UNIVERSITY OF OKLAHOMA

GRADUATE COLLEGE

TRUST IN VIRTUAL TEAMS - THE ROLE OF TASK, TECHNOLOGY AND TIME

A Dissertation

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

Doctor of Philosophy

By

ANDRE L. ARAUJO

Norman, Oklahoma

2004

Downloaded from SHAREOK. Persistent Handle URL: https://hdl.handle.net/11244/777

UMI Number: 3143537

UMI®

UMI Microform 3143537

Copyright 2005 by ProQuest Information and Learning Company.
All rights reserved. This microform edition is protected against
unauthorized copying under Title 17, United States Code.

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

TRUST IN VIRTUAL TEAMS - THE ROLE OF TASK, TECHNOLOGY AND TIME

A Dissertation APPROVED FOR THE

MICHAEL F. PRICE COLLEGE OF BUSINESS

BY

_____
LAKU CHIDAMBARAM

_____
ROBERT C. DAUFFENBACH

_____
SHAILA MIRANDA

_____
SCOTT A. MOSES

_____
R. LEON PRICE

_____
ALBERT B. SCHWARZKOPF

_____
ROBERT W. ZMUD

© Copyright by ANDRE L. ARAUJO 2004

All Rights Reserved.

ACKNOWLEDGEMENTS

Having reached this important milestone in my academic career, I am extremely thankful for all who contributed to this achievement throughout the years that I spent as a doctoral student in the MIS division at the University of Oklahoma. While for some people this may be one of the hardest moments in their life, for me, this experience was profoundly positive, fun and challenging, that I will always cherish in my heart. Below I have summarized the major events that reflect both the completion of this dissertation and the enduring experiences I shared.

First, I would like to thank my committee members for all their support and incentive during the entire dissertation process. In particular, I would like to express my deepest gratitude to Laku Chidambaram, the chairman of my dissertation committee, who was the major source of friendly support, intellectual inspiration, and careful guidance throughout my stay at the University of Oklahoma. During the dissertation phase, in particular, Laku guided me step by step from the theoretical development to the implementation of the laboratory experiment and to the statistical analysis of the data gathered. Working closely with Laku, I was fascinated by his ability to discuss research issues and provide constructive comments on my research writing and theoretical arguments. His constant support, passion and caring was so intensive that soon he became an ‘old’ friend and colleague.

I also would like to thank Bob Zmud who contributed to this dissertation in several ways. During all phases of this dissertation, Bob provided crucial comments and critical analysis that extraordinarily enriched the final product of this study. His creative ideas and theoretical insights triggered special momentum for the next steps I had to follow. In addition, the research seminars that I took with Bob inspired me to appreciate the use of both interpretive and normative approaches. In fact, this dissertation employed theoretical perspectives that reflect such appreciation. Also, as the MIS division chair, Bob was also kind enough to support my trip to Barcelona in order to present a theory paper at the ICIS theory development workshop. This trip was a great and valuable experience since I could discuss and improve the theoretical model as a result of the discussions with outstanding academic researchers in the MIS field. Finally, thanks to Bob for nominating my dissertation proposal project to the ICIS Doctoral Consortium. The consortium helped me to gain confidence in the work I was doing.

I would also like to thank Shaila Miranda whom I met during my second year in the doctoral program and who quickly become a fundamental source of intellectual inspiration throughout the project. Her constant support and motivation gave me the confidence that I needed to conduct this large experiment. I was pretty lucky to have my desktop located next to her office. Even in days that we did not discuss at all, I knew Shaila was there willing to help me at any moment based on her personal and academic life experiences. We have also worked together on a theoretical paper, which challenged my thinking in so many fruitful ways. It was a nice experience when we presented our paper in the ICIS theory development

workshop. I felt very proud of engaging in this project and being introduced to other respected researchers in our field. Thanks!

Indeed, I still have in my mind the summer of 2003 when Shaila, Bob, and Laku conducted the roundtable discussions - a set of weekly meetings in which the doctoral students (including myself) had to present and discuss our ongoing projects with our MIS senior faculty. That summer was critical to this dissertation because I was preparing to conduct the pilot study. In that occasion, your ideas and discussions were fundamental in refining the research model and adjusting the research instruments before running the pilot study. Thanks for this fun and challenging experience!

Leon Price, another important participant in this dissertation project, allowed me to run the laboratory experiment in all fourteen sections of the introduction to the MIS course, for which he was the main coordinator. His constant support and willingness to help me throughout the experiment implementation phase enabled me to make extensive use of the technological resources and facilities in the labs so that I could get more than 500 students of the College of Business involved in the virtual project. In fact, we worked together for several weeks so that I could integrate the virtual project into the regular coursework. I lost sense of the number of times we had to discuss eventual adaptations to the syllabus to fit my research goals. Many times when I had to strictly follow requirements of the experiment, he would just say: *"Andre, tell me what you need and we will figure out a way to solve the*

problem so that we can meet you dissertation requirements". I am extremely grateful for his unconditional support to this project.

My thanks also go to Albert Schwarzkopf, Robert Dauffenbach, and Scott Moses who provided me decisive inputs during my dissertation proposal defense as well as continuous support and encouragement during the entire dissertation process. All the times that I needed them, they were always promptly available to hear my questions and dissertation plans.

Al also helped me and provided me guidance on how to better present my research project during the dissertation proposal. I followed his advice and used his approach during my job interviews. In fact, I think this is one of the reasons my presentations were well received in the job market. Finally, thanks for your statistical insights on how to convert my dissertation work into publishable papers. Thanks, Al!

Bob (Dauffenbach), I would also like to thank you for your recommendation letter to compete for the teaching award at the University level. I was honored to represent the MIS department in this prestigious competition. Thank you for believing in my teaching ability. Well, we made it!

Even though Scott Moses works outside of the MIS division, sometimes, when his email was having problems, I would even find him having lunch at the university neighborhood and I was able to discuss with him dissertation schedules and the need to send him recent versions of my manuscript for his evaluation and appreciation. Scott, I appreciate your constant promptness!

I would also like to thank other MIS division professors who are not part of this dissertation committee, but who have contributed in many ways to the completion of my PhD degree. Thanks to Traci Carte for her invaluable help with the courses that I taught as a TA. Traci's guidance helped me to smoothly adapt to teaching in a second language and find out a course that became my teaching preference. Traci also provided me important hints and ideas on how to successfully and smoothly finish my doctoral degree. Another thanks goes to Rajeev Sharma, who quickly became an 'old' friend and a source of constant motivation. Rajeev also showed me important strategies on how to prepare my application package when looking for a job. I have used many of his suggestions and things have worked out! Finally, I would like to thank the friendship and sharing of experiences that I gained from Pam Carter, Teresa Shaft , 'Jon Jasperson, Richard Van Horn, Manonita Ratwatte, Dan Kemp, and Jack Warner.

Many thanks also go to Yong-Mi Kim, Viet Dao, Wilfred Wu, Catherine Ferguson, Larry Arthur, Jeff Crawford, Leslie Albert for actively participating and motivating their students during the implementation of the virtual project in their lab classes. Also, thanks for the good moments, jokes, and constructive discussions that we had (including Rui Huang and Henry Croes) while sharing the same office. Even though we had two PhD student offices, it was nice when we used to visit each other from one office to another. These constant interactions certainly made our doctoral life an enjoyable and rewarding experience. Thanks also for Judy Oliger who was not only a friend but the key support that always patiently taught and helped us on how to fill in so many different and important administrative forms at

the University. Judy always made our life much easier by providing us just the perfect administrative help that we needed. So many times she helped us to enroll in classes or make reservations for the labs, classrooms, and laptops.

Guys, thanks for the incommensurable lessons you gave me throughout my stay at the University of Oklahoma. As you may note, the paragraphs above not only describe your commitment and support to my education but also the rich and challenging research environment that you have offered me while I was a doctoral student.

Finally, a host of friends and family helped me in many ways during the PhD program. Specifically, my dear friend Victor Aktansel gave me just the right words and encouragement that I needed in the last phases of this dissertation. There are also many who behind the scenes were always available when I most needed help, and I wish to thank them. Thank you Sammy Khawla and Marie Cecile Vermelle. I am especially grateful to all friends who were constantly concerned about my wellbeing during the decisive moments of this dissertation. I would also like to thank my parents Adao de Araujo and Gladis Maria Toso de Araujo, my sister Lisiane and my brother-in-law Marco and their children Vinicius, Heloisa, and Pedro, for understanding the moments we could not spend together and for always believing that I could make it. From all my heart, thanks!

TABLE OF CONTENTS

1. INTRODUCTION 1

1.1 TRUST 3
1.2 TASK 3
1.3 SOCIAL INTERACTION 4
1.4 TIME 5
1.5 GROUP AND TASK OUTCOMES 5
1.6 RESEARCH QUESTIONS 6
1.7 RESEARCH APPROACH 7
1.8 OVERVIEW OF DISSERTATION 8
1.9 EXPECTED CONTRIBUTIONS 10

2. THEORETICAL FOUNDATION 12

2.1 RESEARCH ON COMPUTER-SUPPORTED GROUPS 14
2.2 STATIC APPROACHES TO MEDIA USE 19
2.2.1 Media Richness Theory 19
2.2.2 Social Presence Theory 21
2.3 DYNAMIC APPROACHES TO MEDIA USE 24
2.3.1 Group Development Models 25
2.3.2 Time Interaction and Performance Theory 26
2.3.3 Social Information Processing Theory 27
2.3.4 Structurational Approach 28
2.4 TRUST 31
2.4.1 Model of dyadic trust 33
2.4.2 Model of initial trust in new organizational relationships 36
2.5 SOCIAL CONSTRUCTIONIST PERSPECTIVE 42
2.6 PERCEPTIONS OF THE TASK 44
2.6.1 McGrath's task circumplex 44
2.6.2 A Social Constructionist approach to task characteristics 46
2.6.3 Contributions of the dynamic models 48
2.6.4 Contributions of the trust literature 49
2.6.5 Contributions of the social constructionist approach 50

3. RESEARCH MODEL AND HYPOTHESIS 52

3.1 MODEL OVERVIEW 52
3.2 TRUST BEHAVIOR 54
3.3 TRUSTING BELIEFS 55
3.4 TRUSTOR'S PROPENSITY TO TRUST 58
3.5 TASK PERCEPTION 60
3.6 SOCIAL INTERACTION PERCEPTION 64
3.7 VIRTUAL SETTING 67
3.8 INTERMEDIATE OUTCOMES AND PROCESS SATISFACTION 68

4. RESEARCH DESIGN AND METHODOLOGY 72

4.1 OVERVIEW OF THE RESEARCH DESIGN 72
4.2 RESEARCH DESIGN 73
4.3 OPERATIONAL DEFINITION OF THE VARIABLES 76
4.3.1 Independent Variable 76
4.3.1.1 Virtual Setting 76
4.3.2 Controlled Variables 79
4.3.2.1 Technology 79
4.3.2.2 Task 80
4.3.2.3 Training 81
4.3.2.4 Group Size 82
4.3.2.5 Individual Differences 83
4.3.2.6 Time 83
4.3.3 Process Variables 83
4.3.3.1 Trusting Beliefs 83
4.3.3.2 Perceptions of the Social Interaction 84
4.3.3.3 Trusting behavior 85
4.3.3.4 Perceptions of the task 85
4.3.4 Outcome Variables 85
4.3.4.1 Satisfaction with outcomes 85
4.3.4.2 Task Outcome 86
4.4 EXPERIMENTAL PROCEDURE 87
4.4.1 Subjects 87
4.4.2 Grades 87
4.4.3 Research Agenda 88
4.4.4 Data Collection 91
4.5 PILOT STUDY 92
4.5.1 Task 94
4.5.2 Time 96
4.5.3 Technology 96
4.5.4 Survey instruments 97

5. RESULTS 99

5.1 DESCRIPTIVE STATISTICS 99
5.1.1 Biographical Information 100
5.1.2 Background Information 101
5.2 RELIABILITY 104
5.3 HYPOTHESES TESTS 105
5.3.1 Path Model for Meeting 1 109
5.3.2 Path Model for Meeting 2 110
5.3.3 Path Model for Meeting 3 112
5.3.4 Path Model for Meeting 4 113
5.3.5 Path Model for Meeting 5 115
5.3.6 Detailed Analysis of All Relationships Over Time 119
5.3.6.1 The impact of trusting beliefs on trust behavior 119
5.3.6.2 The impact of a Trustor's Propensity to Trust on Trusting Beliefs 124

5.3.6.3 The impact of Task Perception on Trusting Beliefs *129*
5.3.6.4 The impact of Perceptions of Social Interaction on Trusting Beliefs *135*
5.3.6.5 The impact of Perceptions of Social Interaction on Task Perception ... *154*
5.3.6.6 The impact of the Virtual Setting on Perceptions of Social Interaction *161*
5.3.6.7 The impact of Trust Behavior on Intermediate Outcomes *168*
5.3.6.8 The impact of Outcomes on Perceptions of Social Interaction *172*
5.4 POST-HOC ANALYSIS 186
5.4.1 Repeated Measures *186*
5.4.1.1 Trust Related Constructs *186*
5.4.1.2 Task Perception and Social Interaction Perception *192*
5.4.1.3 Satisfaction with Outcomes and Task Outcomes *197*
5.4.2 Path Analysis at the Group Level *199*
5.4.2.1 Summary of hypotheses tests at the group level *200*
5.4.2.2 Path Model for Meeting 1 ..... *204*
5.4.2.3 Path Model for Meeting 2 ..... *206*
5.4.2.4 Path Model for Meeting 3 ..... *208*
5.4.2.5 Path Model for Meeting 4 ..... *210*
5.4.2.6 Path Model for Meeting 5 ..... *212*
5.4.2.7 Summary of results at the individual and group level *213*
6. DISCUSSION **216**
6.1 CHANGES IN RELATIONSHIPS OVER TIME 216
6.1.1 CONSISTENT EFFECTS *217*
6.1.1.1 The Effects of a Trustor's Propensity to Trust on Trusting Integrity *217*
6.1.1.2 The Effects of Cooperative Perception of the Task on Trusting Beliefs *219*
6.1.1.3 The Effects of Perceptions of Social Interaction on Trusting Beliefs *220*
6.1.1.4 The Effects of Satisfaction with Outcomes on Relationship Conflict and Task-Related Conflict *227*
6.1.2 PROGRESSIVE CHANGES *228*
6.1.2.1 The Effects of the Virtual Setting on Relationship Conflict and Task-Related Conflict *228*
6.1.3 PUNCTUATED CHANGES *231*
6.1.3.1 The Effects of the Virtual Setting on Responsiveness of Others and Shared Identity *231*
6.1.3.2 The Effects of Trusting Ability on Trust Behavior *234*
6.2 PERCEPTIONS OF SOCIAL INTERACTION ACROSS TREATMENTS 236
6.2.1 Task-Related Conflict *236*
6.2.2 Shared Identity *237*
6.2.3 Relationship Conflict and Responsiveness of Others *239*
7. CONCLUSIONS **241**
7.1 IMPLICATIONS FOR RESEARCH 241

7.2 IMPLICATIONS FOR PRACTICE 248
7.3 LIMITATIONS..... 250

LIST OF TABLES

Table 1: Variables and their operationalization *76*
Table 2: Reliability analysis in the pilot study *97*
Table 3: Manipulation Check of Random Assignment Participants' Biographical Information – part A *100*
Table 4: Manipulation Check of Random Assignment Participants' Biographical Information – part B *101*
Table 5: Background Information t-test results *102*
Table 6: Reliability Analysis *104*
Table 7 (a): Summary of results by individuals. *105*
Table 7 (b): Summary of results by meeting (contd.). *106*
Table 7 (c): Summary of results by meeting (contd.). *107*
Table 8 – Legend of the path model mnemonics *108*
Table 9 (a) – Summary of the results over time. *117*
Table 9 (b) – Summary of the results over time. (contd.). *118*
Table 9 (c) – Summary of the results over time. (contd.). *119*
Table 1.1 – The Effects of Trusting Ability on Trust Behavior. *120*
Table 1.2 –The effects of Trusting Integrity to Trust Behavior. *122*
Table 1.3 – The effects of Trusting Benevolence on Trust Behavior. *123*
Table 2.1 – The Effects of Trustor's Propensity to Trust on Trusting Ability. *125*
Table 2.2 – The effects of Trustor's Propensity to Trust on Trusting Integrity. *127*
Table 2.3 – The effects of Trustor's Propensity to Trust on Trusting Benevolence. *128*
Table 3.1 – The Effects of Cooperative Perceptions of the Task on Trusting Ability. *131*
Table 3.2 – The Effects of Cooperative Perceptions of the Task on Trusting Integrity. *132*
Table 3.3 – The Effects of Trustor's Propensity to Trust on Trusting Benevolence. *134*
Table 4.1a – The Effects of Task-Related Conflict on Trusting Ability. *136*
Table 4.1b – The Effects of Task-Related Conflict on Trusting Integrity. *138*
Table 4.1c – The Effects of Task-Related Conflict on Trusting Benevolence. *139*
Table 4.2a – The Effects of Relationship Conflict on Trusting Ability. *140*
Table 4.2b – The Effects of Relationship Conflict on Trusting Integrity. *142*
Table 4.2c – The Effects of Relationship Conflict on Trusting Benevolence. *143*
Table 4.3a – The Effects of Responsiveness of others on Trusting Ability. *145*
Table 4.3b – The Effects of Responsiveness of Others on Trusting Integrity. *147*
Table 4.3c – The Effects of Responsiveness of Others on Trusting Benevolence. *148*
Table 4.4a – The Effects Shared Identity on Trusting Ability. *150*
Table 4.4b – The Effects Shared identity on Trusting Integrity. *152*
Table 4.4c – The Effects Shared identity on Trusting Benevolence. *153*
Table 5.1 – The Effects of Task-Related Conflict on Cooperative Perception of the Task. *155*

Table 5.2 – The Effects of Relationship Conflict on Cooperative Perception of the Task. *157*
Table 5.3 – The Effects of Responsiveness of Others on Cooperative Perception of the Task. *158*
Table 5.4 – The Effects of Shared Identity on Cooperative Perception of the Task. *160*
Table 6.1 – The Effects of the Virtual Setting on Task-Related Conflict. *162*
Table 6.2 – The Effects of the Virtual Setting on Relationship Conflict. *164*
Table 6.3 – The Effects of the Virtual Setting on Responsiveness of Others. *166*
Table 6.4 – The Effects of the Virtual Setting on Shared Identity. *167*
Table 7.1 – The Effects of Trust Behavior on Satisfaction Outcomes. *169*
Table 7.2 – The Effects of Trust Behavior on Task Outcome. *171*
Table 8.1a – The Effects of Satisfaction with Outcomes on Task-Related Conflict. *173*
Table 8.1b – The Effects of Satisfaction with Outcomes on Relationship Conflict. *175*
Table 8.1c – The Effects of Satisfaction with Outcomes on Responsiveness of Others. *177*
Table 8.1d – The Effects of Satisfaction with Outcomes on Shared Identity. *178*
Table 8.2a – The Effects of Task Outcome on Task-Related Conflict. *180*
Table 8.2b – The Effects of Task Outcome on Relationship Conflict. *181*
Table 8.2c – The Effects of Task Outcome on Responsiveness of Others. *183*
Table 8.2d – The Effects of the Task Outcome on Shared Identity. *184*
Table 5.4.2.1 (a) – Summary of Results by Meeting. *201*
Table 5.4.2.1 (b) – Summary of Results by Meeting (contd.). *202*
Table 5.4.2.1 (c) – Summary of Results by Meeting (contd.). *203*
Table (a) – Results across different levels of analysis *214*
Table (b) – Results across different levels of analysis (contd.) *215*

LIST OF ILLUSTRATIONS

Figure 1: General Conceptual Model of the Research *12*
Figure 2: The input-process-output Framework. *18*
Figure 3: Dyadic Model of Trust *35*
Figure 4: Model of Initial Trust in New Organizational Relationships *38*
Figure 5: The Group Task Circumplex *45*
Figure 6: The Research Model. *53*
Figure 7: Virtual Team Room Physical Layout *78*
Figure 8: Collocated Team Room Physical Layout *78*
Figure 9: Summary of the Experimental Procedure (part A) *89*
Figure 10: Summary of the Experimental Procedure (part B) *91*
Figure 11: Path Model for Meeting 1 ..... *109*
Figure 12: Path Model for Meeting 2 ..... *111*
Figure 13: Path Model for Meeting 3 ..... *113*
Figure 14: Path Model for Meeting 4 ..... *114*
Figure 15: Path Model for Meeting 5 ..... *116*
Figure H 1.1: Relationship between Trusting Ability and Trust Behavior (over time). *121*
Figure H 1.2: Relationship between Trusting Integrity and Trust Behavior (over time). *122*
Figure H 1.3: Relationship between Trusting Benevolence and Trust Behavior (over time). *124*
Figure H 2.1: Relationship between Trustor's Propensity to Trust and Trusting Ability (over time). *126*
Figure 2.2 – Relationship between Trustor's Propensity to Trust and Trusting Integrity (over time). *127*
Figure 2.3 – Relationship between Trustor's Propensity to Trust and Trusting Benevolence (over time). *129*
Figure 3.1 – Relationship between Cooperative Perceptions of the Task on Trusting Ability (over time). *131*
Figure 3.2 – Relationship between Cooperative Perceptions of the Task and Trusting Integrity (over time). *133*
Figure 2.3 – Relationship between Trustor's Propensity to Trust and Trusting Benevolence (over time). *134*
Figure 4.1a – Relationship between Task-Related Conflict and Trusting Ability (over time). *137*
Figure 4.1b – Relationship between Task-Related Conflict on Trusting Integrity (over time) *138*
Figure 4.1c – Relationship between Task-Related Conflict and Trusting Benevolence (over time). *139*
Figure 4.2a – Relationship between Relationship Conflict and Trusting Ability (over time). *141*

Figure 4.2b – Relationship between Relationship Conflict and Trusting Integrity (over time). 142
Figure 4.2c – Relationship between Relationship Conflict and Trusting Benevolence (over time). 144
Figure 4.3a – Relationship between Perceptions of Responsiveness of others and Trusting Ability (over time). 146
Figure 4.3b – Relationship between Responsiveness of Others and Trusting Integrity (over time). 147
Figure 4.4a – Relationship between Shared Identity and Trusting Ability (over time). 151
Figure 4.4b – Relationship between Perceptions of Shared identity and Trusting Integrity (over time). 152
Figure 4.4c – Relationship between Shared Identity and Trusting Benevolence (over time). 154
Figure 5.1 – Relationship between Task-Related Conflict and Cooperative Perception of the Task (over time). 156
Figure 5.2 – Relationship between Relationship Conflict and Cooperative Perception of the Task (over time). 157
Figure 5.3 – Relationship between Responsiveness of Others and Cooperative Perception of the Task (over time). 159
Figure 5.4 – Relationship between Shared Identity and Cooperative Perception of the Task (over time). 160
Figure 6.1 – Relationship between Virtual Setting and Task-Related Conflict (over time). 163
Figure 6.2 – Relationship between Virtual Setting and Relationship Conflict (over time). 165
Figure 6.3 – Relationship between Virtual Setting and Responsiveness (over time). 166
Figure 6.4 – Relationship between Virtual Setting and Shared Identity (over time). 168
Figure 7.1 – Relationship between Trust Behavior and Satisfaction with Outcomes (over time). 170
Figure 7.2 – Relationship between Trust Behavior and Task Outcome (over time). 171
Figure 8.1a – Relationship between Satisfaction with Outcomes and Task-Related Conflict (over time). 174
Figure 8.1b – Relationship between Satisfaction with Outcomes and Relationship Conflict (over time). 176
Figure 8.1c – Relationship between Satisfaction with Outcomes and Responsiveness of Others (over time). 177
Figure 8.1d – Relationship between Satisfaction with Outcomes and Shared Identity (over time). 179
Figure 8.2a – Relationship between Task Outcome and Task-Related Conflict (over time). 180
Figure 8.2b – Relationship between Task Outcome and Relationship Conflict (over time). 182

Figure 8.2c – Relationship between Task Outcome and Relationship Conflict (over time). 183
Figure 5.10 – Profiles of Trusting Ability (over time) 187
Figure 5.11 – Profiles of Trusting Integrity (over time) 188
Figure 5.12 – Profiles of Trusting Benevolence (over time) 189
Figure 5.13 – Profiles of Trustor's Propensity to Trust Integrity (over time) 190
Figure 5.14 – Profiles of Trust Behavior (over time) 191
Figure 5.15 – Profiles of Task Perception (over time) 193
Figure 5.16 – Profiles of Task-Related Conflict (over time) 194
Figure 5.17 – Profiles of Relationship Conflict (over time) 195
Figure 5.18 – Profiles of Responsiveness of Others (over time) 196
Figure 5.19 – Profiles of Shared Identity (over time) 197
Figure 5.20 – Profiles of Satisfaction with Outcomes (over time) 198
Figure 5.21 – Profiles of Task Outcomes (over time) 199
Figure 5.4.2 (1) – Path Model for Meeting 1 at the Group Level 204
Figure 5.4.2 (2) – Path Model for Meeting 2 207
Figure 5.4.2 (3) – Path Model for Meeting 3 209
Figure 5.4.2 (4) – Path Model for Meeting 4 211
Figure 5.4.2 (5) – Path Model for Meeting 5 213

ABSTRACT

Virtual teams face major impediments to developing trust given their relative inability to evaluate other members' abilities, motivations and work patterns. However, trust is the foundation on which virtual teams can build effective performance strategies and accomplish group tasks. Empirical evidence suggests that trust can be developed among members of virtual teams, although it takes time to do so. Other key factors, in developing trust besides time include the task the group is engaged in and the work setting. Furthermore, social constructionist approaches assert that characteristics of organizational elements such as the task can change over time based on group perceptions that evolve as members interact and make sense of their embedded situations. Therefore, since different types of tasks and settings affect group processes and outcomes differently, the development of trust will vary according to the group's perceptions of the task over time and characteristics of the setting. This study developed an integrative model of trust in virtual teams by explicitly examining the interactions of task, technology and time, along with their combined impact on team processes and outcomes. This model was tested empirically using data from a longitudinal field experiment that manipulated setting type—virtual vs. collocated teams. Data about members' perceptions and team performance were collected using a repeated measures research design structured around a database design project. Results of the analysis provide partial support for the model and offer insights about the

development of trust in virtual teams. Implications of the findings for research and practice are discussed.

KEYWORDS: Collaborative technologies, task, trust, social constructionist perspective, social information processing, adaptive structuration theory, time interaction performance, virtual teams, group processes and outcomes.

1. INTRODUCTION

Given the economic and industry scenario over the last couple of years, companies are encouraging their employees to communicate and work with their geographically distant partners through the use of communication technologies, thus reducing time spent in meetings and huge amounts of money in traveling expenses. In this scenario, executives have drastically reduced their airline reservations, substituting face-to-face meetings with virtual meetings (Jarvenpaa and Leidner 1999; Lipnack and Stamps, 2000). While these arguments support the fact that virtual teams are being implemented as cost-cutting measures, organizations adopting virtual teams are searching for means to overcome the absence (or limitation) of group interaction structures that exist in collocated teams (Biggs, 2000; Lipnack and Stamps, 2000, O'Hara-Devereaux and Johansen, 1994). When operating in the context of virtual teams, geographically dispersed members interact and communicate electronically on task and relational aspects using a variety of collaborative technologies such as groupware, electronic-mail, videoconferencing systems, among others. While these technologies provide the means to work in groups, they impose team interaction structures and processes that need to be managed well.

Different from a collocated environment, members of virtual teams do not share the same physical space, do not (or rarely) see each other, have limited control to assure that others are contributing equally to the task, and work with

people with whom they have never worked or even met before (Walther, 1992). Therefore, in this virtual setting, trust plays a critical role in mediating the relationship between the electronic environment and group outcomes over time (Jarvenpaa, et al., 1998; Kanawattanachai and Yoo, 2002; Lipnack and Stamps, 2000). Prior literature has suggested that the act of trust reflects the way individuals perceive others' characteristics (Boon and Holmes, 1991; Mayer, et al., 1995) and behavior (Gabarro, 1978) as well as how members perceive the process in which they are embedded (Berger and Luckmann, 1967).

While a great deal of work has examined the productivity of computer-supported groups and virtual teams by providing evidence on the importance of the task (Gallupe, 1985; Benbasat and Lim, 1993; Poole, et al., 1985), group's patterns of social interaction (DeSanctis and Poole, 1994; Miranda and Bostrom, 1993; Poole and DeSanctis, 1990; Walther, 1992, Yates, Orlikowski and Okamura, 1999), and group outcomes (Potter and Balthazard, 2000; Ryssen and Godar, 2000), very little research has opened the black box of group process variables in order to understand how they evolve and affect performance over time. Given that the result of this amalgam of team interaction process over time will reflect new patterns of trust behavior and outcomes, this dissertation examines the complex path of relationships between task, a group's patterns of social interaction, and especially on trust – the critical element in virtual teams. Below we present an overview of the variables addressed in this study.

1.1 Trust

Organizational and social science theorists (e.g., Berscheid, 1994; Coleman, 1990; Gambetta, 1988; Kramer and Tyler, 1996; Lindskold, 1978; Ouchi, 1979; Rotter, 1967) argue that when working in teams, if members are to engage in cooperative and productive enterprises they must either be able to closely monitor each other or to trust each other. In a de-individuated context such as the virtual team setting where few clues exist about others' abilities, motivations or work patterns members need to feel comfortable before they can collaborate effectively on tasks in the absence (or limitation) of collocated group process components. Thus, trust is the important catalyst for effective interaction and success of virtual team enterprises (Jarvenpaa et al., 1998). In fact, Lipnack and Stamps (2000) emphasize this point by stating "online, we go through people we trust". While recent research in the MIS literature (e.g., Jarvenpaa, et al. 1998; Jarvenpaa and Leidner 1999; Kanawattanachai and Yoo, 2002; Muhlfelder, et al., 1999; Sarker, et al., 2000) has addressed trust issues in virtual teams, there is still a need to understand how trust along with other group process variables evolve and change over time, in turn affecting group performance.

1.2 Task

Research (e.g., Arrow, et al., 2000; Straus and McGrath, 1994) shows that the nature of work groups engage in and the type of task they perform affect group processes differently. Previous research on groups supported by computer

technologies has also provided evidence that task plays a key role in determining processes and outcomes (e.g., McGrath, et al., 1993; Gallupe, 1985; Benbasat and Lim, 1993; Hollingshead, et al., 1993). When performing a task, a group adapts its behavior to embedded contextual conditions, that is, its available resources (e.g., content area expertise) and group settings (e.g., technological tools), which present important contextual elements that group members have to deal with (Arrow et al., 2000). Thus, over time, as members of a virtual team interact they develop shared perceptions of the task that are socially constructed (Berger et al., 1967). As a result, how members of virtual teams develop their perceptions of the task determines group interaction processes and the development of relational ties over time.

1.3 Social Interaction

The extent of experiences and relationships that group members share allows them to develop an understanding of another's behavior (Gabarro, 1978), each other's actions and performance, their social interaction influences, and how they perceive others in the group. Thus, the patterns of responsiveness and validation that have characterized the relationship in the past provide the foundation for predicting how the trustor may perceive the trustee (Boon et al., 1991) and other process variables. In other words, individuals' perceptions of their social interaction influence how they perceive task characteristics and others' trustworthiness key elements that influence future trusting behavior. To this date, no single study has looked at how the complex path of members' perceptions evolves over time influencing group satisfaction and task outcomes.

1.4 Time

While trust, perceptions of the task, and perceptions of the social interaction are essential ingredients of group interaction, members take time to develop such perceptions in lean environments (Chidambaram, 1996; Walther, 1992). As discussed earlier, the extent to which a person develops perceptions depend on how group processes evolve and change over time as a result of ongoing interaction and experiences. For example, the extent to which a person is willing to trust others may depend on the success of past interaction and outcomes (Zucker, 1986). Thus, in order to understand the evolution of these variables it is necessary to adopt a longitudinal perspective in which time plays a critical role.

1.5 Group and Task Outcomes

An extant body of literature has focused on group and task outcomes. However, most studies have considered only the final outcome of a specific group task or project. Scholars have manipulated either input or process variables in order to verify group performance when the task or project was completed (Applegate, et al., 1986; Conklin and Begeman, 1988; Dennis, et al., 1996; Hwang and Guynes, 1994; Potter and Balthazard, 2000; Ryssen and Godar, 2000). While this approach has helped us understand productivity in virtual teams (or computer-supported groups), very little work has focused on how groups and task outcomes influence team members' perceptions of the process over time.

1.6 Research Questions

The functioning and even survival of any work or social group depends upon the existence of trust (Rotter, 1967). Trust is a critical ingredient in virtual teams, both to achieving effective outcomes (Gabarro, 1978) and to providing people's feelings of closeness (Berscheid, 1994) by reducing the negative effects of geographical distance among members (Jarvenpaa, et al., 1998; Kanawattanachai and Yoo, 2002). Thus, trust enables a climate in which group members' interactions are made possible and is an alternative mechanism not only to overcome interpersonal barriers but also to maintain sufficient levels of productivity necessary for activity to continue (Shapiro, 1987; Zucker, 1986).

Given components of these virtual interactions, the development of socially constructed perceptions of the group members over time, and the importance of trust to ensure group satisfaction and task productivity improvements in virtual teams, we argue that ***virtual teams will develop trust over time based on their perceptions of the task and social interaction, which in turn will affect group outcomes and satisfaction with the process***. Hence, considering the interaction between these elements along with their combined impact on group processes and outcomes as keys to understanding productivity in virtual teams, this dissertation specifically addressed the following research questions:

a) What are the antecedents and consequences of trust in virtual teams?

b) What are the effects of the interaction between a group's perceptions of the process and trust on satisfaction and group outcomes over time?

