Image
	(+3) (+1)	(-3) (0)	(0) (+2)	(+1) (+1)	(0) (+1)	(0) (+2)	(0) (+2)	(+1) (0)	(0) (0)	(0) (+2)	(0) (+2)	(0) (+2)
Text Messaging (Text + Simple Emoticons)	X	X	X	X		X		X	X			
Audio Messaging												
Multi Media Greetings (Complex Animations)												
Voice Conferencing	X	X	X	X			X	X	X	X	X	X
Video Conferencing	X	X	X	X			X	X	X	X	X	X
File Sharing	X	X	X	X				X	X	X	X	X
Group Activity Features (e.g. Co-Editing, Group Planning)	X		X	X	X	X	X	X	X	X	X	X
Personal Profile												
Individual Web Space (Blog)												
Public Web Space (Web Forum/Bulletin)												
Automatic Reminder/Alerts	X		X	X	X			X	X			X
E-Cards Sending												
Sending SMS												
Online Multimedia Streaming	X	X	X	X	X	X	X	X	X	X	X	X
Efficiency	21	-15	0	7	0	0	0	7	0	0	0	0
Effectiveness	7	0	14	7	3	6	8	0	0	10	10	12

CS3253 Virtual Team Case Competition

Introduction Packet

Case Competition Coordinator: Eric Lim
limtzeke@comp.nus.edu.sg
KM Lab (S15-6-15): Phone 6516 7355

If you have any questions or experience any problems, please contact case competition coordinator immediately!

IMPORTANT!! Please do NOT embark on any part of the project until you have read this entire document thoroughly.

BACKGROUND

"The virtual firm, work-where-you-live not live-where-you-work option is about to become reality. In the age of cellular and satellite communications, the Internet, and wide-band, high-speed telecommunications, the "office" may no longer be relevant. Whether you're in Telluride or Camden, all customers and all staff are, or should be, considered truly equidistant." (Zuboff & Maxmin, "The Changing Nature of Work," The Camden Conference on Telecommunications, 1997).

More organizations are using synchronous (e.g., Instant Messaging) and asynchronous (e.g., Online Discussion Forums) applications to enable individuals to overcome boundaries of time and space. Instead of flying employees back and forth between sites, organizations are creating "virtual teams" to solve problems via telecommunications applications (Business Week, April 6th, 1998). The easily available integrated voice, video, and data networks along with freely downloadable software have enable such new forms of collaboration.

But what is the "reality" of meeting in a "virtual meeting space"?

In these two weeks of case competition, you will communicate and collaborate with **a team of 4 or 5** in a virtual team setting using the assigned communication software. Your task is to analyze two ERP implementation cases and present your analysis and recommendation in a concise and professional manner. The objectives of this virtual team case competition are for you to:

1. develop analytical and problem-solving skills in a business context,
2. develop the capability of working in a virtual team setting, and
3. experience and appreciate the social and technical challenges of working in a virtual team setting.

A panel of judges including both academic scholars and IT practitioners will be invited to evaluate your deliverables. The **top three performing teams** will be awarded certificates and gift certificates (SGD\$30, \$20, and \$10 for each team members in the top three places, respectively). Your individual and team performance on the case competition will count toward **25% of your final grades** for this module.

ACTIVITIES & IMPORTANT DATES

18 September, 2006 (Monday)

1. You will receive the following information through your school email address (**Please keep this information CONFIDENTIAL**):
 - a. A unique **Member ID** by which you will be identified for the VT case competition, and
 - b. A unique **IVLE Guest Account** and the corresponding **IVLE Password** to log into module GVT3253.
2. You will be able to access the following documents in **IVLE Module GVT3253**:
 - a. Detailed Case Competition Timeline (**Lesson Plan**),
 - b. Virtual Team Working Rules and Regulations (**Workbin**), and
 - c. **Case (A)** and **Discussion Questions** for the **Individual Report (Workbin)**.

2 October, 2006 (Monday)

1. **DUE by Midnight**: One-page **Individual Report** for Case (A).
2. You will receive the following information through your school email address (**Please keep this information CONFIDENTIAL**):
 - a. The **Member IDs** of your team members, and
 - b. A unique **Hotmail Account** and its corresponding **Hotmail Password**.
3. You will be able to access the following documents in **IVLE Module GVT3253 (Workbin)**:
 - a. The **User Manual** for your assigned **Virtual Team Communication Software**, and
 - b. **Discussion questions** for Case (A) **Group Report**.

3 October, 2006 (Tuesday)

1. **Week#1 Team Building Exercise** (Details will be posted in **IVLE Module GVT3253/Workbin**)

9 October 2006 (Monday)

1. **DUE by Midnight**: Five-page **Group Report** for Case (A).
2. **Week#1 Online Survey**: URL will be sent to your hotmail accounts and be posted in **IVLE Module GVT3253 (Announcement)**. Your completion of the survey counts toward one tutorial attendance.

10 October 2006 (Tuesday)

1. **Case (B)** and **Discussion Questions** for Case (B) **Group Report (Workbin)** will be available in **IVLE Module GVT3253 (Workbin)**.
2. **Week#2 Team Building Exercise** (Details will be posted in **IVLE Module GVT3253/Workbin**).

16 October 2006 (Monday)

1. **DUE by Midnight**: Five-page **Group Report** for Case (B).
2. **Week#2 Online Survey**: URL will be sent to your hotmail accounts and be posted in **IVLE Module GVT3253 (Announcement)**. Your completion of the survey counts toward one tutorial attendance.
3. Peer-Evaluation form will be accessible in **IVLE Module GVT3253 (Workbin)**. Return your peer-evaluation form to the case competition coordinator (Eric Lim, limtze@comp.nus.edu.sg) by **5:00 PM** on **18 October, 2006**.

GENERAL INFORMATION ABOUT THE CASE COMPETITION

The purpose of this case study exercise is to simulate a real-life business situation that is beneficial in preparing you for what you might probably face in your future workplace. While the experience is secondhand and condensed, the merit of a case study is that it allows a business problem to be explored in a complex form, including elements of reality, which might be impossible to reproduce in the classroom. In general, you are expected to tease out the key issues embedded in the case description and to identify appropriate strategies for resolving these identified issues.

The case in question, split into 2 parts (A & B), is a synthesis of the environmental and organizational challenges faced by an MNC in re-positioning its Information Technology (IT) as a means for sustaining long-term competitiveness. When analyzing the case, you are to put yourselves in the shoes of **business-IT consultants** who are engaged in the MNC in **re-evaluating the roles of IT in this organization and to make proposals that will help the MNC achieve their business objectives.**

IMPORTANT RULES FOR THE PROJECT

During the Project

The **TRUE IDENTITY** of team members **MUST BE KEPT ANONYMOUS** for the duration of the project.

1. You are **NOT** allowed to disclose information about your true identity to your team members.
2. You are to address each other using **ONLY** the assigned unique **Member ID**.
3. You are **NOT** allowed to discuss any project related matters with any other members outside your team. Your communication and correspondence are strictly limited to **ONLY your team members** or the **case competition coordinator**.

The entire project should be completed using **ONLY** the **Virtual Team Communication Software** assigned to each project team. **NO OTHER** media (cell phones, etc.) should be used for the purpose of the competition. It is **NOT ALLOWED** for team members to meet up **face to face** at any point in time before the submission of the final project report. If students are found to have infringed upon the aforementioned rules for the duration of the project (e.g. meet up face to face to work on this particular project), **the whole team will be DISQUALIFIED from the competition.**

Report Format

The reports including the 1-page individual report and the 5-page group reports should follow the structure of an “**Executive Case Summary**”. This will include **a title** for the reports indicating the main thesis of the report, **supporting paragraphs** for the title, **in-depth analysis and responses** to the discussion questions, and **detailed recommendations**. Not following the format, exceeding the page limits, or missing any of the above mentioned components in your report will result in deductions in your grades. The reports should use **Times New Roman** font of **size 11 or 12**, with **1.5 spacing**, and **margins of 1** on each side (will be **Strictly Enforced**).

Project Evaluation

There are two components for the grading of the case competition: **an individual** and **a group component**:

1. Evaluations for the Individual Component (40%)

The grade awarded for the individual component will be based on your individually prepared report that is to be submitted by **midnight** on **Monday, 2 October, 2006**. The individual report will be evaluated by course instructors and constitutes **40%** of the grade you will receive **for the project**.

2. Evaluations for the Group Component (60%)

For the group component of the grade, it is awarded based on two group proposals that are to be submitted by **midnight** on **9 October, 2006** and **16 October, 2006**, respectively. The two group reports will be evaluated by a panel of invited experts including **academic scholars** and **IT practitioners**. Final team performance on the case competition will be the average of scores given by the panel judges.

A peer evaluation form will be available on **16 October, 2006** in **IVLE Module GVT3253** for downloading. This **CONFIDENTIAL** evaluation allows you to assess your team members' performance, contribution attitude, and professionalism in your virtual team collaboration. Since the true identity of each team member is not known, it will hopefully minimize biases that may seep in through personal relations established prior to the competition. The completed peer evaluation should be submitted electronically to the case competition coordinator (Eric Lim, limtzeke@comp.nus.edu.sg) by **5:00 PM** on **18 October, 2006**.

The team score received by each team will be adjusted individually based on the results from the peer evaluations. This **adjusted score** constitute **60%** of the grade you will receive **for the project**.

Evaluation Criteria for Individual Reports and Group Reports

- **Relevance** – the extent to which the analysis and recommendations presented adhere to content documented such that they do not claim facts beyond the contextual boundaries and scope of the case description.
- **Completeness** – the extent to which the analysis and recommendations presented cover all essential aspects of the business problem and/or solution based on the content documented in the case description.
- **Organization & Presentation** – the extent to which the arguments presented are clear, concise, and do not contradict one another, and that the analytical results and recommendations are presented in an organized and structured manner.
- **Creativity** – the extent to which the analytical approach and/or proposed recommendations demonstrate unique insights into the business problem and/or solution.
- **Feasibility** – the extent to which the proposed recommendations are feasible.

Online Surveys

You will be asked to respond to **two online surveys**, one each at the end of each week, assessing your virtual team experience. The completion of the two surveys counts toward your **two tutorial attendances**. The URL for the surveys will be sent to your assigned **hotmail accounts** on **9 October, 2006** and **16 October, 2006**, respectively and will also be posted in **IVLE Module GVT3253** announcements. Your responses will be kept confidential and will be accessible only to the course instructors and the case competition coordinator.

INSTRUCTIONS – USING IVLE MODULE GVT3253 TO ACCESS UPDATES AND INFORMATION

You will be given a unique identifying **Member ID** in the format of **VT3253-#** (where # is a number from 1-78). You are to address each other in the team using this assigned Member ID.

You will also receive an **IVLE Guest Account** in the format of **GSTMember#** (where # is the same as that in the **Member ID**) and its password. Updates and information about the case competition will be available in the **IVLE module GVT3253**. You're recommended to log on frequently using your **IVLE Guest Account** for updates and announcements.

Log-in to IVLE Module GVT3253 (<http://ivle.nus.edu.sg>)

NUS National University of Singapore

Integrated Virtual Learning Environment
IVLE 7.8

>> CAMPUS LOGIN

ENTER

>> WEB/GUEST LOGIN

UserID: GSTMEMBER
Password: ●●●●●●●●
Domain: GUEST
 Remember me!
Login

Forgot/Change Password?

>> OPTIONS

- Open Syllabus
- Search Engines

Best viewed with Internet Explorer 5.0+

>> NEWS

08/09/06 All Undergraduate Students
A. ONLINE DECLARATION OF SATISFACTORY/UNSATISFACTORY OPTION; AND
B. ONLINE DECLARATION OF GRADUATE MODULE(S) FOR CREDIT

The above Online Declaration exercises will be held from 00:00 on 18 September 2006 to 23:59 on 1 October 2006. No grace period will be allowed after this deadline.

To access the declaration website for S/U option, [click here](#). For online declaration of Graduate Modules for credit, [click here](#).

Please check your email for further information on the two declaration exercises. Thank you.

Ang Siau Gek
Assoc Prof and Registrar

05/09/06 Student Portal Naming Contest Voting Starts
Vote for your favorite names and stand a chance to win Borders gift vouchers worth \$100. To participate or find out more about the contest, visit the [ISIS Website](#).