1.7 Research Approach

The above research questions were addressed through a longitudinal experiment using subjects from fourteen sections of an introductory MIS course. In order to compare the development of trust between virtual and collocated teams, 105 groups composed of three, four or five members were formed. Fifty two groups were virtual teams, and fifty three were collocated teams. This method ensured the conditions necessary to empirically test the theoretical arguments developed in this dissertation. In addition, it was provided an experimental setting in which perceptions of the subjects were collected at various points in time (Tuckman, 1965).

Perceptions of the individuals were collected using surveys and outcomes of the task were drawn from grades assigned to groups based on their performance at several phases of the group project.

1.8 Overview of dissertation

To address the questions described previously, this dissertation is organized into seven chapters. **Chapter II** presents the theoretical foundations that underlie the research model and arguments developed throughout this study. First, an overview of previous research about collaborative technologies is presented. In the same section, the general input-process-output framework applied in these studies and how it serves as the starting point of my research model is discussed.

Second, the major theoretical approaches to media use are described including group developmental models, Time Interaction Process (TIP) Theory, and Social Information Processing Theory (SIP). Taken together, these theories support the notion that group interaction processes develop over time in a virtual team setting.

Third, how task has been theorized in the past along with an explanation of how a social constructionist approach can help to conceive of task characteristics is discussed. Fourth, research conceptualizations and approaches to trust are reviewed in order to provide a theoretical foundation for the dimensions of trust that are considered in this research project. At the end of this chapter, the theories are summarized and an explanation of their contributions to the study of virtual teams is offered.

Chapter III describes the research model along with a detailed explanation of its components and relationships in light of the theoretical foundations developed

in Chapter II. In addition, the set of hypotheses tested in this experiment are presented. This chapter represents an integration of group process variables such as perceptions of the task, trust, and a group's patterns of social interaction over time by linking them to performance measures in virtual teams. Such an approach offered the opportunity to open the black box of group process variables in order to investigate how these factors develop and affect performance over time.

Chapter IV explains the research methodology. The experimental design, subjects, task, training, system functions, controls and treatments are explained in detail. Additionally, the ways in which the variables described in the previous chapter were operationalized for the purposes of this study is described. Finally, the key results and lessons learned from the pilot study are discussed.

Chapter V describes the results of the statistical analyses. This chapter is organized into four parts. First, results of the descriptive statistics are described. Second, reliability scores of the survey instruments are presented. Then, results of the path models and hypotheses of the relationships are discussed. Finally, a post-hoc analysis including repeated measures analysis and path analysis at the group level is described.

Chapter VI describes a summary of the major findings, limitations of this study, and implications of the results for practice and research.

Appendices In this section the task materials, instruments employed, task evaluation worksheet, IRB form, and all other information relevant to the study are included.

1.9 Expected Contributions

This dissertation provides both theoretical and practical contributions. From a theoretical perspective, this study contributes to the body of knowledge by providing insights into the effects of individuals' perceptions and the use of collaborative technologies on trust development and group outcomes over time. Specifically, it provides a theoretical integration of five key constructs related to the development of trust in virtual teams — technology, perceptions of the task, perceptions of the social interaction, time, and group outcomes.

Furthermore, this study develops a theoretical framework that incorporates both individual and institutional views of trust by empirically testing its assumptions through a longitudinal experiment. Thus, it contributes to the virtual team literature by systematically studying trust. The virtual environment differs remarkably from organizational contexts where people meet at the same place and at the same time. While trust is an essential ingredient that enables interaction among group members dispersed geographically, it is affected by the amount of time available.

Another theoretical contribution of this study is the incorporation of timing effects in the development of trust as well as the effects of past teammates' behavior on members' perceptions of group processes and trust. Therefore, it focuses on the understanding of deeper social structures that underlie group work in

the context of virtual teams. Finally, we hope that our shift in ontological and epistemological approach to the way we conceive task type and the focus on group interaction patterns over time will provide researchers a better understanding about the manner in which virtual teams work.

The virtual environment differs remarkably from organizational contexts where people meet at the same place and at the same time. Thus, practical implications include how collaborative technologies help or inhibit group working processes and outcomes that in turn may provide guidelines on how to efficiently manage virtual teams.

In addition, results of this study may highlight group process aspects that managers might consider when developing intervention mechanisms to foster trust development in virtual teams.

Finally, this study may help managers to understand some of the antecedents to trust in virtual teams by implementing a working setting in which teammates communicate synchronously within a specific time limit. This setting, seen in many organizations, highlights the need for efficient mechanisms to coordinate group tasks and communication among group members.

2. THEORETICAL FOUNDATION

The purpose of this chapter is to establish the foundations for this dissertation through a review of relevant literature. The research questions associated with this research are:

- How do the antecedents of trust, satisfaction with the process, and group outcomes evolve and affect trust over time?
- What are the effects of the interaction between a group's perceptions of the process and trust on satisfaction and group outcomes over time?

The overall conceptual model for investigating these questions is shown in Figure 1. This model derives its basic assumptions from the following areas: computer-supported groups, dynamic approaches to media use, and models of dyadic trust (based on perceived characteristics of the trustee), initial trust formation in new relationships, and social constructionist perspective.

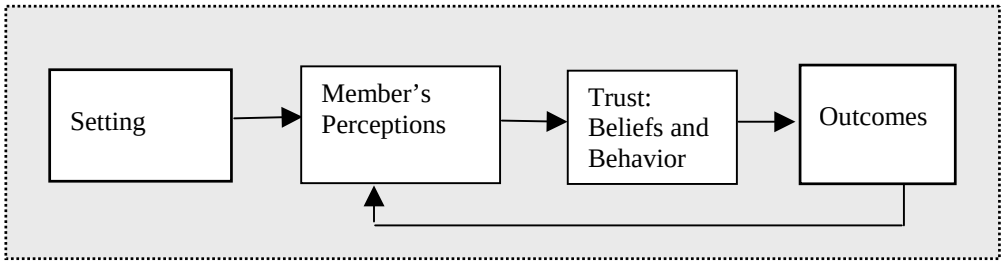


Figure 1: General Conceptual Model of the Research

The model described in Figure 1 highlights the general conceptual components of virtual team interactions. It suggests that: (a) the work setting influences team members' perceptions of the interaction processes; (b) the development of these socially constructed perceptions will in turn affect the development of trust; and (c) outcomes will be affected by these processes and will reciprocally affect them.

The chapter is thus organized into four sections. The first section discusses a general model that has been applied in previous research on computer-supported groups. It also provides the foundation for understanding how groups interact with technology over time. This section contrasts static approaches with dynamic approaches to media use. The second section provides an overview of theoretical approaches to trust and describes the theoretical lenses that will serve as the foundation basis for the analysis of trust in virtual teams. The next section describes studies on task by focusing on the computer-supported group literature. Finally, the last section discusses the social constructionist perspective and how it can help describe virtual team processes and outcomes by revealing the unfolding social interaction mechanisms over time.

2.1 Research on Computer-Supported Groups

Early research on computer-supported groups focused on the socio-psychological aspects of groups when they communicated using electronic devices (e.g.: Williams, 1975; Williams, 1977; Vallee, et al., 1977). Later, in the 80's, the topic attracted the interest of group communication researchers as well. As a result, a great deal of work was done examining group process variables (e.g., Kiesler, et al., 1984; Kiesler, et al., 1985; Hiltz, et al., 1986). At about the same time, MIS researchers focused on the use of both decision support systems (DSS) (e.g., Huber, 1990b; Huber, 1990a) and group decision support systems (GDSS) (e.g., Chidambaram, et al., 1991b; Dennis, et al., 1988; Dickson, et al., 1993; Gallupe, 1985; Watson, et al., 1988; Applegate, et al., 1986) to improve decision-making processes and outcomes. In studying collaborative technologies, some studies have been more concerned with technology impact on group performance (Applegate, et al., 1986; Conklin and Begeman, 1988; Hwang and Guynes, 1994) while others have focused on group processes (Chidambaram, 1996; Miranda and Bostrom, 1993; Saunders and Jones, 1990; Walther and Burgoon, 1992).

Saunders and Jones (1990) developed a research model integrating assumptions from both decision-making and communication schools to examine temporal aspects of information acquisition. Drawing on a dynamic model of media selection and use and focusing on group process variables, they observed behavioral patterns that reflected the manner in which managers used and selected sources and media to fit their decision-making needs. For instance, their results

suggested that “a manager failing to receive critical information, after numerous requests of a source may seek alternative sources” (p.35). In other words, the extent to which a manager will extensively rely on a specific source depends on the responsiveness of the source over a series of requests over time. Thus, established patterns of interaction (i.e., reflective behaviors and attitudes) between the manager and the source influence the manner in which a group member perceives other sources, thus affecting how managers select technologies. In addition, this study provides evidence of the effects of contextual elements on patterns of information acquisition exhibited by managers.

These arguments contribute to this dissertation in various ways. First, it highlights the importance and influence of the setting to group interactions and performance. Second, it supports the notion that users may manipulate some technological structures as a function of their own needs. Finally, it highlights the importance of examining the underlying dynamics of group interactions by applying temporal approaches.

Also focusing on group process variables, Miranda and Bostrom (1993) investigated the impact of group support systems on conflict development and management. Grounded in the group conflict literature (Coser, 1956; Deustch, 1969), assumptions of the structuration theory (Giddens, 1979; Giddens, 1984), and adaptive structuration theory (DeSanctis and Poole, 1994; Poole and DeSanctis, 1990), this study examined how group process structuring unfolded in terms of issue-related conflict (or task-related conflict) and interpersonal conflict through a

longitudinal approach by observing how members interacted with each other over time. While the issue-related conflict is viewed positively (because it stimulates group members to develop better solutions), interpersonal conflict is viewed as being detrimental to group performance (because it is targeted at persons within the group, see Deustch, 1969 for a detailed explanation of such assumptions).

Results of this study contribute in several ways. First, it highlights the importance of two types of group conflict when studying virtual team settings. Second, it highlights the importance of longitudinal methodologies to examine variations in group processes over time. Finally, it suggests that group conflict can vary as the result of group's members' interactions.

In the same vein, Chidambaram (1996) used a longitudinal controlled experiment to examine group relational developments over time. Specifically, it focused on how groups' attitudes and outcomes evolved over time with repeated use of computer technologies. Grounded in social information processing theory (Walther, 1992), this study argued that computer-supported teams needed longer time to develop close relations compared to collocated teams. Results provided empirical support for group relational developments in a lean environment showing that groups that communicate only through computer technologies are able to overcome initial technological barriers, thus exhibiting socio-emotional involvement and improving performance over time.

This dissertation is important for many reasons. First, it provided empirical evidence that refutes commonly accepted assumptions of deterministic models that

do not explain relational developments in lean environments. Second, it shows that given appropriate time users can find creative ways to transform and adapt technological structures to fulfill their own needs. Thus, this study emphasizes the role of social structures that unfold over time. Finally, the research model developed in this study recognizes group members' assessment of the interaction process as an important element to understand group outcomes. In other words, while negative perceptions of the process may lead to process losses, positive perceptions may lead to process gains. This assumption highlights the importance of group members' perceptions and their influence on group outcomes. Thus, it provides evidence on the development of group members' social perceptions based on repeated social interactions over time.

Also grounded in the social information processing theory, (Walther et al., 1992) conducted a longitudinal controlled experiment to compare face-to-face groups with computer-supported groups. Their results suggest that user's perceptions can change as a function of user's experience with technology. Therefore, this study provides empirical evidence on the importance of user's perceptions when addressing group processes and outcomes in technology supported team environments.

Much of the cited research has been based on an Input-Process-Outcome theoretical framework. This approach implies that characteristics of the input variables generate changes in group process variables, which, in turn, affect group outcomes. Consequently, group outcomes tend to differ according to variations in

these process variables. Following this research stream, studies have also manipulated variables such as task (Gallupe, 1985), time (McGrath, et al., 1993, Hollingshead, et al., 1993), and the setting characteristics (Chidambaram, 1996).

This input-process-output framework is summarized in Figure 2 by highlighting task, setting, and time as critical elements to the understanding of virtual teams. In this general model, task and setting are viewed as key input variables that affect group processes and outcomes. Different types of tasks and settings are likely to require different processes and may engender different outcomes (Chidambaram, 1996; Gallupe, 1985, Hollingshead, et al., 1993; Jarvenpaa, et al. 1998; Jarvenpaa and Leidner, 1999; McGrath, et al., 1993; Poole, et al., 1985).

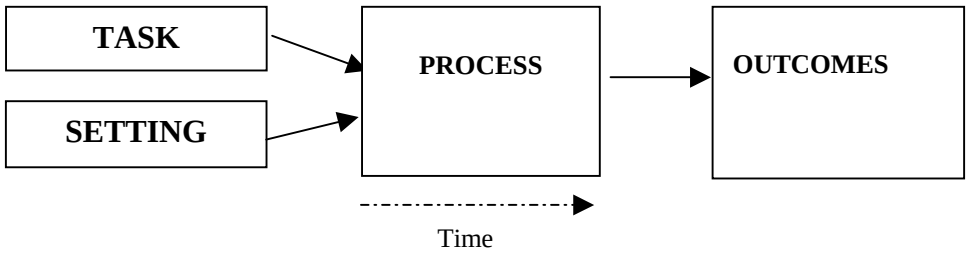


Figure 2: The input-process-output Framework.

In the following sections, two approaches to teams – a static approach and dynamic approach - are contrasted by emphasizing the role of group development using theoretical frameworks such as TIP, SIP, and AST. Following these sections, trust and the dimensions of trust used in this research are described. Finally, the

importance of the task and the social constructionist perspective are described. These discussions collectively form the theoretical basis of the research model developed in this dissertation.

2.2 Static Approaches to Media Use

In the study of computer-supported groups, theories such as Media Richness Theory (Daft & Lengel, 1984) and Social Presence Theory (Short, Williams, & Christie, 1976) have relied on assumptions that team outcomes and processes are a result of the technological capacities of the medium. In general, such work—rooted in rational decision assumptions—views technology as imposing constraints on group interaction, thereby hindering the establishment of relationships.

2.2.1 Media Richness Theory

Developed by Daft and Lengel (1984), this theoretical approach defines media in terms of its capacity to facilitate shared meaning. It proposes that efficient managers use and select media based on its ability to meet managerial informational needs by reducing information uncertainty and equivocality. Then, media is described as either rich or lean based on a richness hierarchy that describes to what extent the media allows organizational members to provide immediate feedback, enable personalness of source, use multiple cues, and communicate in natural language, thus facilitating shared understanding. For example, face-to-face is richer than telephone. While a telephone provides rapid feedback, is personal, and uses natural language, it provides fewer cues than face-

to-face communication. Therefore, most of the electronic email systems would be leaner than a telephone, that is, an electronic email system has the capacity to provide rapid, although not immediate feedback such as the telephone. In addition, in general, an electronic system offers fewer opportunities to convey language cues in comparison to a face-to-face communication. In summary, communication media is described over a continuum of richness in that face-to-face communication is richer than telephone, which is richer than electronic mail, and so on.

Another underlying assumption is that highly equivocal messages are more efficiently managed via rich media such as face-to-face communication, rather than poor media such as an electronic mail. Highly equivocal contexts arise when multiple individuals may interpret messages differently depending upon their unique needs, backgrounds, and perspectives. In such organizational episodes equivocality can be reduced by using communication mechanisms that facilitate discussions of multiple interpretations, exchange of subjective views, instant feedback, and conveyance of use of multiple cues, thus leading managers to develop shared understanding and social agreement upon. On the other hand, unambiguous messages are best handled using lean media. This happens because with unequivocal messages consensus about the meaning has already been established or negotiated. This situation is characterized by routinized communicative actions where group members have already developed share meaning and understandings and little or no feedback is necessary. In other words, there is an established and common grammar among organizational actors and the messages have clear and unambiguous content.

Implicit in these arguments is the fact that informational needs vary across different managerial contexts and media varies in terms of its richness. Therefore, different communication media is appropriate for different contexts and levels of performance will be higher when the chosen media fits informational needs. While this approach has been largely used in previous research, its use has neglected the dynamic nature of managerial choice as well as adaptations of technology over time.

2.2.2 Social Presence Theory

Closely related to media richness theory, the social presence theory (Short et al., 1976) describes communication media as a continuum that indicates the degree to which the medium facilitates awareness of the other person and interpersonal relationships. In other words, the continuum reflects the degree to which group members feel the social presence of other members with whom they are interacting when using a communication medium. Thus, different media exhibit varying inherent structural capacities for social presence.

Under this theoretical umbrella, in order to have an efficient communication the medium selected has to match the level of interpersonal involvement required by the task at hand. For instance, communication media high in social presence such as face-to-face is best suited for tasks that demand highly interpersonal involvement such as conflictive and competitive tasks. Similarly, communication media low in social presence such as electronic-email is best suited for tasks that require low

social presence. Implicitly, performance is likely to suffer when the medium does not match task demands.

Taken together, Social Presence Theory and Media Richness Theory are intrinsically grounded on the following assumptions:

- Any media has inherent properties (i.e., objective characteristics) that are fixed despite its use over time;
- The context of media use does not affect media characteristics; thus, a specific media is assumed to be used in the same way across a variety of social settings;
- As a result of fixed characteristics of the media, users' patterns of behavior and attitudes reflect such media features; thus, they do not provide space to changes in the media based on users' interaction over time;
- There is a hierarchy that characterizes each media in which face-to-face is considered to be the richest communication medium, followed by the telephone, electronic email, letter, writing memo, and so on;
- The choice making process is objectively rational in that managers and users evaluate and select the medium that best match demands of the task at hand. This approach circumscribes an approach in which efficiency criteria is the key determinant of human behavior.

Largely focusing on media properties that satisfy managerial needs these approaches largely neglect the fact that users can exhibit different perceptions regarding their working processes and patterns of interaction that may influence how they adapt and/or choose different media. In short, these approaches do not open the black box of human cognitions developments and changes over time as a result of group members' social interaction processes.

Extending these theories, an important contribution toward a non-static approach was proposed by Symbolic Interactionist Perspective (Trevino, Daft, & Lengel, 1990). Grounded on assumptions of the symbolic interactionism (Blumer, 1969; Cooley, 1902; Dewey, 1922; Mead, 1934), (Trevino et al., 1990) argue that three key variables either enable or constrain managerial media choices: 1) the equivocality of the message (as described earlier in the media richness theory); 2) contextual determinants, and 3) symbolic cues conveyed by the medium. Within this perspective managerial behavior is determined by external forces such as distance and time pressure, accessibility and critical mass of users. In addition, it recognizes that a medium may also be selected based on symbolic meanings that transcend the explicit message. For instance, consistent with interpretive assumptions this approach emphasizes symbolic processes and subjective meaning. The use and selection of the media has to do with group members' interpretation of the subjective norm that resides within the organizational context. However, SIP still treats media defined by invariant and objective attributes.

To summarize, in general, these perspectives do not incorporate the sequence of communication interactions that unfold as group members use the technology, interact, and develop perceptions over time. Furthermore, the effects of contextual elements on media use are largely neglected with the exception of the symbolic interactionist approach, which emphasize external forces. Taken together, these assumptions underlie a rational approach, which limits the possibility of users' development of relational ties over time, thus, hindering group processes such as trust development. In the next section alternative approaches that consider the dynamic aspects of group interaction over time are discussed.

2.3 Dynamic Approaches to Media Use

Theories such as social information processing theory (Walther, 1992), adaptive structuration theory (DeSanctis and Poole, 1994; Poole and DeSanctis, 1990), genre theory (Yates, Orlikowski and Okamura, 1999), and channel expansion theory (Carlson & Zmud, 1999) have focused on the dynamic aspects of media use and their impacts on team outcomes and processes over time. In general, these approaches consider both technology influences and group interaction processes as they evolve over time by influencing one another, in turn, affecting group productivity. Before discussing the dynamic approaches to media use, group developmental models that have offered important contributions to these perspectives are briefly described. Then, dynamic approaches to media use such as TIP, SIP, and AST are discussed. Finally, at the end of this section key contributions of the dynamic approaches are summarized.

2.3.1 Group Development Models

Viewing groups as dynamic entities, group behavioral researchers (e.g., Bales, 1950; Bales and Strodtbeck, 1951; McGrath, 1991) have proposed various models of group development. Based on an exhaustive literature review, Chidambaram and Bostrom (1997) suggested that such models can be categorized as either sequential or non-sequential. Sequential models are those that view group development as a linear process. That is, over time, groups pass through different phases in an orderly and predetermined sequence of steps. Furthermore, these models focus on understanding what phases are exhibited during a group's life. An example of the sequential approach is the equilibrium model proposed by Bales and associates (Bales, 1950; Bales and Strodtbeck, 1951).

The equilibrium model suggests that groups that meet more than once go through three phases (orientation, evaluation, and control) varying their actions according to the phase they are in. The orientation phase is the initial set of meetings where an exploratory context is established. Evaluation, the next phase, is one in which members shift their focus to examining the task to be executed. Control, the final phase, is one in which the focus is on the accomplishment of the task. Also, the model recognizes that in all phases besides task needs, groups also have socio-emotional needs and they continually try to maintain a balance between them.

Non-sequential models, however, argue that phases do not occur in an orderly manner. That is, stages are not predetermined and can occur differently for

different groups in different contexts. The major focus of this approach is on understanding how group processes occur. One example of this approach is the Time Interaction Performance (TIP) Theory developed by McGrath and colleagues (McGrath, 1991).

2.3.2 Time Interaction and Performance Theory

TIP proposes that group processes are composed of a complex set of paths, modes, and functions suggesting that groups engage in many other activities – some related to the task and others not (McGrath, 1991). Certainly, whenever the group deviates its focus from the task to other activities, task performance suffers. However, such activities are necessary to maintain the group's social needs in addition to accomplishing its task. Thus, they are important to the long-run effectiveness of the group and can be critical in: a) maintenance of well-being among the members; b) resolution of either operational or political problems; and c) level of engagement in other group projects and activities. Thus, based on the amount of time the group spends working together, different group interaction processes unfold and different outcomes are likely to occur. Furthermore, over time groups' intermediate outcomes and satisfaction with the process influences group process variables. Studies that have applied TIP include: Jarvenpaa and Leidner (1999); Kahai and Cooper (2003); Masey, Montoya-Weiss, Massey, and Hung (2003); Montoya-Weiss, Massey, and Song (2000); Montoya-Weiss, Massey, and Song (2001).

Both non-sequential and sequential perspectives recognize that group development occurs through different phases. While the non-sequential models focus on how such phases occur and evolve, sequential models are concerned with describing what these phases are. Both models recognize that groups spend time working on socio-emotional and task needs, even though focus on one dimension is achieved at the expense of the other. As a result, both perspectives can be seen as complementary approaches to the understanding of group development (Chidambaram et al., 1997). Thus, both models recognize the shifts that teams make from the task to relational ties.

2.3.3 Social Information Processing Theory

Contrasting to static approaches, a growing number of studies (e.g., Carlson and Zmud, 1999; Chidambaram, 1996; Powell, 2000; Wei, 1997), drawing on a relational development perspective, have suggested that over time groups can overcome the limitations imposed by the media. For example, Chidambaram (1996) demonstrated that over time computer-supported groups can and do exhibit relational development in terms of increased cohesiveness and better ability to manage conflict. Wei (1997) also argues that after a shared social construction is built up among the group members, rich information can be conveyed and relational development is possible even in a lean medium. In a similar vein, Carlson and Zmud (1999) proposed Channel Expansion Theory, which suggests that the 'barriers' of media can be overcome via different types of knowledge.

The primary theoretical arguments of the relational perspective are rooted in Social Information Processing Theory (Walther, 1992). Contradictory to theories that have considered characteristics of the medium as fixed, SIP argues that given enough time for groups to interact, they will adapt existing media including lean electronic media to exchange relational information, and thereby gathering more trust information about partners. When members exchange relational information, they build shared social perceptions, thus reinforcing or changing individual's perceptions of the task. In a similar vein, task outcomes provide one's knowledge about how other group members have performed thus influencing group's experience and enabling members to make more sense of the task at hand. In other words, the extent to which a person will be willing to vest cognition-based trust in others may depend on the success of past interaction (Zucker, 1986). Therefore, in working conditions that extend over time, group's task performance have a determining impact on group's social interaction, in turn, affecting how members perceive others members as trustful. In the same vein, group satisfaction with the process influences how members build shared social perceptions, thus reinforcing or changing individual's perceptions.

2.3.4 Structurational Approach

For many years IT researches have relied on either decision–making models or interpretive schemas for analyzing organizational and technology phenomena. Decision-making models are primarily based on positivist assumptions, that is, the technology is viewed as an external variable that promotes changes in the organizational environment. On the other hand, interpretive schemas consider

technology as an opportunity for organizational change, that is, technology is not a causal agent of change rather it is an artifact that is implemented and adapted as a result of social structures that evolve throughout its use. Built upon these approaches, Poole and DeSanctis (1990) proposed the adaptive structuration theory (AST). The AST theory proposes an integration of these two research streams in order to better understand organizational change and use of IT. Primarily, AST theory was adapted from the Structuration Theory (Giddens, 1979, 1984, 1993) and was developed to study electronic meeting systems (EMS). In addition, the integration of these two different perspectives allows researchers to explain the power of social practices without ignoring the role that technologies play in shaping interaction and organizational change.

AST conceives the technology to be inherently social in nature. Doing so, there is a mutual understanding in that the technology promotes changes in the society and results of the social practices create conditions for evolution of technology. As a result, there is a complex interaction between technologies and users. For instance, while collaborative technologies may offer changes in the nature of social interaction, users play an important role in adapting such systems to meet their needs. This process of mutual determinism between collaborative technologies and users is explained in terms of patterns of appropriation, which consists in analyzing structures and the role they play in group interaction. To conduct such an analysis the theory develops concepts of structure, systems, spirit, and structural features grounded on the work of structuration (Bourdieu,1978; Giddens, 1979) and appropriation (Ollman,1971). By laying out these concepts, AST

explains how the process of structuration, that is, the process by which systems are produced and reproduced through member's use of rules and resources. Thus, the underlying assumption of this model is that group interaction is the critical factor of these processes in that it facilitates the effects of technological structures on group outcomes in such a way that group productivity depends on the nature of the technology and how groups appropriate the technology.

Several studies have subscribed to the AST theory when studying social and organizational processes that emerge over time as technologies are used: Chin, Gopal and Salisbury (1997) elaborated a scale to measure faithfulness of appropriation; Poole and DeSanctis (1990) conducted an empirical research employing their developed coding schema to capture levels of micro appropriation; (Gopal, Bostrom, & Chin, 1992) used PLS technique to test a proposed research model based on AST.

Closely related to the AST approach, Tyre and Orlikowski (1994) used the concept of adaptation to study technology adaptations over time and Yates and Orlikowski (1992) employed the concept of structuration to study genre production, reproduction and change over time in order to understand relationships between organizational communication and communication media. Research that has applied AST include: Miranda and Bostrom (1993); Montoya-Weiss, Massey, and Song (2000); Reinig and Shin (2002); Sarker and Sahay (2003).

2.4 Trust

An essential element for social exchange relations (Barnard, 1938; Blau, 1968; Deutsch, 1960; Garfinkel, 1963) and collective action (Luhmann, 1979; Parsons, 1951), trust has been studied in several disciplines—including sociology (Barber, 1983; Lewis and Weigert, 1985; Luhmann, 1979; Shapiro, 1987; Zucker, 1986), organizational behavior and psychology (Johnson-George and Swap, 1982; Rempel, et al., 1985), to name a few. For example, adopting an organizational perspective, Zucker (1986) differentiated the mechanism of trust production in economic structures as process-based, characteristic-based, or institution-based trust.

Recent literature (e.g., Bromiley and Cummings, 1995; Hosmer, 1995; Lewicki and Bunker, 1995; Mishra, 1996; Sitkin and Roth, 1993) has offered us alternative typologies that provide more diverse conceptualization of trust (Bigley & Pearce, 1998). For instance, Lewicki and Bunker (1995) grouped trust studies into three categories: trust as individual difference, trust as an institutional phenomenon, and trust as expectations of another party in a transaction. Closely related to Lewicki and Bunker's (1995) theoretical schema, Sitkin and Roth (1993) clustered trust studies into four major areas: individual attributes, behaviors, situations, and institutional arrangements. Finally, Hosmer (1995) categorized trust studies in terms of individual expectations, interpersonal relations, economic exchanges, social structures, and ethical principles.

In summary, some psychologists tend to view trust as a personal attribute, social psychologists are more inclined to view trust as an interpersonal phenomena, and economists are more likely to see trust based on a rational choice perspective. As a personal attribute, theorists consider trust more as a belief, expectancy, or feeling that is developed in an individual's early psychological developments, thus it is conceived of as an outcome of the individual's inherent personality. Trust as an interpersonal phenomenon is viewed as a situation-specific concept and "is the extent to which one party is willing to depend on the other party with a feeling of relative security even though negative consequences are possible" **(McKnight, Cummings, & Chervany, 1996)**. Thus, contextual factors serve to either enhance or inhibit the development and maintenance of trust (Lewicki et al., 1995). From a sociological and economic view, trust is viewed as both a phenomenon between and within institutions, and between individuals and these institutions or organizations.

Recently, scholars have incorporated several of these dimensions by suggesting the need to consider trust as a multidimensional construct (Mayer, et al., 1995; McAllister, 1995; McKnight, et al., 1998) that encompasses several organizational events such as decision to trust, trusting beliefs, and dispositional trust. This approach enables us to combine dimensions of trust from different research streams. Doing so, it is possible to capture several aspects of the organizational context. For instance, it offers key factors to the understanding of trust in the context of virtual teams. For example, members of virtual teams may exhibit trust based on: a) their social interaction with each other (i.e., an

interpersonal approach), b) their individual psychological characteristics (i.e., a psychological approach), and c) the opportunities and constraints imposed by the virtual team context (i.e., a situation-specific effect explained by the interpersonal approach).

In the next two sections, the two multidimensional approaches (McAllister, 1995; McKnight, et al., 1998) are described in more detail. In addition, some of their components are combined into a new multidimensional approach that reflects trust in virtual teams. The first model focuses on dyadic relationships and the second emphasizes initial trust in new organizational relationships.

2.4.1 Model of dyadic trust

Drawing from a social psychology approach, Mayer, et al., (1995) developed a model of dyadic trust that focuses on characteristics of the trustor and trustee within an organizational setting (Figure 3). The model supports the notion that a party will be willing to trust others based on perceived personality traits of the other party. This approach has two intrinsic and fundamental assumptions: First, traits of the trustee lead to general expectations about the trustworthiness of others. Second, different people may perceive personality traits of others differently. The traits of the trustee are defined in terms of ability, benevolence, and integrity. These traits express what is called factors of trustworthiness, which provide a foundation to the understanding of trust for another party.

Ability refers to the set of personal skills and competencies related to a specific task. Thus, it is the extent to which the trustor perceives the trustee to

possess a set of personal qualifications relevant to some specific domain that enables the trustee to be perceived competent. While some authors have adopted the ability construct (e.g., (Cook & Wall, 1980); Deutsch, 1960; (Jones, James, & Bruni, 1975); and Sitkin and Roth, 1993), others (e.g., (Butler, 1991); (Butler & Cantrell, 1984); Kee and Knox, 1970; Lieberman, 1981; and Rosen and Jardee, 1977) have used competence as a similar concept. Even though these two concepts are usually treated as synonyms, Mayer, et al., (1995) argue that the ability construct better captures task and situation specific elements.

Benevolence represents the extent to which the trustee is perceived to be willing to do good to the trustor Mayer, et al., (1995). Therefore, it implies a relationship between the trustor and trustee in which the trustee is assumed to have a positive orientation toward of the trustor without an egocentric profit motive. According to Mayer, et al., (1995), several researchers have already adopted benevolence when studying trust between parties (e.g., Larzelere and Huston, 1980; Solomon, 1960; Strickland, 1958), while others (e.g., Butler and Cantrell, 1984; Frost, et al., 1978; Hovland, et al., 1953) have adopted similar constructs such as loyalty, altruism, and motivations to lie.

Finally, ***integrity*** refers to the extent to which the trustor perceives the trustee to adhere to a set of principles that are acceptable by the trustor (Mayer, et al., 1995). Several scholars (e.g., Butler, 1991; Hart, et al., 1986; Lieberman, 1981; Ring and Van de Ven, 1992) have used integrity or similar constructs as antecedents to trusting behavior.

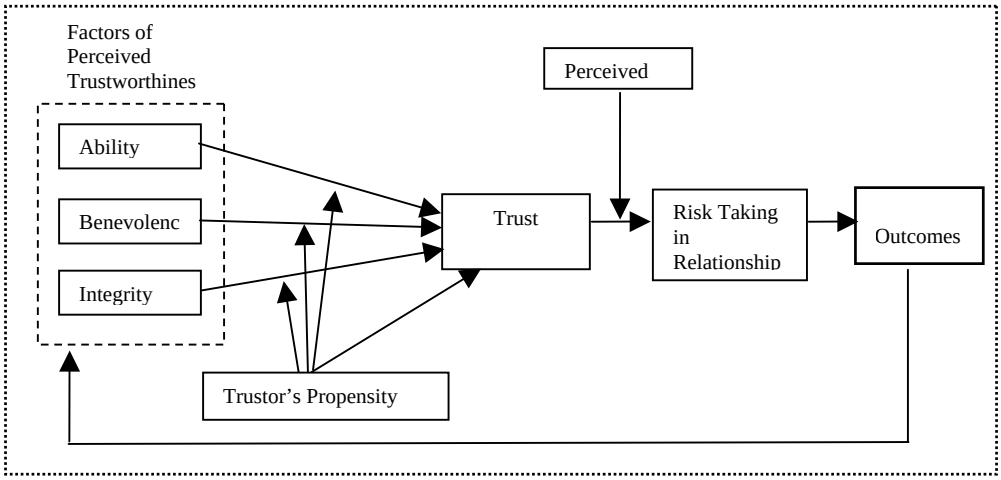


Figure 3: Dyadic Model of Trust
(Mayer, et al. 1995)

Mayer, et al.'s (1995) dyadic model also employs the concept of propensity to trust, which is similar to disposition to trust as described by McKnight, et al. (1998). Propensity to trust is an inherent personality trait that reflects different developmental experiences, personality types, and cultural backgrounds of each individual. It develops and changes over the years and is very stable in shorter periods of time. It explains situations where an individual would be willing to trust others regardless of the contextual elements, thus it is a personality trait of the trustor that is stable across situations.

Another relevant contribution of this model is the attempt to clarify misunderstandings between trust and risk, their integrative model of organizational trust establishes an important distinction between trust and its outcomes by

assuming that the act of taking risk is different from trust. While trust is the willingness to assume risk, behavioral trust (i.e., the outcome of trust) is the act of risk taking in the relationship. In this sense, "*one does not need to risk anything in order to trust, but one needs to take a risk in order to engage in trusting action"* (p.724). Thus, trust does not necessarily involve a risk taking behavior, but risk taking behavior is inherent in the manifestation of trust.

Nonetheless, while Mayer, et al.'s (1995) model focuses on a dyadic relationship, it lacks the ability to capture how trust unfolds within a social system. Finally, it does not address initial trust developments in contexts where people do not have a previous history of interaction as it is the case of virtual teams. To overcome these limitations, in the following sections it is described an additional theoretical approach that addresses these questions.

2.4.2 Model of initial trust in new organizational relationships

McKnight, et al. (1998) theorized on trust based on assumptions that members who engage in new organizational relationships may exhibit high initial levels of trust. This theoretical development helps to understand why recent research (e.g., Kramer, 1994) apparently contradicts past literature on trust that adopted an approach in which trust develops gradually over time. In other words, past cumulative research on trust relied on the assumption that people who meet for the first time tend to exhibit low levels of initial trust. Nonetheless, when studying MBA students who have never met before, Kramer (1994) found that these students exhibited high levels of initial trust. While Kramer (1994) results seem to contradict

previous findings, McKnight, et al. (1998) distilled this apparent paradox by identifying unseen factors and processes that explain why trust can be high when organizational members first meet.

McKnight, et al.'s (1998) model is based on four major research streams (Figure 4): 1) personality; 2) calculative; 3) institutional; and 4) cognitive. The ***personality*** approach is defined in terms of *faith in humanity*. It expresses to extent to which one perceives others as trustworthy based on one's beliefs about human nature that reflect already developed patterns of thinking about relationships in general. This happens when a person has little or no situational information available to draw on other reasons. In addition, the ***calculative*** approach defined in terms of *trusting stance* represents the extent to which one is willing to rely on others because outcomes are expected to be better when doing so. Both faith in humanity and trusting instance encompass what is called disposition to trust, a salient construct that is related to novelty situations where organizational members are new and do not know each other. In these situations, group members operating in novelty situations perceive others based either on their earlier psychological developments or on their beliefs that things will turn out best when willing to depend on others given that their situational information available is scarce. Taken together faith in humanity and trusting instance reflects a general tendency of people to consistently depend on others across a broad variety of situations and persons (i.e., **dispositional to trust**). For instance, it reflects trustor beliefs that are independent of the trustee personal characteristics and it is closely related to the propensity to trust as described by Mayer, et al. (1995).

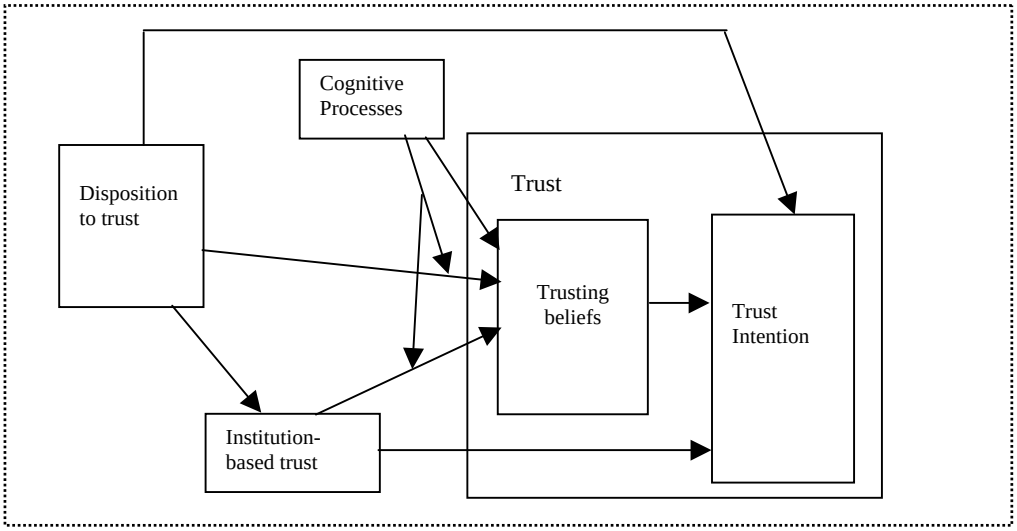


Figure 4: Model of Initial Trust in New Organizational Relationships (McKnight, et al. 1998)

The ***institutional*** approach to trust refers to impersonal structures such as contextual conditions and situational normality that enable one to act in anticipation of a future successful interaction (e.g., Shapiro, 1987; Zucker, 1986). It is described in terms of two major constructs: situational normality beliefs and structural assurance beliefs. The former reflects contexts where people perceive things to be normal or in proper order such as when someone uses procedures that have already been successfully used in the past. This situation is also represented by a social system where a shared understanding among members has already been built, thus characterizing a safe environment that makes the person to feel comfortable with other's role in that setting. The latter refers to institutional safeguards such as regulations, guarantees, and legal resources that enables one to believe that individuals are trustworthy in situations where information about other

person is very incomplete due to the limited or lack of interpersonal relationship experiences with each other. In this situation, the institutional safeguards operate as a control mechanism that provides assurance to people's expectations, minimizes perceived risks, or establishes a comfortable environment in which the trustor person believes that the trustee will behave according to norms of the surrounding environment.

While the institutional dimension describes processes that underlie high initial trust in new organizational relationships, it has limited power to explain interpersonal relationships in virtual teams addressed by this research for the following reasons:

- the context of virtual teams in this dissertation includes a project in which group members have never worked before; thus it is unlikely that group members will anticipate future successful interactions based on procedures that have been successful in the past;

- the virtual setting and the use of novel technological structures such as collaborative technologies forces virtual members to face unusual situations. In other words, it is very unlikely that group members will feel that the virtual environment is safe and secure, given that it may be their first and unique experience in such an environment;

- while contracts (and other legal methods) may operate as organizational remedies, acting as impersonal mechanisms to foster organizational

legitimacy as a substitute for the lack of interpersonal trust, previous research has argued that such control mechanisms are often ineffective at the individual level (Argyris, 1994; Donaldson and Davis, 1991; Granovetter, 1985; Sitkin and Roth, 1993). Therefore, this research focuses on group development issues that unfold over time excluding any contractual, guarantee, or legal sources to manipulate group members' perceptions and expectancies in regard to their group partners. Thus, this study treats contractual affects as a control variable.

Cognitive processes refer to group members' perceptions based on cognitive cues or first impressions rather than group interaction patterns (i.e., personal interactions) over time. For instance, cognitive processes are expressed in terms of categorization processes and illusions of control. While categorization processes are a set of one's perceptions based on perceptions of common goals and values shared among people (i.e., unit grouping), reputation of members, and stereotyping such as voice tone or physical appearance, illusions of control refer to processes that help people build trust through personal perceptions that differ from reality based on people's initial effort to think about another person's turstworthiness or upon immediate attempt to gauge whether or not they influence that person in some small way (p.481).

McAllister's (1995) model of affect and cognition-based trust also focused on cognitive elements. Grounded on previous work (e.g., Lewis and Wiegert, 1985; Johnson-George and Swap, 1982; Rempel, Holmes, and Zanna; 1985), McAllister's

(1995) arguments distinguished two major forms of interpersonal trust: cognition-based trust and affect-based trust. In the same line of reasoning, but at an organizational level of analysis, Cummings and Bromiley (1995) also proposed and empirically tested a model of trust that explicitly recognizes three major dimensions: affective (the way people feel), cognitive (the way people think), and behavior (the way people intend to behave).

Cognition-based trust is a form of trust that is related to the set of individual's expectations such as individual beliefs about peer reliability and dependability that need to exist for trust relationships to exist and develop (Zucker, 1986). Affect-based trust represents emotional bounds such as reciprocated interpersonal care and concern between individuals (Lewis and Wiegert, 1985). When differentiating cognitive-based trust from affect-based trust, McAllister (1995) argues that in many organizational situations some forms of cognitive-based trust such as dependability and faith (Pennings and Woiceshyn, 1987) moderate interpersonal affect-based trust components (Granovetter, 1985; Griesinger, 1990; Pennings and Woiceshyn, 1987). Thus, people need to have developed some levels of peer dependability and reliability before they engage into emotional relationships (Johnson-George and Swap, 1982). In other terms, interpersonal affect is developed upon cognitive developments (Holmes and Rempel, 1989; Rempel et al., 1985). According to Jarvenpaa, et al. (1998) both cognitions and affect can be captured by the trusting beliefs construct.

This dissertation adopted a theoretical approach based on trust models developed by Mayer, et al. (1995) and McKnight, et al. (1998) because they include several elements that reflect the development and maintenance of trust in social relationships that extend over time. A synthesis of these ideas along with an explanation on how they contributed to this dissertation is presented below.

2.5 Social Constructionist Perspective

More than three decades ago, Berger and Luckman (1967) published a book that made a great impact on the discipline of sociology. Their book – *The Social Construction of Reality* – developed a framework of sociological analysis that explored central ideas of knowledge and the relationship between objective and subjective reality by radically changing the way we understand ourselves. The social constructionist perspective suggests that human social order is produced through interpersonal negotiations and implicit understandings that are built up via shared stories and experiences. In this sense, through interpretation processes, virtual team members make patterns of meanings out of their activities in the electronic environment. Both the context and the results of their interactions influence how they perceive and "objectify" organizational elements around them. Thus, beliefs held by members of a group determine to what extent meanings of terms are sustained and invented. In other words, knowledge of social and symbolic interaction helps to predict individual's cognitions and behavior.

An important analysis offered by Berger and Luckman (1967) is the distinction between objective and subjective reality. The objective reality refers to

facts of every day life that appear to be real or given to those who 'inhibit' it. These are shared definitions of reality and established patterns of acting become taken for granted as realities, which are constructed, confirmed, and reproduced over time. This dimension of reality offers some key ideas to the understanding of task in virtual teams. For example, when we conceive of tasks as an organizational object with inherent fixed characteristics that may change as a function of the institutional environment rather than human actions the role of an objective reality is emphasized.

The subjective reality recognizes that human beings have the capacity to adapt their environments to their purposes through a process of reflection. It is through interaction with others in a given situation that the subjective reality takes it form. Thus, it offers an alternative approach that allows us to conceive task as a subjective reality that takes it form based on virtual team members' perceptions that evolve over time.

Other theories that have subscribed to social constructionist ideas include structural symbolic interactionism (Stryker and Statham, 1985), social information processing theory (Salancick and Pfeffer, 1978), social learning theory (Bandura, 1986), and group conformity theories (Fulk, 1993). Specifically, research on communication media in organizations has applied three major streams: structuration (Poole and DeSanctis, 1990), symbolic interactionism (Trevino et al., 1987), and social influence (Fulk, et al., 1987). These theories have focused on social interaction aspects that facilitate coordinated actions and creation of shared

meanings among situated actors. Interestingly, even though current literature has demonstrated a growing interest in social constructionist models, application of such models in the MIS area is in its infancy, with a few exceptions (Fulk et al., 1995).

A summary of these ideas focusing on how they apply to the study of virtual teams is described in the next section. Specifically, the application of the social constructionist approach to the understanding of perceptions of task characteristics is addressed.

2.6 Perceptions of the Task

Task has been found to be a key determinant of the group performance variance (Poole et al., 1985). Thus, it is almost impossible to study task groups not taking into account differences in group processes and performance that are caused by different types of task. In the last decades researchers studying groups have devoted a considerable time of their work on defining and identifying different task types and impacts on group work. For instance, McGrath (1984) has proposed an integrated conceptual framework, called Task Circumplex, which has been used in the MIS literature (e.g., Chidambaram, 1996; Hollingshead, et al., 1993; Jarvenpaa and Leidner 1999; Kahai and Cooper; 2003; Miranda and Bostrom, 1993; Montoya-Weiss, Massey, and Song; 2000; Montoya-Weiss, Massey, and Song; 2001; O'Connor, et al., 1993; Vician and DeSanctis, 2000).

2.6.1 McGrath's task circumplex

The task circumplex has four quadrants (generate, choose, negotiate, and execute), each of which is composed of two different types of task (see Figure 5). In

addition, each quadrant is situated along two orthogonal axes. The first dimension shows whether a task is conceptual or behavioral (based on the basis of outcome) and the second dimension shows if a task requires cooperation or conflict resolution (based on the type of behavior of group members) among the group members.

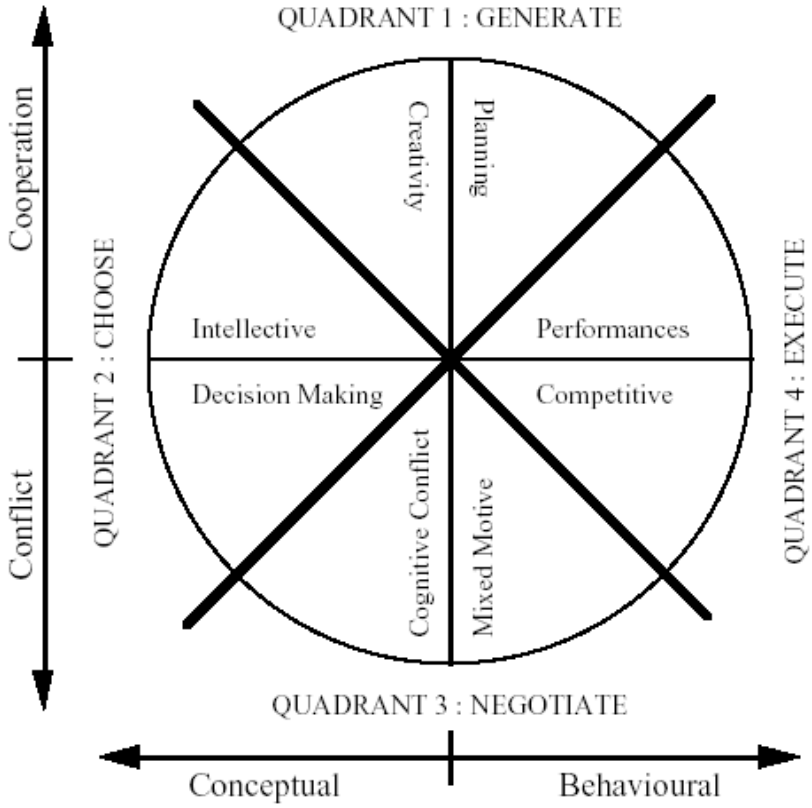


Figure 5: The Group Task Circumplex
(McGrath, 1984)

For example, the upper part -- the cooperative dimension – includes intellective tasks, creativity tasks, planning tasks, and performance tasks. This dimension reflects situations where members have to combine their efforts without conflict or trade-off. On the other hand, the lower part -- conflict tasks – includes

tasks in which members strive to resolve conflictive issues such as different preferences, viewpoints, interests, and power. Tasks in this dimension are decision-making tasks, cognitive conflict tasks, mixed-motive tasks, and contests tasks, respectively.

According to McGrath (1984), different types of task stimulate group members to operate in different modes. As a result, groups exhibit different processes and outcomes. For example, when a group is performing a planning task, it is expected that group members will operate in a cooperative mode. In this case, the group will work to develop a course of action to achieve an already defined objective. However, when a group is performing a cognitive conflict task, group members will resolve conflicts related to different viewpoints. Thus, group members are expected to exhibit greater conflict.

2.6.2 A Social Constructionist approach to task characteristics

While McGrath (1984) model and similar approaches have offered important theoretical contributions for MIS literature, in general they have not considered the fact that group members may perceive task characteristics differently as individuals' interaction evolve over time. In other words, these approaches sustain the following assumptions:

- Task has inherent characteristics (i.e., objective properties) that do not change despite group's interaction and performance over time.

- Task characteristics are expected to be the same across different settings and uses.

- Limited space is given for users' development of different perceptions over time.

To overcome limitations explained above, this research uses the task circumplex as a means to identify task inherent characteristics that are latent at the very beginning of group processes, that is, at the earlier stages of group task working behavior. However, it also recognizes that members' perceptions of task characteristics may change over time as group members engage in a set of activities, which result in different patterns of interaction that in turn reflect in members' perceptions differently. To fully understand how these processes evolve and how members may perceive task characteristics to be different over time, such processes are further described in light of the Social Constructionist Perspective, which provides an alternative way of conceptualizing task characteristics.

The social constructionist perspective allows us to define task characteristics as a an organizational element highly susceptible to reinterpretation and social construction in that the impact of task on work groups can not be reproduced independently of human action and interpretation (Robey and Azevedo, 1991). Furthermore, applying social constructionist approach task can be conceived as an organizational element that exhibits interpretive flexibility. In this vein, characteristics of the task are open to more than one interpretation and they can mean different things for different individuals or different groups. The social constructionist role is to

identify this process and how and why characteristics of the task come to assume one particular form from a range of possible alternatives. As a result, task dimensions as proposed by McGrath (1984) may vary from group to group as a result of the individual's social interaction over time.

2.6.3 Contributions of the dynamic models

The following list summarizes the key contributions of the dynamic approaches to this study:

- They view collaborative technologies as having properties, which can change as a result of members' use over time.
- They highlight the impact of contextual influences on the way people interact. For instance, members of virtual teams have different contextual influences compared to those in collocated teams. Furthermore, the context of media use affects media and task characteristics in ways that can be perceived differently by different team members.
- They emphasize the critical role that human actions play when understanding technology, group processes and outcomes. In other words, dynamic approaches offer mechanisms to conceive organizational elements as susceptible to various interpretations based on users' individual perceptions that develop over time.

- They highlight the importance of social mechanisms that emerge from the interaction between technology and users by focusing on group interaction processes and their unfolding influences over time. Thus, such approaches deny hierarchical and fixed classifications of technology and other elements.

- When applying dynamic perspectives, trust is conceived of as a crucial socio-emotional element to the existence and maintenance of the group in virtual teams. As a result, over time groups will spend time focusing both on task demands and on the development of social relationships such as trust. Thus, managerial choices are viewed as being the interplay between task and social needs rather than pure instrumental and rational choices.

2.6.4 Contributions of the trust literature

- Disposition to trust provides relevant information on how members trust each other at the very early stages of group interaction.

- Over time, as members of virtual teams interact, it is likely that perceptions of the trustor regarding the process and group experiences will reduce the impact of disposition to trust.

- Given that disposition to trust is a set of intrinsic personal characteristics of the trustee that develops over a long period of time, the nature of this construct might not change over a relatively short period of interaction.

- Mayer, et al.'s (1995) model does not fully describe the outcome elements that are part of the relationship between trustor and trustee.

- McKnight, et al.'s (1998) focus on initial interpersonal interactions does not include influences of members' perceptions and experiences in relationships that extend over time.

- Both Mayer, et al. (1995) and McKnight, et al. (1998) indicate that the extent to which a party is willing to trust others is affected by a set of trustworthiness factors (i.e., trusting beliefs).

- Both Mayer, et al. (1995) and McKnight, et al. (1998) emphasize the role of the context and patterns of previous behavior as parties interact over time in order to model how the impact of trust antecedents (i.e., ability, benevolence, and integrity) unfold over time.

- Both models recognized that the outcomes of trusting behavior can influence trustor perceptions, which in turn can affect levels of trust.

2.6.5 Contributions of the social constructionist approach

The following list summarizes the key contributions of the social constructionist approach to this study:

- It highlights the impact of the group work context on the way task characteristics can be perceived differently by different team members.

- It emphasizes the critical role that human actions play when working on a task. In other words, similar to dynamic approaches to media use, the social constructionist view highlights mechanisms to conceive of task characteristics flexibly so that they can change as the result of various interpretations based on users' individual perceptions that evolve over time.

- It addresses the importance of social mechanisms that emerge from the member' social interaction by focusing on group interaction processes and their unfolding influences over time. This approach denies fixed classifications of the task over time.

- It offers a subjective view on the way we conceive task.

In the next chapter, major components of the dissertation model are presented along with a set of hypotheses that identify relationships among each variable.

3. RESEARCH MODEL AND HYPOTHESIS

3.1 Model Overview

The interactions between variables such as task perceptions, setting, perceptions of the social interaction, and trust tend to vary according to a group's development stage, thus generating different outcomes over time. This argument is based on the Time Interaction Process (TIP) Theory proposed by McGrath (1991) who articulated that time plays an important role in determining group processes and performance. Many studies (McGrath, et al., 1993, Hollingshead, et al., 1993, Gruenfeld and Hollingshead, 1993, O'Connor, et al., 1993, Galegher and Kraut, 1994, and Qureshi, 1998) have subscribed to this view and applied longitudinal research methodologies in which interaction patterns and outcomes were observed and examined over time.

In addition, in the virtual setting few clues exist about other's abilities, motivations or work patterns due to the fact that team members do not share the same physical space, do not (or rarely) see each other, and work with people with whom they have never worked or even met before (Walther, 1992). As a result, members need to compensate this lack of social mechanisms by trusting each other (Jarvenpaa, et al., 1998). Therefore, trust is a vital element for effective interaction and success of virtual team enterprises (Jarvenpaa, et al., 1998; Lipnack and Stamps, 2000).

The central tenet of our theory is this: Members of a virtual team need trust to perform well and given appropriate time they will ultimately develop trust, which will enhance performance. In addition, since organizational elements are socially constructed through members' interaction, members will develop perceptions of the task characteristics and their social interaction differently over time, thus, varying group processes and outcomes. As a result, the development of trust and the completion of group outcomes will vary according to members' perceptions over time.

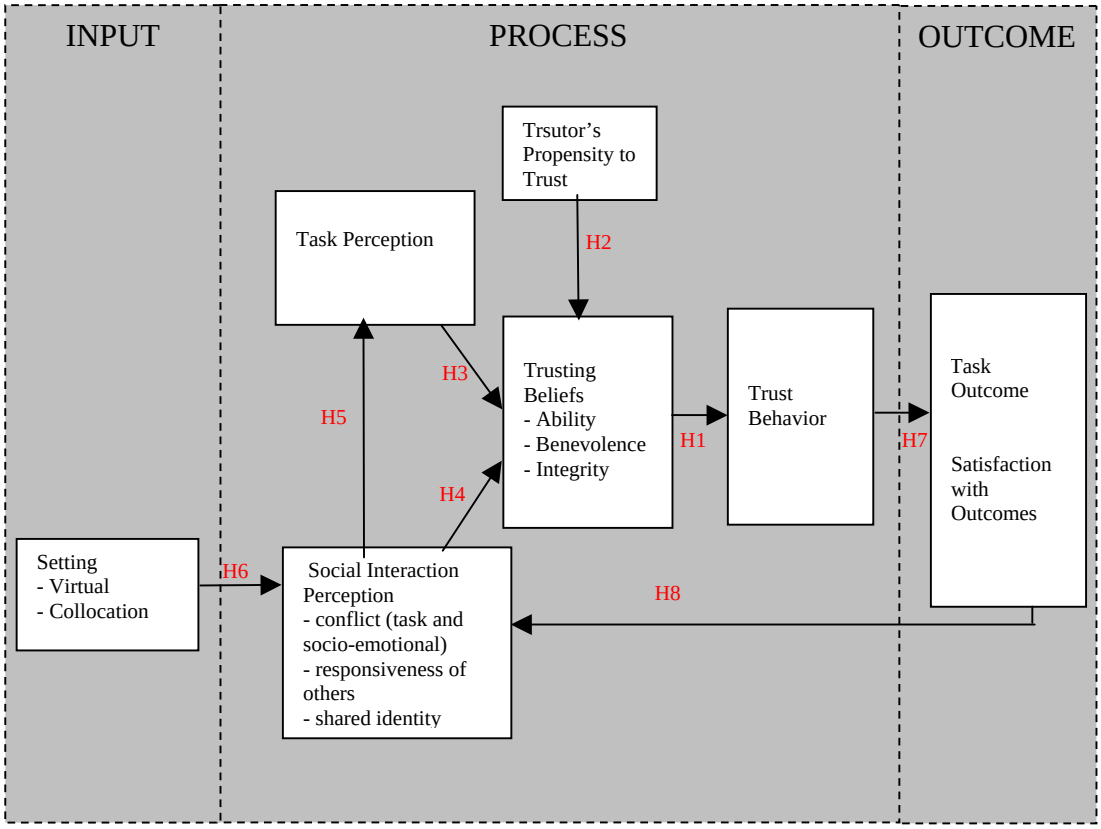


Figure 6: The Research Model.

In particular, the research model is applicable to contexts where member's tasks have a high degree of interdependence and measures of performance are based on group outcomes. Where all members of a group are working towards common group goals, our model suggests that trust behavior will affect group outcomes. However, in cases where individuals are working towards personal goals, members may not place their trust in others indicating that trust behavior in such circumstances is unlikely to affect group outcomes. In essence, the boundaries of our model apply to those group settings where all members of the group are working towards a shared set of group goals.

Below the research model (Figure 6) for this study is presented and in the following sections its various components are described. Since the major focus of this dissertation is on trust behavior, we discuss it first and then trace its antecedents. Finally, we conclude by describing the consequences, i.e., outcomes.

3.2 Trust Behavior

When operating in a virtual context, individuals not only bring their existing motivations and perceptions of the world expressed in terms of disposition to trust but also develop and change previous perceptions based on situations in which they are embedded through interacting patterns that differ from those of the collocated teams. Therefore, based on Mayer, et al. (1995) and McKnight, et al. (1998) we adopt a multidimensional approach to trust in which both personal (i.e., individual's disposition to trust) and interpersonal dimensions (i.e., trusting beliefs) allow us to capture how trust unfolds over time. Similar to the Mayer et al. (1995) model, this framework focuses on trust issues that unfold between two specific parties – a

trustor and a trustee – within an organizational setting. Given that individual's intentions to pursue a specific course of action in a given context and time is the best predictor of the individual's actual behavior Thus, one's intention is largely predicted by one's beliefs (Fishbein & Ajzen, 1975) and trust behavior reflects trust action as pointed out in Mayer, et al.'s (1995) model. As a result, based on Mayer, et al. (1995) and McKnight, et al. (1998), **trust behavior** is defined as *one's act of dependence on another party in a given situation even though negative outcomes are possible, which reflects trusting beliefs of the trustor in relation to the trustee.*

3.3 Trusting Beliefs

Trusting belief *refers to the attributes of the trustee* (Hovland et al., 1953), which allows us to understand the amount of trust that a given party has about another party (Mayer, et al. 1995). Following previous work on trust in virtual teams (i.e., Jarvenpaa, et al., 1998; Kanawattanachai and Yoo, 2002), trusting belief among group members is viewed as an important antecedent of trusting intention, and in turn, trust behavior. This approach is consistent with theoretical arguments that beliefs act as antecedents of intentions (Davis, 1989; Dobing, 1993; Fishbein and Ajzen, 1975; Mayer, et al. 1995).

Both Mayer, et al. (1995) and McKnight, et al. (1998) indicate that the extent to which a party is willing to trust others is affected by a set of trustworthiness factors (i.e., trusting beliefs). The importance of this trust component as an antecedent of trusting behavior has also been emphasized in the virtual team literature (e.g., Jarvenpaa, et al. 1998; Jarvenpaa and Leidner, 1999). For instance,

Jarvenpaa, et al.'s (1998) study showed that in the early phases of group interaction, integrity was found to predict the strongest level of trust while benevolence predicted the weakest level of trust. Also, members' own propensity to trust had a significant effect on trust, though it was unchanged over time. Findings of the qualitative analysis suggest that teams that developed high levels of swift trust, a form of fragile and temporary trust (Markus, 1994) outperformed those teams that developed lower levels of trust. Furthermore, based on a series of descriptive cases, Jarvenpaa and Leidner (1999) explored the challenges of creating and maintaining trust in virtual teams by analyzing communication behaviors. In their study, master's students from several universities around the world were asked to complete three tasks—two team-building exercises and a final project—in a period of eight weeks. Results supported the existence of swift trust and indicated that trust is more likely created via communication behaviors established in the initial stage of group interaction. As a result, this dissertation includes trusting beliefs as a key antecedent of trusting behavior in a dyadic relationship.

As discussed earlier, Mayer et al.'s (1995) dyadic model suggests three major trustee characteristics that explain most of the variation in trusting intentions: ability, integrity, and benevolence. In the context of virtual teams, **ability** refers to the extent to which the trustor perceives the trustee to possess a set of skills and characteristics relevant both to the task at hand and to the technology available. For instance, when interacting through communication technologies members who have greater technical expertise may be perceived as being more skilled given the characteristics of the setting. Similarly, their skills on the task they are performing

influences the way the trustor perceives the trustee. As a result, the ability construct enables to capture member's perceptions of their partners within a task and situation specific context.

Benevolence represents the extent to which the trustee is perceived to as being willing to do good to the trustor, aside from an egocentric or profit motive (Larzelere and Huston, 1980; Solomon, 1960; Strickland, 1958). Finally, ***integrity*** refers to the extent to which the trustor perceives the trustee to adhere to a set of principles that are acceptable by the trustor. Several scholars (e.g., Butler, 1991; Hart et al., 1986; Lieberman, 1981; Ring and Van de Ven, 1992) have used integrity or similar constructs as antecedents to trusting behavior.

Taken together, the three attributes of the trustee (i.e., ability, benevolence, and integrity) as suggested by Mayer et al. (1995) explain the degree to which the trustor perceives the trustee to be trustworthy, which in turn, leads to trusting intention. Similarly, Jarvenpaa, et al. (1998) adopted these trustee attributes when studying virtual teams. Finally, recent theoretical developments on trust (e.g., Jarvenpaa, et al., 1998; Kanawattanachai and Yoo, 2002; Mayer, et al., 1995) support the notion of trusting beliefs positively impacting trusting intention. Hence, we present:

H1: Trust beliefs defined in terms of ability, benevolence, and integrity will positively influence trusting behavior.

3.4 Trustor's Propensity to Trust

Trustor's propensity to trust was a construct initially proposed by Erikson (1968) and Rotter (1967; 1971; 1981). It refers to an individual's general tendency to trust others independently of the context, task, and trustee characteristics and represents traits that the trustor develops during childhood, thus including trustor culture, social development experiences, and personality type. Mayer et al., (1995) suggest that a trustor's propensity to trust is a general willingness to trust others regardless of whether people are reliable or not across a broad spectrum of different situations and is likely to be stable over time.

Building upon the work of Erikson (1968) and Rotter (1967; 1971; 1980), McKnight et al. (1998) distinguish two types of trustor's propensity to trust: faith in humanity and trusting instance. **Faith in humanity** *is a personality based trust that captures how a trustor perceives trustee characteristics at the beginning of a relationship while little or no information is available*. These perceptions occur because people have limited information about others due to the novelty of the situation (Rotter, 1971). In other words, faith in humanity has greater effects on trusting beliefs when people do not know each other personally (Goldsteen et al., 1989). **Trusting instance**, on the other hand*, refers to the intention to depend on another, regardless of the trustee attributes.* It is a calculative trust that captures the trustor's willingness to depend on others because he believes that doing so will turn out for best, even though others may not be trustworthy, that is, the likelihood of positive outcomes supersedes those of negative outcomes.

In a virtual setting, while a person's faith in humanity predicts that a team member will have a tendency to believe in other group members depending upon his/her own personal characteristics regardless of the extent to which the trustee is reliable or not, a person's trusting instance predicts that an individual intends to trust others based on calculative outcomes rather than perceived characteristics of the team members. Such effects are likely to be strongest in new relationships where people have not had much time to interact.

Mayer, et al. (1995) and McKnight, et al. (1998) have indicated the importance of disposition to trust in their models. This construct, conceptualized in terms of trustor's propensity to trust, relates to this research in the following manner:

Over time, as members of virtual teams interact, attitudes and behavioral patterns unfold enabling members to develop perceptions of others work and contributions, thus offering additional elements for trustor actions. In this scenario, it is likely that perceptions of the trustor regarding the process and group experiences will strongly define to what extent the trustor will rely on the trustee in future interactions, thus reducing the impact of disposition to trust. However, members of a virtual team start their interpersonal interaction with no previous knowledge of their virtual partners. Thus at the very initial stages of group interaction, when they have only had few opportunities to observe other members interactions, their perceptions of these members' characteristics will be limited. Such limitations on their ability to develop perceptions of the process and people will likely force them to rely on their own personal beliefs and public knowledge of others. In this sense, disposition to

trust provides relevant information on how members trust each other at the very early stages of group interaction.