30/08/06 Webcast Lectures for Mac Users
For Mac users who are not able to view Webcast Lectures, please provide the module code(s) and email to citsbms@nus.edu.sg

29/08/06 Design The New FASS Website
Accept the challenge to design the new FASS website and stand to WIN \$1,000 CASH! For more details: <http://www.fas.nus.edu.sa/designfass>

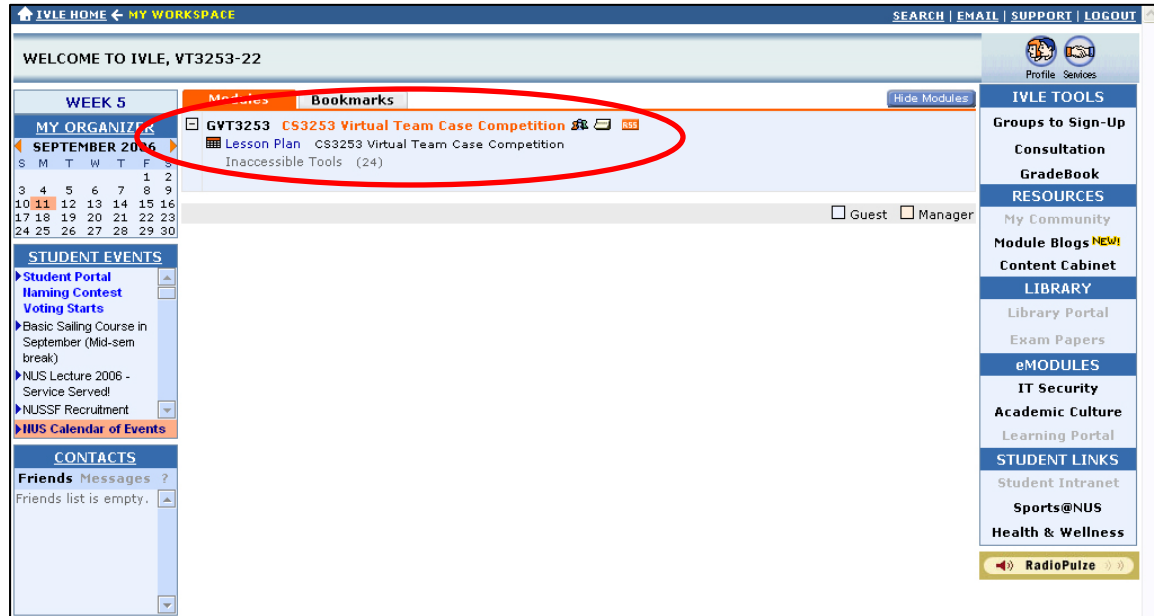
>> IVLE

- About IVLE
- >> IVLE Support**
 - NUS IT Care
 - Online Support
 - Login Screens
 - System Check
- >> LINKS**
 - Library Portal
 - Office of Admissions
 - Office of Alumni Relations
 - Webcast Service

Information Page: GVT3253 Virtual Team Case Competition

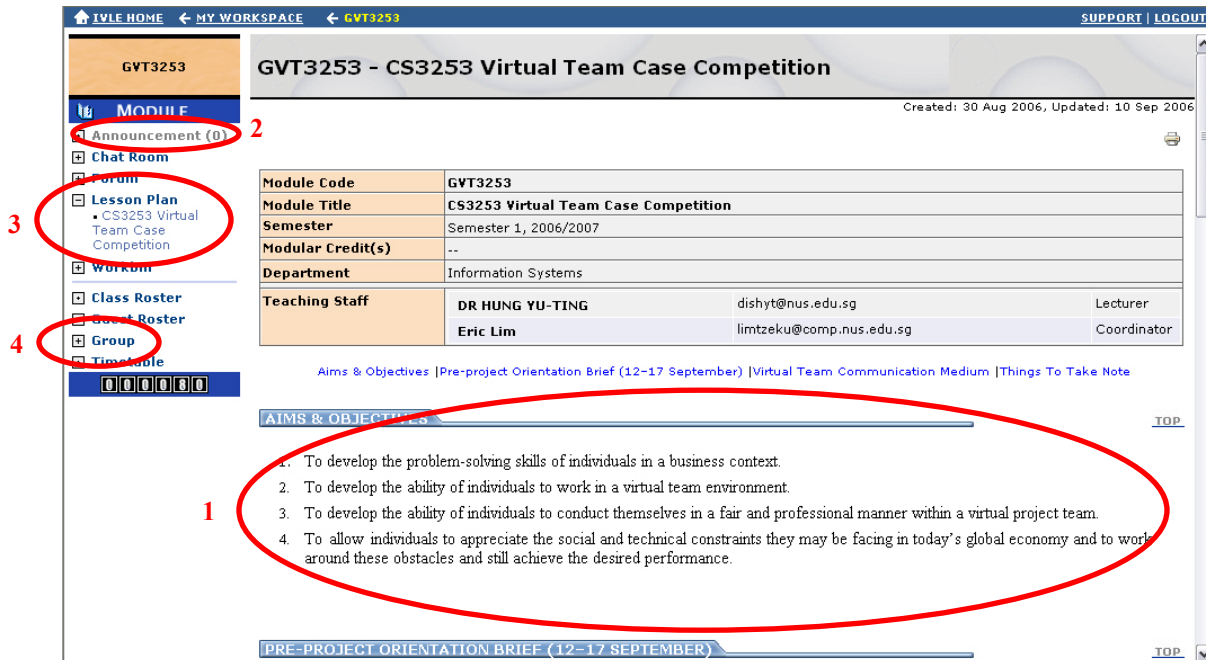
IVLE Module GVT3253 – Module Access Page

You should be able to access the IVLE Module GVT3253 page once you log on to IVLE.



Project Information, Announcements, Timeline & Team Membership

You will be able to access to updates and information about the Case Competition: **(1) Important Project Information**, **(2) Announcements**, **(3) Lesson Plan – Project Time Table**, and **(4) Team Memberships** (team membership will be announced on 2 October, 2006) from the space in the IVLE page highlighted below in the screenshot.



CS3253 Virtual Team Case Competition

User Manual [IVLE]

Case Competition Coordinator: Eric Lim
limtzeke@comp.nus.edu.sg
KM Lab (S15-6-15): Phone 6516 7355

If you have any questions or experience any problems, please contact case competition coordinator immediately!

IMPORTANT!! Please do NOT embark on any part of the project until you have read this entire document thoroughly.

During these two weeks of competition, you and your team members are going to use **IVLE 7.8** and **Hotmail Accounts** for your team communication and collaboration for the project. In this communication environment, you will have access to:

1. An assigned personal **Hotmail Account** as your **main email account for any correspondences** that are related to this case competition). Please refer to **page 2** for detailed instructions of how to use your Hotmail Account. Please note that you are **NOT ALLOWED** to use the **Windows Live Messenger** for your team communication.
2. A designated **Chat Room, Discussion Form, and Workbin** for your team. To log on to **IVLE Module GVT3253**, you need to use your **IVLE Guest Account** and the provided **Password** (please refer to instructions enclosed in the **Introduction Packet**). You are allowed to use **ALL** application tools provided by IVLE **EXCEPT** for the following:
 - a. Transmission of Voice Messages within Chat Room function, and
 - c. Reveal personal information and photos that will expose your TRUE IDENTITY.

Remember, you are allowed to communicate with your team members **ONLY** through the use of your assigned **Hotmail Account** and the designated **IVLE**.

Also, it is highly recommended that you frequently check the updates and announcements about the case competition posted in **IVLE Module GVT3253**.

INSTRUCTIONS – USE HOTMAIL AS YOUR MAIN EMAIL ACCOUNT FOR THE CASE COMPETITION

During the two weeks of case competition, you can **send and receive e-mails** using your assigned **Hotmail Account**. The case competition coordinator may also send **announcements and critical information** pertain to the case competition to your Hotmail Account. It is highly recommended that you frequently check your hotmail account.

Accessing your E-mails in your Hotmail Account

You can access your emails in your **Hotmail Accounts** (in the format of **VT3253-#@hotmail.com** where # is your assigned **Member ID**) using the provided password at the following Website: <http://www.hotmail.com>. Your team members' Hotmail address should also be in the same stated format. It is as easy as **replacing** the (#) with your team members' Member ID (#).

Home | My MSN | Shopping | Money | People & Chat

Search []

msn Hotmail

What's new For Free Hotmail? MSN Hotmail Inbox Storage is now 250 MB and there is an increased attachment size of 10 MB!

New to MSN Hotmail?

A smarter way to email – FREE!

- **Get enhanced security for your email!**
Help keep your inbox free from contamination. With powerful spam filters and enhanced virus scanning & cleaning.
- **Easily connect & share!**
Send & receive e-mail from any Web connection. With a huge 250MB inbox* and the ability to send up to 10MB files or photos.
- **Express yourself!**
Have fun personalizing e-mail to friends & family. With unique emoticons, signatures, background choices, fonts & layout styles.

[Sign Up](#)

*250MB inbox available only in the 50 United States, District of Columbia, and Puerto Rico. Eligible Hotmail users will first receive 25MB at sign-up. Please allow at least 30 days for activation of your 250MB storage to verify your e-mail account and help prevent abuse. Microsoft Corporation reserves the right to provide 250MB inbox to free Hotmail accounts at its discretion.

Sign In to Hotmail

E-mail address:

Password:

[Forgot your password?](#)

[Sign In](#)

Save my e-mail address and password

Save my e-mail address

Always ask for my e-mail address and password

[Sign in using enhanced security](#)

Windows Live ID
Works with Windows Live, MSN, and Microsoft Passport sites
[Account Services](#) | [Privacy Statement](#) | [Terms of Use](#)
© 2006 Microsoft Corporation. All rights reserved.

©2006 Microsoft Corporation MSN Privacy & Legal About

INSTRUCTIONS – HOW TO USE IVLE 7.8

Following the instructions given in your **Introduction Packet**, you can log into **IVLE Module GVT3253**.

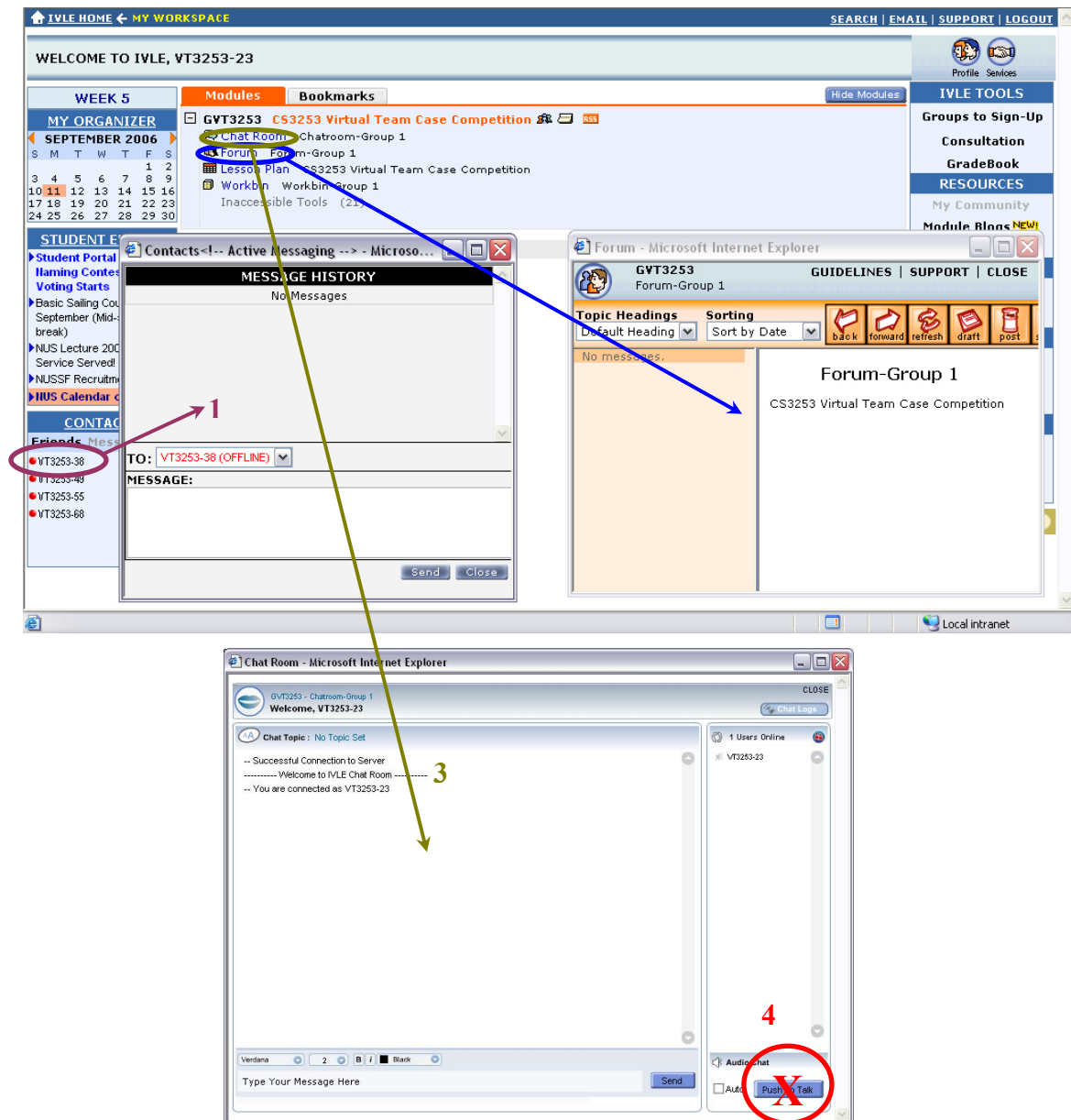
Once you logged on IVLE, you will see a page resemble to the screenshot shown below that contains several tools and functions including **Chat Room**, **Forum**, and **Workbin**. You can also see your team members' **Member IDs** in the Contact Window.

The screenshot displays the IVLE interface for module GVT3253. The main content area shows a list of tools and functions under the 'GVT3253 CS3253 Virtual Team Case Competition' heading, including 'Chat Room', 'Forum', 'Lesson Plan', and 'Workbin'. The left sidebar contains a 'CONTACT' section with a list of member IDs: VT3253-38, VT3253-49, VT3253-55, and VT3253-68. The right sidebar lists various IVLE tools and resources, including 'IVLE TOOLS', 'Groups to Sign-Up', 'Consultation', 'GradeBook', 'RESOURCES', 'My Community', 'Module Blogs', 'Content Cabinet', 'LIBRARY', 'eMODULES', 'IT Security', 'Academic Culture', 'STUDENT LINKS', and 'Sports@NUS'.

You can initiate communications with your team members in several ways:

- (1) You can initiate an **1-to-1 Chat Session** (1) (with a particular member by double click on his or her Member ID,
- (2) You can post a message in the **Forum** (2),
- (3) You can initiate a **Group Chat Session** (3) by double click on the **Chat Room** link in your IVLE main page, or
- (4) You can send e-mails to your team members' **Hotmail Accounts** as shown above.

You are **NOT ALLOWED** to **change your assigned password** and to reveal any information about yourself that may **expose your TRUE IDENTITY**. You are free to use the tools provided by IVLE **EXCEPT FOR** the "Push Talk" function (4) in the Chat Room (see the screenshot below).



CS3253 Virtual Team Case Competition

User Manual [Windows Live Messenger]

Case Competition Coordinator: Eric Lim
limtzeke@comp.nus.edu.sg
KM Lab (S15-6-15): Phone 6516 7355

If you have any questions or experience any problems, please contact case competition coordinator immediately!

IMPORTANT!! Please do NOT embark on any part of the project until you have read this entire document thoroughly.

During these two weeks of competition, you and your team members are going to use **WINDOWS LIVE MESSENGER** for your team communication and collaboration for the project. In this communication environment, you will have access to:

3. An assigned personal **Hotmail Account** as your **main email account for any correspondences** that are related to this case competition). Please refer to **page 2** for detailed instructions of how to use your Hotmail Account.
4. A designated **Windows Live Messenger** for your team. To log on to the messenger, you need to use your **Hotmail Account** and **Hotmail Password**. You are allowed to use **ALL** application tools provided by Windows Live Messenger **EXCEPT** for the following:
 - a. Transmission of Voice Messages.
 - b. Voice and Video Conferencing, and
 - c. Reveal personal information and photos that will expose your TRUE IDENTITY.

Remember, you are allowed to communicate with your team members **ONLY** through the use of your assigned **Hotmail Account** and the designated **Windows Live Messenger**.

Also, it is highly recommended that you frequently check the updates and announcements about the case competition posted in **IVLE Module GVT3253**. You will need to use your assigned **IVLE Guest Account** and **Password** to access the module. Detail instructions for how to log on and use IVLE module GVT3253 were given in your **Introduction Packet**.

INSTRUCTIONS – USE HOTMAIL AS YOUR MAIN EMAIL ACCOUNT FOR THE CASE COMPETITION

During the two weeks of case competition, you can **send and receive e-mails** using your assigned **Hotmail Account**. The case competition coordinator may also send **announcements and critical information** pertain to the case competition to your Hotmail Account. It is highly recommended that you frequently check your hotmail account.

Accessing your E-mails in your Hotmail Account

You can access your emails in your **Hotmail Accounts** (in the format of **VT3253-#@hotmail.com** where # is your assigned **Member ID**) using the provided password at the following Website: <http://www.hotmail.com>. Your team members' Hotmail address should also be in the same stated format. It is as easy as **replacing** the (#) with your team members' Member ID (#).

Home | My MSN | Shopping | Money | People & Chat

Search

msn Hotmail

What's new For Free Hotmail? MSN Hotmail Inbox Storage is now 250 MB and there is an increased attachment size of 10 MB!

New to MSN Hotmail?

A smarter way to email – FREE!

- **Get enhanced security for your email!**
Help keep your inbox free from contamination. With powerful spam filters and enhanced virus scanning & cleaning.
- **Easily connect & share!**
Send & receive e-mail from any Web connection. With a huge 250MB inbox* and the ability to send up to 10MB files or photos.
- **Express yourself!**
Have fun personalizing e-mail to friends & family. With unique emoticons, signatures, background choices, fonts & layout styles.

Sign Up

*250MB inbox: available only in the 50 United States, District of Columbia, and Puerto Rico. Eligible Hotmail users will first receive 25MB at sign-up. Please allow at least 30 days for activation of your 250MB storage to verify your e-mail account and help prevent abuse. Microsoft Corporation reserves the right to provide 250MB inbox to free Hotmail accounts at its discretion.

Sign In to Hotmail

E-mail address: VT3253-19@hotmail.com

Password: ●●●●●●●●

[Forgot your password?](#)

Sign In

Save my e-mail address and password

Save my e-mail address

Always ask for my e-mail address and password

[Sign in using enhanced security](#)

Windows Live ID
Works with Windows Live, MSN, and Microsoft Passport sites
[Account Services](#) | [Privacy Statement](#) | [Terms of Use](#)
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©2006 Microsoft Corporation MSN Privacy & Legal About

INSTRUCTION – HOW TO DOWNLOAD & USE WINDOWS LIVE MESSENGER

Downloading a Free Version of Windows Live Messenger


You can download Windows Live Messenger for free from the following URL:

<http://get.live.com/messenger/overview>.

Windows Live™ Services

Windows Live Messenger

Connect and share instantly on the world's most popular IM network



Get it free

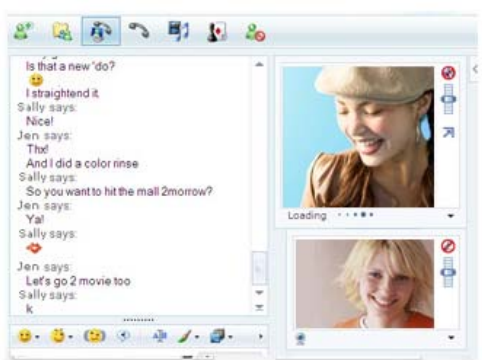
[Overview](#)|[Features](#)|[System Requirements](#)

Call their phones. Call their PCs.
Call your friends' mobile or landline phones. It's affordable both within the US and internationally. And calling someone's PC is always free.

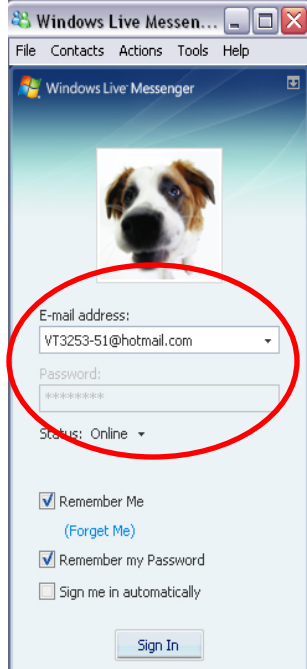
See them on the screen
Show and tell: Grab a webcam and start a video conversation within minutes.

Share stuff
Set up a Sharing Folder with a friend. Drop in photos and other stuff, as many as your computer can handle. See it even when one of you is offline.

New: talk to your Yahoo! friends, too
With Windows Live Messenger, you can now connect with your Yahoo! Messenger with Voice contacts. Forget needing multiple accounts to talk to your friends. Do it all from Windows Live Messenger. The world's largest IM network has just gotten bigger – and better. [Learn more.](#)



Using Windows Live Messenger



General Usage of Windows Live Messenger

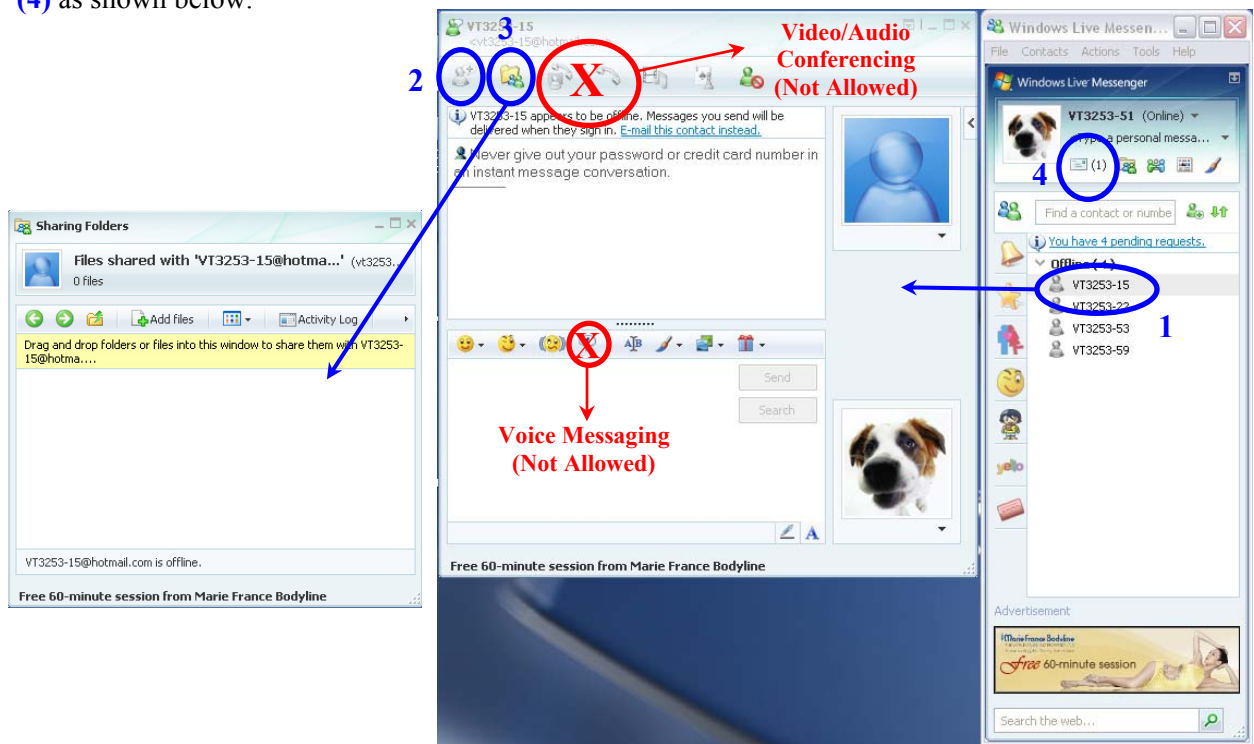
Using your assigned **Hotmail Account** in the format of **VT3253-#@hotmail.com** (where # refers to your assigned **Member ID**) and the password, you will be able to log onto Windows Live Messenger as shown on the left.