Finally, given that disposition to trust is a set of intrinsic personal characteristics of the trustee that develops over a long period of time, the nature of this construct might not change over a relatively short period of interaction. Thus, in a virtual team setting where the project lasts for a short period of time, it is unlikely that its influence will significantly change over time. As a result, while disposition to trust is an important element of group interaction, this research treats it as a controlled variable given that the scope of this project is limited by a six-week time frame. McKnight, et al. (1998) also state that the time frame of the relationship is an important element that needs to be considered when predicting the influences of disposition to trust. In general, disposition to trust is likely to have a significant impact in new organizational relationships, while it may dissipate over time as a result of the effects of ongoing relationships over time. Thus, we establish the following:

H2: A trustor's propensity to trust will positively influence trusting beliefs.

3.5 Task Perception

An important body of research has dealt with the effects of different types of task on group performance (e.g., Benbasat and Lim, 1993; Carter, 1950; Kent and

McGrath, 1985; Laughlin and Shippy, 1983; Laughlin, et al., 1991; McGrath, 1984; Roby and Lanzetta, 1957, Steiner, 1972). Benbasat and Lim (1993), for example, conducted a meta-analysis on the moderating effects of task on decision quality. They found computer-supported groups performed differently when engaged in single-component tasks versus dual-component tasks. Results from other studies cited above also confirm that different tasks affect group outcomes differently.

Furthermore, according to McGrath (1984), different types of task stimulate group members to operate in different modes. As a result, groups exhibit different processes and outcomes. For example, when a group is performing a planning task, it is expected that group members will operate in a cooperative mode. In this case, the group will work to develop a course of action to achieve an already defined objective. However, when a group is performing a cognitive conflict task, group members will be resolving conflicts related to different viewpoints. Thus, group members are expected to exhibit higher degree of conflictive behavior.

While there is a great deal of research on the impact of different task types on group processes and outcomes, researchers have neglected the conception of task as a socially constructed element. In general, task type has been treated as an input variable and a fixed element that exists regardless of a group's characteristics and working patterns over time. When we adopt a social constructionist approach (Berger et al., 1967), task characteristics (i.e. task type) are the result of a group's perceptions, which can change over time.

Consequently, since members' perceptions evolve and change over time (Walther, 1996) based on how they interpret or make sense of their social situations (Fine, 1992; Prasad, 1993), a social constructionist position allows us to view task type as the result of members' interpretations over time. Thus, groups will perceive tasks to be either conflictive or cooperative depending on how members interact and interpret different situational episodes in which they are embedded (Granovetter, 1985). These different perceptions of the task will have important implications for group work. For instance, relationships will evolve differently, thereby resulting in different paths (i.e., processes) and consequently different destinations (outcomes). In other words, a group's socio-emotional tone reflects its perceptions of the task and as the group interaction evolves over time, perceptions will tend to vary, thus varying its socio-emotional beliefs in relation to others as well.

Tasks perceived as cooperative have embedded in them a high level of implicit trust. Such an environment facilitates members sharing their ideas and helping each other. It is a context where socio-emotional interaction is characterized by the assumption of members being on the same side; hence trust is evident from the start. On the other hand, tasks perceived as conflictive stimulate members to resolve divergent viewpoints in an environment of negotiations, dispute and, sometimes, even hostility. In such a context, usually the interaction is focused on individual interests and members have difficulty developing relational ties. Since trust is a socio-emotional variable, it is expected that groups perceiving cooperative tasks will have higher levels of implicit trust compared to groups perceiving conflictive tasks. In other words, the inherent levels of trust embedded in tasks will

vary based on how participants view the task. Thus, we suggest that when a task is perceived as being cooperative, members are likely to exhibit higher levels of trust compared to when a task is perceived as being conflictive.

Both Mayer, et al. (1995) and McKnight, et al. (1998) emphasize the role of the context and patterns of previous behavior as parties interact over time in order to model the antecedents of trust (i.e., ability, benevolence, and integrity). For instance, as people interact, their perceived ability may change as the dynamics of the situation of the task change. Similarly, as group members interact they develop perceptions about other members' attitudes and preferences. Such group outcomes may determine the extent to which they perceive other group members as benevolent. For instance, if attitudes and preferences are perceived as similar, they may positively influence perceptions of benevolence. In addition, the context of actions can influence perceptions of integrity in ways that virtual member's actions may not be questioned if perceived to be consistent with contextual demands or earlier decisions already taken. Therefore, the theoretical approach taken in this dissertation includes antecedents of trusting beliefs in terms of perceptions of social interaction and characteristics of the task. Hence:

H3: Cooperative perceptions of the task will positively influence trusting beliefs.

3.6 Social Interaction Perception

Perceptions of the social interaction refers to the extent of experiences and relationships that group members share, which allows them to develop an understanding of another's behavior (Gabarro, 1978). The literature strongly suggests the influence of members' previous behavior and attitudes on subsequent stages of group interaction. We define perceptions of social interaction in terms of responsiveness of others, amount of shared identity, and task-related conflict and relationship conflict.

Responsiveness of others refers to the extent to which a member is responsive to others requests. A virtual team member who posts requests to other members most often expects others to provide some type of response. Past research suggests an increased perception of cooperation among members is associated with a greater degree of responsiveness (Gefen and Ridings, 2002). In other words, when virtual members respond to a request quickly and often, they increase the reciprocal nature of interactions, thereby increasing the sense of "groupness" and helping the development of trust.

Amount of shared identity refers to the extent that an individual identifies with his or her team members. Individuals evaluations of others actions and behaviors are influenced by their view of shared group identity (Levine and Moreland, 1987). Mannix et al. (p.237) have found shared identity to be a critical element of virtual work teams.

The literature on conflict (Deutsch, 1969) has suggested two dimensions of conflict: task-related conflict and relationship conflict. Task-related conflict also called issue-related conflict, refers to issues related to the task at hand and may have several positive functions. For instance, it may act as the medium through which problems can be discussed and solutions can be found, thus helping groups to leverage their outcomes. Relationship or interpersonal conflict, on the other hand, is targeted at persons within the group and can be detrimental to group work by increasing levels of the intensity of negative attitudes toward the other side. As discussed earlier, studies on GSS (Miranda and Bostrom, 1993) have also adopted such a distinction.

Over time group members develop a capacity to predict one's partner's response and the quality of performance based on a deeper understanding of another's behavior. This ability is a function of experiences and the number of relationships among group members (Gabarro, 1978). For example, individuals working in collocated teams can get a better feel of others' abilities and needs than individuals working in virtual teams because collocated team members are physically close to each other and often can easily interact with other members. In addition, the more ongoing opportunities individuals have to communicate with each other, the better are their chances to predict other's behavior based on their experiences. In short, trust develops over time as one accumulates relevant knowledge through interaction with other persons (Holmes, 1991; Lewicki and Bunker, 1995).

Parties cultivate their knowledge of each other by gathering data, seeing each other in different contexts, experiencing each other's actions. Similarly, the quantity of information shared will influence trust expectations among members (Butter, 1999). For example, while some virtual members might be located in different countries, at some point in time, members of this virtual team would exchange and share information about each other. As a result of such an information gathering process, individuals get to better know others, thus changing or reinforcing their perceptions of the trustees. It occurs when one has enough information about others to understand them and to accurately predict their likely behavior (Lewicki and Bunker, 1995 p.142). Therefore, the patterns of responsiveness and validation that have characterized the relationship in the past lay the foundation for predicting how the trustor may perceive the trustee (Boon et al., 1991). Piccoli and Ives (2003) empirically confirmed these arguments when studying virtual teams. Their results suggested that members engaged in frequent interactions maintained high levels of trust and exhibited better performance in comparison to members of groups with low levels of trust. Thus, in the virtual team environment, the **history of social interactions** *refers to the particular history of the previous group interactions that profoundly affect how a person will perceive others to be trustworthy* and therefore engage in future trusting behavior. Hence, we propose:

H4: Perceptions of the social interaction will positively influence trusting beliefs.

H5: Perceptions of the social interaction will positively influence cooperative perception of the task.

3.7 Virtual Setting

Taking into consideration the setting within which group members are embedded (Granovetter, 1985), we recognize that the social context within which individuals behave (Bellah, et al, 1985; Etzioni, 1988; Kramer and Messic, 1995; Selznick, 1992; Wilson, 1993) that both shapes and is shaped by long-term social connections between individuals and organizational forms (Kramer & Tyler, 1995). Furthermore, communication among group members is set within particular contextual parameters and constraints (Lewicki and Bunker, 1995 p.133). As described earlier, new organizational forms have evolved, and increasingly research has started to focus on the emerging contexts of these virtual teams (e.g., Burke and Chidambaram, 1999; Jang, et al., 2002; Lonchamp and Muller, 2001; Maznevski and Chudoba, 2000; Mortensen and Hinds, 2001; Sarbaugh-Thompson and Feldman, 1998; Schlichter, et al., 1998; Vogel, et al., 2001; Turoff, et al., 1993).

In an environment where people are geographically distant from each other and interact only through technological means, group interaction and outcomes might suffer due to distance and communication constraints such as members difficulty in collaborating (Lipnack et al., 2000), low levels of social presence (Short et al., 1976), lack of immediate feedback (Daft et al., 1984), and social loafing (O'Hara-Devereaux et al., 1994). Furthermore, communication among group

members is set within particular contextual parameters and constraints (Lewicki and Bunker, 1995 p.133). Hence, the work setting of a group influences the extent to which individuals gather trust information about others.

Furthermore, given that organizational members in a collocated setting make use of multiple cues to communicate and evaluate members, they are likely to have better perceptions of their team members in comparison with virtual team members. However, given enough time for virtual groups to interact, they will adapt existing media including lean electronic media to exchange relational information and develop perceptions of their team members (Walther, 1992). In other words, virtual team members are expected to exchange relational information over time and thus improve their ability to evaluate other members and develop better perceptions of social interaction. Then, we offer the following:

H6: Over time, members of virtual team will develop perceptions of social interaction at higher levels than members of collocated teams.

3.8 Intermediate Outcomes and Process Satisfaction

In the context of virtual teams, studies (e.g., Potter and Balthazard, 2000; Ryssen and Godar, 2000) have shown that clear links exist between group processes and group outcomes**.** Potter and Balthazard (2000) focusing on integrative negotiation using subjects located in China and in the US found that subjects from both cultures reported that virtual groups did not perform as well as

collocated teams. Such differences were attributed to a lack of understanding about the negotiating partners in the virtual context since group members could not see each other or freely interact. Ryssen and Godar's (2000) case study examined the role of task in a distance education environment involving American and Belgian students. They found that students shifted focus from task to communication when they had communication problems such as the lack of responses among group members. However, when trust was established among subjects these issues became easier to manage, thus increasing project effectiveness. In summary, along with theoretical work on group development, these studies provide empirical support for the link of group process factors such as trust with regard to group outcomes. Hence, we establish:

H7: Trusting behavior will positively influence task outcomes and satisfaction with outcomes.

Trust can be viewed in two ways – as a rational outcome based on individuals' recognition of the potential benefits of their continued interaction and as a by-product of the embeddedness of individuals in a web of social relations such that values and expectations are commonly shared. In the former, trust may be difficult to develop among antagonists, while, in the latter, groups well endowed with trust will reap the benefits of cooperation while those without it are doomed to suffer.

While Mayer, et al.'s (1995) model highlights the role of the context and the patterns of previous interactions on outcomes of trusting behaviors, it does not fully describe the outcome elements that are part of this relationship. As a result, this

research project opens the black box of outcomes by including variables such as task outcomes and perceptions of the process in order to observe how the antecedents of trust (i.e., ability, benevolence, and integrity) unfold over time. Furthermore, given that McKnight, et al.'s (1998) focus was on initial interpersonal interactions (i.e., on an individual's disposition to trust or on institutional cues that enable one person to trust another), they exclude influences of members' perceptions and experiences in relationships that extend over time. Thus, to address trust in virtual teams, longitudinal studies are necessary to observe social interaction processes and their influences on the antecedents of trust. The model developed in this dissertation accounts for such social interactions and their influences on group processes over time.

Furthermore, the outcomes of trusting behavior can influence trustor perceptions, which in turn can affect levels of trust. For example, in interactions that last several weeks, a virtual member that performs poorly in one of the meetings may be perceived as less trustworthy by other virtual members in the following meetings. On the other hand, virtual members may perceive someone that does a very good job as more trustworthy over time. Hence, this research project incorporates the feedback effects of group satisfaction and task outcomes on individual's perceptions over time. Therefore, we recognize the extent to which trust is neither chosen nor embedded but instead learned and reinforced, hence a product of ongoing interaction and discussion (Powell, 2000). Several scholars (e.g., Rempel et al, 1985; Rotter, 1980; Zand, 1972) have found that trust develops and changes over time as the result of on-going interactions and experiences.

Therefore, grounded in this perspective, in groups that meet more than one time, perceptions of the social interaction is expected to develop based on outcomes of previous interactions (Granovetter, 1985; Shapiro, 1987). Hence:

H8: Over time, task outcomes and satisfaction with outcomes will influence perceptions of the social interaction.

4. RESEARCH DESIGN AND METHODOLOGY

This chapter describes operationalization of the variables, hypotheses, the research project implementation, and statistical analysis of the data. In order to increase internal validity of the study, the research method employed a longitudinal laboratory experimental design (Campbell, Stanley, and Gage, 1981). While such a design may limit the external validity of the results, it offers a great deal of rigor to test theoretical assumptions by helping to build a body of scientific evidence. The experiment was conducted in two parts: pilot testing and the actual study. The pilot study served as a testing tool for the actual study by providing insights on the research procedures before the actual experiment was conducted. Using results of the pilot study, the research design was reviewed and appropriate changes made. In the next section, the research design is discussed followed by a description of results of the pilot study.

4.1 Overview of the Research Design

This study focuses on group development processes in the context of collaborative technologies. It is argued that group processes and perceptions of trust will vary as a function of the type of the environment within which a group interacts. For instance, groups using collaborative technologies in a distributed mode will exhibit different group processes compared to those groups using the same technology in a collocated mode. These differences in group process will reflect in different perceptions of the task, development of trust, and evolution of

group outcomes. These arguments are based on dynamic perspectives of group interaction such as described earlier. In addition, this study is built upon previous work on collaborative technologies and the social constructionist literature.

4.2 Research Design

This study employed a longitudinal repeated-measures design to examine group processes and outcomes over time. The variable manipulated was setting type - virtual vs. collocated.

In this study, 503 students enrolled in a basic undergraduate MIS course (MIS 2113 computer based information systems) sections during the Fall semester participated in the experiment. The MIS 2113 course was taken by students with a business or aviation major or business minor and offers an introduction to the principles and practices of the management of information systems. Students discussed topics such as database management, systems development, ethics, electronic-commerce, and software and hardware components. The course was divided into two modules: the lecture and the lab. In the lecture module, management information system concepts and terminologies were discussed, while in the lab module students learned how to write basic HTML programs and work extensively on Microsoft Access by developing a variety of databases. The lab component had fourteen sections with a maximum of 35 students in each section.

In each 2113 lab section, subjects were randomly assigned to groups. In addition, sections were assigned to experimental treatments based on their scheduled day of the week. Out of the total of fourteen sections, seven sections met

on Mondays and seven sections met on Wednesdays. In both days, sections met from 9:00 a.m. to 7:15 p.m. There was a 15 minute break time between each section. Therefore, in order to make the logistic of the experiment possible since all sections met in the same room, virtual teams met on Wednesdays, while face to face teams met on Mondays. This treatment condition, allowed the researcher to prepare the lab room at the beginning of each day before groups met according to the treatment condition.

All MIS 2113 students participated in a group project developed and tailored to meet the requirements of this research design and of the course work. The project consisted in developing a database system including forms, reports, queries, and a switchboard. Students were randomly assigned to groups of three, four or five depending on the number of students in each lab section. The total number of groups was 105. After groups had been randomly formed and assigned to different treatments (i.e., the independent variable), they met six times for a total of approximately seven hours, including the training session.

At the end of each group meeting, questionnaires that assess members' perceptions with respect to the variables examined in this study were administered. Also objective measures of task outcome (i.e., grades obtained in each stage of the group project) at the end of each meeting, excluding the training session were collected. Other structural variables were either controlled or randomized to minimize their effect in this study.

The study was designed to measure the differential impacts of the meeting environment on the development of group process variables such as trust, perceptions of the task, and perceptions of the social interaction, and group output variables such as task outcomes and group satisfaction with the process and outcomes.

This study addressed the following variables: perceptions of the task, trusting beliefs in terms of ability, integrity, and benevolence, perceptions of the social interaction as defined by task-related conflict, socio-emotional conflict, shared identity, and responsiveness of others, trusting behavior, satisfaction with the process and outcomes, and task intermediate outcomes.

VARIABLE	**OPERATIONALIZATION**
Independent Variables: Meeting Environment	
Collocated Synchronous	Same room – same time; can talk face-to-face
Distributed Synchronous	Same room – same time; but cannot see or talk to partners face-to-face
Controlled Variables: Technology	All groups have the same set of technological tools (e.g., Yahoo! Groups)
Task	Database project (developed for this study)
Training	The same script for all groups
Group size	Four or five members (randomly assigned)
Individual Differences	Random assignment of members to groups

Controlled Variables:	
Time allowed (three levels)	One hour and fifteen minutes each session
Session	One session total
Task	Five sessions total
Training	One session total
Process Variables:	**Post session questionnaire**
Trusting beliefs:	
Ability	Jarvenpaa, et al. (1998)
Integrity	Jarvenpaa, et al. (1998)
Benevolence	Jarvenpaa, et al. (1998)
Perceptions of the social interaction	
Task-related conflict	Mortensen and Hinds (2001)
Socio-emotional conflict	Mortensen and Hinds (2001)
Responsiveness of others	Ridings et al. (2002)
Shared Identiy	Mortensen and Hinds (2001)
Perceptions of the task	(adapted from Thomas, K. W. 1979)
Trusting behavior	Developed for this study
Outcome Variables:	
Satisfaction with the process	Post session questionnaire (Dennis, 1996)
Satisfaction with outcomes	Post session questionnaire (Chidambaram, 1996)
Task outcomes	Blind evaluation by course instructors to treatment conditions (following a standardized pre-defined evaluation sheet)

Table 1: Variables and their operationalization

4.3 Operational Definition of the Variables

4.3.1 Independent Variable

4.3.1.1 Virtual Setting

This research argued that different configurations of the virtual setting influence group processes and outcomes differently. In one treatment condition -– the virtual team -- groups will communicate only through the Yahoo! Groups system,

a collaborative technology that enables geographically dispersed members to share messages and files in a database repository, which can be accessed by any computer connected on the Internet. While group members were in the same room, the geographical dispersion was simulated by assigning people to pre-defined seats in a way that they could not communicate face-to-face and could not visually identify with whom they were working. The physical layout of this experimental room describing the location of virtual team member is provided in Figure 7.

In the collocated teams setting, team members sat next to each other and communicated face-to-face. The physical layout of experimental room describing the location of the collocated teams is provided in Figure 8. The collocated teams also used Yahoo! Groups system to share files and messages during the execution of the task. In addition, they could communicate verbally throughout the duration of the study.

In both conditions participants had their own computers with all the software tools necessary to work on the task. Given that this study only addressed the impact of geographically dispersion, the communication mode was synchronous for both treatments in that all tasks needed to be completed within the allocated time limit of one hour and fifteen minutes. The pilot study confirmed that groups were able to finish the task within the time limit.

Computer 1 pg02a	Computer 2 pg01a	Computer 3 pg03a	Computer 4 pg02b	Computer 5 pg01b	Aisle	Computer 6 pg06b	Computer 7 pg07c
Computer 8 pg04a	Computer 9 pg05a	Computer 10 pg06a	Computer 11 pg04b	Computer 12 pg05b	Aisle	Computer 13 free	Computer 14 pg01e
Computer 15 pg02c	Computer 16 pg01c	Computer 17 pg03b	Computer 18 pg02d	Computer 19 pg03c	Aisle	Computer 20 pg06c	Computer 21 pg07d
Computer 22 pg04c	Computer 23 pg05c	Computer 24 pg07a	Computer 25 pg04d	Computer 26 pg05d	Aisle	Computer 27 free	Computer 28 free
Computer 29 pg02e	Computer 30 pg01d	Computer 31 pg03d	Computer 32 pg06d	Computer 33 pg03e	Aisle	Computer 34 pg06e	Computer 35 pg07e
Computer 36 pg04e	Computer 37 pg05e	Computer 38 pg07b	Computer 39 free	Computer 40 free	Aisle	Computer 41 free	Computer 42 free

Figure 7: Virtual Team Room Physical Layout

Computer 1 pg01a	Computer 2 pg01b	Computer 3 pg01c	Computer 4 pg01d	Computer 5 pg01e	Aisle	Computer 31 pg07a	Computer 32 pg07b
Computer 6 pg02a	Computer 7 pg02b	Computer 8 pg02c	Computer 9 pg02d	Computer 10 pg02e	Aisle	Computer 33 pg07c	Computer 34 pg07d
Computer 11 pg03a	Computer 12 pg03b	Computer 13 pg03c	Computer 14 pg03d	Computer 15 pg03e	Aisle	Computer 35 pg07e	Computer 36 free
Computer 16 pg04a	Computer 17 pg04b	Computer 18 pg04c	Computer 19 pg04d	Computer 20 pg04e	Aisle	Computer 37 free	Computer 38 free
Computer 21 pg05a	Computer 22 pg05b	Computer 23 pg05c	Computer 24 pg05d	Computer 25 pg05e	Aisle	Computer 39 free	Computer 40 free
Computer 26 pg06a	Computer 27 pg06b	Computer 28 pg06c	Computer 29 pg06d	Computer 30 pg06e	Aisle	Computer 41 free	Computer 42 free

Figure 8: Collocated Team Room Physical Layout

Summarizing, to manipulate virtual setting, groups were randomly assigned to one of the two different meeting modes (synchronous virtual teams or synchronous collocated teams). The two treatments were identical in all respects other than their spatial dispersion and ability to communicate face-to-face. Half of the groups communicated only through the Yahoo! Groups, while the other half could also communicate face-to-face.

4.3.2 Controlled Variables

While setting type was manipulated, other sources of structure were either controlled or randomly assigned. Controlled variables included technology, task, training, group size, individual differences, and time.

4.3.2.1 Technology

This study was not concerned with the effect of different technologies on group processes and outcomes; thus all groups used the same technology (i.e., Microsoft Access and Yahoo! Groups) to complete the database project. Microsoft Access software is a database tool that allows creation of tables, forms, reports, and queries. During the semester students spent a great deal of time during the semester learning on how to use this technology, which was the key educational component of the MIS 2113 lab sections.

Yahoo! Groups – the web-based system that allows geographically dispersed people to communicate on the Internet by offering functions such as sending and receiving electronic-mails, post group messages, share files and photos, plan group events, among others – was not included in the lab section

course work. Therefore, training on this tool was given prior to the group work projects. This aspect is discussed in more detail in the training section. Yahoo! Groups provides a variety of web tools, but subjects had restricted access only to the features that meet the research design. For instance, functions such as message postings, file sharing, and list of members were enabled for all experimental groups, while all other web tools such as chat, database, polls, and calendar were disabled. These features were enabled and/or disabled by setting up group characteristics when creating groups in the Yahoo! Groups system.

4.3.2.2 Task

The task was developed and tailored to meet requirements of the experiment and is the same for all groups. It was a database development project that consisted of five phases. In each session, subjects worked on different activities so that at the end of the fifth session groups had a complete database project. Each of these sessions included independent deliverables (but related to previous deliverables), requiring only information presented with that particular problem. Thus, the task was interdependent across sessions and subjects. Each problem required database skills such as the creation of tables, forms, and reports that are taught during the semester prior to the execution of this experiment.

The task was developed in order to be relevant to the target population (i.e., MIS 2113 undergraduate students) chosen to participate in the experiment and to provide some level of external validity given that it is a real classroom project based on what students have learned during the semester. Also, it was part of the student

grade for the semester. Each of the five tasks was worth ten points out of total of fifty total points towards the student grade. This task was tested and validated in the pilot study (see Appendix D).

4.3.2.3 Training

One week prior to engaging in the group project, groups had one training session of 1 hour and 15 minutes on Yahoo! Groups technology. In addition, at the beginning of the training session, each subject was asked to fill-out a pre-meeting questionnaire soliciting biographical and background information (see Appendix B). During the training, all the system features and functions necessary to perform the tasks were explained. In the training session, subjects could access these instructions from a website and simulate the use of the web tools with the experimental tasks. The training, which lasts one session, is the same for all groups. Given the importance of training as identified by the pilot study, the following steps were taken to ensure all subjects participated in the training exercise. First, the content of the training was posted at the experimenter website (http://students.ou.edu/A/Andre.L.Araujo-2/training) so that participants could remotely access it anytime they want during the experiment. Second, students were told that their participation in the training was worth five points towards their lab section grade. In addition, they were told that if they did not show up for the training session, they would not only lose the five points for the training, but would also not be eligible for the other 50 points of the virtual team project. However, if for some approved reason a student could not make the scheduled lab for the training day, he/she had to send an e-mail to the main researcher to schedule a special training

session. He/she should have the coordinator course approval for the special training session.

During the training session, students were asked to develop a mini database system, which simulated the overall characteristics of the complete project. Finally, to ensure comparability across sections, all training sessions followed a script developed by the experimenter. The experimenter and one assistant - the instructor of that lab section – were present during each training session.

4.3.2.4 Group Size

Even though prior research has provided evidence on the importance of group size (Dennis, et al., 1988), there is a lack of evidence on the ideal number of individuals per group. For instance, while some studies on teamwork suggested an inverse relationship between size and performance (e.g., Latane, 1986; Mullen, et al., 1994), others have reported a positive relationship between size and productivity (e.g., Gallupe, et al., 1992). In addition, some research on virtual teams has employed a variation of group sizes within the same experiment. For example, Jarvenpaa et al. (1998) and Jarvenpaa and Leidner (1999) used teams with four to six members. Kayworth and Leidner's (2001) study had teams consisting of five to seven members. Finally, Maznevski and Chudoba's (2000) case study observed teams with group size varying from eight to twelve members. Given this controversy regarding group size, this study attempted to control for group size by having the number of members in each group randomly selected in a way that the number of

participants varied between three and five students depending on the number of students enrolled in each of the MIS 2113 lab sections.

4.3.2.5 Individual Differences

The main individual differences are members' previous experience, cultural background mix, and trustor's propensity to trust. Random assignment of students to treatments prevented the occurrence of any systematic effect due to individual differences. Manipulation check for individual differences were done by using demographic data collected through the surveys (e.g. GPA, age, and gender).

4.3.2.6 Time

The research model also included time as a controlled variable. Each group met on five separate occasions to perform five distinct database project tasks in a five-week period, excluding the training section.

4.3.3 Process Variables

This study applied a longitudinal perspective to investigate group processes and outcomes changes over time; therefore an identical post-meeting questionnaire (Appendix C) that gathered data on process and outcome variables was administered to participants during the final ten minutes of each of the five sessions. How each variable was measured is described below.

4.3.3.1 Trusting Beliefs

Trusting behavior indicates the extent to which an individual perceives others as being trustworthy in terms of ability, integrity, and benevolence. These constructs

were originally developed by Schoorman et al. (1996) based on Mayer, et al. (1995) overall conceptualization of trust and later adapted to the context of virtual teams by Jarvenpaa, et al. (1998). The current study used the modified version. In the Jarvenpaa, et al. (1998) study the construct reliability (Cronbach's alpha) of ability, integrity, and benevolence were 0.90, 0.92, and 0.85 respectively. These dimensions of trusting beliefs were also used by Kanawattanachai and Yoo (2002).

4.3.3.2 Perceptions of the Social Interaction

This study defined perceptions of the social interaction in terms of the amount task and socio-emotional group conflict, responsiveness of others, and amount of shared identity.

4.3.3.2.1 Task and Socio-emotional Group Conflict

This study operationalized task and socio-emotional conflict using scales developed by Jehn's 1994 and later modified by Mortensen and Hinds (2001). The modified version measures both task-related conflict and socio-emotional conflict using four-item, five-point scales. In the Mortensen and Hinds (2001) study items of task and relationship conflict had construct reliability (Cronbach's alpha) of 0.87 and 0.96 respectively.

4.3.3.2.2 Responsiveness of Others

Responsiveness of others was assessed using Ridings et al.'s (2002) scale developed based on the conceptual work of Gefen (2000) and Lewis and Weigert (1985). This is a three-item, five-point scale, with a construct reliability of 0.95.

4.3.3.2.3 Amount of Shared Identity

Amount of shared identity was measured using a twelve-item, five-point scale based on the work of Jehn (1994) and later adapted by Mortensen and Hinds (2001) with construct reliability of 0.93.

4.3.3.3 Trusting behavior

It represents the actual act of trust exhibited by the trustor and was assessed using a five-item, five-point scale. This scale has been previously developed by Pearce et al. (1992) and modified by Jarvenpaa, et al. (1998) to reflect team aspects rather than organizational aspects. In Jarvenpaa, et al. (1998) study items of this construct had reliability of 0.92.

4.3.3.4 Perceptions of the task

An exhaustive literature review conducted by the experimenter did not find any scale specific tailored to measure perceptions of the task. Thus, the scale was developed for the purposes of this study. Specifically, it was measured to what extent team members perceive task as either cooperative or conflictive. The instrument is based on theoretical work developed by Thomas (1979). This work highlights the major characteristics of a cooperative task versus a conflictive task.

4.3.4 Outcome Variables

4.3.4.1 Satisfaction with outcomes

Research on collaborative technologies (e.g., Reining, 2003) has argued that adoption and continued use of collaborative technologies are largely influenced by

user's overall satisfaction. The importance of user's satisfaction is described in the Fjermestad and Hiltz (1998-99) meta-analysis, which shows that over 25 percent of the 200 GSS studies have examined this construct. When addressing satisfaction, several researchers (Easton et al., 1992; Jessup et al., 1996; Kerr and Murphy, 1994; Vreed et al., 2000; Briggs and Vreed, 1997) have viewed satisfaction in terms of two dimensions: satisfaction with the process and satisfaction with the outcomes. This distinction is important because users may be satisfied with the process and not satisfied with outcomes, and vice versa. Satisfaction with the process relates to methods, procedures, and deliberations used by a group during their interaction while working on the task. Satisfaction with outcomes refers to user's perceptions regarding to task deliverables. Therefore, this research used satisfaction with outcomes measured using a four-item construct adapted from Chidambaram (1996) with a reliability of 0.95.

4.3.4.2 Task Outcome

Task outcome was calculated based on the grade obtained by each group at the end of each task deliverable phase. The process was as follows: at the end of each session, the lab instructor collected all group project deliverables and grades all projects following a standard evaluation sheet that was developed for this study (see Appendix D). In addition, at the beginning of each session (excluding the first session) groups received an email containing their grade for the previous deliverable.

4.4 Experimental Procedure

4.4.1 Subjects

The subjects were undergraduate students with no prior experience with virtual meetings. In each MIS 2113 section, they were randomly assigned to groups of three to five members depending on the number of students enrolled in that section. Once one individual was assigned to a group, he or she remained in the same group during the duration of the study. Also, groups remained in the same treatment until the research was completed. Each group member received an email account, which was used throughout the experiment. Thus, their names were kept confidential in the virtual teams.

4.4.2 Grades

Students' grades were based on their regular participation in the experiment throughout the six-week period. This procedure was to help reduce absenteeism and mortality as well as motivate subjects. To avoid participants' knowing specific details of the task, instructions and guidelines were provided only at the beginning of each phase of the experiment. Also, students were asked not to discuss any matter related to the task outside class. However, even if they did not follow these instructions, any discussion outside the experimental setting did not enable them to prepare for the subsequent task session due to the fact that every task meeting had different requirements that were provided only at the beginning of each session. There were 10 points possible for each meeting that students participated. That amounts to 10% of their final course grade. The points were awarded based on their performance during each task. Since the points were awarded individually, students

got these points even if one or more members of their group missed a meeting; however, the students did not receive any points for the sessions that they missed.

4.4.3 Research Agenda

During the experiment, students met for five task sessions, spaced a week a part. In order to participate in the experiment students had to take one training session that was given one week prior to the first project session. Before the starting of the training session, participants were asked to fill out a research consent form (Appendix A) and a demographic survey (Appendix B) (i.e., the pre-meeting questionnaire) that collected data about subjects attitudes toward computers, their cultural background, years of work experience, and education. In addition, at the end of each of the five task sessions, they were asked to respond to a post-meeting questionnaire (Appendix B) that collected relevant data on the dependent variables addressed in this study. Subjects were not informed about the purpose of the experiment until the final task session (see summary of the experimental procedure in Figure 9).