Once you logged on, you will find that your team members' Member IDs have already been added in your contact list. You can initiate a 1 to 1 instant messaging session with a specific member by **double clicking** on his/her **Member ID (1)**.

You can also initiate a group chat session by clicking on the button shown in **(2)** when you have already initiated a 1 to 1 instant messaging session and invite other members into the discussions. In addition, you can also share documents and files among your team members by creating on the shared folder button as shown in **(3)**

You are **NOT ALLOWED** to **change your assigned password** and to reveal any information about yourself that may **expose your TRUE IDENTITY**. You are free to use and customize the tools provided by the Windows Live Messenger **EXCEPT FOR** the Voice Messaging and Video/Audio Conferencing functions.

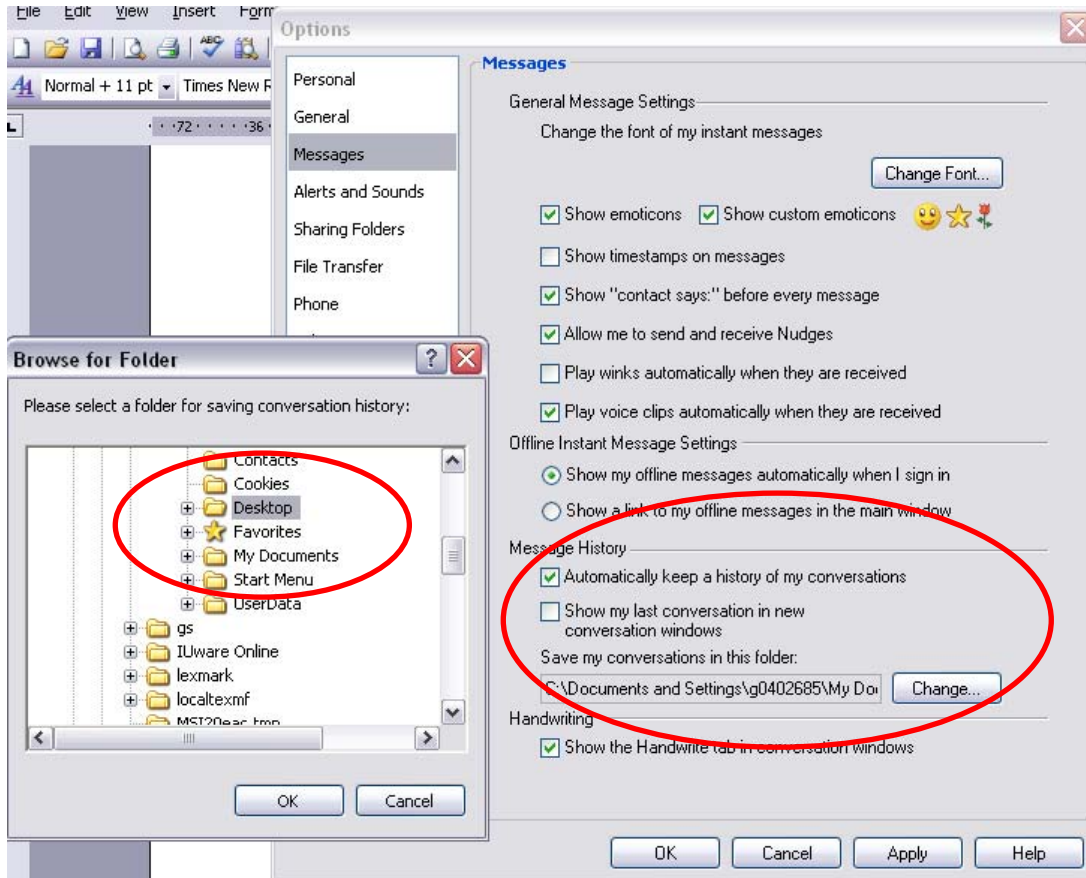
In addition to accessing your Hotmail Account e-mails from the hotmail Website (please refer to page 2), you can also access your e-mails directly from the Window Live Messenger interface by clicking on icon **(4)** as shown below.



To Save Your Team Communication History

Under the “Tools” menu, select “Options” and you will see a message box resemble to the screenshot shown below. Go to the category “Messages” and select “Automatically keep a history of my conversations” and select the location on the computer to save your communication logs. Logging team communication will allow you to keep records of your communication for future references.

In addition, your team is **required to save a copy of all your team’s communication logs** in the **shared folder (3)** as shown in the instruction for every member to access.



Appendix I: Cases, Discussion Questions and Peer-Evaluation Forms

CS3253 Virtual Team Case Competition

Semester 1, 2006/2007

Individual Case Assessment

Please read the following case: “**Dow Corning Corporation (A): Business Processes and Information Technology**” by J.W. Ross (1997), **MIT CISR (Center for Information System Research) Case Study**.

Write a ONE-page executive summary of this case including your responses to the following questions:

1. Analyze Dow Corning's current (as in 1994) business and industrial environment by identifying its strengths, weaknesses, threats, and potential opportunities.
2. Discuss how Dow Corning's current IT infrastructure (as in 1994) was associated with its business strengths, weaknesses, threats, and opportunities. Discuss whether you believe the implementation of the SAP system will serve to address Dow Corning's weaknesses and threats and to leverage its strengths and create new opportunities.

Conclude your summary by suggesting what Dow Corning should do next.

IMPORTANT!! Please name your file using the following format: **VT#YourMemberID.doc**. For example, if your **assigned member ID** is **45**, the file name for your individual report will be “VT#45.doc”.

CS3253 Virtual Team Case Competition

Semester 1, 2006/2007

Group Assessment & Proposal (A)

Please read the following case: “**Dow Corning Corporation (A): Business Processes and Information Technology**” by J.W. Ross (1997), **MIT CISR (Center for Information System Research) Case Study**.

Work with your virtual team members and write a FIVE-page proposal including (1) your identification of key issues associated with Dow Corning’s decision to implement SAP, stated in the form of a proposed title with supporting arguments, and (2) an in-depth analysis of the following issues associated with its plans to implementing the SAP system:

3. While Dow Corning was bleeding with net income loss, it was considering to implementing SAP to globally integrate its supply chain management. Using the IT-Business Strategic Alignment concept, explain why you agree or disagree with Dow Corning's decision.
4. Should Dow Corning outsource its SAP implementation? Why or why not?
5. Discuss the technical and managerial challenges Dow Corning would face in implementing the SAP system. Prepare a detailed proposal recommending possible managerial steps to be undertaken by Dow Corning in ensuring a smooth transition when the SAP system is introduced to the organization.

IMPORTANT!! Please name your file using the following format: **CaseAYourTeamName.doc**. For example, if you **team name** is **SINDragon**, the file name for this group proposal will be “CaseASINDragon.doc”.

CS3253 Virtual Team Case Competition

Semester 1, 2006/2007

Group Assessment & Proposal (B)

Please read the following case: “**Dow Corning Corporation (B): Reengineering Global Processes**” by J.W. Ross (1997), **MIT CISR (Center for Information System Research) Case Study**. Work with your virtual team members and write a FIVE-page proposal including (1) your identification of key issues associated with Dow Corning’s SAP implementation process, stated in the form of a proposed title with supporting arguments, and (2) an in-depth analysis of the following issues associated with its global SAP implementation approach:

1. Dow Corning chose to use the Application Package ISD approach and decided to have its internal IT teams to manage the implementation of SAP/R3’s full range capabilities without customizing any modules. Do you think this was an appropriate approach? Why or why not?
2. Use ISD project phases to analyze the steps undertaken by Dow Corning prior to its global SAP implementation. To what extent do you believe these steps to be effective in contributing to Dow Corning’s successful SAP implementation on the global basis?
3. Identify the challenges Dow Corning may encounter when they implement SAP on a global basis. Highlight the lessons learned from its pilot implementation in three European sites and propose how Dow Corning can more effectively address these challenges.

IMPORTANT!! Please name your file using the following format: **CaseBYourTeamName.doc**. For example, if your **team name** is **SINDragon**, the file name for this group proposal will be “CaseBSINDragon.doc”.

Your assigned **USER ID**: VT3253-

Fill in your team members' **USER IDs** and evaluate each individual on his/her **effectiveness on the following dimensions over the duration of the case competition**. Use the following scales for your evaluations:

0 = Abysmal 1= Barely 2 = Below Average 3 = Average 4 = Good 5 = Great!

Please submit your completed peer evaluation form to **Eric Lim** (limtzeku@comp.nus.edu.sg) through e-mail by **18 October, 2006 by 6:00 PM**. We take your evaluations seriously. Please take time evaluating each team member. Your evaluations will be kept confidential and only accessible by the lecturer. **Please note that your submission is MANDATORY. Failing to submit this form will result in 50% deduction on your overall grade on the project.**

		Member 1	Member 2	Member 3	Member 4
TEAM MEMBER UESR ID: VT3253-		_____	_____	_____	_____
1.	Communicating with other members				
2.	Planning and strategizing our team work plan				
3.	Organizing and influencing the logical flows of our team analyses				
4.	Contributing towards efficient and effective team meetings				
5.	Carrying his/her fair share of workload				
6.	Meeting deadlines				
7.	Constructively resolving team disagreements and conflicts				
8.	Positively challenging others for the team to excel beyond basic requirements				
9.	Supporting others and building a sense of team membership				
10.	Submitting good quality individual work				
Total Score for each Individual Member: (Summation of all Scores above)					

Appendix J: Descriptive Statistics for Indicator Variables

Descriptive Statistics for Indicator Variables							
Measurement Items		Week 1 [Sample Size N = 76]		Week 2 [Sample Size N = 71]		Combined Data [Sample Size N = 147]	
		Mean	S.D.	Mean	S.D.	Mean	S.D.
<i>Procedural Justice</i>							
P1A	In the past week, the General Guidelines for Working as a Virtual Project Team were consistently adhered to by my team members.	5.58	1.10	5.24	1.42	5.41	1.27
P2A	In the past week, the General Guidelines for Working as a Virtual Project Team allowed me to play a role in our team decision-making process.	5.47	0.74	5.35	1.02	5.41	0.88
P3A	In the past week, the General Guidelines for Working as a Virtual Project Team allow me to have fair opportunities to express my opinions to the team during the decision-making process.	5.58	0.88	5.37	1.12	5.48	1.01
P4A	The General Guidelines for Working as a Virtual Project Team meet most ethical and moral standards.	5.37	0.95	5.27	1.22	5.32	1.09
P5A	The General Guidelines for Working as a Virtual Project Team addressed my concerns about the how we carried out our team discussions.	5.12	1.19	5.17	1.15	5.14	1.16
P6A	The General Guidelines for Working as a Virtual Project Team are free of biases.	5.25	1.23	5.15	1.32	5.20	1.27
P1B	In the past week, the Guidelines for Conflict Resolution were consistently adhered to by my team members.	5.25	1.03	5.20	1.12	5.22	1.07
P2B	In the past week, the Guidelines for Conflict Resolution allowed me to have fair opportunities to express my side of views to the team when we tried to resolve our disagreements.	5.28	0.97	5.23	1.19	5.25	1.08
P3B	In the past week, the Guidelines for Conflict Resolution allowed me to better manage the resolution of our decisional conflicts.	5.13	1.09	5.14	1.12	5.14	1.10
P4B	The Guidelines for Conflict Resolution meet most ethical and moral standards.	5.32	1.00	5.23	1.24	5.27	1.12
P5B	The Guidelines for Conflict Resolution were able to address my concerns regarding how we resolve decisional conflicts.	5.21	0.88	5.06	1.18	5.14	1.04
P6B	The Guidelines for Conflict Resolution are free of biases.	5.03	1.17	5.00	1.32	5.01	1.24
<i>Interactional Justice</i>							
I1	In the past week, the communications between me and my team members were conducted in a candid manner.	5.32	1.18	5.27	1.36	5.31	1.25
I2	In the past week, I did not encounter any improper comments or remarks in my communications with my team members.	5.71	1.23	5.69	0.99	5.70	1.12
I3	In the past week, I was treated in a congenial manner in my communications with	5.67	0.97	5.73	0.84	5.71	0.91