PROJECT PHASE	INSTRUCTOR ROLE	TEAM ROLE (VIRTUAL AND COLLOCATED)
TRAINING SESSION (October 27 and 29) **DO PRACTICE EXERCISE USING Yahoo!Groups and Access**	Provide instructions on how to use technology a) Explain how to use yahoo@groups.com b) Explain how to work individually and then import Access Objects c) Conduct one practice exercise d) Collect exercise outcome	Read instructions Communication enforcement: a) get to know each other
FIRST MEETING (November 03 and 05) **CREATE ACCESS TABLES**	a) Provide instructions on the task b) Send different individual tasks to each member. Each member will receive unique information that is relevant to another team member (i.e., Primary Key) c)Collect Homework	Read instructions, work on the task and post task solution Communication enforcement: a) get information on primary keys from other members b) put all tables together
SECOND MEETING (November 10 and 12) **DEVELOP FORMS**	a) Provide instructions on the task and database current version containing tables with data and relationships b) Send different cliparts and individual tasks to each member. Each member will receive a clipart that is relevant to another team member c)Collect Homework	Read instructions, work on the task and post task solution Communication enforcement: a) get clipart from other members b) put all forms together

Figure 9: Summary of the Experimental Procedure (part A)

THIRD MEETING (November 17 and 19) **- ADD COMMAND BUTTONS TO THE FORMS** **- ENTER ONE RECORD INTO EVERY TABLE**	a) Provide instructions on the task and database current version b) Send manual: Instructions on Adding Command Buttons to only one member. Thus, he/she will have to share this information with other group members c) Send information on records to be added to members. Each member will receive unique information that is relevant to another team member (i.e., records to be entered and instruction's manual) d)Collect Homework	Read instructions, work on the task and post task solution Communication enforcement: a) get instruction's manual b) get information on records to be entered c) put all forms together
FOURTH MEETING (December 01 and 03) **DEVELOP REPORTS**	a) Provide instructions on the task and database current version b) Send different cliparts and individual tasks to each member. Each member will receive a clipart that is relevant to another team member c)Collect Homework	Read instructions, work on the task and post task solution Communication enforcement: a) get clipart from other members b) put all reports together
FIFTH MEETING (December 08 and 10) **ADD MACRO COMMANDS TO THE SWITCHBOARD**	a) Provide instructions on the task and database current version b) Send manual: Instructions on Adding Macros to only one member. Thus, he/she will have to share this information with other group members c) Send different macros and individual tasks to	Read instructions, work on the task and post task solution Communication enforcement: a) get instruction's manual b) get information on macros to be entered b) put all macros together

	each member. Each member will receive a macro that is relevant to another team member d)Collect Homework	

Figure 10: Summary of the Experimental Procedure (part B)

In order to motivate students to fill out the questionnaires, at the end of the class project students in each section who completed the survey forms had a chance to win a free $10.00 OU Bookstore gift certificate that was randomly drawn at the end of the last meeting. One gift certificate was given for each section. This drawing procedure was in class and occured in the following way: First, the user ID of all students who participated in the survey was written on a slip of paper and placed in a hat. Second, the researcher asked one of the students present in the class to pick one slip of paper from the hat. Third, the gift certificate was given to the student whose user ID was drawn from the hat.

Finally, to motivate students to perform well, in addition to their project grade, at the end of the project, the researcher gave a U$ 10.00 OU Bookstore gift certificate to each member of the group with the highest performance in each section.

4.4.4 Data Collection

Data was collected from the survey questionnaires described above. The questionnaires contained Likert type scales to measure dependent and independent

variables. The unit of analysis was the individual. Self-reported measures were taken from individual surveys.

To evaluate changes in group processes and outcomes over time the task was composed of five different but inter-related sub-tasks that included different deliverables at the end of every week. In addition, each task phase had a group grade assigned by the instructor.

To ensure randomness of team placement, no differences were detected in the descriptive data obtained from the preliminary survey between individuals given the manipulation and those not receiving the manipulation. The manipulation did not occur until after the preliminary survey was completed.

Random Samples: Samples from the two groups were drawn from independent populations. This was achieved by randomly assigning participants to teams and by randomly assigning manipulation treatment to half the teams.

4.5 PILOT STUDY

The pilot study was conducted in the summer of 2003. Its major purpose was to validate the task, the research instruments, and check the effectiveness of the experimental procedures. A sample of 58 undergraduate students from two sections of MIS 2113 computer based information systems course was used. They lasted two months - June 2003 and July 2003. The main study was conducted in all sections of the same course - MIS 2113. These two sections were similar to the sections selected in main study.

A virtual project consisting of five different tasks was developed to meet research requirements of this study and further integrated into the MIS 21131 course work. Grades obtained in the virtual project during the pilot study accounted for approximately 10% of the student's course grade. To increase motivation to participate in the virtual project, students were told that all members of the team with highest virtual project scored in each section would receive a U$ 10.00 gift certificate. Each task was tailored to last 1 hour and 15 minutes – the amount of time students would spend in classroom each time they meet for lab section of the MIS 2113 course. In addition, all tasks are built upon previous knowledge students have obtained in the course. Thus, before participating on the virtual project it was expected that students would have learned necessary tools and procedures to accomplish all five tasks.

In order to work on the virtual project, groups of 4 or 5 students were formed. Students were randomly selected in each group. Since these students were on teams with class members, they were told not to communicate about the project outside class. Even though, some students may have not followed this instruction, each task deliverable was turned in at the end of every class, thus students can not work on the task once they have finished the task. Also, students could access the task only in classroom.

Prior to participating on the pilot study the importance of the research project was told to the students. Also, the researcher distributed a research consent form in paper format by asking students to read and sign it if they agreed to participate in

the surveys. Although the main experiment consisted on one day training and five days to work on the virtual project, due to limited time available for the summer sections, the pilot study consisted on one day training plus four days to work on the tasks. Because of this, the virtual project in the pilot study consisted of four tasks rather than five tasks.

Prior to starting the training session, the following procedures were conducted:

In order to increase participation in the survey, students were told that at the end of the virtual project the researcher would randomly select a student who fills out the survey instruments to receive a U$ 10.00 gift certificate. All of the students enrolled in these two sections signed the consent form. Finally, students were asked to fill out a demographic questionnaire.

All experimental procedures were identical to those proposed for the main experiment except that the groups in the pilot study met for five sessions (including training session) rather than six sessions as it was the case of the main study.

4.5.1 Task

One of the major objectives of the pilot study was to access and validate the virtual project, which was specifically developed for this study. Students worked on a database project during five weeks. In each week students would work on a different task such as creating tables, forms, reports, and macros. Each task took at the

maximum of 1 hour and 15 minutes to be completed. The allocated time was based on the time students meet every week in this course.

One of the major requirements of the research design was to include a task with a level of complexity related to the knowledge students had acquired during their course work prior to working on the database project. At the end of the pilot, several students were interviewed and reports suggested that all participants felt comfortable in working on the virtual project by using knowledge provided to them during the semester. Also, all groups were able to finish all tasks in less than 1h and 15 minutes. Finally, students expressed motivation to work on the all virtual project tasks and they suggested including them in the course syllabus for the following semesters.

The pilot study also tested technological training delivered to the students prior to working on the task. The training was given in a session of 1 h and 15 minutes prior to working on the project and included instructions on how to use specific functionalities of the Yahoo! Groups web-system that would be used to solve the tasks. The training also provided a small simulation of the environment students would face when working on the real database project. Observations during the pilot execution showed the critical importance of the training. In this sense, the training (Appendix D) was established as a mandatory requirement prior to the participation in the virtual project for all students that would participate in the main experiment.

4.5.2 Time

Time was another critical component of the experiment. The database project was divided into 5 tasks – one task per week – lasting the maximum of 1 hour and 15 minutes per session. This time limitation was due to the weekly time students have to regularly meet for that section given that in order to maintain control of the experimental environment students could work on the task only in the classroom.

Observations from the researcher and results of the pilot demonstrated that all groups were able to finish all tasks in less than 1h and 15 minutes. In other words, the developed task fit requirements of the time available to students.

4.5.3 Technology

The pilot study also served to test the technology used in the main experiment. A few glitches were encountered with the Yahoo!Groups web system. For instance, in the training session it was found that each Yahoo! Groups homepage only allows its participants to both download and upload files into their group's webpage up to 13 or 14 times per day. This functionally was critical to accomplishment of the tasks since it was the procedure that allowed team members exchange files while addressing task demands. After long system research, the researcher found out that team members could both upload and download files with no limitation once participants were configured as moderator of their own group. Therefore, this system limitation was solved by changing the status of each team member in the group from regular participant to moderator. After adopting such a

procedure, groups were able to exchange files as many times as they needed according to each task requirement.

4.5.4 Survey instruments

Another important aspect of the pilot study was to validate scales to be used in the main experiment. Survey instruments used in the pilot study presented high levels of reliability across all meetings as it can be seen on the next table. Therefore, reliability tests confirmed the validity of the scales. As a result, there were no changes to the survey items used in the main study. Reliability results of the survey items during the pilot study are shown in Table 1.

	All Meetings	Meeting 1	Meeting 2	Meeting 3	Meeting 4
Item	**Alpha**	**Alpha**	**Alpha**	**Alpha**	**Alpha**
Trusting Ability	0.9282	0.8998	0.9102	0.9593	0.9409
Trusting Integrity	0.9439	0.9129	0.9425	0.9607	0.9538
Trusting Benevolence	0.9060	0.8574	0.8867	0.9347	0.9282
Turstor's Propensity to Trust	0.8990	0.8365	0.9148	0.9198	0.9241
Relationship Conflict	0.8244	0.8432	0.7725	0.8344	0.8437
Task Conflict	0.8100	0.7922	0.8012	0.7821	0.8603
Shared Identity	0.9476	0.9339	0.9463	0.9570	0.9548
Responsiveness of Others	0.9451	0.9247	0.9337	0.9524	0.9694
Satisfaction with Outcomes	0.9380	0.9009	0.9376	0.9518	0.9629

Table 2: Reliability analysis in the pilot study

CHAPTER SUMMARY

This chapter described the methodology used for the dissertation. The overall research design was discussed, including level of analysis, research context, and data collection method. Next, operational definitions of the variables were presented. Finally, details of the pilot study conducted in order to validate the proposed measures and procedures were presented. The next chapter details results from the statistical analyses performed on the data gathered during the main study.

5. RESULTS

In this chapter results of the statistical analysis are discussed. First, descriptive statistics are presented including demographic data, reliability coefficients, means, and standard deviations. Second, correlation matrixes for all variables examined in this study are described. Third, results of the path analysis are described for each of the five meetings studied. Fourth, a full path analysis of all relationships included in the research model is examined over time for the entire project. These paths resulted in 33 hypotheses for the first meeting and 41 hypotheses for the four subsequent meetings. Both significant and non-significant relationships are discussed in this section. Finally, post-hoc analysis using repeated measures ANOVAs are described by highlighting changes over time for each construct. This section also presents statistical results of the path analysis at the group level for the five meetings.

5.1 DESCRIPTIVE STATISTICS

A total of 507 undergraduate students participated in this study. They were randomly assigned to 103 groups. Groups were comprised of 5, 4, and 3 members depending on the number of students enrolled in each of the fourteen MIS 2113 lab sections. While some groups experienced subject mortality when some students withdrew from their classes during the semester, no groups were entirely dropped from the analyses.

5.1.1 Biographical Information

Tables 3 and 4 present attributes related to subjects' academic standing, major, sex, GPA, age, part and full-time working experience (in months). As shown in Table 3, following randomization of subjects, post-hoc chi-square tests showed no significant differences among treatments with respect to major and sex. In addition, Table 4, showed no significant differences among treatments with respect to GPA, AGE, and part and full-time working experience.

	Collocated (n=245)	Virtual (n=262)	Chi-Square	df	Sig. (2-tailed)
Major			17.5280	12	0.1310
Accounting (BBA)	14	18			
Accounting (BAC/MAC)	14	14			
Energy Management	9	7			
International Business	19	22			
Mgt Information Systems	21	26			
Real State	5	0			
Accounting (BAC)	1	8			
Economics	5	5			
Finance	36	57			
Management	51	28			
Marketing	43	42			
Other	27	33			
Missing	0	2			
Academic Standing			25.1190	6	0.0000
Sophomore	156	123			
Junior	69	117			
Senior	20	16			
Other	0	2			
Missing	0	4			
Sex			1.1890	2	0.5520
Male	156	175			
Female	89	83			
Missing	0	4			

Table 3: Manipulation Check of Random Assignment Participants' Biographical Information – part A

	Collocated (n=245)	Virtual (n=262)	t	df	Sig. (2-tailed)
GPA			0.0220	494	0.9830
Average	3.2221	3.2212			
Std. Dev.	0.4581	0.4621			
Missing	7	4			
AGE			-0.8450	504	0.3980
Average	20.6000	20.8400			
Std. Dev.	2.8730	3.3440			
Missing	0	1			
Part Time Work (months)			-0.5930	505	0.5540
Average	21.6776	22.7595			
Std. Dev.	18.7120	22.1084			
Missing	0	0			
Full Time Work (months)		0	0.0810	505	0.9360
Average	12.2735	12.0305			
Std. Dev.	30.8298	36.6384			
Missing	0	0			

Table 4: Manipulation Check of Random Assignment Participants' Biographical Information – part B

5.1.2 Background Information

Other factors that may also impact an individual's contribution to group processes and outcomes are described in Table 5, which depicts other subject attributes that may impact outcomes. The pre-meeting questionnaire solicited participant's perceptions with respect to the following background information:

a) the extent of prior experience with groups

b) whether the subject liked working in groups

c) whether the participant was outgoing in groups

d) whether the subject liked using computers

e) level of typing ability.

Results of t-test analysis on these factors are presented in Table 5 and described below.

		Collocated	Virtual	t	df	Sig. (2-tailed)
I have a lot of experience working in groups				-2.6680	502	0.0080
	Mean	2.3500	2.6800			
	Std. Dev.	1.2700	1.5100			
I like to work in groups				-0.8980	505	0.3700
	Mean	2.8200	2.9500			
	Std. Dev.	1.5360	1.7060			
I am normally pretty outgoing in groups				-0.2800	502	0.7790
	Mean	2.6500	2.6900			
	Std. Dev.	1.4920	1.5520			
I like using computers				-0.8060	502	0.4210
	Mean	2.4900	2.6100			
	Std. Dev.	1.5190	1.7050			
How well do you type				-0.1580	502	0.8740
	Mean	4.8900	4.9200			
	Std. Dev.	1.5620	1.4440			

Table 5: Background Information t-test results

The first question verified how much experience subjects had in working in groups in order to test for systematic differences among treatments. The scale varied from 1 to 5 where 1 indicated a high level of experience while a 5 indicated very little experience with groups. According to Table 3, members of virtual teams (mean = 2.6800) reported more group experience than members of collocated groups (mean = 2.3500). Since results between these two groups were statistically significant ($p < 0.01$), an analysis of covariance (MANCOVA) was conducted in order to verify whether this variable had impact on the dependent variables. MANCOVA results including this item as a covariate was statistically significant

identical to the results found in the MANOVA. Thus, the variability of experience of working in groups had no systematic impact on the dependent variables.

The second question verified to what extent subjects liked working in groups. A score of 5 showed that participants had great affinity toward group work while a 1 showed very little disposition to work in groups. Results showed that members of virtual groups had a higher score compared to members of collocated groups. However, this result was not statistically significant; thus, this variable did not influence any of the dependent variables targeted in this study.

The last two questions gathered information on the participants' experience and enjoyment of using computers. One question assessed the extent to which participants enjoy working with computers. The other question gathered information on how well they can type using computers since subjects had to use computer both to work on the task and to communicate with each other when operating in a virtual team. Results shown in Table 5 confirmed that these two variables had no impact on any of the outcomes addressed by this study.

5.2 RELIABILITY

SPSS was used to verify internal consistency of the items used in this study. The reliability score of all constructs was calculated for each time participants met during the group project. Thus, Table 6 provides reliability results of all constructs during the entire project and for each meeting separately. According to Fomell et al., 1981, reliability scores of each item should be greater than 0.70.

As shown in Table 6, the reliability scores of all constructs were consistently high during the entire project (i.e., greater than 0.80). In addition, reliability results exhibited stability over time.

	All Meetings	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Item	**Alpha**	**Alpha**	**Alpha**	**Alpha**	**Alpha**	**Alpha**
Trusting Ability	0.9399	0.9183	0.9378	0.9412	0.9472	0.9533
Trusting Integrity	0.9241	0.8997	0.9295	0.9200	0.9260	0.9410
Trusting Benevolence	0.9089	0.8454	0.9191	0.9093	0.9191	0.9356
Turstor's Propensity to Trust	0.8935	0.8383	0.8995	0.8971	0.9000	0.9225
Relationship Conflict	0.8482	0.8200	0.8339	0.8342	0.8669	0.8649
Task Conflict	0.8452	0.8061	0.8313	0.8430	0.8688	0.8571
Shared Identity	0.9406	0.9198	0.9360	0.9443	0.9485	0.9526
Responsiveness of Others	0.9344	0.9058	0.9395	0.9349	0.9468	0.9402
Satisfaction with Outcomes	0.9505	0.9452	0.9431	0.9515	0.9571	0.9560

Table 6: Reliability Analysis

5.3 HYPOTHESES TESTS

This section describes results of the path analysis performed on all relationships in the research model. The hypothesized relationships were analyzed using PLS software. Their results are summarized in Tables 7 (a), 7 (b) and 7 (c).

HYPOTHESIS		RESULTS BY INDIVIDUALS				
Trusting Beliefs and Trust Behavior		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H1.1:	Trusting ability will positively influence trust behavior.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H1.2:	Trusting integrity will positively influence trust behavior.	Unsupported	Unsupported	**Supported**	**Supported**	Unsupported
H1.3:	Trusting benevolence will positively influence trust behavior.	Unsupported	Unsupported	Unsupported	Unsupported	Unsupported
Trustor's Propensity to Trust and Trusting Integrity		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H2.1:	A trustor's propensity to trust will positively influence trusting ability.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H2.2:	A trustor's propensity to trust will positively influence trusting integrity.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H2.3:	A trustor's propensity to trust will positively influence trusting benevolence.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
Task Perception and Trusting Beliefs		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H3.1:	Cooperative perception of the task will positively influence trusting ability.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H3.2:	Cooperative perception of the task will positively influence trusting integrity.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H3.3:	Cooperative perception of the task will positively influence trusting benevolence.	Unsupported	Unsupported	Unsupported	Unsupported	**Supported**

Table 7 (a): Summary of results by individuals.

HYPOTHESIS		RESULTS BY INDIVIDUALS				
Perceptions of Social Interaction and Trusting Beliefs		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H4.1a	Task-related conflict will negatively influence trusting ability.	Unsupported	Unsupported	**Supported**	Unsupported	Unsupported
H4.1b	Task-related conflict will negatively influence trusting integrity.	Unsupported	Unsupported	Unsupported	**Supported**	Unsupported
H4.1c	Task-related conflict will negatively influence trusting benevolence.	Unsupported	Unsupported	Unsupported	Unsupported	Unsupported
H4.2a	Relationship conflict will negatively influence trusting ability.	Unsupported	Unsupported	**Supported**	Unsupported	**Supported**
H4.2b	Relationship conflict will negatively influence trusting integrity.	Unsupported	**Supported**	**Supported**	Unsupported	Unsupported
H4.2c	Relationship conflict will negatively influence trusting benevolence.	**Supported**	**Supported**	**Supported**	Unsupported	Unsupported
H4.3a	Responsiveness of others will positively influence trusting ability.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H4.3b	Responsiveness of others will positively influence trusting integrity.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H4.3c	Responsiveness of others will positively influence trusting benevolence.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H4.4a	Shared identity will positively influence trusting ability.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H4.4b	Shared identity will positively influence trusting integrity.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H4.4c	Shared identity will positively influence trusting benevolence.	**Supported**	**Supported**	**Supported**	**Supported**	Unsupported
Perceptions of Social Interaction and Cooperative Perception of the Task		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H5.1	Task-related conflict will negatively influence cooperative perception of the task.	Unsupported	Unsupported	Unsupported	**Supported**	Unsupported
H5.2	Relationship conflict will negatively influence cooperative perception of the task.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H5.3	Responsiveness of others will positively influence cooperative perception of the task.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H5.4	Shared identity will positively influence cooperative perception of the task.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**

Table 7 (b): Summary of results by meeting (contd.).

HYPOTHESIS		RESULTS BY INDIVIDUALS				
Virtual Setting and Perceptions of Social Interaction		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H6.1	The virtual setting will positively influence task-related conflict.	**Supported**	**Supported**	Unsupported	Unsupported	**Supported**
H6.2	The virtual setting will negatively influence relationship conflict.	**Supported**	**Supported**	Unsupported	Unsupported	Unsupported
H6.3	The virtual setting will negatively influence responsiveness of others.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H6.4	The virtual setting will negatively influence shared identity.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
Trust Behavior and Outcomes		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H7.1	Trust behavior will positively influence satisfaction with outcomes.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H7.2	Trust behavior will positively influence task outcomes.	Unsupported	Unsupported	Unsupported	Unsupported	**Supported**
Outcomes and Perceptions of the Social Interaction.		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H8.1a:	Satisfaction with outcomes will negatively influence relationship conflict.	na	**Supported**	**Supported**	**Supported**	**Supported**
H8.1b:	Satisfaction with outcomes will positively influence shared identity.	na	**Supported**	**Supported**	**Supported**	**Supported**
H8.1c:	Satisfaction with outcomes will negatively influence task-related conflict.	na	**Supported**	**Supported**	**Supported**	**Supported**
H8.1d:	Satisfaction with outcomes will positively influence responsiveness of others.	na	**Supported**	**Supported**	**Supported**	**Supported**
H8.2a:	Task outcome will negatively influence relationship conflict.	na	**Supported**	**Supported**	**Supported**	Unsupported
H8.2b:	Task outcome will positively influence shared identity.	na	**Supported**	**Supported**	Unsupported	Unsupported
H8.2c:	Task outcome will negatively influence task-related conflict.	na	Unsupported	Unsupported	**Supported**	**Supported**
H8.2d:	Task outcome will positively influence responsiveness of others.	na	Unsupported	**Supported**	Unsupported	Unsupported

Table 7 (c): Summary of results by meeting (contd.).

Since time is a key element of group development, as has been argued in earlier chapters, five complete models (one for each meeting) including all hypothesized relationships are presented. This analytical approach provides a comprehensive picture that examines all hypothesized relationships over time.

Following the description of these five models, all hypotheses tested are compared across the five meetings. In this sense, each hypothesis is presented along with its path coefficients (and significance levels) during each meeting. In addition, each construct of the research model is described using mnemonics shown in the table below.

MNEMONIC	DESCRIPTION
T	Virtual Setting
SHAR	Shared Identity
RESP	Responsiveness of Others
TKCF	Task-Related Conflict
RLCO	Relationship Conflict
TKPR	Cooperative Perception of the Task
BEN	Trusting Benevolence
ABIL	Trusting Ability
INTG	Trusting Integrity
PROP	Propensity to Trust
SOUT	Satisfaction with Outcomes
GRPT	Trust Behavior
TKOUT	Task Outcomes

Table 8 – Legend of the path model mnemonics

5.3.1 Path Model for Meeting 1

The overall model in Figure 11, presents the path coefficients for all hypothesized relationships during the first meeting. Overall, 21 out of 33 hypothesized relationships were supported (a detailed description of these relationships is presented in the next section). The hypotheses related to the effects of previous outcomes (i.e., satisfaction outcome and task outcome) on subsequent group interaction variables (i.e., relationship conflict, task-related conflict, shared identity, and responsiveness of others) were not tested since participants did not have any outcomes at this stage of the project.

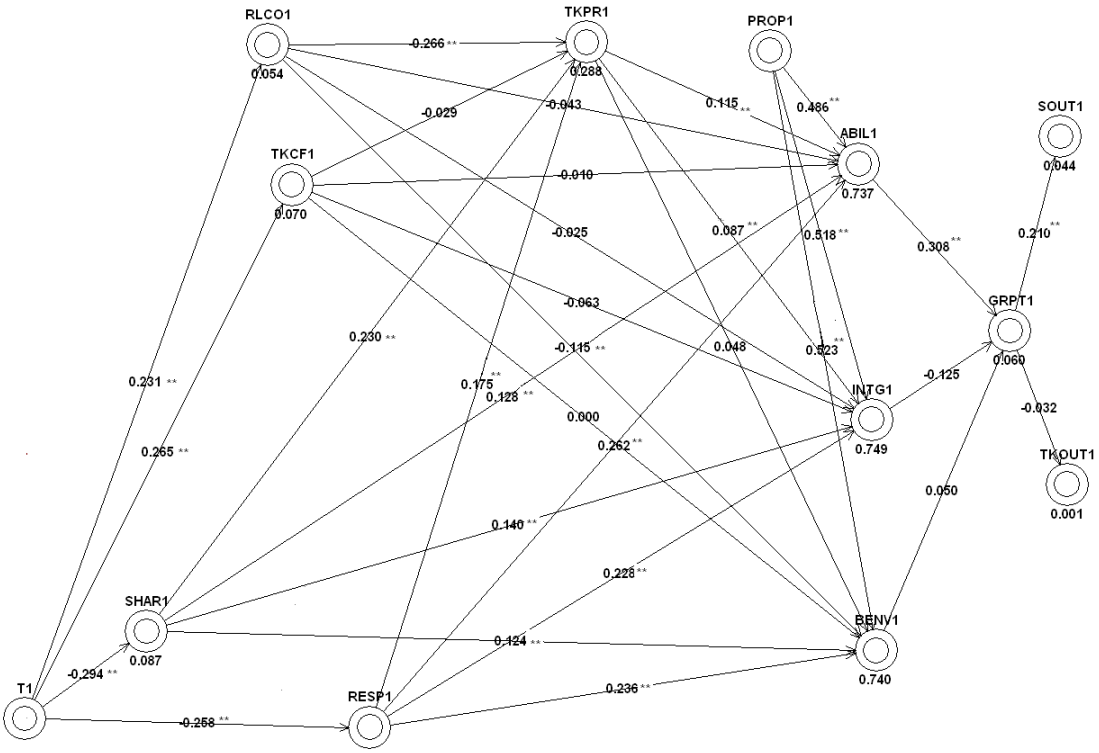


Figure 11: Path Model for Meeting 1
(** p < 0.01 and * p < 0.05)

Overall, the hypotheses about relationships between trustor's propensity to trust and trusting beliefs were fully supported. Those hypotheses relating task perception and trusting beliefs were partially supported. Specifically, hypotheses about the effect of task perception on trusting ability and trusting integrity was supported, while that about the effect of task perception on trusting benevolence was not supported. Hypotheses about relationships between perceptions of social interaction and trusting beliefs were partially supported. Specifically, both responsiveness of others and shared identity affected all components of trusting beliefs. Furthermore, most of the hypotheses about relationships between perceptions of social interaction and task perception were supported while those about the relationship between trust behavior and outcomes (i.e., satisfaction with outcomes) were partially supported. Finally, the setting had a significant effect on all dimensions of social interaction, while the relationships between trusting beliefs and trust behavior were minimally supported (since only the effect of trusting ability on trust behavior was significant).

5.3.2 Path Model for Meeting 2

Figure 12 presents results for all relationships during meeting 2. In this stage of group work, 28 out of 41 hypothesized relationships were supported. In addition, since groups had task outcomes (from the previous week, meeting 1), the hypothesized effects of previous outcomes on group interaction variables were tested. Thus, eight relationships were added to the previous model. The same analytical procedure (now with 41 hypotheses) was adopted with regard to meetings 3, 4, and 5.

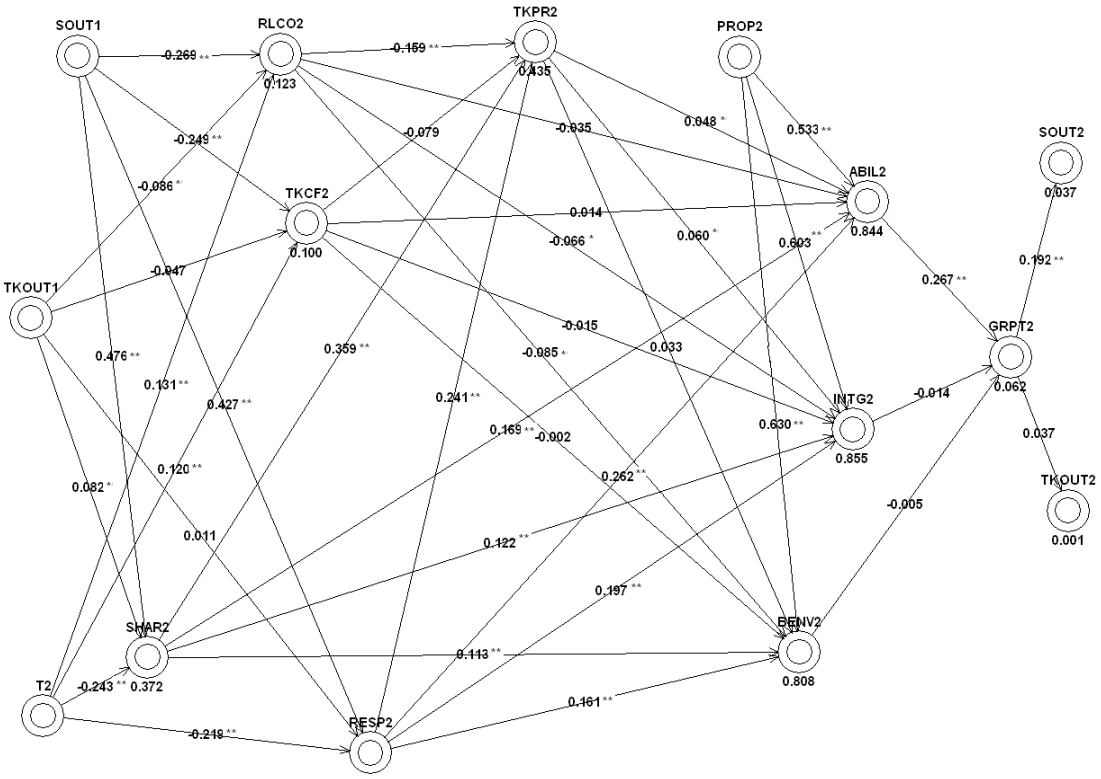


Figure 12: Path Model for Meeting 2
(** p < 0.01 and * p < 0.05)

Overall, most of the results were similar to those described in meeting 1. Only one hypothesized relationship had a different result from the previous meeting. Contrary to meeting 1, the effect of relationship conflict on trusting beliefs was significant. Thus, in meeting 2, relationship conflict affected trusting beliefs along two dimensions: trusting integrity and trusting benevolence. In addition, the impact of previous outcomes on most perceptions of social interaction was significant with the exception of two relationships: task outcome with task-related conflict and task

outcome with responsiveness of others. Thus, taken together these results strongly support the notion that previous outcomes affect perceptions of social interaction.

5.3.3 Path Model for Meeting 3

In meeting 3, number of hypothesized relationships that were supported increased from 25 to 30. Those results that differ from the previous session (meeting 2) are described below.

First, trusting beliefs had somewhat different impacts on trust behavior. Specifically, the effects of both trusting ability and trusting integrity on trust behavior were significant, while in meeting 2 only the effect of trusting ability on trust behavior was significant.

Second, most of the hypothesized relationships between previous outcomes and perceptions of social interaction were supported with the exception of the impact of task outcome on the responsiveness of others. Thus, 7 out of 8 relationships related to previous outcomes were supported. In the previous meeting 6 of these relationships were supported.

Third, the effects of social interaction on trusting beliefs were more strongly evident (in 8 out of 12 relationships) compared to the results from the previous meeting. Specifically, the impact of both task-related conflict and relationship conflict on trusting integrity were significant. Finally, the effect of the virtual setting on both task-related conflict and relationship conflict were not significant (unlike in meeting 2).

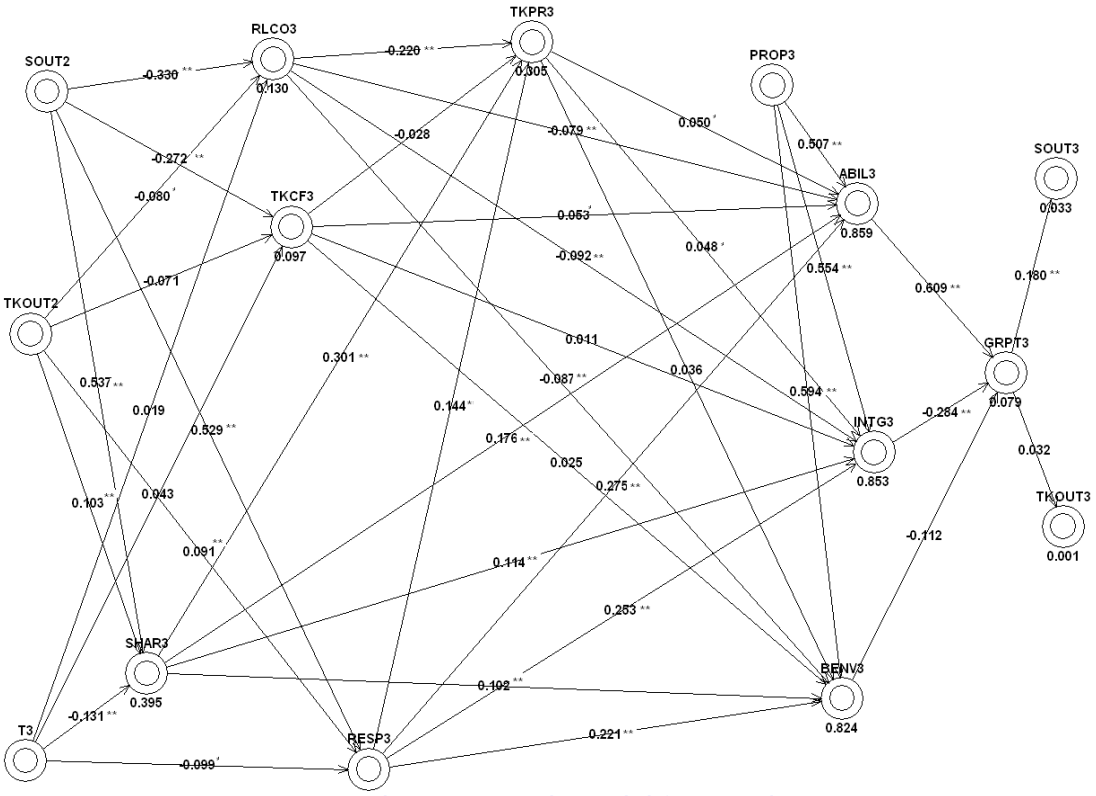


Figure 13: Path Model for Meeting 3
(** $p < 0.01$ and * $p < 0.05$)

5.3.4 Path Model for Meeting 4

In meeting 4, 27 out of the 41 hypothesized relationships were significant as shown in Figure 4. Overall, most of the results were similar to those found in meeting 3 with the exceptions described below.

Responsiveness of others and shared identity both had significant impact on all components of trusting beliefs (as was the case in the previous meetings). However, task-related conflict and relationship conflict had different results. For

instance, in meeting 4, none of the hypotheses between relationship conflict and trusting beliefs were supported. In addition, the hypothesis about the influence of task-related conflict on trusting ability was not supported, while that about the influence of task-related conflict on trusting integrity was supported. Also, the impact of task-related conflict on trusting benevolence was not significant (as in previous meetings).

The hypothesis about the effect of task outcome on shared identity as well as the one about its impact on the responsiveness of others was not supported. In addition, the relationship between task outcome and task-related conflict was significant.

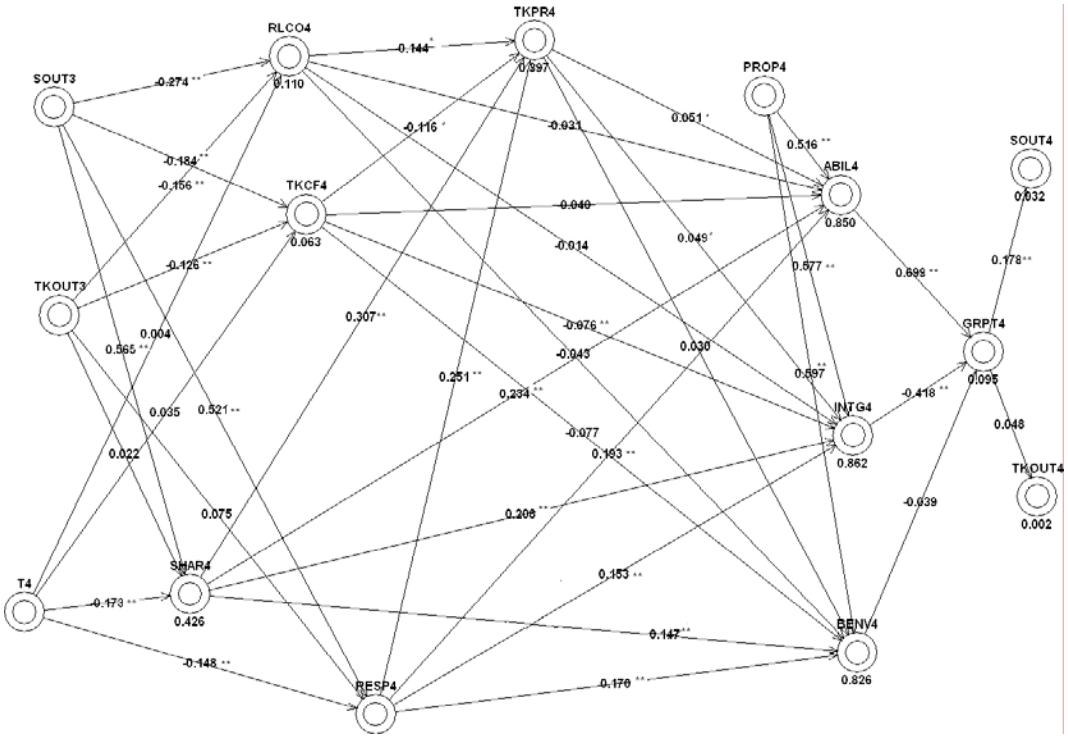


Figure 14: Path Model for Meeting 4
(** p < 0.01 and * p < 0.05)

5.3.5 Path Model for Meeting 5

Figure 15 shows the results from meeting 5. In this final stage of the group project, 25 out of the 41 hypothesized relationships were significant. Overall, the results were similar to those in the previous meeting (meeting 4) with few exceptions as described below. First, the effect of trusting ability on trust behavior was significant, while the impact of both trusting integrity and trusting benevolence on trust behavior was not significant.

Second, social interaction also had a different impact on trusting beliefs compared to previous sessions. The relationship between task-related conflict and trusting integrity was not significant; however the relationship between relationship conflict and trusting ability was significant. In addition, the effects of responsiveness of others on trusting beliefs was fully supported (across all five meetings), while the impact of shared identity had support in most components of trusting beliefs with the exception of trusting benevolence. In the previous meetings responsiveness of others and shared identity had significant impact on all components of trusting beliefs. Thus, this is the only case in which these relationships were not fully supported.

Third, the relationship between components of perception of social interaction and task perception had similar results to those found in meetings 1, 2, and 4 where the impact of task-related conflict on task perception was not supported. All other relationships between perception of social interaction and task perception were supported as was the case in all four previous meetings.

Fourth, the impact of the virtual setting on perception of social interaction was supported in the following dimensions: task-related conflict, responsiveness of others, and shared identity. Therefore, only the relationship between the virtual setting and relationship conflict was not supported.

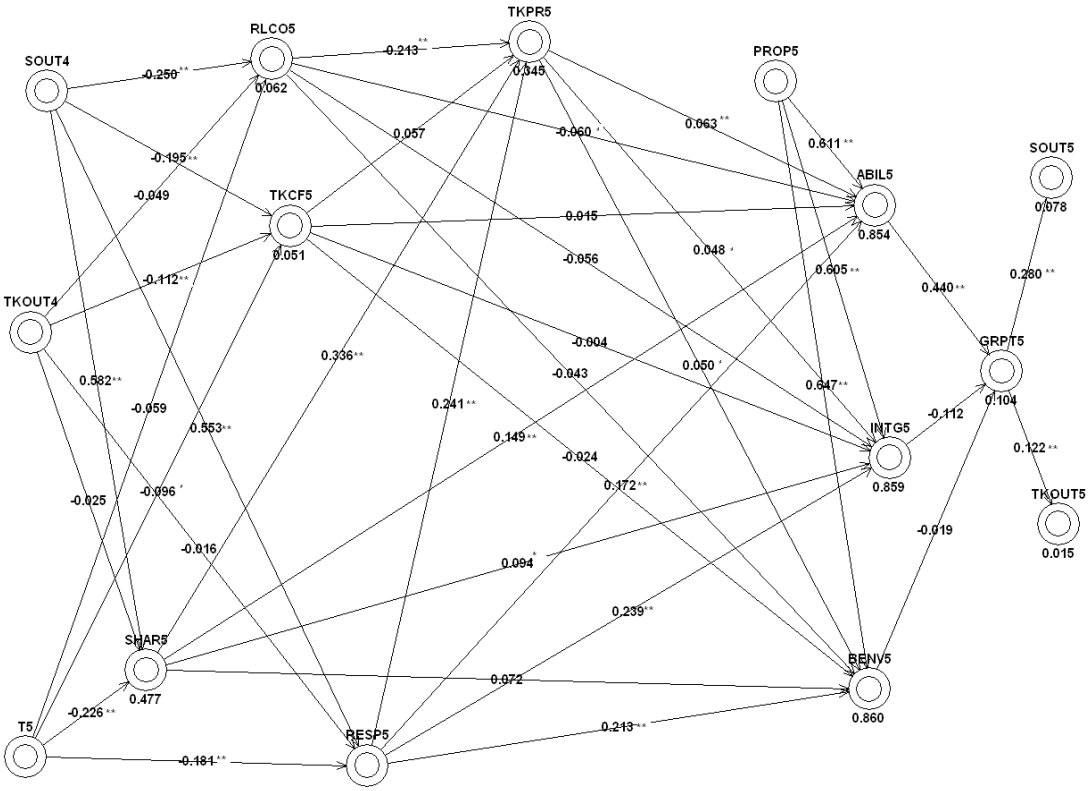


Figure 15: Path Model for Meeting 5
(** $p < 0.01$ and * $p < 0.05$)

Fifth, contrary to the four antecedent meetings, meeting 5 had support of the impact of trust behavior on those two dimensions of outcomes: satisfaction with outcomes and task outcome. In other words, the impact of trust behavior on outcomes was fully supported.

Finally, all components of previous outcomes had the same results of the previous meetings with the exception of the relationship between task outcome and relationship conflict, which was not supported. This relationship was supported in the four previous meetings. Below we present a summary table describing the over time results of all relationships tested in the model.

		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H1.1	Path Coefficient	**0.3080**	**0.2670**	**0.6090**	**0.6990**	**0.4400**
	P-Level	**0.0017**	**0.0067**	**0.0000**	**0.0000**	**0.0010**
H1.2	Path Coefficient	-0.1250	-0.0140	**-0.2840**	**-0.4180**	-0.1120
	P-Level	0.1680	0.4604	**0.0118**	**0.0023**	0.2637
H1.3	Path Coefficient	0.0500	-0.0050	-0.1120	-0.0390	-0.0190
	P-Level	0.3422	0.4848	0.1888	0.3682	0.4553
H2.1	Path Coefficient	**0.4860**	**0.5330**	**0.5070**	**0.5160**	**0.6110**
	P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
H2.2	Path Coefficient	**0.5180**	**0.6030**	**0.5540**	**0.5770**	**0.6050**
	P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
H2.3	Path Coefficient	**0.5230**	**0.6300**	**0.5940**	**0.5970**	**0.6470**
	P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
H3.1	Path Coefficient	**0.1150**	**0.0480**	**0.0500**	**0.0510**	**0.0630**
	P-Level	**0.0002**	**0.0324**	**0.0123**	**0.0191**	**0.0068**
H3.2	Path Coefficient	**0.0870**	**0.0600**	**0.0480**	**0.0490**	**0.0480**
	P-Level	**0.0061**	**0.0195**	**0.0268**	**0.0278**	**0.0275**
H3.3	Path Coefficient	0.0480	0.0330	0.0360	0.0300	**0.0500**
	P-Level	0.0760	0.1637	0.0874	0.1304	**0.0214**
H4.1a	Path Coefficient	-0.0100	0.0140	**0.0530**	-0.0400	0.0150
	P-Level	0.3969	0.3167	**0.0373**	0.0615	0.3070
H4.1.b	Path Coefficient	-0.0630	-0.0150	0.0110	**-0.0760**	-0.0040
	P-Level	0.0791	0.3107	0.3822	**0.0058**	0.4565
H4.1c	Path Coefficient	0.0000	-0.0020	0.0250	-0.0770	-0.0240
	P-Level	0.5000	0.4827	0.2335	0.0863	0.2324
H4.2a	Path Coefficient	-0.0430	-0.0350	**-0.0790**	-0.0310	**-0.0600**
	P-Level	0.1412	0.1554	**0.0083**	0.1646	**0.0269**
H4.2b	Path Coefficient	-0.0250	**-0.0660**	**-0.0920**	-0.0140	-0.0560
	P-Level	0.2935	**0.0427**	**0.0093**	0.3377	0.1008
H4.2c	Path Coefficient	**-0.1150**	**-0.0850**	**-0.0870**	-0.0430	-0.0430
	P-Level	**0.0062**	**0.0408**	**0.0098**	0.2066	0.1042

Table 9 (a) – Summary of the results over time.

		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H4.3a	Path Coefficient	**0.2620**	**0.2620**	**0.2750**	**0.1930**	**0.1720**
	P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0001**	**0.0011**
H4.3b	Path Coefficient	**0.2280**	**0.1970**	**0.2530**	**0.1530**	**0.2390**
	P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0003**	**0.0000**
H4.3c	Path Coefficient	**0.2360**	**0.1610**	**0.2210**	**0.1700**	**0.2130**
	P-Level	**0.0000**	**0.0008**	**0.0004**	**0.0002**	**0.0000**
H4.4a	Path Coefficient	**0.1280**	**0.1690**	**0.1760**	**0.2340**	**0.1490**
	P-Level	**0.0002**	**0.0000**	**0.0000**	**0.0000**	**0.0066**
H4.4b	Path Coefficient	**0.1400**	**0.1220**	**0.1140**	**0.2080**	**0.0940**
	P-Level	**0.0001**	**0.0004**	**0.0004**	**0.0000**	**0.0406**
H4.4c	Path Coefficient	**0.1240**	**0.1130**	**0.1020**	**0.1470**	0.0720
	P-Level	**0.0006**	**0.0050**	**0.0018**	**0.0003**	0.0678
H5.1	Path Coefficient	-0.0290	-0.0790	-0.0280	**-0.1160**	0.0570
	P-Level	0.3525	0.0944	0.3563	**0.0278**	0.1095
H5.2	Path Coefficient	**-0.2660**	**-0.1590**	**-0.2200**	**-0.1440**	**-0.2130**
	P-Level	**0.0006**	**0.0059**	**0.0039**	**0.0217**	**0.0002**
H5.3	Path Coefficient	**0.1750**	**0.2410**	**0.1440**	**0.2510**	**0.2410**
	P-Level	**0.0049**	**0.0001**	**0.0208**	**0.0004**	**0.0007**
H5.4	Path Coefficient	**0.2300**	**0.3590**	**0.3010**	**0.3070**	**0.3360**
	P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
H6.1	Path Coefficient	**0.2650**	**0.1200**	0.0430	0.0350	**-0.0960**
	P-Level	**0.0000**	**0.0057**	0.2020	0.2617	**0.0285**
H6.2	Path Coefficient	**0.2310**	**0.1310**	**0.0190**	**0.0040**	**-0.0590**
	P-Level	**0.0000**	**0.0040**	0.3455	0.4697	0.1249
H6.3	Path Coefficient	**-0.2580**	**-0.2190**	**-0.0990**	**-0.1480**	**-0.1810**
	P-Level	**0.0000**	**0.0000**	**0.0104**	**0.0002**	**0.0000**
H6.4	Path Coefficient	**-0.2940**	**-0.2430**	**-0.1310**	**-0.1730**	**-0.2260**
	P-Level	**0.0000**	**0.0000**	**0.0028**	**0.0000**	**0.0000**
H7.1	Path Coefficient	**0.2100**	**0.1920**	**0.1800**	**0.1780**	**0.2800**
	P-Level	**0.0000**	**0.0000**	**0.0001**	**0.0008**	**0.0000**
H7.2	Path Coefficient	-0.0320	0.0370	0.0320	0.0480	**0.1220**
	P-Level	0.2270	0.1538	0.1902	0.1536	**0.0021**

Table 9 (b) – Summary of the results over time. (contd.).

		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H8.1a	Path Coefficient	**n/a**	**-0.2490**	**-0.2720**	**-0.1840**	**-0.1950**
	P-Level	n/a	**0.0000**	**0.0000**	**0.0002**	**0.0004**
H8.1b	Path Coefficient	**n/a**	**-0.2690**	**-0.3300**	**-0.2740**	**-0.2500**
	P-Level	n/a	**0.0000**	**0.0000**	**0.0000**	**0.0000**
H8.1c	Path Coefficient	**n/a**	**0.4270**	**0.5290**	**0.5210**	**0.5530**
	P-Level	n/a	**0.0000**	**0.0000**	**0.0000**	**0.0000**
H8.1d	Path Coefficient	**n/a**	**0.4760**	**0.5370**	**0.5650**	**0.5820**
	P-Level	n/a	**0.0000**	**0.0000**	**0.0000**	**0.0000**
H8.2a	Path Coefficient	**n/a**	-0.0470	-0.0710	**-0.1260**	**-0.1120**
	P-Level	n/a	0.0784	0.0616	**0.0065**	**0.0053**
H8.2b	Path Coefficient	**n/a**	**-0.0860**	**-0.0800**	**-0.1560**	-0.0490
	P-Level	n/a	**0.0153**	**0.0471**	**0.0056**	0.1572
H8.2c	Path Coefficient	**n/a**	0.0110	**0.0910**	0.0750	-0.0160
	P-Level	n/a	0.3911	**0.0053**	0.0587	0.3057
H8.2d	Path Coefficient	**n/a**	**0.0820**	**0.1030**	0.0220	-0.0250
	P-Level	n/a	**0.0135**	**0.0030**	0.3247	0.2358

Table 9 (c) – Summary of the results over time. (contd.).

5.3.6 Detailed Analysis of All Relationships Over Time

5.3.6.1 The impact of trusting beliefs on trust behavior

In the theory section, it was argued that trusting beliefs were important antecedents of trust behavior. According to previous research (i.e., Jarvenpaa, et al., 1998; Kanawattanachai and Yoo, 2002) trusting beliefs can be defined in terms of ability, integrity, and benevolence. Each of these components determines the extent to which team members will exhibit trust behavior toward their partners. Hence, the following general hypothesis was presented:

5.3.6.1.1 H 1: Trusting Beliefs defined in terms of Ability, Benevolence, and Integrity will positively influence Trust Behavior.

Following the previous theoretical arguments, three specific hypotheses (one for each component of trusting beliefs) are then tested and a discussion of their statistical results is presented below.

5.3.6.1.2 H 1.1: Trusting Ability will positively influence Trust Behavior.

As proposed in the theory section, trusting beliefs defined in terms of trusting ability will positively influence trust behavior across all five meetings. The more team members perceived their partners to be able to execute the task, the more trust members placed in others. This pattern of behavior was significant ($p < 0.01$) during the entire project (for every meeting) as it is shown in Table 1.1.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.3080**	**0.2670**	**0.6090**	**0.6990**	**0.4400**
P-Level	**0.0017**	**0.0067**	**0.0000**	**0.0000**	**0.0010**

Table 1.1 – The Effects of Trusting Ability on Trust Behavior.

Taken together, these results suggest that the impact of trusting ability on trust behavior increased over time due to the fact that team members perceived the trustee's ability to be an important factor when engaging in trust behaviors. As shown in Figure 1.1, as team members progressed with their project, they realized the importance of their partner's ability to the accomplishment of the task. As a result, trusting ability scores in meetings 3, 4, and 5 were higher than those in meetings 1 and 2.

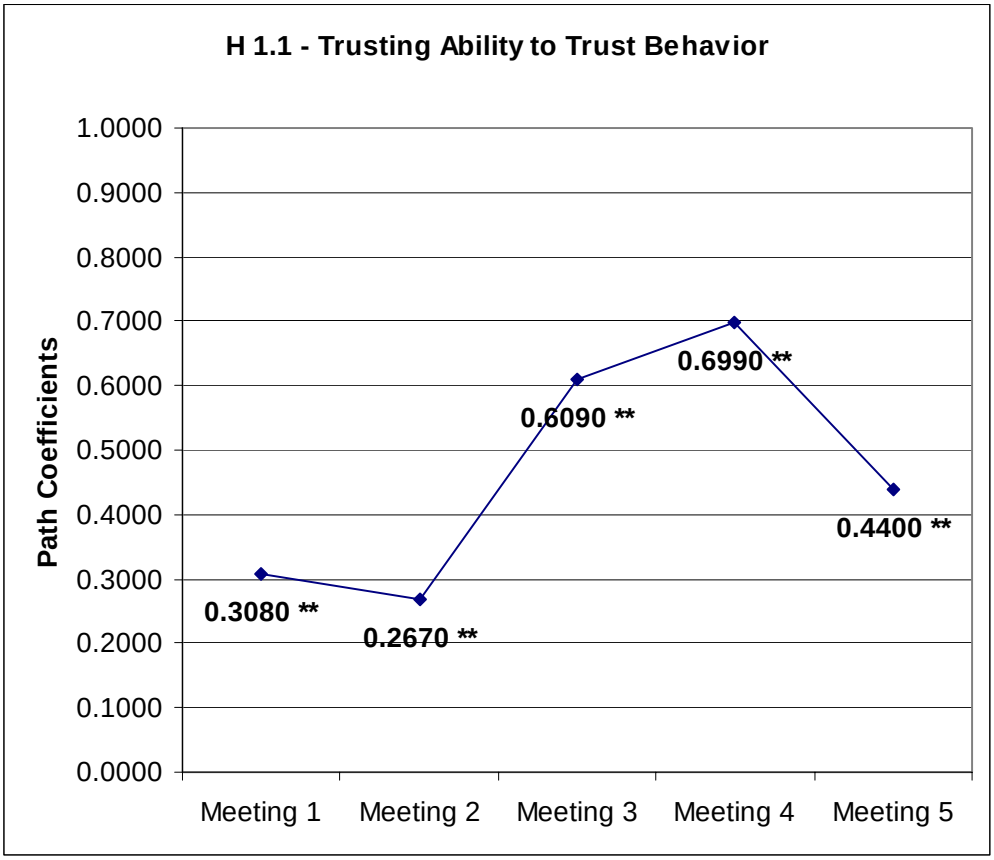


Figure H 1.1: Relationship between Trusting Ability and Trust Behavior (over time).

5.3.6.1.3 H 1.2: Trusting Integrity will positively influence Trust Behavior.

Trusting beliefs defined in terms of trusting integrity refers to the extent to which members perceive their team members as exhibiting a behavior that is acceptable to his/her own set of behavioral principles. As discussed in the theory section, it was expected an impact of trusting integrity on trust behavior. As shown in Table 1.2, this hypothesis was supported in meetings 3 ($p < 0.05$) and 4 ($p < 0.01$) with path coefficients of -0.2840 and -0.4180, respectively. Thus, the hypothesized relationship was partially supported across all five meetings.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	-0.1250	-0.0140	**-0.2840**	**-0.4180**	-0.1120
P-Level	0.1680	0.4604	**0.0118**	**0.0023**	0.2637

Table 1.2 –The effects of Trusting Integrity to Trust Behavior.

According to the significant paths (meetings 3 and 4) shown in Table 1.2, the relationship between trusting integrity and trust behavior increased in strength over time – but in the opposite direction. In other words, members with higher levels of trusting integrity about their team members experienced lower levels of trust behavior toward their partners in the mid-life of the group.

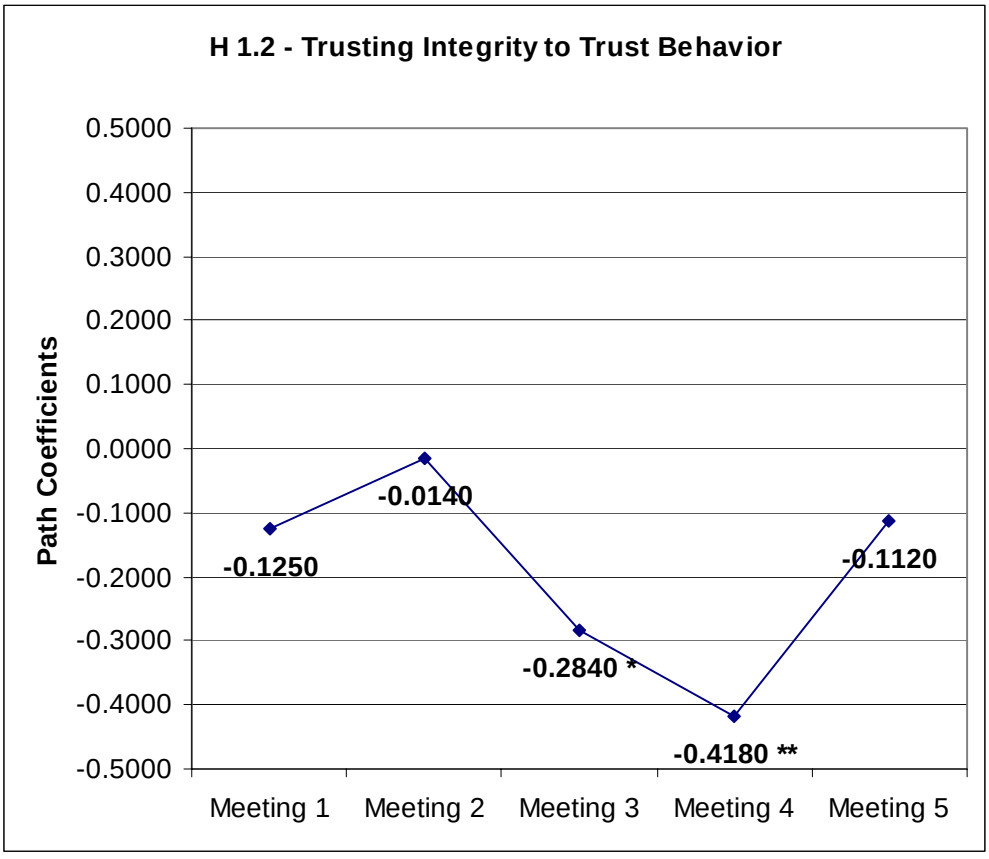


Figure H 1.2: Relationship between Trusting Integrity and Trust Behavior (over time).

These results suggest that, contrary to expected in the theory section, the more a member perceives trusting integrity in his/her team members, the lesser a member will engage in trusting acts with his/her team members. We suspect these results indicate that the need for trust behavior is reduced when members' perceive others as possessing trusting integrity.

5.3.6.1.4 H 1.3: Trusting Benevolence will positively influence Trust Behavior.

Trusting benevolence - a component of trusting beliefs – is the extent to which members perceive their team members as being willing to do good aside from an egocentric motive. According to the theory discussed earlier, the more members perceive their partners as benevolent, the more members will place trust in their team members. In other words, trusting benevolence will positively influence trust behavior during the entire project.

According to Table 1.3, the path coefficients changed slightly over time, but the results were not statistically significant at the $p < 0.05$ level. Thus, this hypothesis was not supported in any meeting.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	0.0500	-0.0050	-0.1120	-0.0390	-0.0190
P-Level	0.3422	0.4848	0.1888	0.3682	0.4553

Table 1.3 – The effects of Trusting Benevolence on Trust Behavior.

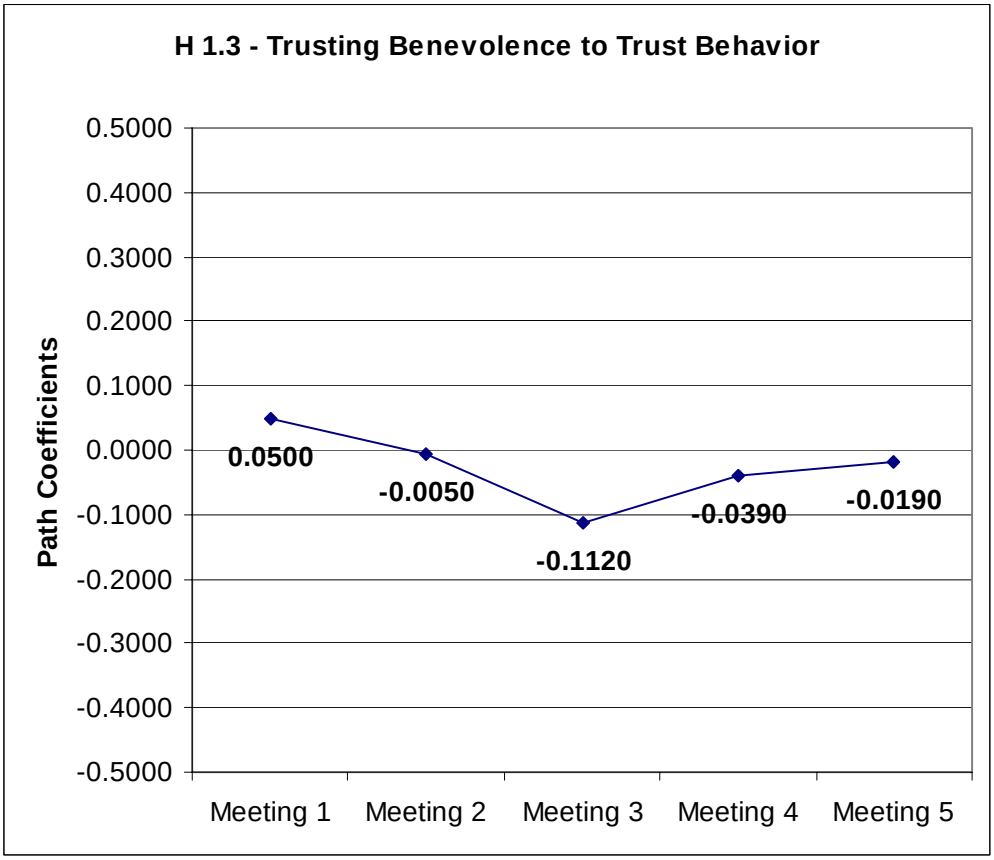


Figure H 1.3: Relationship between Trusting Benevolence and Trust Behavior (over time).

5.3.6.2 The impact of a Trustor's Propensity to Trust on Trusting Beliefs

The theoretical discussion in earlier chapters highlights the importance of the effects of a trustor's propensity to trust on trusting beliefs, that is, a trustor's own intrinsic attributes that may affect trusting beliefs towards a trustee (Mayer et al., 1995; McKnight et al., 1998). Regardless of the situational context, task, and trustee characteristics, a trustor may perceive others to be more or less trustworthy based on his or her own cultural values, social experiences, and personality types; thus, the act of trust is not based on whether or not the trustee is reliable. Thus, it is

expected that the greater a member's propensity to trust, the more a member will perceive others as trustworthy. Consequently, the following general hypothesis was presented:

5.3.6.2.1 H 2: A Trustor's Propensity to Trust will positively influence Trusting Beliefs.

Since trusting beliefs is expressed in terms of ability, integrity, and benevolence, this study tested specific hypotheses related to the impact of a trustor's propensity to trust based on each component of trusting beliefs. The results are presented below.

5.3.6.2.2 H 2.1: A Trustor's Propensity to Trust will positively influence Trusting Ability.

As expected, a trustor's propensity to trust positively influenced trusting ability. In other words, members with higher propensity to trust also developed higher perceptions of trusting ability towards their partners. The results were statistically significant ($p < 0.01$) during the entire project as shown in Table 2.1. Therefore, overall, hypotheses were supported across all five meetings.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.4860**	**0.5330**	**0.5070**	**0.5160**	**0.6110**
P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Table 2.1 – The Effects of Trustor's Propensity to Trust on Trusting Ability.

According to the path coefficient results in Figure 2.1, the relationship between a trustor's propensity to trust and trusting ability changed over time. As shown in Figure 2.1, these results suggest that the impact of trustor's propensity to

trust on trusting ability had an incremental pattern over the course of the group project. Figure 2.1 also shows that as team members progressed with their project, their own propensity to trust served as an important predictor of the extent to which team members perceived trusting ability in their partners.

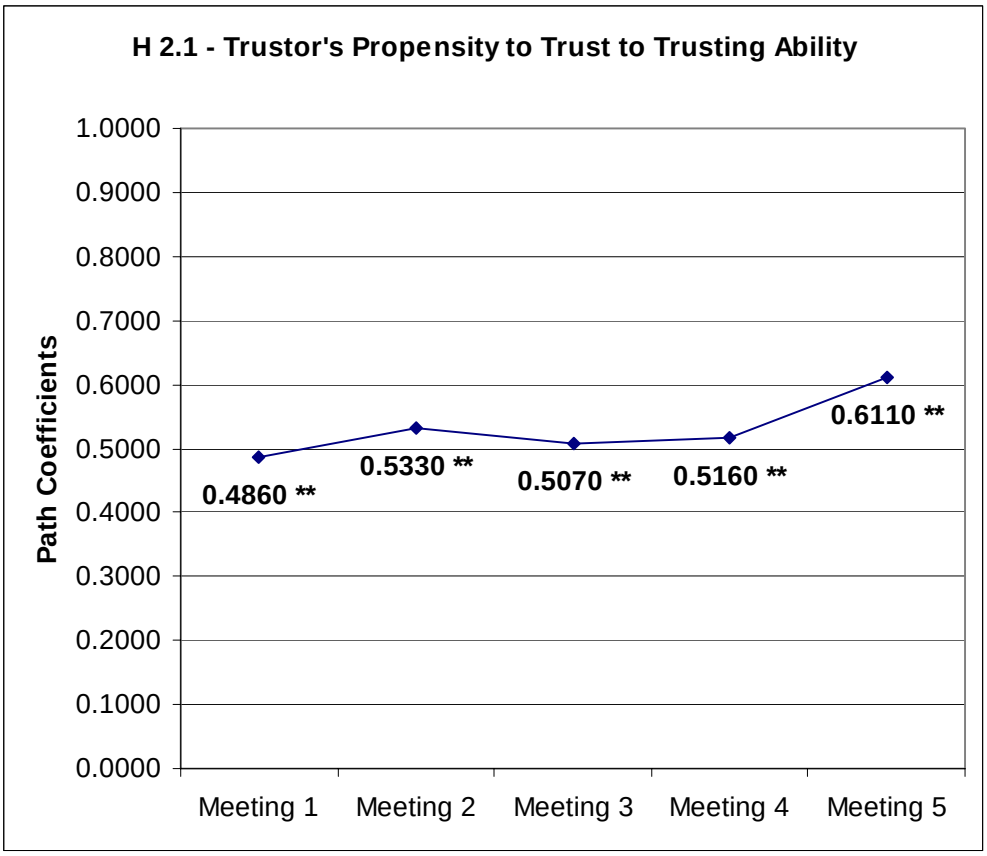


Figure H 2.1: Relationship between Trustor's Propensity to Trust and Trusting Ability (over time).