	my team members.						
I4	In the past week, my team members took into consideration how I feel when communicating with me.	5.45	0.97	5.66	0.83	5.56	0.91
I5	In the past week, I was treated with dignity in my communications with my team members.	5.72	0.89	5.69	0.87	5.72	0.87
I6	In the past week, I was treated with respect in my communications with my team members.	5.78	0.87	5.68	0.89	5.74	0.87
I7	In the past week, I was able to receive timely responses from my team members.	5.18	1.28	5.38	1.27	5.29	1.28
I8	In the past week, I was able to reason with my team members in a friendly manner.	5.67	0.93	5.65	1.00	5.67	0.96
Distributive Justice							
D1	I believe that the competition results for this case competition will reflect the effort that our team has put into the work.	5.24	1.44	4.85	1.64	5.06	1.55
D2	I believe that the competition results for this case competition will reflect the quality of work our team has accomplished.	5.33	1.34	4.90	1.54	5.13	1.45
D3	I believe that the competition results for this case competition will reflect how much I have contributed to the project.	5.08	1.19	4.73	1.51	4.92	1.36
D4	I believe that the grade I am going to receive for this case competition will reflect the effort that I have put into our work.	4.88	1.21	4.63	1.51	4.77	1.37
D5	I believe that the grade I am going to receive for this case competition will reflect the quality of work our team has accomplished.	5.28	1.11	4.89	1.52	5.10	1.33
D6	I believe that the grade I am going to receive for this case competition will reflect how much I have contributed to the project.	4.91	1.25	4.72	1.49	4.83	1.36
Team Goal Commitment							
TGC1	In the past week, I committed a major chunk of my time on achieving our team goals.	5.22	1.24	5.15	1.31	5.18	1.28
TGC2	In the past week, I was very happy to spend a major chunk of my time working towards our team goals.	4.74	1.41	4.70	1.57	4.72	1.49
TGC3	In the past week, I enjoyed discussing our team goals with my friends outside the team.	4.04	1.34	3.72	1.49	3.89	1.42
TGC4	In the past week, I had to sacrifice other activities so that our team would be able to accomplish our team goals.	5.24	1.21	5.18	1.29	5.22	1.25
TGC5	I identified strongly with our team goals.	5.21	1.02	5.06	1.34	5.15	1.18
TGC6	In the past week, I was proud to show others that I was working hard towards our team goals.	4.95	1.09	4.70	1.26	4.84	1.17
TGC7	The team goals really inspired me to contribute to the best of my ability during our team discussion last week.	4.93	1.30	4.86	1.38	4.91	1.33

TGC8	I was committed to the goals our team chose to focus on achieving.	5.34	1.14	5.23	1.14	5.30	1.13
TGC9	Whether we achieved our team goals means a lot to me.	5.13	1.16	5.06	1.25	5.10	1.20
Constituent Dimensions of Para Social Presence							
Connectivity							
PSP1C	In the past week, it was easy to establish shared goals and objectives with my team using the assigned Virtual Team Communication Software.	4.38	1.57	4.82	1.44	4.60	1.52
PSP2C	In the past week, it was easy to determine a common direction on how we should proceed with the project using the assigned Virtual Team Communication Software.	4.58	1.56	4.70	1.46	4.65	1.50
PSP3C	In the past week, I was able to establish a unified vision with my team when using the assigned Virtual Team Communication Medium to work on our project.	4.86	1.26	4.85	1.34	4.86	1.29
Sense of Understanding							
PSP1U	In the past week, I was able to make my points properly understood using the Virtual Team Communication Software.	4.70	1.40	4.70	1.45	4.71	1.41
PSP2U	In the past week, I was able to clearly express my thoughts to my team members using the Virtual Team Communication Software.	4.67	1.41	4.56	1.42	4.63	1.40
PSP3U	In the past week, I was able to express my emotional state to my team members using the Virtual Team Communication Software.	4.21	1.33	4.24	1.42	4.23	1.37
PSP4U	In the past week, I was able to understand my team members' ideas easily using the Virtual Team Communication Software.	4.54	1.40	4.62	1.37	4.59	1.38
Involvement							
PSP1I	In the past week, the use of the Virtual Team Communication Software encouraged me to be more engaged in our team discussion.	4.24	1.49	4.58	1.49	4.41	1.50
PSP2I	In the past week, I found it interesting to interact with my team members using the Virtual Team Communication Software.	4.17	1.65	4.44	1.54	4.31	1.60
PSP3I	In the past week, I was always keen to interact with my team members using the Virtual Team Communication Software.	4.37	1.42	4.45	1.57	4.42	1.49
PSP4I	In the past week, I was able to feel a sense of involvement when interacting with my team members using the Virtual Team Communication Software.	4.78	1.44	4.79	1.29	4.79	1.36
Positivity							
PSP1P	In the past week, the use of the Virtual Team Communication Software did not made me feel any significant pressure from the communication with my team members.	4.67	1.29	4.66	1.35	4.67	1.32
PSP2P	In the past week, I felt positive when communicating with my team members using the Virtual Team Communication Software.	4.75	1.28	4.69	1.33	4.72	1.30

PSP3P	In the past week, I was able to interact with my team members in a relaxed manner using the Virtual Team Communication Software.	4.95	1.34	4.86	1.37	4.91	1.35
PSP4P	In the past week, the use of Virtual Team Communication Software made me feel comfortable in communicating with my team members.	4.72	1.34	4.73	1.40	4.73	1.37

Note: Dropped items are shaded.

Appendix K: Inter-Item Correlation Matrices

Inter-Item Correlation Matrix [Survey Data for Week 1]

	P1A	P2A	P3A	P4A	P5A	P6A	P1B	P2B	P3B	P4B	P5B	P6B	I1	I2	I3	I4	I5	I6	I7	I8	D1	D2	D3	D4	D5	D6
P1A	1.000																									
P2A	.462**	1.000																								
P3A	.474**	.657**	1.000																							
P4A	.291*	.451**	.664**	1.000																						
P5A	.223	.391**	.467**	.622**	1.000																					
P6A	.236*	.468**	.404**	.557**	.643**	1.000																				
P1B	.469**	.541**	.613**	.543**	.572**	.483**	1.000																			
P2B	.409**	.557**	.648**	.609**	.639**	.507**	.671**	1.000																		
P3B	.281*	.552**	.558**	.507**	.700**	.641**	.670**	.733**	1.000																	
P4B	.281*	.482**	.577**	.693**	.554**	.596**	.608**	.664**	.515**	1.000																
P5B	.230*	.478**	.559**	.684**	.661**	.623**	.641**	.721**	.775**	.756**	1.000															
P6B	.248*	.496**	.464**	.617**	.691**	.820**	.525**	.569**	.702**	.705**	.732**	1.000														
I1	-.153	-.143	-.037	-.153	-.179	-.110	-.186	-.228*	-.147	-.154	-.218	-.210	1.000													
I2	.214	-.052	-.028	-.044	-.013	.057	-.068	.001	-.041	-.142	-.029	.108	.247*	1.000												
I3	-.094	-.114	-.055	-.084	-.081	-.053	-.249*	-.128	-.148	-.194	-.136	-.134	.476**	.655**	1.000											
I4	.154	-.095	.083	-.022	-.070	.006	-.139	-.118	-.120	-.120	-.142	-.058	.445**	.645**	.709**	1.000										
I5	-.012	-.184	.003	-.036	.019	-.046	-.170	-.142	-.017	-.171	-.078	-.083	.479**	.536**	.697**	.763**	1.000									
I6	.012	-.102	-.020	-.060	.013	.003	-.085	-.146	.017	-.117	.010	-.060	.471**	.522**	.635**	.701**	.864**	1.000								
I7	-.219	-.220	-.225	-.264*	-.154	-.021	-.186	-.319**	-.046	-.244*	-.140	-.128	.357**	.203	.327**	.318**	.420**	.501**	1.000							
I8	-.085	-.178	-.025	-.072	-.037	-.009	-.205	-.163	-.009	-.160	-.044	-.127	.509**	.347**	.661**	.564**	.760**	.730**	.600**	1.000						
D1	-.020	-.069	-.015	-.162	-.126	-.049	-.219	-.152	-.020	-.239*	-.197	-.099	.261*	.400**	.466**	.552**	.520**	.361**	.286*	.427**	1.000					
D2	.023	-.132	-.017	-.149	-.175	-.091	-.262*	-.162	-.067	-.249*	-.205	-.125	.271*	.471**	.494**	.551**	.559**	.337**	.290*	.463**	.877**	1.000				
D3	-.056	-.089	-.082	-.156	-.120	-.014	-.136	-.181	-.060	-.224	-.156	-.098	.201	.335**	.486**	.362**	.350**	.223	.236*	.326**	.730**	.663**	1.000			
D4	-.028	-.100	-.085	-.159	-.101	-.025	-.242*	-.153	-.039	-.245*	-.176	-.083	.260*	.388**	.443**	.488**	.415**	.290*	.272*	.309**	.750**	.714**	.814**	1.000		
D5	.118	-.096	.011	-.072	-.015	.065	-.095	-.010	.047	-.104	-.087	-.016	.348**	.467**	.491**	.574**	.563**	.420**	.384**	.514**	.747**	.777**	.679**	.736**	1.000	
D6	-.048	-.140	-.108	-.140	-.074	-.063	-.220	-.133	-.040	-.245*	-.164	-.099	.183	.391**	.504**	.453**	.495**	.336**	.278*	.388**	.748**	.769**	.853**	.877**	.758**	1.000

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

	TGC1	TGC2	TGC3	TGC4	TGC5	TGC6	TGC7	TGC8	TGC9	PSPC1	PSPC2	PSP3	PSPU1	PSPU2	PSPU3	PSPU4	PSPI1	PSPI2	PSPI3	PSPI4	PSPP1	PSPP2	PSPP3	PSPP4
TGC1	1.000																							
TGC2	.554**	1.000																						
TGC3	.211	.288*	1.000																					
TGC4	.516**	.201	.126	1.000																				
TGC5	.635**	.584**	.120	.347**	1.000																			
TGC6	.559**	.614**	.410**	.342**	.629**	1.000																		
TGC7	.514**	.763**	.399**	.281*	.612**	.738**	1.000																	
TGC8	.701**	.664**	.236*	.405**	.750**	.796**	.737**	1.000																
TGC9	.583**	.675**	.340**	.320**	.639**	.742**	.750**	.774**	1.000															
PSPC1	.236*	.569**	.233*	-.076	.330**	.407**	.573**	.395**	.440**	1.000														
PSPC2	.242*	.501**	.263*	-.024	.232*	.401**	.539**	.308**	.326**	.870**	1.000													
PSPC3	.226	.444**	.153	.040	.292*	.410**	.498**	.379**	.351**	.800**	.870**	1.000												
PSPU1	.209	.352**	.099	-.012	.334**	.382**	.423**	.360**	.322**	.678**	.657**	.770**	1.000											
PSPU2	.287*	.386**	.028	.101	.317**	.378**	.403**	.387**	.329**	.556**	.537**	.686**	.885**	1.000										
PSPU3	.287*	.500**	.205	.217	.300**	.457**	.486**	.384**	.363**	.655**	.654**	.662**	.660**	.714**	1.000									
PSPU4	.168	.398**	.081	.042	.245*	.350**	.460**	.268*	.252*	.728**	.747**	.777**	.795**	.754**	.733**	1.000								
PSPI1	.239*	.444**	.236*	.028	.282*	.500**	.540**	.401**	.376**	.639**	.607**	.630**	.549**	.534**	.635**	.630**	1.000							
PSPI2	.118	.381**	.238*	.053	.238*	.448**	.452**	.366**	.364**	.569**	.509**	.543**	.555**	.534**	.596**	.565**	.874**	1.000						
PSPI3	.157	.282*	.090	.142	.331**	.458**	.309**	.407**	.270*	.460**	.377**	.491**	.480**	.461**	.530**	.488**	.765**	.767**	1.000					
PSPI4	.283*	.412**	.164	.161	.467**	.568**	.527**	.528**	.410**	.597**	.593**	.672**	.577**	.509**	.576**	.577**	.605**	.611**	.653**	1.000				
PSPP1	.105	.304**	.038	.085	.265*	.328**	.448**	.296**	.270*	.516**	.493**	.585**	.522**	.519**	.468**	.558**	.549**	.540**	.474**	.607**	1.000			
PSPP2	.263*	.378**	.146	.263*	.418**	.468**	.528**	.436**	.302**	.539**	.576**	.656**	.488**	.436**	.534**	.562**	.573**	.532**	.587**	.790**	.735**	1.000		
PSPP3	.112	.255*	.165	.090	.320**	.354**	.444**	.337**	.254*	.473**	.469**	.526**	.464**	.451**	.427**	.472**	.564**	.536**	.558**	.716**	.772**	.727**	1.000	
PSPP4	.118	.222	.162	.074	.208	.308**	.417**	.237*	.204	.511**	.517**	.535**	.531**	.515**	.474**	.570**	.528**	.544**	.459**	.637**	.809**	.698**	.839**	1.000

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Inter-Item Correlation Matrix [Survey Data for Week 2]

	P1A	P2A	P3A	P4A	P5A	P6A	P1B	P2B	P3B	P4B	P5B	P6B	I1	I2	I3	I4	I5	I6	I7	I8	D1	D2	D3	D4	D5	D6
P1A	1.000																									
P2A	.763**	1.000																								
P3A	.643**	.761**	1.000																							
P4A	.714**	.708**	.772**	1.000																						
P5A	.634**	.697**	.761**	.785**	1.000																					
P6A	.584**	.610**	.579**	.793**	.749**	1.000																				
P1B	.682**	.707**	.784**	.706**	.789**	.698**	1.000																			
P2B	.613**	.609**	.741**	.769**	.813**	.728**	.819**	1.000																		
P3B	.596**	.656**	.761**	.743**	.812**	.795**	.831**	.908**	1.000																	
P4B	.608**	.637**	.696**	.827**	.824**	.807**	.729**	.788**	.834**	1.000																
P5B	.631**	.650**	.694**	.733**	.847**	.756**	.760**	.796**	.821**	.865**	1.000															
P6B	.648**	.639**	.664**	.719**	.746**	.830**	.698**	.730**	.773**	.774**	.897**	1.000														
I1	.439**	.447**	.523**	.567**	.556**	.526**	.500**	.590**	.590**	.604**	.558**	.485**	1.000													
I2	.651**	.577**	.525**	.636**	.598**	.528**	.506**	.581**	.538**	.542**	.501**	.533**	.547**	1.000												
I3	.627**	.611**	.526**	.654**	.490**	.500**	.466**	.489**	.476**	.534**	.488**	.513**	.560**	.700**	1.000											
I4	.520**	.501**	.442**	.616**	.468**	.521**	.429**	.501**	.497**	.561**	.487**	.471**	.462**	.618**	.666**	1.000										
I5	.546**	.512**	.482**	.644**	.525**	.503**	.475**	.511**	.497**	.553**	.447**	.422**	.564**	.728**	.720**	.843**	1.000									
I6	.480**	.475**	.448**	.542**	.502**	.409**	.424**	.462**	.460**	.492**	.465**	.401**	.543**	.675**	.624**	.761**	.881**	1.000								
I7	.607**	.593**	.602**	.737**	.643**	.589**	.582**	.626**	.582**	.596**	.509**	.426**	.477**	.616**	.510**	.451**	.560**	.553**	1.000							
I8	.613**	.700**	.649**	.711**	.687**	.638**	.625**	.669**	.679**	.672**	.633**	.562**	.667**	.721**	.681**	.665**	.724**	.703**	.691**	1.000						
D1	.549**	.546**	.587**	.584**	.507**	.579**	.538**	.538**	.599**	.604**	.593**	.579**	.510**	.363**	.453**	.518**	.434**	.375**	.385**	.513**	1.000					
D2	.527**	.524**	.582**	.554**	.551**	.571**	.618**	.575**	.618**	.615**	.630**	.625**	.407**	.315**	.331**	.388**	.296*	.257*	.326**	.449**	.901**	1.000				
D3	.497**	.500**	.504**	.544**	.562**	.545**	.472**	.528**	.585**	.640**	.616**	.573**	.320**	.410**	.346**	.452**	.327**	.327**	.374**	.465**	.816**	.804**	1.000			
D4	.487**	.512**	.491**	.503**	.621**	.509**	.517**	.548**	.567**	.598**	.682**	.607**	.339**	.370**	.313**	.345**	.259*	.271*	.356**	.460**	.688**	.749**	.862**	1.000		
D5	.537**	.555**	.586**	.581**	.603**	.574**	.629**	.594**	.637**	.611**	.641**	.656**	.409**	.393**	.344**	.311**	.297*	.279*	.394**	.434**	.812**	.924**	.753**	.759**	1.000	
D6	.432**	.521**	.508**	.524**	.582**	.512**	.525**	.532**	.563**	.561**	.595**	.568**	.299*	.337**	.304*	.352**	.252*	.222	.338**	.413**	.725**	.793**	.857**	.926**	.791**	1.000

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

	TGC1	TGC2	TGC3	TGC4	TGC5	TGC6	TGC7	TGC8	TGC9	PSPC1	PSPC2	PSP3	PSPU1	PSPU2	PSPU3	PSPU4	PSPI1	PSPI2	PSPI3	PSPI4	PSPP1	PSPP2	PSPP3	PSPP4	
TGC1	1.000																								
TGC2	.427**	1.000																							
TGC3	.119	.147	1.000																						
TGC4	.475**	.260*	.161	1.000																					
TGC5	.444**	.422**	.274*	.357**	1.000																				
TGC6	.455**	.555**	.345**	.491**	.561**	1.000																			
TGC7	.378**	.681**	.169	.304**	.632**	.801**	1.000																		
TGC8	.525**	.454**	.216	.390**	.789**	.617**	.633**	1.000																	
TGC9	.414**	.364**	.262*	.276*	.756**	.591**	.568**	.724**	1.000																
PSPC1	.076	.374**	.237*	.080	.532**	.444**	.528**	.463**	.522**	1.000															
PSPC2	.084	.460**	.258*	.098	.586**	.466**	.598**	.472**	.510**	.942**	1.000														
PSPC3	.088	.467**	.280*	.099	.618**	.465**	.562**	.465**	.457**	.824**	.855**	1.000													
PSPU1	.093	.495**	.153	.083	.509**	.461**	.524**	.432**	.443**	.701**	.770**	.809**	1.000												
PSPU2	.022	.453**	.157	.068	.478**	.422**	.479**	.398**	.415**	.687**	.750**	.715**	.894**	1.000											
PSPU3	.203	.462**	.209	.163	.474**	.464**	.493**	.391**	.459**	.603**	.649**	.682**	.800**	.796**	1.000										
PSPU4	.050	.406**	.151	.097	.542**	.474**	.503**	.442**	.472**	.720**	.767**	.756**	.859**	.884**	.792**	1.000									
PSPI1	.130	.385**	.223	.130	.563**	.565**	.556**	.513**	.518**	.711**	.724**	.727**	.809**	.816**	.751**	.846**	1.000								
PSPI2	.016	.344**	.123	.182	.452**	.540**	.556**	.409**	.514**	.677**	.696**	.665**	.752**	.762**	.711**	.780**	.812**	1.000							
PSPI3	.063	.345**	.203	.171	.403**	.555**	.514**	.416**	.490**	.672**	.685**	.668**	.759**	.770**	.684**	.762**	.836**	.896**	1.000						
PSPI4	.139	.237*	.335**	.342**	.587**	.499**	.443**	.512**	.611**	.558**	.583**	.612**	.672**	.660**	.639**	.644**	.743**	.777**	.764**	1.000					
PSPP1	.062	.262*	.194	.183	.586**	.419**	.481**	.506**	.602**	.585**	.608**	.626**	.707**	.703**	.609**	.695**	.694**	.718**	.687**	.829**	1.000				
PSPP2	.127	.360**	.173	.284*	.621**	.475**	.477**	.559**	.561**	.592**	.624**	.681**	.688**	.707**	.602**	.698**	.771**	.775**	.742**	.823**	.777**	1.000			
PSPP3	.044	.200	.213	.282*	.504**	.399**	.339**	.398**	.548**	.540**	.553**	.582**	.650**	.652**	.563**	.706**	.729**	.724**	.725**	.820**	.817**	.843**	1.000		
PSPP4	.187	.177	.189	.256*	.578**	.440**	.402**	.495**	.561**	.570**	.589**	.586**	.635**	.628**	.549**	.691**	.745**	.730**	.725**	.775**	.787**	.814**	.889**	1.000	

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Inter-Item Correlation Matrix [Combined Survey Data]

	P1A	P2A	P3A	P4A	P5A	P6A	P1B	P2B	P3B	P4B	P5B	P6B	I1	I2	I3	I4	I5	I6	I7	I8	D1	D2	D3	D4	D5	D6
P1A	1.000																									
P2A	.652**	1.000																								
P3A	.582**	.723**	1.000																							
P4A	.549**	.611**	.729**	1.000																						
P5A	.432**	.548**	.612**	.701**	1.000																					
P6A	.431**	.547**	.500**	.687**	.693**	1.000																				
P1B	.585**	.633**	.705**	.633**	.677**	.595**	1.000																			
P2B	.528**	.588**	.701**	.703**	.724**	.627**	.751**	1.000																		
P3B	.449**	.604**	.662**	.633**	.753**	.718**	.751**	.824**	1.000																	
P4B	.478**	.578**	.648**	.773**	.689**	.711**	.674**	.737**	.686**	1.000																
P5B	.481**	.589**	.644**	.715**	.749**	.695**	.705**	.765**	.792**	.822**	1.000															
P6B	.475**	.578**	.576**	.674**	.716**	.825**	.617**	.659**	.741**	.743**	.824**	1.000														
I1	.192*	.209*	.287**	.265**	.194*	.231**	.183*	.237**	.241**	.281**	.240**	.172*	1.000													
I2	.416**	.258**	.236**	.282**	.243**	.265**	.188*	.273**	.211*	.186*	.230**	.299**	.381**	1.000												
I3	.262**	.258**	.231**	.285**	.170*	.201*	.083	.175*	.137	.168*	.181*	.174*	.510**	.672**	1.000											
I4	.311**	.200*	.242**	.286**	.165*	.234**	.118	.179*	.157	.209*	.167*	.188*	.442**	.629**	.690**	1.000										
I5	.288**	.202*	.259**	.329**	.256**	.226**	.150	.201*	.233**	.214**	.209*	.174*	.521**	.615**	.705**	.788**	1.000									
I6	.273**	.226**	.239**	.271**	.245**	.209*	.174*	.181*	.236**	.215**	.266**	.179*	.508**	.584**	.625**	.712**	.872**	1.000								
I7	.215**	.225**	.210*	.272**	.222**	.277**	.194*	.178*	.260**	.201*	.209*	.154	.415**	.376**	.409**	.381**	.483**	.519**	1.000							
I8	.307**	.329**	.352**	.367**	.319**	.326**	.228**	.295**	.341**	.303**	.342**	.240**	.594**	.509**	.666**	.601**	.742**	.715**	.642**	1.000						
D1	.320**	.301**	.340**	.272**	.190*	.287**	.187*	.239**	.301**	.245**	.273**	.271**	.397**	.376**	.447**	.507**	.474**	.371**	.322**	.471**	1.000					
D2	.329**	.265**	.339**	.262**	.188*	.265**	.211*	.256**	.289**	.249**	.293**	.285**	.345**	.389**	.401**	.442**	.421**	.300**	.292**	.452**	.892**	1.000				
D3	.291**	.282**	.281**	.270**	.237**	.300**	.207*	.240**	.292**	.295**	.324**	.285**	.270**	.361**	.399**	.378**	.334**	.283**	.295**	.401**	.782**	.748**	1.000			
D4	.290**	.281**	.267**	.241**	.275**	.273**	.182*	.259**	.290**	.257**	.351**	.309**	.306**	.370**	.366**	.393**	.330**	.282**	.306**	.391**	.717**	.736**	.844**	1.000		
D5	.390**	.324**	.376**	.335**	.314**	.357**	.321**	.356**	.374**	.337**	.377**	.376**	.382**	.412**	.394**	.401**	.408**	.341**	.368**	.461**	.786**	.864**	.729**	.752**	1.000	
D6	.242**	.263**	.258**	.253**	.262**	.251**	.188*	.250**	.281**	.226**	.293**	.273**	.249**	.358**	.397**	.386**	.367**	.277**	.301**	.401**	.736**	.782**	.855**	.905**	.776**	1.000