5.3.6.2.3 H 2.2: A Trustor's Propensity to Trust will positively influence Trusting Integrity.

The impact of a trustor's propensity to trust on trusting integrity was statistically significant ($p < 0.01$) for the entire project as shown in Table 2.2.

Therefore, the hypotheses were supported across all five meetings. Thus, the greater a members' propensity to trust, the more a member perceived trusting integrity about their partners.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.5180**	**0.6030**	**0.5540**	**0.5770**	**0.6050**
P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Table 2.2 – The effects of Trustor's Propensity to Trust on Trusting Integrity.

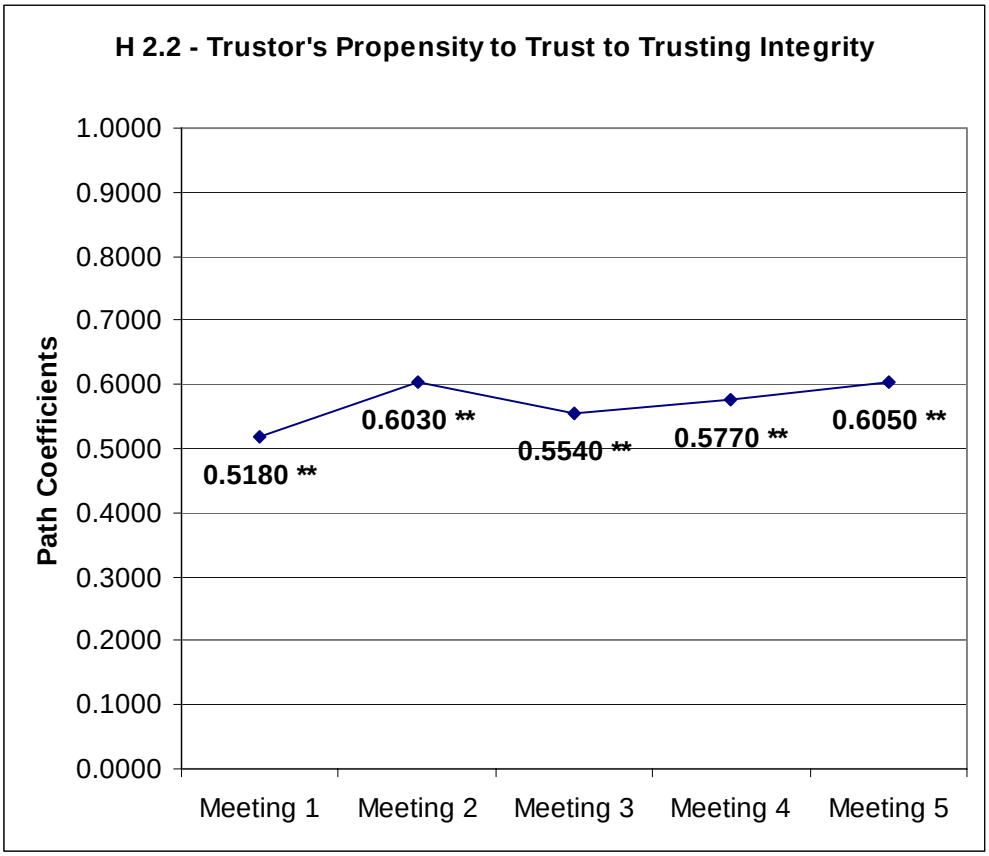


Figure 2.2 – Relationship between Trustor's Propensity to Trust and Trusting Integrity (over time).

Overall, the relationship was stable across meetings. Clearly, the effects of a trustor's propensity to trust on trusting integrity support earlier theoretical arguments in that propensity to trust is built over the years and it does not change in short periods of time.

5.3.6.2.4 H 2.3: A Trustor's Propensity to Trust will positively influence Trusting Benevolence.

Following previous discussions on the effects of trustor's propensity to trust on trusting beliefs, trusting benevolence also had statistically significant results ($p < 0.01$) during the entire project. Thus, this hypothesis was supported across all five meetings. Results suggest that members with higher levels of propensity to trust also perceived their partners as more trusting benevolent.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.5230**	**0.6300**	**0.5940**	**0.5970**	**0.6470**
P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Table 2.3 – The effects of Trustor's Propensity to Trust on Trusting Benevolence.

Furthermore, based on the path analysis results, team members experienced stable effects of a trustor's propensity to trust on trusting benevolence over time. Such changes exhibited a similar pattern to those found in the relationship between a trustor's propensity to trust others. For instance, as shown in Figure 2.3, these results suggest that team members' perceptions of trustworthiness about others are consistently and positively affected by the extent to which the trustor has the propensity to trust others.

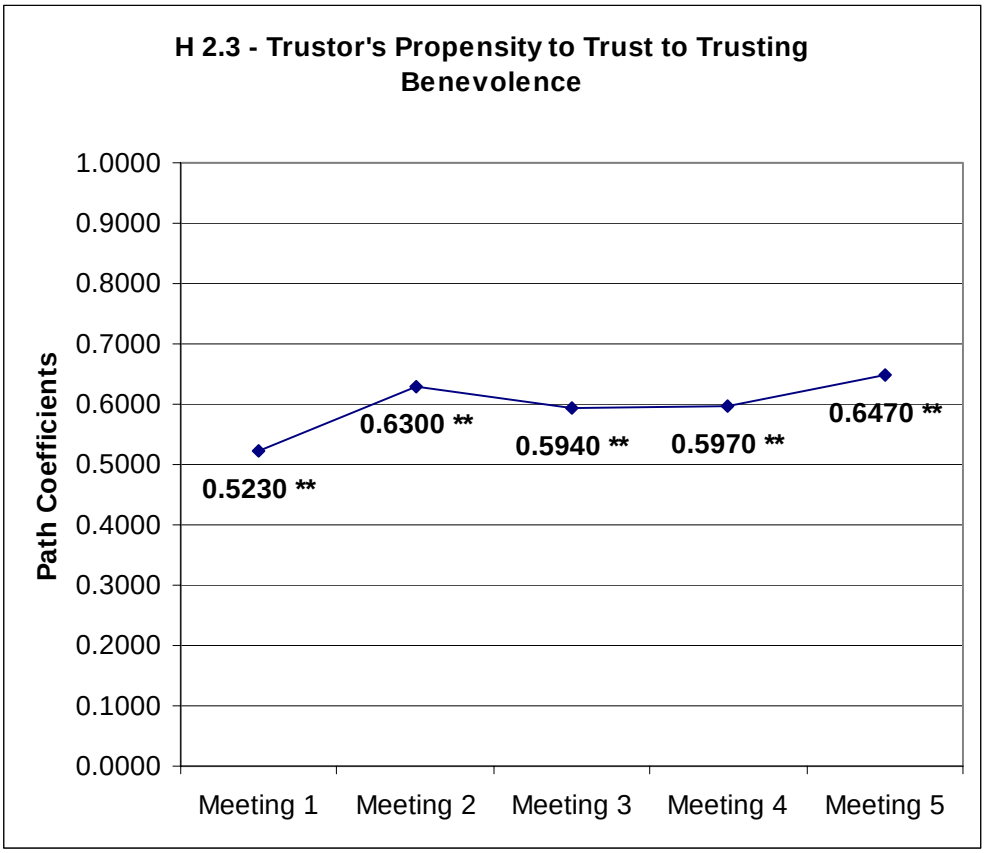


Figure 2.3 – Relationship between Trustor's Propensity to Trust and Trusting Benevolence (over time).

Overall, a trustor's propensity to trust had positively significant results on all components of trusting beliefs during the entire project. Also, the strength of the relationship exhibited an incremental pattern over time.

5.3.6.3 The impact of Task Perception on Trusting Beliefs

In the theory chapter of this dissertation, it was argued that members' perceptions evolve over time (Walther, 1996) as a result of their interactions with others and interpretations of the social situations in which they are embedded (Berger and Luckmann, 1967; Granovetter, 1985). Based on this argument, the

research model proposed that task perceptions will influence trusting beliefs. Specifically, the following hypothesis is presented:

5.3.6.3.1 H 3a: Cooperative perceptions of the task will positively influence trusting beliefs.

According to the methodology chapter, perception of the task was measured using a scale that varies from 1 to 5. In this scale, the lower the score, the more cooperative the task was perceived, whereas the higher the score, the more conflictive the task was perceived. In this sense, the following section discuss hypothesis 3.1, which is the opposite of hypothesis 3.2. In addition, the impact of task perception is discussed in light of the three components of trusting beliefs (i.e., ability, integrity, and benevolence), thus generating three specific hypotheses as presented below. These hypotheses and a discussion of their statistical results are described below.

5.3.6.3.2 H 3.1: Cooperative Perceptions of the Task will positively influence Trusting Ability.

The research model proposes that cooperative perceptions of the task will positively influence trusting ability. This effect was fully supported across all five meetings as shown in Table 3.1. In meetings 1 and 5 the hypothesized relationship was supported at the $p < 0.01$ level and in meetings 2, 3, and 4 the support was at the $p < 0.05$ level.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.1150**	**0.0480**	**0.0500**	**0.0510**	**0.0630**
P-Level	**0.0002**	**0.0324**	**0.0123**	**0.0191**	**0.0068**

Table 3.1 – The Effects of Cooperative Perceptions of the Task on Trusting Ability.

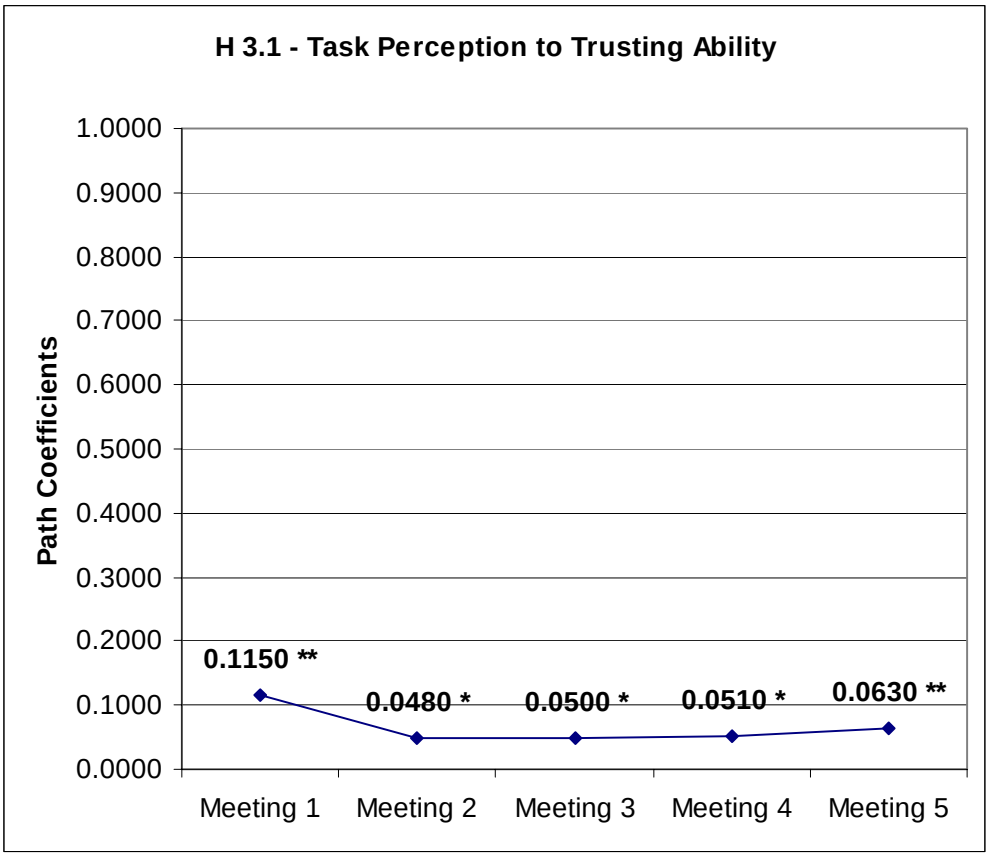


Figure 3.1 – Relationship between Cooperative Perceptions of the Task on Trusting Ability (over time).

A visual inspection of Figure 3.1, suggests that the strength of this relationship was stable over time. According to Figure 3.1 task perception is an important predictor of trusting ability as team members progressed with their project,

thus influencing the extent to which members perceive trusting ability in their partners.

5.3.6.3.3 H 3.2: Cooperative Perceptions of the Task will positively influence Trusting Integrity.

As expected, the impact of a trustor's propensity to trust based on trusting integrity had statistically significant results for the entire project as shown in Table 3.2. Therefore, these hypotheses were supported for the entire project. In the first meeting the hypothesized effect was supported at the $p < 0.01$ level, while in the subsequent meetings the support was at the $p < 0.05$ level. Thus, cooperative perceptions of the task positively influenced trusting ability. Furthermore, the strength of the relationship seems to be stable across meetings.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.0870**	**0.0600**	**0.0480**	**0.0490**	**0.0480**
P-Level	**0.0061**	**0.0195**	**0.0268**	**0.0278**	**0.0275**

Table 3.2 – The Effects of Cooperative Perceptions of the Task on Trusting Integrity.

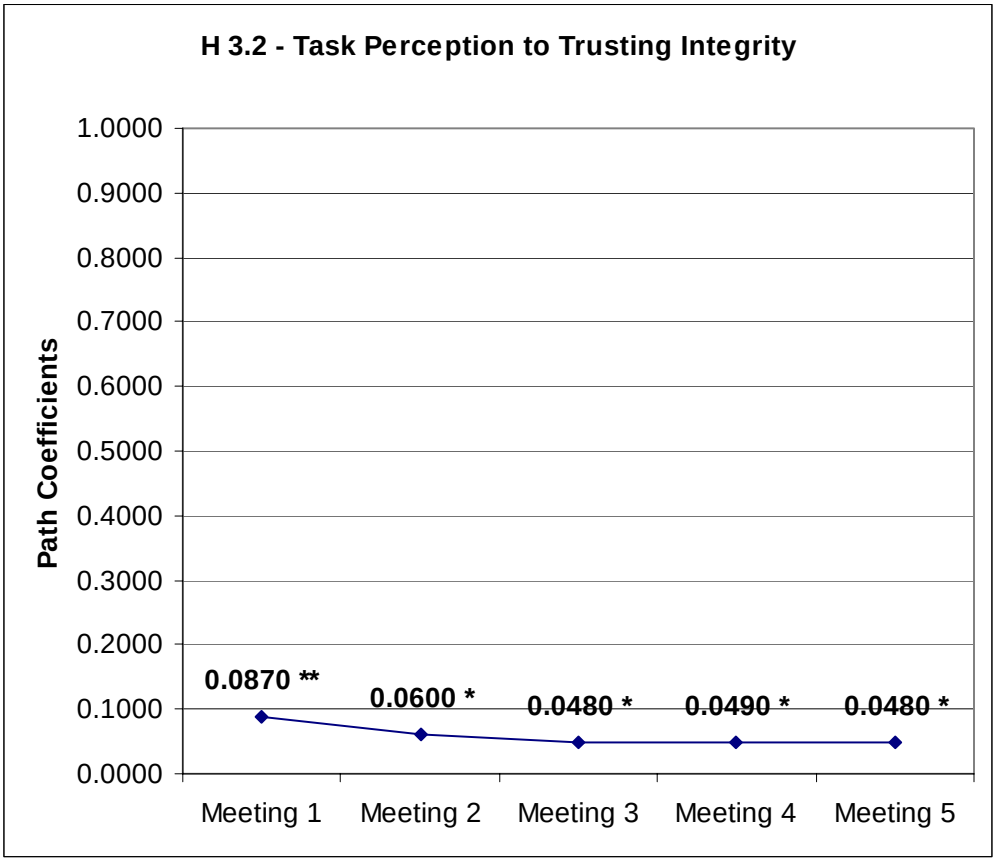


Figure 3.2 – Relationship between Cooperative Perceptions of the Task and Trusting Integrity (over time).

5.3.6.3.4 H 3.3: Cooperative Perceptions of the Task will positively influence Trusting Benevolence.

As argued in the theory section, cooperative perceptions of the task will positively influence trusting benevolence. Results of the path analysis supported this hypothesis only in the last meeting, in which the relationship was significant at the $p < 0.05$ level. Therefore, overall, this hypothesis was minimally supported suggesting that members' perceptions of the task did not impact their trusting benevolence over

time. Finally, even though the relationship was minimally supported, based on Figure 2.3, the path coefficients results were very stable across all meetings.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	0.0480	0.0330	0.0360	0.0300	**0.0500**
P-Level	0.0760	0.1637	0.0874	0.1304	**0.0214**

Table 3.3 – The Effects of Trustor's Propensity to Trust on Trusting Benevolence.

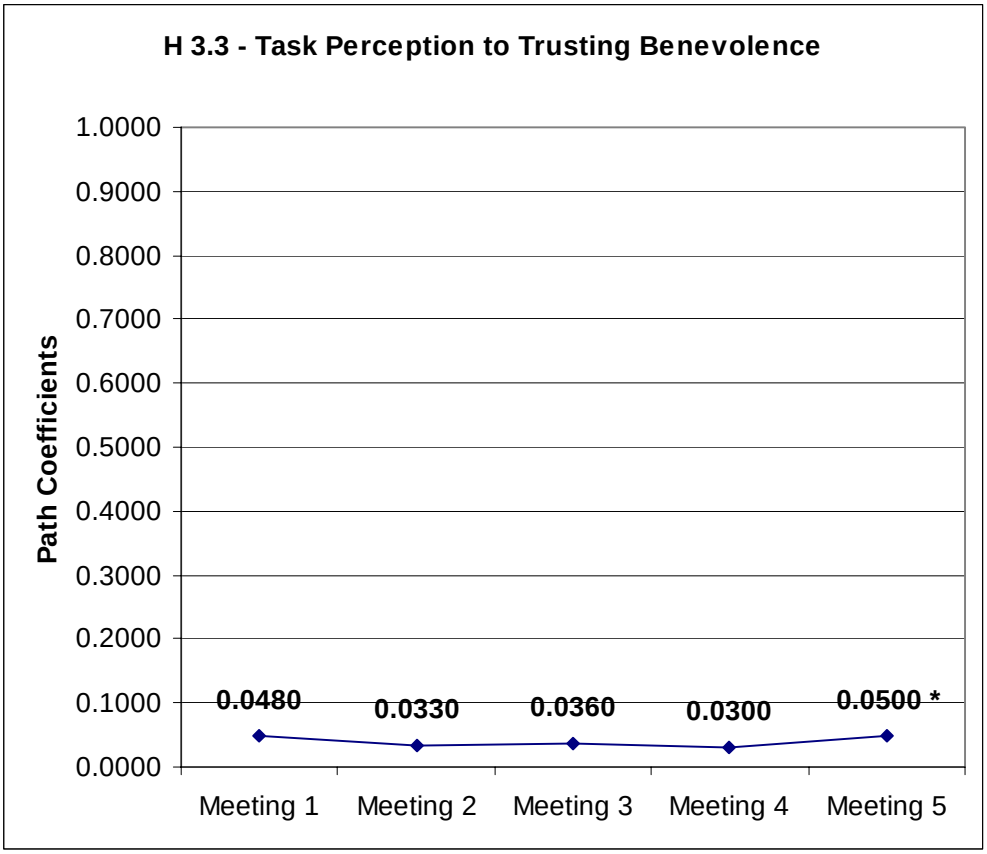


Figure 2.3 – Relationship between Trustor's Propensity to Trust and Trusting Benevolence (over time).

Overall, the impact of cooperative perception of the task on trusting beliefs was significant in two components of trusting beliefs (i.e., trusting ability and trusting integrity), while its impact on trusting benevolence was supported only in meeting 5.

5.3.6.4 The impact of Perceptions of Social Interaction on Trusting Beliefs

Subsequent stages of group interaction are strongly affected by the previous behavior and attitudes of group members. Thus, the extent to which a person perceives others in the group as being trustworthy is strongly influenced by his or her own perceptions of the social interaction patterns of previous stages of group work. The research model posited that members who work in the same project for an extended period of time will develop trusting beliefs toward their partners based on their perceptions of previous group interactions. Therefore, the following general hypothesis was presented:

5.3.6.4.1 H 4: Perceptions of Social Interaction will influence Trusting Beliefs.

Taking into consideration the various attributes of social interaction, the research model defined perceptions of social interaction in terms of task-related conflict, relationship conflict, responsiveness of others, and shared identity. Thus, the specific hypotheses that express the relationships between such components of social interaction and trusting beliefs are discussed below.

Perception of task-related conflict relates to task issues that arise when members are working on a common project. Previous theoretical arguments have stated that this type of conflict stimulates group members to discuss and explored

solutions to problems encountered. In this sense, the following hypothesis was established:

5.3.6.4.2 H 4.1: Task-Related Conflict will positively influence Trusting Beliefs.

Given that trusting beliefs are defined in terms of ability, integrity, and benevolence, this study analyzed the impact of task-related conflict on each of these dimensions. The following paragraphs describe results of these relationships based on hypotheses H 4.1a, H 4.1b, and H 4.1c.

5.3.6.4.3 H 4.1a: Task-Related Conflict will positively influence Trusting Ability.

The effect of task-related conflict on trusting ability was supported only in meeting 3 ($p < 0.05$). Also, the relationship in meeting 3 was positive as predicted previously. Even though some paths coefficients were negative in meetings 1 and 4, these results were not statistically significant.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	-0.0100	0.0140	**0.0530**	-0.0400	0.0150
P-Level	0.3969	0.3167	**0.0373**	0.0615	0.3070

Table 4.1a – The Effects of Task-Related Conflict on Trusting Ability.

While not statistically significant in 4 out of 5 meetings, this relationship, as shown in Figure 4.1a, did not exhibit a consistent pattern of change over time.

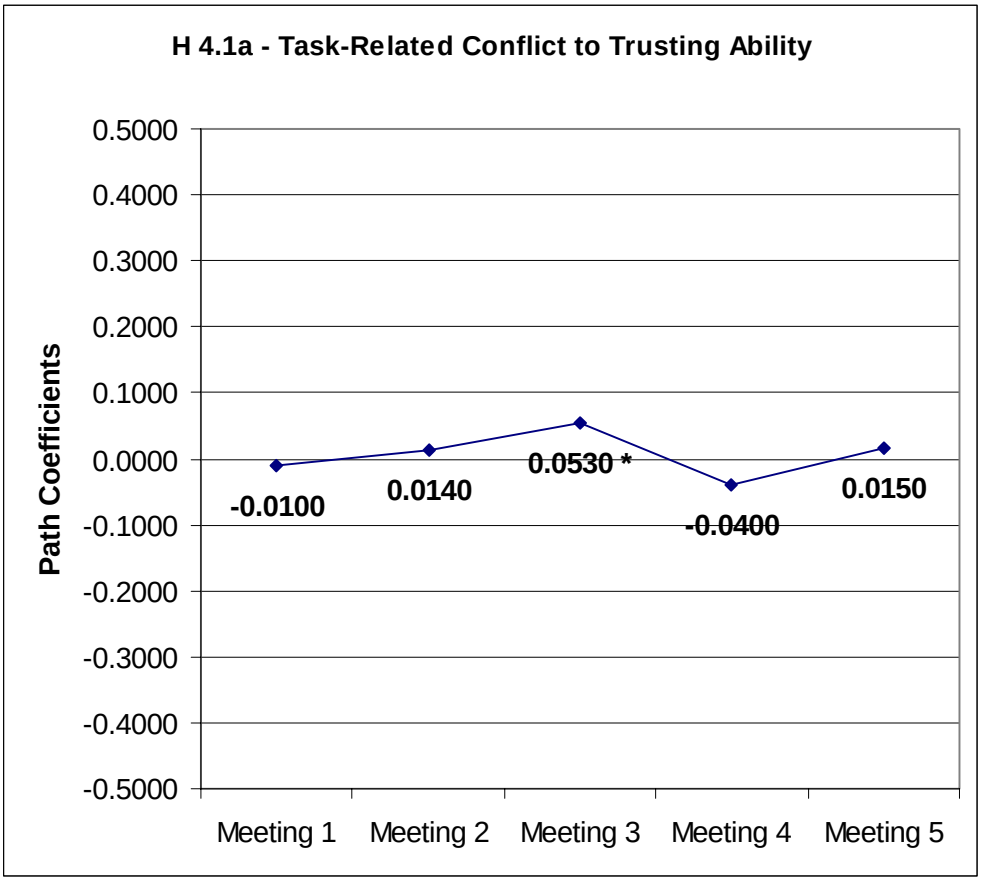


Figure 4.1a – Relationship between Task-Related Conflict and Trusting Ability (over time).

5.3.6.4.4 H 4.1b: Task-Related Conflict will positively influence Trusting Integrity.

Following a similar pattern to that described in the previous hypothesis, the effect of task-related conflict on trusting integrity was also supported in only one meeting ($p < 0.01$). Also, although not significant in four meetings, the relationship changed directions over time. Table 4.1b and Figure 4.1b shows changes in this relationship. However, such changes did not follow a consistent pattern over time.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	-0.0630	-0.0150	0.0110	**-0.0760**	-0.0040
P-Level	0.0791	0.3107	0.3822	**0.0058**	0.4565

Table 4.1b – The Effects of Task-Related Conflict on Trusting Integrity.

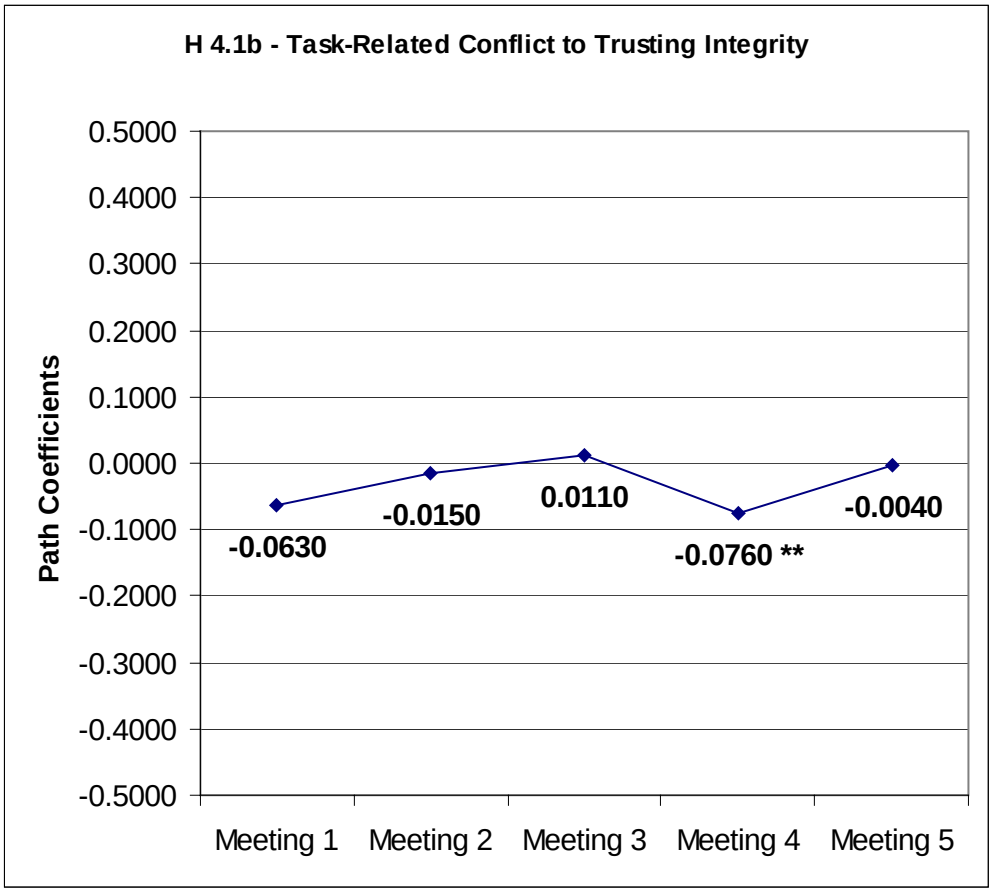


Figure 4.1b – Relationship between Task-Related Conflict on Trusting Integrity (over time)

5.3.6.4.5 H 4.1c: Task-Related Conflict will positively influence Trusting Benevolence.

The relationship between task-related conflict and trusting benevolence was not supported during the entire project. In addition, the direction of this relationship also changed over time.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	0.0000	-0.0020	0.0250	-0.0770	-0.0240
P-Level	0.5000	0.4827	0.2335	0.0863	0.2324

Table 4.1c – The Effects of Task-Related Conflict on Trusting Benevolence.

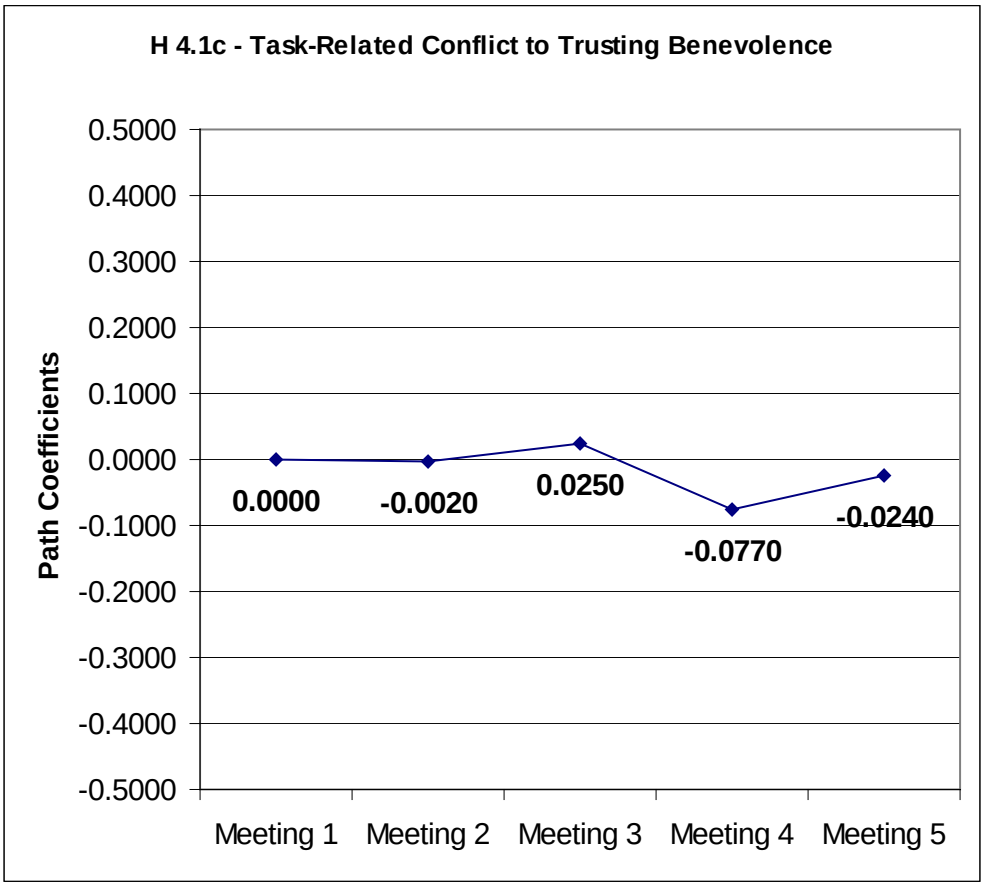


Figure 4.1c – Relationship between Task-Related Conflict and Trusting Benevolence (over time).

Overall, the impact of task-related conflict on the three components of trusting beliefs was marginally supported. To sum up, trusting beliefs were not affected by the extent to which members perceived the task to be conflictive. Thus, task-related conflict did not play a major role in predicting trusting beliefs.

5.3.6.4.6 H 4.2: Relationship Conflict will negatively influence Trusting Beliefs.

Relationship conflict – another component of social interaction perception – was also expected to influence trusting beliefs. However, its impact was expected to be negative since relationship conflict referred to conflict targeted at people rather than emerging from the task. Thus, members may feel hotility toward group members, which will negatively affect the development of trusting beliefs. The impact of relationship conflict on each dimension of trusting beliefs (i.e., ability, integrity, and benevolence) is described below. These relationships are expressed in hypotheses H 4.2a, H 4.2b, and H 4.2c.

5.3.6.4.7 H 4.2a: Relationship Conflict will negatively influence Trusting Ability.

The effect of task-related conflict on trusting ability was supported in meeting 3 ($p < 0.01$) and meeting 5 ($p < 0.05$). In addition, as expected, the relationship was negative. Furthermore, as shown in Figure 4.2a, this relationship did not exhibit a consistent pattern across all meetings. Overall, this hypothesis was minimally supported.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	-0.0430	-0.0350	**-0.0790**	-0.0310	**-0.0600**
P-Level	0.1412	0.1554	**0.0083**	0.1646	**0.0269**

Table 4.2a – The Effects of Relationship Conflict on Trusting Ability.