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

	TGC1	TGC2	TGC3	TGC4	TGC5	TGC6	TGC7	TGC8	TGC9	PSPC1	PSPC2	PSP3	PSPU1	PSPU2	PSPU3	PSPU4	PSPI1	PSPI2	PSPI3	PSPI4	PSPP1	PSPP2	PSPP3	PSPP4	
TGC1	1.000																								
TGC2	.487**	1.000																							
TGC3	.165*	.213**	1.000																						
TGC4	.495**	.232**	.146	1.000																					
TGC5	.525**	.489**	.213**	.351**	1.000																				
TGC6	.503**	.580**	.382**	.421**	.590**	1.000																			
TGC7	.445**	.719**	.280**	.294**	.620**	.769**	1.000																		
TGC8	.614**	.556**	.229**	.398**	.765**	.702**	.685**	1.000																	
TGC9	.496**	.511**	.300**	.298**	.703**	.660**	.656**	.749**	1.000																
PSPC1	.154	.465**	.213**	-.005	.415**	.401**	.540**	.413**	.468**	1.000															
PSPC2	.165*	.478**	.253**	.033	.411**	.424**	.564**	.381**	.412**	.897**	1.000														
PSPC3	.155	.456**	.218**	.071	.473**	.437**	.531**	.421**	.406**	.800**	.860**	1.000													
PSPU1	.150	.426**	.126	.036	.428**	.421**	.473**	.395**	.383**	.681**	.709**	.790**	1.000												
PSPU2	.156	.420**	.098	.085	.404**	.402**	.442**	.394**	.373**	.604**	.634**	.700**	.889**	1.000											
PSPU3	.244**	.479**	.204*	.189*	.395**	.457**	.489**	.386**	.412**	.624**	.650**	.672**	.731**	.754**	1.000										
PSPU4	.109	.400**	.112	.068	.400**	.406**	.479**	.349**	.359**	.721**	.756**	.766**	.825**	.814**	.761**	1.000									
PSPI1	.180*	.410**	.213**	.076	.422**	.514**	.540**	.445**	.441**	.676**	.661**	.673**	.673**	.662**	.690**	.731**	1.000								
PSPI2	.066	.359**	.170*	.113	.340**	.478**	.497**	.379**	.431**	.620**	.594**	.598**	.645**	.634**	.649**	.664**	.845**	1.000							
PSPI3	.107	.315**	.146	.156	.368**	.504**	.415**	.409**	.384**	.558**	.527**	.583**	.624**	.616**	.610**	.625**	.798**	.827**	1.000						
PSPI4	.214**	.325**	.242**	.245**	.519**	.527**	.485**	.519**	.502**	.575**	.588**	.642**	.619**	.576**	.603**	.607**	.663**	.681**	.703**	1.000					
PSPP1	.084	.282**	.119	.135	.442**	.374**	.465**	.399**	.441**	.541**	.547**	.606**	.615**	.610**	.540**	.624**	.616**	.621**	.584**	.708**	1.000				
PSPP2	.195*	.369**	.161	.274**	.528**	.471**	.502**	.497**	.435**	.553**	.596**	.668**	.588**	.570**	.568**	.627**	.663**	.642**	.666**	.803**	.756**	1.000			
PSPP3	.079	.227**	.192*	.188*	.420**	.378**	.391**	.368**	.404**	.493**	.506**	.554**	.556**	.550**	.495**	.583**	.636**	.618**	.642**	.761**	.794**	.785**	1.000		
PSPP4	.153	.199*	.175*	.167*	.412**	.375**	.409**	.364**	.387**	.533**	.550**	.561**	.584**	.571**	.512**	.628**	.631**	.630**	.597**	.699**	.798**	.756**	.864**	1.000	

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Appendix L: EFA with Maximum Likelihood Estimation and Promax Rotation

Factor Matrix for Combined Data [Maximum Likelihood Estimation with Promax Rotation]

	Factor							
	1	2	3	4	5	6	7	8
P2A	.676							
P3A	.689							
P4A	.771							
P5A	.810							
P6A	.785							
P1B	.822							
P2B	.840							
P3B	.856							
P4B	.843							
P5B	.918							
P6B	.851							
I3				.666				
I4				.752				
I5				.985				
I6				.971				
I8				.719				
D1		.839						
D2		.864						
D3		.921						
D4		.881						
D5		.798						
D6		.892						
TGC1					.800			
TGC5					.703			
TGC6					.688			
TGC8					.936			
TGC9					.726			
PSP1C							.729	
PSP2C							.893	
PSP3C							.573	
PSP1U								.781
PSP2U								.835
PSP1I						.747		
PSP2I						.853		
PSP3I						.724		
PSP1P			.892					
PSP2P			.670					
PSP3P			.917					
PSP4P			.936					

Extraction Method: Maximum Likelihood.
 Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 10 iterations.

Factor Matrix for Week 1 [Maximum Likelihood Estimation with Promax Rotation]

	Factor							
	1	2	3	4	5	6	7	8
P2A	.648							
P3A	.685							
P4A	.751							
P5A	.760							
P6A	.786							
P1B	.752							
P2B	.781							
P3B	.848							
P4B	.764							
P5B	.894							
P6B	.857							
I3			.598					
I4			.702					
I5			.929					
I6			.989					
I8			.775					
D1		.812						
D2		.765						
D3		.967						
D4		.884						
D5		.733						
D6		.878						
TGC1				.754				
TGC5				.730				
TGC6				.752				
TGC8				.967				
TGC9				.758				
PSP1C							.690	
PSP2C							.897	
PSP3C							.636	
PSP1U								.712
PSP2U								.902
PSP1I						.836		
PSP2I						.854		
PSP3I						.835		
PSP1P					.838			
PSP2P					.548			
PSP3P					.766			
PSP4P					.961			

Extraction Method: Maximum Likelihood.
 Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Factor Matrix for Week 2 [Maximum Likelihood Estimation with Promax Rotation]

	Factor							
	1	2	3	4	5	6	7	8
P2A		.599						
P3A		.795						
P4A		.638						
P5A		.937						
P6A		.577						
P1B		.962						
P2B		1.029						
P3B		.943						
P4B		.711						
P5B		.657						
P6B		.403						.633
I3				.680				
I4				.841				
I5				.960				
I6				.878				
I8		.505		.469				
D1			1.019					
D2			1.030					
D3			.820					
D4			.685					
D5			.877					
D6			.796					
TGC1					.823			
TGC5					.538			
TGC6					.603			
TGC8					.753			
TGC9					.551			
PSP1C						.710		
PSP2C						.597		
PSP3C	.441							
PSP1U	.704							
PSP2U	.729							
PSP1I	.793							
PSP2I	.852							
PSP3I	.874							
PSP1P	.870							
PSP2P	.897							
PSP3P	1.099							-.503
PSP4P	1.004							-.426

Extraction Method: Maximum Likelihood.
 Rotation Method: Promax with Kaiser Normalization.

a. Rotation converged in 8 iterations.

Appendix M: Descriptive Statistics for Latent Constructs

Latent Construct	Week 1 [Sample Size N = 76]				Week 2 [Sample Size N = 71]				Combined Data [Sample Size N = 147]			
	Before Dropping Items		After Dropping Items		Before Dropping Items		After Dropping Items		Before Dropping Items		After Dropping Items	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Procedural Justice	5.30	0.78	5.27	0.81	5.20	1.04	5.20	1.04	5.25	0.92	5.24	0.93
Interactional Justice	5.56	0.79	5.66	0.81	5.59	0.83	5.68	0.78	5.59	0.80	5.67	0.80
Distributive Justice	5.12	1.13	5.12	1.13	4.79	1.41	4.79	1.41	4.97	1.28	4.96	1.28
Team Goal Commitment	4.98	0.91	5.17	0.98	4.85	0.94	5.04	1.03	4.92	0.92	5.11	1.00
Connectivity	4.61	1.39	4.61	1.39	4.79	1.35	4.79	1.35	4.70	1.37	4.69	1.37
Sense of Understanding	4.53	1.25	4.68	1.36	4.53	1.32	4.63	1.40	4.54	1.28	4.66	1.37
Involvement	4.39	1.33	4.26	1.42	4.56	1.36	4.49	1.45	4.48	1.35	4.37	1.43
Positivity	4.77	1.19	4.77	1.19	4.74	1.27	4.74	1.27	4.76	1.23	4.76	1.22

Appendix N: Inter-Construct Correlation Matrices

Inter-Construct Correlation Matrix [Survey Data for Week 1]

		PJ	IJ	DJ	TGC	PSP-C	PSP-U	PSP-I	PSP-P
PJ	Procedural Justice	.941							
IJ	Interactional Justice	-.118	.922						
DJ	Distributive Justice	-.157	.562**	.950					
TGC	Team Goal Commitment	-.155	.360**	.480**	.913				
PSP-C	Connectivity	-.108	.457**	.664**	.404**	.939			
PSP-U	Sense of Understanding	.014	.430**	.576**	.393**	.697**	.939		
PSP-I	Involvement	-.028	.171	.407**	.406**	.607**	.575**	.923	
PSP-P	Positivity	-.123	.458**	.438**	.352**	.615**	.558**	.635**	.928

Note: Construct reliability [Cronbach's Alpha] is shown on diagonals.

** Correlation is significant at the 0.01 level (2-tailed).

Inter-Construct Correlation Matrix [Survey Data for Week 2]

		PJ	IJ	DJ	TGC	PSP-C	PSP-U	PSP-I	PSP-P
PJ	Procedural Justice	.971							
IJ	Interactional Justice	.684**	.928						
DJ	Distributive Justice	.705**	.448**	.962					
TGC	Team Goal Commitment	.491**	.484**	.543**	.874				
PSP-C	Connectivity	.701**	.483**	.746**	.530**	.954			
PSP-U	Sense of Understanding	.663**	.407**	.572**	.460**	.792**	.944		
PSP-I	Involvement	.600**	.360**	.522**	.524**	.761**	.842**	.944	
PSP-P	Positivity	.556**	.384**	.441**	.567**	.666**	.740**	.827**	.948

Note: Construct reliability [Cronbach's Alpha] is shown on diagonals.

** Correlation is significant at the 0.01 level (2-tailed).

Inter-Construct Correlation Matrix [Combined Survey Data]

		PJ	IJ	DJ	TGC	PSP-C	PSP-U	PSP-I	PSP-P
PJ	Procedural Justice	.953							
IJ	Interactional Justice	.153	.923						
DJ	Distributive Justice	.186*	.526**	.955					
TGC	Team Goal Commitment	.075	.398**	.502**	.901				
PSP-C	Connectivity	.153	.443**	.664**	.429**	.941			
PSP-U	Sense of Understanding	.234**	.414**	.563**	.409**	.724**	.940		
PSP-I	Involvement	.175*	.199*	.416**	.424**	.659**	.653**	.931	
PSP-P	Positivity	.115	.427**	.430**	.415**	.631**	.615**	.691**	.934

Note: Construct reliability [Cronbach's Alpha] is shown on diagonals.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Appendix O: Confirmatory Factor Analysis Using PLS Analytical Technique

Indicator Loading Table [Survey Data for Week 1]

	Procedural Justice	Interactional Justice	Distributive Justice	Team Goal Commitment	Connectivity	Sense of Understanding	Involvement	Positivity
P1B	0.771914	-0.189848	-0.222761	-0.120171	-0.226218	-0.043007	-0.107594	-0.111863
P2A	0.606728	-0.148213	-0.118691	-0.002643	-0.093749	0.017852	-0.033961	-0.056772
P2B	0.841905	-0.156256	-0.150731	-0.160867	-0.027485	0.056439	-0.047945	-0.197917
P3A	0.737359	0.005319	-0.060626	-0.110391	-0.076604	0.125974	0.079234	-0.036749
P3B	0.790754	-0.07132	-0.036875	-0.065093	0.050357	0.100974	-0.029568	-0.097904
P4A	0.826242	-0.058978	-0.157468	-0.182183	-0.161397	0.024162	0.024091	-0.080609
P4B	0.87098	-0.171017	-0.246849	-0.262261	-0.163935	-0.047807	-0.013751	-0.134085
P5A	0.775337	-0.039299	-0.114964	-0.118702	-0.043837	0.027931	-0.051683	-0.151794
P5B	0.901458	-0.096471	-0.184471	-0.230584	-0.130544	-0.131467	-0.139841	-0.172688
P6A	0.706745	-0.020602	-0.036018	-0.007278	-0.009481	0.036828	0.016923	-0.007439
P6B	0.807237	-0.101034	-0.098845	-0.109315	-0.0968	-0.048912	-0.013903	-0.062896
I3	-0.166189	0.846096	0.533678	0.316418	0.401278	0.293849	0.103207	0.390868
I4	-0.103589	0.883067	0.546411	0.445743	0.367767	0.374684	0.221583	0.443165
I5	-0.10672	0.928436	0.532032	0.307157	0.499085	0.472446	0.207716	0.457781
I6	-0.06985	0.890338	0.359284	0.310413	0.32747	0.321065	0.030866	0.33342
I8	-0.121954	0.821987	0.441468	0.260358	0.436668	0.423544	0.191779	0.391107
D1	-0.19159	0.540484	0.891011	0.343028	0.597774	0.525065	0.356036	0.440517
D2	-0.210629	0.555863	0.884488	0.430839	0.592257	0.56979	0.385575	0.420558
D3	-0.182374	0.401517	0.885764	0.420774	0.54372	0.424914	0.318917	0.368731
D4	-0.19453	0.45606	0.918719	0.499469	0.605345	0.470391	0.37445	0.356616
D5	-0.063817	0.590336	0.861825	0.343574	0.596085	0.606814	0.370635	0.403382
D6	-0.185268	0.500314	0.938353	0.481018	0.649401	0.506145	0.377929	0.394274
TGC1	-0.174883	0.267618	0.359869	0.576876	0.247739	0.254923	0.185336	0.177482
TGC5	-0.244598	0.422578	0.451685	0.870403	0.303869	0.335815	0.306465	0.351187
TGC6	-0.166953	0.293472	0.415173	0.916932	0.428858	0.391877	0.503746	0.415434
TGC8	-0.130599	0.347151	0.423504	0.866413	0.38381	0.384776	0.421104	0.376213
TGC9	-0.145173	0.283608	0.475191	0.790814	0.396734	0.335568	0.360603	0.291502
PSP1C	-0.1532	0.380176	0.63278	0.426544	0.943128	0.637487	0.595825	0.56473
PSP2C	-0.136824	0.407154	0.629391	0.354836	0.95983	0.616819	0.533496	0.572585
PSP3C	-0.098335	0.51616	0.62853	0.403228	0.938971	0.750741	0.595361	0.644014
PSP1U	-0.001541	0.409083	0.561018	0.407687	0.742791	0.972298	0.565984	0.550211
PSP2U	-0.026094	0.422318	0.545084	0.386778	0.627929	0.969174	0.546507	0.524041
PSP1I	-0.113626	0.21674	0.517917	0.450179	0.661302	0.558298	0.943963	0.614703
PSP2I	0.059982	0.123047	0.364301	0.415568	0.572555	0.561306	0.94108	0.593841
PSP3I	-0.068166	0.152502	0.251808	0.458753	0.471059	0.484947	0.90984	0.584957
PSP1P	-0.157096	0.325221	0.391615	0.3498	0.562357	0.536456	0.558456	0.905011
PSP2P	-0.126036	0.436705	0.422565	0.494977	0.622873	0.476454	0.607006	0.896536
PSP3P	-0.150441	0.471646	0.406007	0.394219	0.517002	0.471467	0.593846	0.916123
PSP4P	-0.108145	0.436031	0.348197	0.29619	0.549966	0.539445	0.546786	0.903817

Indicator Loading Table [Survey Data for Week 2]

	Procedural Justice	Interactional Justice	Distributive Justice	Team Goal Commitment	Connectivity	Sense of Understanding	Involvement	Positivity
P1B	0.877268	0.555823	0.596661	0.580847	0.574327	0.477527	0.440972	0.455749
P2A	0.7814	0.639609	0.572579	0.490099	0.568677	0.480235	0.393396	0.337227
P2B	0.901051	0.605607	0.600802	0.617152	0.53425	0.576901	0.522292	0.518045
P3A	0.840173	0.582861	0.588779	0.507531	0.659731	0.596412	0.514949	0.423188
P3B	0.925322	0.601197	0.64629	0.633	0.622404	0.596688	0.551892	0.519731
P4A	0.88193	0.720619	0.595223	0.597993	0.640325	0.616854	0.550415	0.498229
P4B	0.911584	0.644067	0.657892	0.673229	0.648354	0.611042	0.564157	0.521641
P5A	0.912472	0.61379	0.623367	0.62719	0.632616	0.597095	0.556447	0.513698
P5B	0.914627	0.577834	0.682707	0.658942	0.689247	0.64417	0.638797	0.557566
P6A	0.863596	0.591068	0.59504	0.57943	0.555214	0.586792	0.506076	0.514019
P6B	0.875525	0.539738	0.654438	0.560084	0.669256	0.619548	0.574068	0.542319
I3	0.588404	0.820109	0.376502	0.394193	0.396976	0.345395	0.303334	0.318128
I4	0.566162	0.893165	0.426331	0.544859	0.473254	0.354973	0.332883	0.331253
I5	0.573559	0.939819	0.334653	0.490817	0.368948	0.3101	0.270723	0.320124
I6	0.523202	0.89301	0.311097	0.438107	0.365095	0.258879	0.255662	0.267637
I8	0.743545	0.868801	0.494943	0.617827	0.519292	0.504175	0.423813	0.461611
D1	0.643722	0.524779	0.89066	0.590663	0.68902	0.559798	0.487365	0.390553
D2	0.666307	0.398332	0.934126	0.628108	0.726367	0.583725	0.504014	0.435193
D3	0.628411	0.442601	0.926693	0.657367	0.663464	0.501446	0.463081	0.354194
D4	0.637247	0.382408	0.912073	0.694387	0.646637	0.469567	0.435629	0.408088
D5	0.687006	0.38213	0.911237	0.619505	0.709648	0.556765	0.524954	0.45104
D6	0.618108	0.357617	0.930783	0.713662	0.669155	0.469761	0.465615	0.403397
TGC1	0.04134	0.171295	0.077694	0.166571	0.086741	0.059182	0.074854	0.112821
TGC5	0.643	0.566946	0.636037	0.896561	0.605205	0.507234	0.502783	0.617157
TGC6	0.328475	0.351476	0.484868	0.665947	0.478854	0.454291	0.584304	0.466946
TGC8	0.489693	0.410829	0.494544	0.722616	0.487326	0.426541	0.472954	0.528912
TGC9	0.523939	0.499804	0.553879	0.846935	0.517763	0.441043	0.536099	0.611412
PSP1C	0.657697	0.441372	0.711219	0.620693	0.962209	0.713096	0.725117	0.615404
PSP2C	0.683715	0.472195	0.7556	0.654865	0.974113	0.780813	0.741552	0.639318
PSP3C	0.66767	0.489836	0.668197	0.655427	0.9347	0.78327	0.725853	0.667079
PSP1U	0.63596	0.44172	0.552431	0.576365	0.794985	0.973788	0.817513	0.721979
PSP2U	0.651792	0.359816	0.55169	0.563754	0.750142	0.972585	0.827024	0.724755
PSP1I	0.596371	0.350457	0.505049	0.651141	0.752926	0.834724	0.935418	0.789876
PSP2I	0.57949	0.410183	0.500599	0.616902	0.709495	0.77759	0.951105	0.792607
PSP3I	0.531827	0.276468	0.473837	0.560655	0.705201	0.785591	0.957093	0.773748
PSP1P	0.531946	0.356981	0.463967	0.684289	0.634132	0.724254	0.739059	0.911643
PSP2P	0.627879	0.496828	0.418627	0.680228	0.661129	0.716677	0.805885	0.924673
PSP3P	0.471859	0.325283	0.35937	0.614425	0.583177	0.668867	0.765777	0.95095
PSP4P	0.442103	0.27277	0.399063	0.621834	0.60814	0.64882	0.774609	0.934787

Indicator Loading Table [Combined Survey Data]

	Procedural Justice	Interactional Justice	Distributive Justice	Team Goal Commitment	Connectivity	Sense of Understanding	Involvement	Positivity
P1B	0.830137	0.202584	0.278991	0.229791	0.220505	0.25267	0.180045	0.211686
P2A	0.755588	0.267982	0.314294	0.225055	0.270168	0.268021	0.183309	0.153294
P2B	0.870057	0.24798	0.319904	0.251721	0.300881	0.350514	0.266066	0.207474
P3A	0.801915	0.332278	0.381928	0.224651	0.353434	0.410988	0.315782	0.243537
P3B	0.879815	0.264914	0.36195	0.276795	0.368321	0.362994	0.273018	0.230457
P4A	0.841331	0.367074	0.324045	0.250661	0.299096	0.363818	0.316439	0.259645
P4B	0.864972	0.267141	0.320481	0.245575	0.296432	0.323197	0.304122	0.243169
P5A	0.844345	0.275064	0.297515	0.252042	0.309263	0.31333	0.252682	0.185752
P5B	0.893328	0.278647	0.383857	0.277583	0.351087	0.316694	0.301257	0.259613
P6A	0.822521	0.270382	0.321477	0.236671	0.286252	0.315344	0.271196	0.264678
P6B	0.852652	0.221124	0.34607	0.191334	0.320501	0.3053	0.306058	0.267934
I3	0.236701	0.821034	0.435218	0.313396	0.396803	0.302496	0.192392	0.336183
I4	0.232285	0.881039	0.460957	0.484859	0.42108	0.353732	0.275361	0.371888
I5	0.283738	0.937715	0.415821	0.398262	0.43389	0.383697	0.238542	0.378936
I6	0.283087	0.893719	0.328148	0.387131	0.335164	0.277828	0.133695	0.286764
I8	0.39474	0.844589	0.467818	0.37768	0.480014	0.459358	0.319525	0.429537
D1	0.334856	0.534163	0.884454	0.388215	0.632413	0.544856	0.406359	0.410929
D2	0.345205	0.46639	0.906035	0.428716	0.632322	0.567401	0.420298	0.414366
D3	0.348845	0.414943	0.915136	0.510944	0.591161	0.464159	0.3749	0.349473
D4	0.36541	0.398032	0.922172	0.579745	0.601038	0.463978	0.394909	0.371511
D5	0.432286	0.445868	0.910004	0.476128	0.643251	0.565436	0.454251	0.418763
D6	0.331869	0.413755	0.93418	0.537978	0.642148	0.474686	0.406496	0.379907
TGC1	-0.01768	0.222487	0.171802	0.639582	0.133469	0.142769	0.100305	0.118618
TGC5	0.354796	0.497283	0.547156	0.866901	0.44273	0.421311	0.386778	0.485997
TGC6	0.171329	0.315151	0.441777	0.820021	0.422601	0.416062	0.517757	0.423664
TGC8	0.255017	0.385265	0.439474	0.910589	0.41798	0.406481	0.42665	0.442006
TGC9	0.280893	0.39233	0.504302	0.873935	0.436507	0.388477	0.430316	0.450078
PSP1C	0.322712	0.413844	0.63342	0.458791	0.948476	0.6711	0.667474	0.589748
PSP2C	0.348811	0.438936	0.670054	0.430142	0.965234	0.693627	0.632319	0.601526
PSP3C	0.370466	0.49014	0.64132	0.4743	0.939942	0.764853	0.661093	0.646545
PSP1U	0.38684	0.422149	0.537492	0.441997	0.768025	0.974247	0.693998	0.6385
PSP2U	0.368289	0.370084	0.546861	0.44569	0.689345	0.974677	0.691024	0.618519
PSP1I	0.279265	0.283215	0.481938	0.491174	0.70902	0.693301	0.941649	0.697774
PSP2I	0.334307	0.255485	0.407212	0.432163	0.638993	0.657836	0.948478	0.688723
PSP3I	0.293902	0.212237	0.363362	0.43639	0.584084	0.649411	0.929439	0.68331
PSP1P	0.237306	0.320363	0.416641	0.444708	0.597124	0.623925	0.64839	0.907032
PSP2P	0.31841	0.4514	0.407517	0.532829	0.636725	0.591887	0.702288	0.907845
PSP3P	0.204813	0.384118	0.367049	0.416832	0.542598	0.561501	0.672174	0.929587
PSP4P	0.218911	0.33694	0.359399	0.418773	0.573362	0.583043	0.661176	0.922066