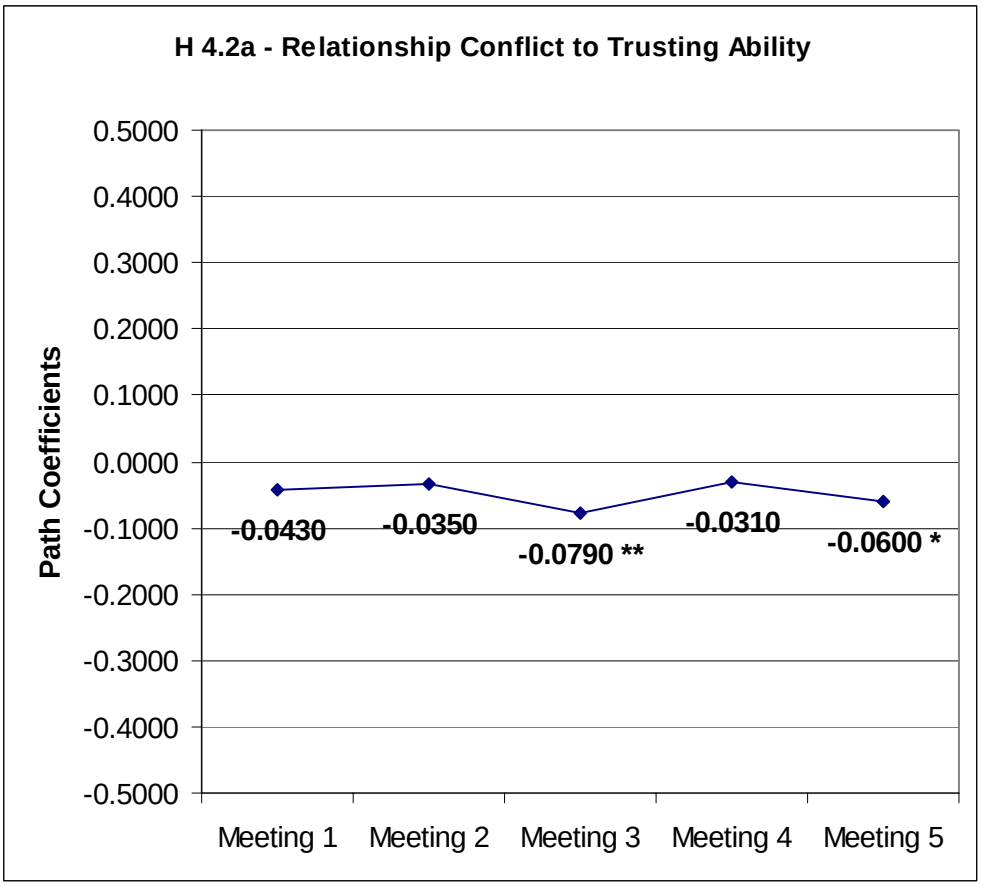


Figure 4.2a – Relationship between Relationship Conflict and Trusting Ability (over time).

5.3.6.4.8 H 4.2b: Relationship Conflict will negatively influence Trusting Integrity.

The relationship between relationship conflict and trusting integrity was statistically significant in meeting 2 ($p < 0.05$) and meeting 3 ($p < 0.01$). Also, the relationship was negative in all meetings as predicted earlier. In other words, the more members experienced relationship conflict among group members, the lesser members developed trusting integrity about their partners.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	-0.0250	**-0.0660**	**-0.0920**	-0.0140	-0.0560
P-Level	0.2935	**0.0427**	**0.0093**	0.3377	0.1008

Table 4.2b – The Effects of Relationship Conflict on Trusting Integrity.

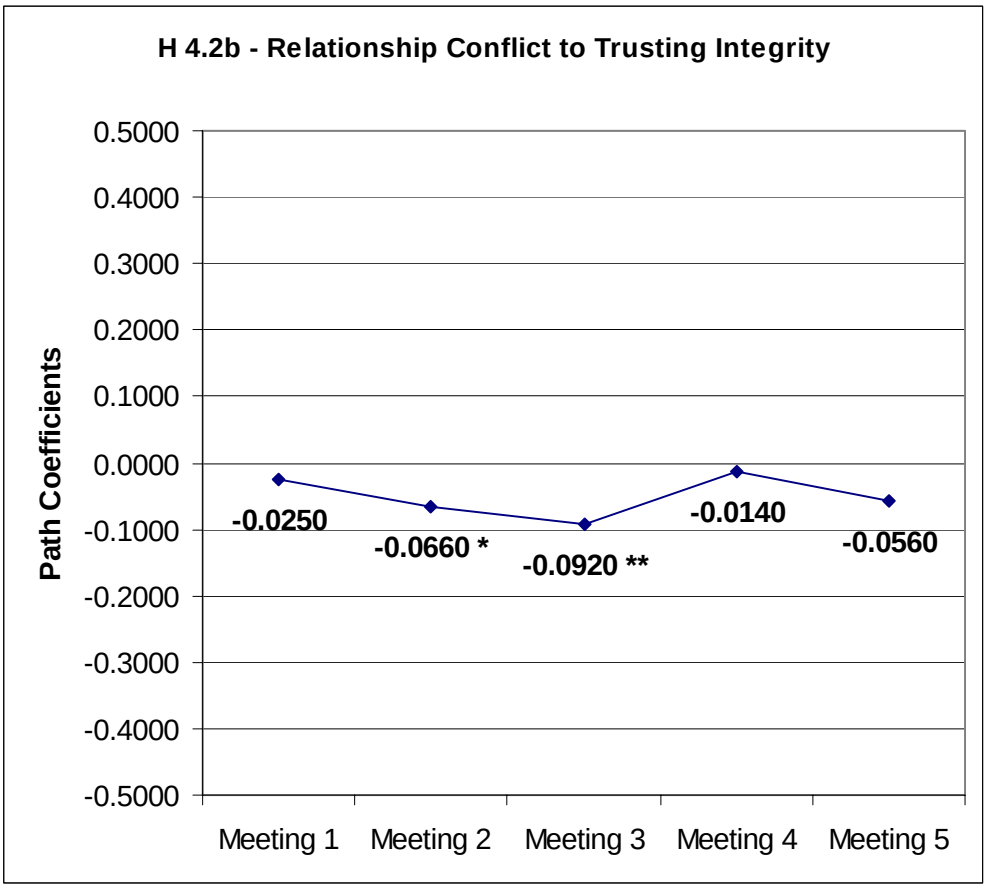


Figure 4.2b – Relationship between Relationship Conflict and Trusting Integrity (over time).

Based on the results described above, the hypothesized relationship was partially supported, indicating that trusting integrity is negatively influenced to some extent by the amount of relationship conflict members experience when together. As group members continue to work together their perceptions of trusting integrity are less affected by relationship conflicts exhibited among group members.

5.3.6.4.9 H 4.2c: Relationship Conflict will negatively influence Trusting Benevolence.

As shown in Figure 4.2c, the effect of task-related conflict on trusting benevolence was significant in the first three meetings. In addition, the relationship was negative throughout all five meetings as proposed. Thus, the more members experienced relationship conflict, the more trusting benevolence suffered among group members.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**-0.1150**	**-0.0850**	**-0.0870**	-0.0430	-0.0430
P-Level	**0.0062**	**0.0408**	**0.0098**	0.2066	0.1042

Table 4.2c – The Effects of Relationship Conflict on Trusting Benevolence.

As seen in Figure 4.2c, the negative relationship held across all five meetings and it exhibited an incremental pattern over time. In other words, as members progressed during the initial stages of group development (meetings 1, 2, and 3) relationship conflict played an important role in predicting trusting benevolence. These effects while negative in the initial three meetings, ceased to be significant in the final meetings.

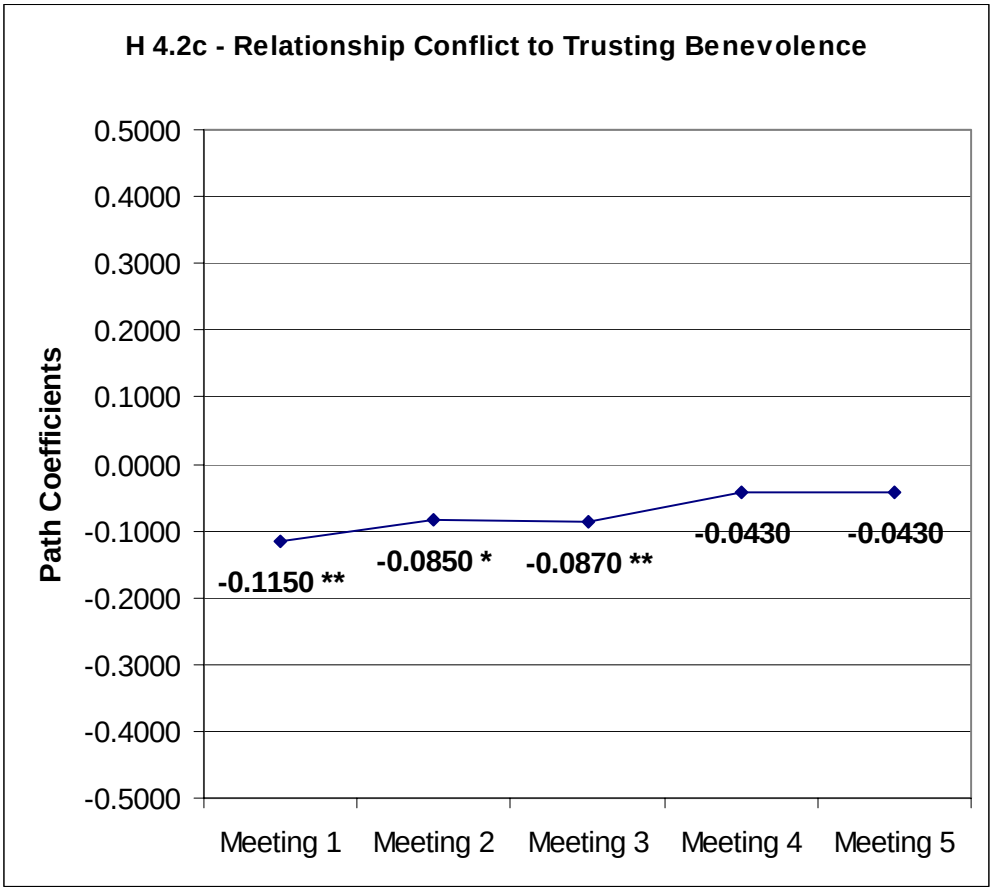


Figure 4.2c – Relationship between Relationship Conflict and Trusting Benevolence (over time).

5.3.6.4.10 H 4.3: Responsiveness of Others will positively influence Trusting Beliefs.

Responsiveness of others refers to the extent to which members perceive others as responding quickly to their comments. According to theoretical arguments, the more a person perceives others as being responsive, the more they will develop a sense of cooperation and thus strengthen their trusting beliefs about their partners. Thus, a positive relationship was proposed between responsiveness of

others and trusting beliefs. Statistical results of these hypothesized relationships (i.e., H 4.3a, H 4.3b, and H 4.3c) are described below.

5.3.6.4.11 H 4.3a: Responsiveness of others will positively influence Trusting Ability.

As anticipated, responsiveness of others influenced trusting ability across all five meetings. The more team members perceived their partners as being responsive to their request, the more trusting ability members placed in others. This pattern of behavior was statistically significant ($p < 0.01$) during the entire project (for every meeting) as shown in Table 4.3a.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.2620**	**0.2620**	**0.2750**	**0.1930**	**0.1720**
P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0001**	**0.0011**

Table 4.3a – The Effects of Responsiveness of others on Trusting Ability.

However, while the relationship was significant throughout the entire project, visualization in Figure 4.3a suggests that it weakened somewhat at the final stages of the project. It also suggests that over time, the impact of responsiveness on members' perceptions of others' trusting abilities decreased. As shown in Figure 4.3a, such effects were significant across all five meetings.

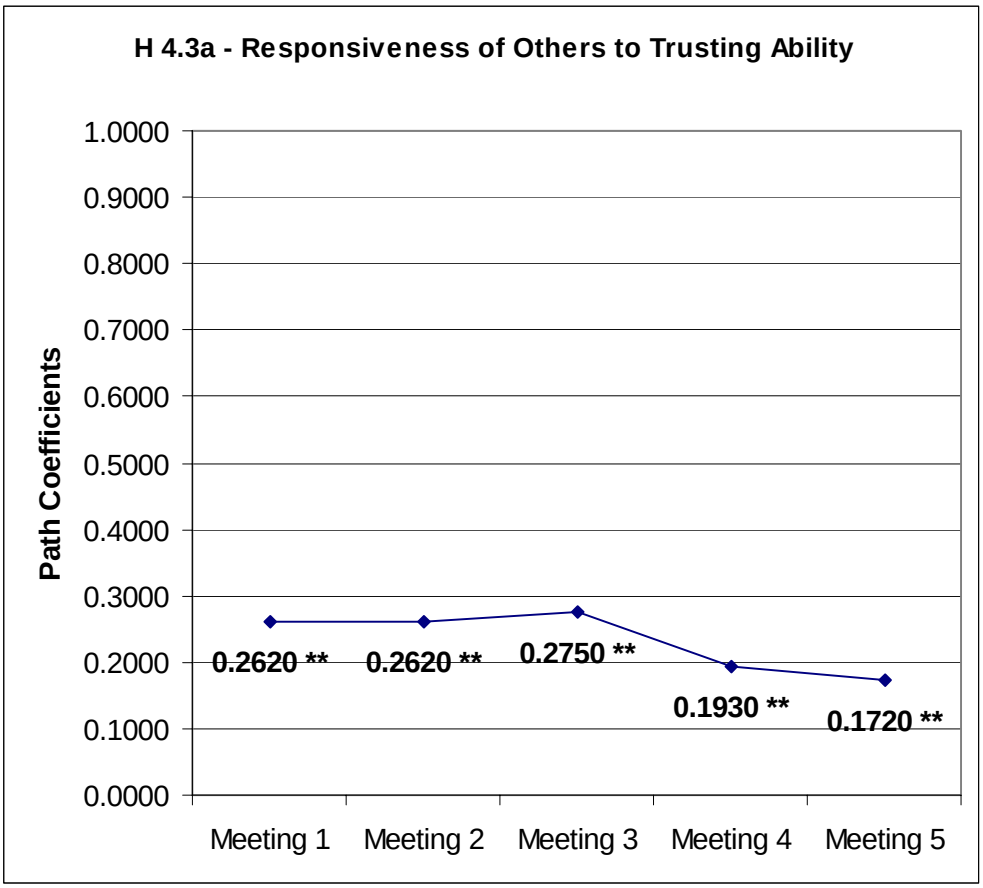


Figure 4.3a – Relationship between Perceptions of Responsiveness of others and Trusting Ability (over time).

5.3.6.4.12 H 4.3b: Responsiveness of others will positively influence Trusting Integrity.

The relationship between responsiveness of others and trusting integrity was also statistically significant across all five meetings ($p < 0.01$). Table 4.3b shows that the path coefficients were positive for all meetings as expected. Thus, the more members perceived others as being responsive, the more members developed integrity based trust toward their partners.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.2280**	**0.1970**	**0.2530**	**0.1530**	**0.2390**
P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0003**	**0.0000**

Table 4.3b – The Effects of Responsiveness of Others on Trusting Integrity.

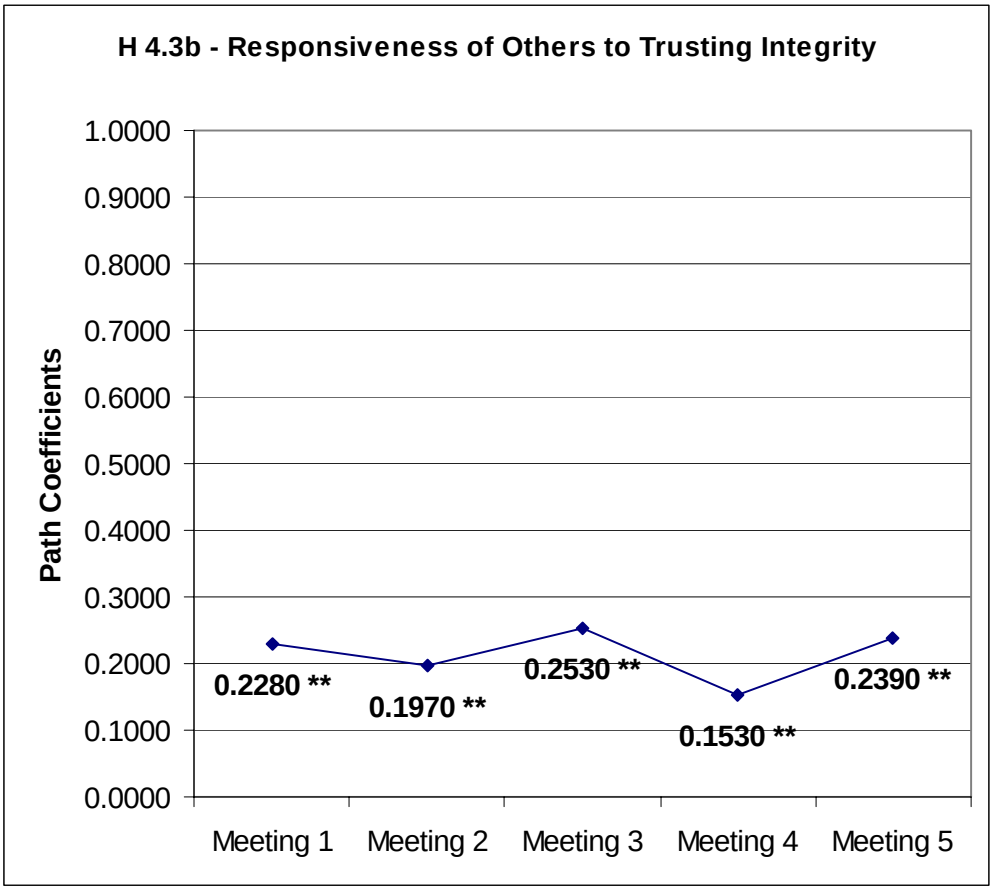


Figure 4.3b – Relationship between Responsiveness of Others and Trusting Integrity (over time).

Figure 4.3b shows that despite small changes in the values of the path coefficients, the pattern of relationships was consistently positive. Based on the results, the hypothesized relationship was strongly supported, thus indicating that

the extent of trusting integrity experienced over time was positively related to the perceived of responsiveness of others.

5.3.6.4.13 H 4.3c: Responsiveness of Others will positively influence Trusting Benevolence.

Table 4.3c shows that the effect of responsiveness of others on trusting benevolence was supported across all meetings ($p < 0.01$) in the same manner as trusting ability and integrity. Here too the relationship was positive across all five meetings as theorized.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.2360**	**0.1610**	**0.2210**	**0.1700**	**0.2130**
P-Level	**0.0000**	**0.0008**	**0.0004**	**0.0002**	**0.0000**

Table 4.3c – The Effects of Responsiveness of Others on Trusting Benevolence.

Figure 4.3c suggests that the changes reflect behavior similar to that of the relationship between responsiveness of others and trusting integrity. Overall, this relationship was strongly supported across all five meetings suggesting that the extent of trusting benevolence was positively influenced by the responsiveness of others. Thus, responsiveness of others was an important predictor of trusting benevolence over time.

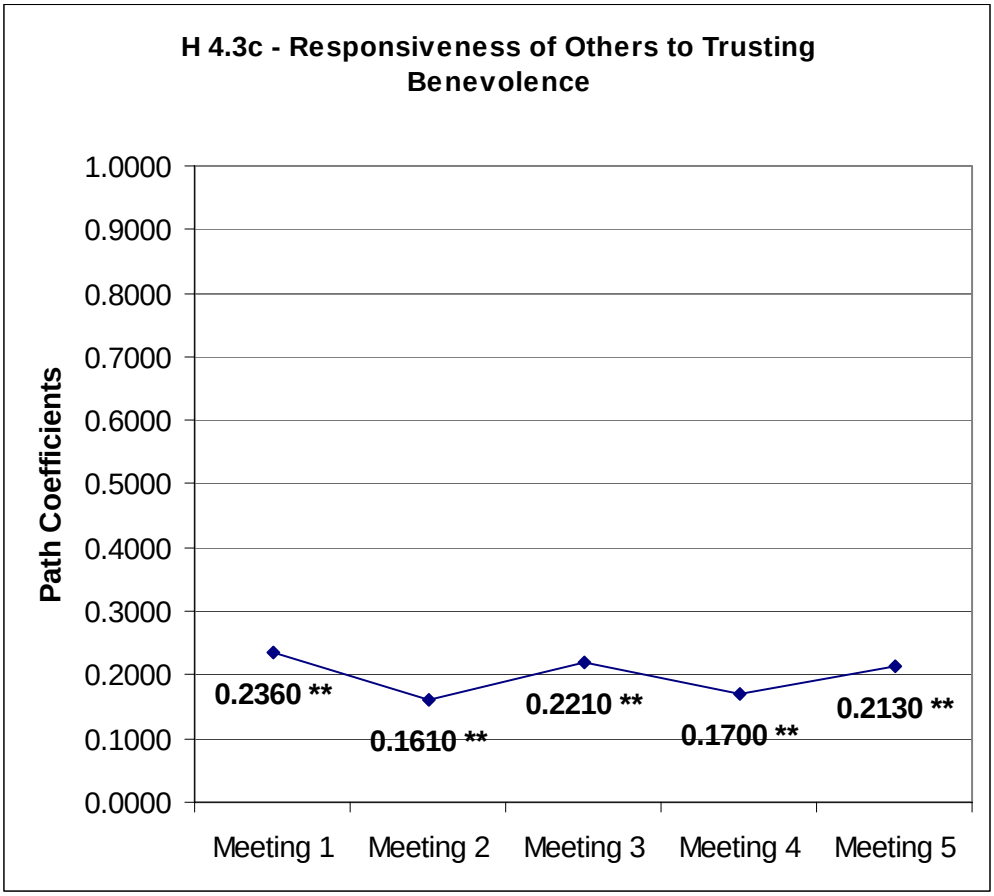


Figure 4.3c – Relationship between Responsiveness of Others and Trusting Benevolence (over time).

5.3.6.4.14 H 4.4: Shared Identity will positively influence Trusting Beliefs.

Shared identity refers to the extent to which group members identify themselves as part of the group in which they are working. It was theorized that the extent to which members see themselves as part of the group would influence how trusting beliefs towards their partners unfold over time. Since the development of shared identity was seen as a positive outcome, it was expected to positively

influence trusting beliefs over time. Below the statistical results of these hypothesized relationships (i.e., H 4.4a, H 4.4b, and H 4.4c) are described.

5.3.6.4.15 H 4.4a: Shared Identity will positively influence Trusting Ability.

As discussed in the theory section, shared identity is expected to positively influence trusting ability. The more members identify themselves with their partners, the more ability-based trust members will place in others. This relationship was significant ($p < 0.01$) in all five meetings as shown in Table 4.4a.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.1280**	**0.1690**	**0.1760**	**0.2340**	**0.1490**
P-Level	**0.0002**	**0.0000**	**0.0000**	**0.0000**	**0.0066**

Table 4.4a – The Effects Shared Identity on Trusting Ability.

In addition, with the exception of the last meeting, visualization in Figure 4.4a suggests that the strength of this relationship increased over time. Overall, such effects were significant across all five meetings strongly supporting the hypothesized relationship.

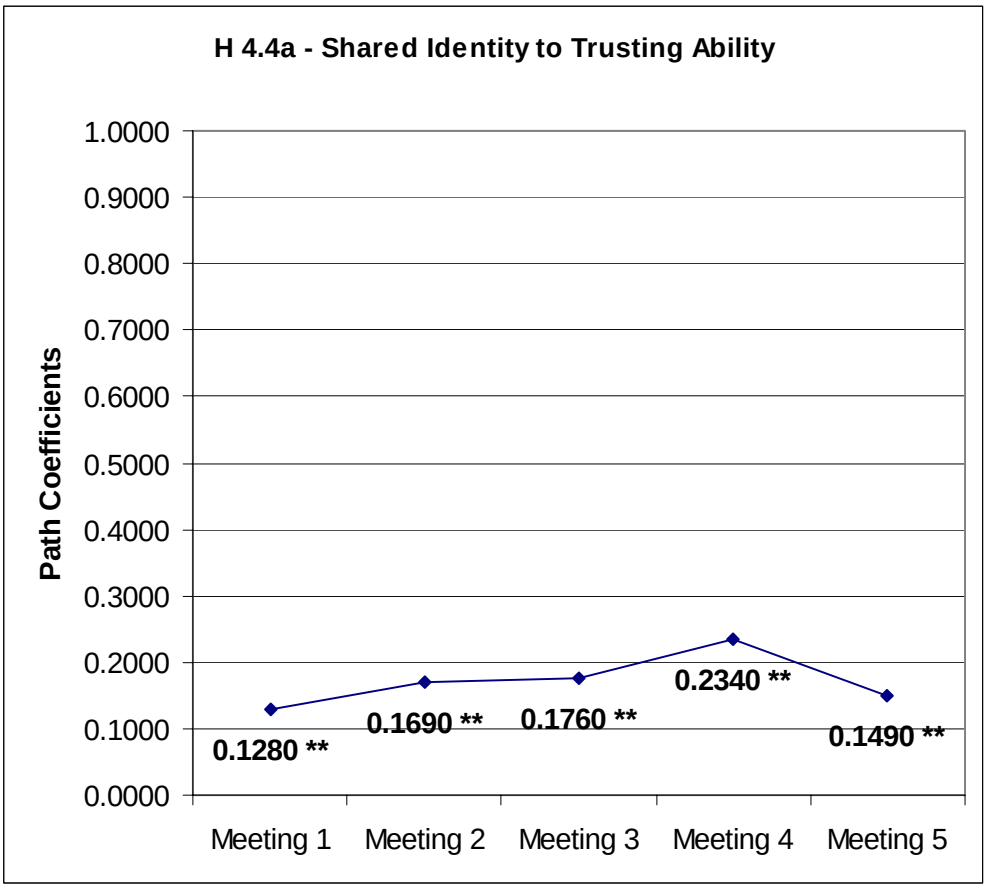


Figure 4.4a – Relationship between Shared Identity and Trusting Ability (over time).

5.3.6.4.16 H 4.4b: Shared Identity will positively influence Trusting Integrity.

According to results presented in Table 4.4, the relationship between shared identity and trusting integrity was statistically significant during the entire project. With the exception of the last meeting in which the path was significant at $p < 0.05$ level, it was significant at $p < 0.01$ level in the other four meetings. In addition, Table 4.4b provides evidence about the consistently positive relationship between these two variables in all meetings. Results confirm theoretical arguments in that the stronger the shared identity, the stronger is the trusting integrity of members.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.1400**	**0.1220**	**0.1140**	**0.2080**	**0.0940**
P-Level	**0.0001**	**0.0004**	**0.0004**	**0.0000**	**0.0406**

Table 4.4b – The Effects Shared identity on Trusting Integrity.

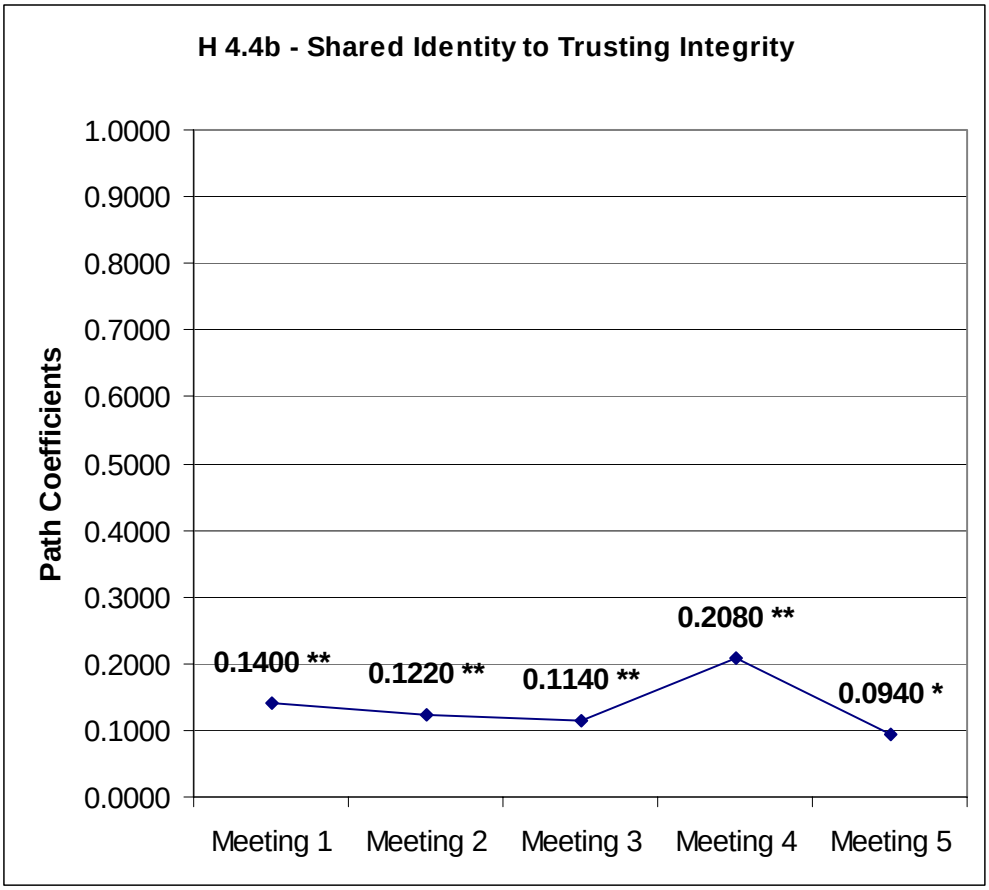


Figure 4.4b – Relationship between Perceptions of Shared identity and Trusting Integrity (over time).

Based on the results depicted in Table 4.4b, the hypothesized relationship was strongly supported, indicating that trusting integrity is positively influenced by

the extent of shared identity that members perceived when working on the group project.

5.3.6.4.17 H 4.4c: Shared identity will positively influence Trusting Benevolence.

As shown in Figure 4.4c, the effect of shared identity on trusting benevolence was significant in the initial four meetings ($p < 0.01$). In addition, the relationship was positive throughout all five meetings. Thus, the more members they perceived benevolence-based trust about their partners.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.1240**	**0.1130**	**0.1020**	**0.1470**	0.0720
P-Level	**0.0006**	**0.0050**	**0.0018**	**0.0003**	0.0678

Table 4.4c – The Effects Shared identity on Trusting Benevolence.

Summarizing, with the exception of the impact of shared identity on trusting benevolence in the last meeting (where $p < 0.10$), the relationship during other meetings was significant ($p<0.01$), suggesting that the posited link between shared identity and trusting benevolence was strongly supported.

Overall, results for all three components of trusting beliefs showed positive relationships as expected. Therefore, the results confirmed that the more members of a group see themselves as being part of a group, the more members develop trusting beliefs towards their partners.

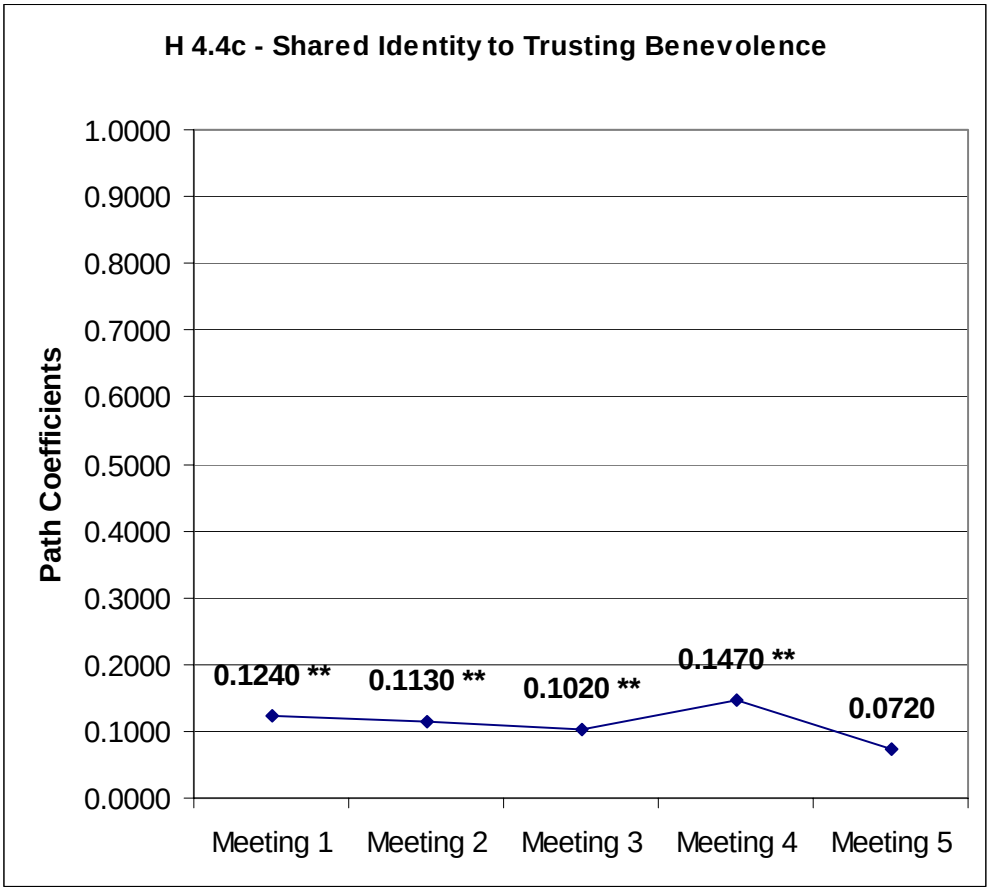


Figure 4.4c – Relationship between Shared Identity and Trusting Benevolence (over time).

5.3.6.5 The impact of Perceptions of Social Interaction on Task Perception

This study also hypothesized that perceptions of social interaction will influence task perception. In other words, based on patterns of social interaction members will perceive the task as being cooperative or conflictive. Based on this theoretical argument, the following general hypothesis was presented:

5.3.6.5.1 H 5: Perception of Social Interaction will influence Task Perception.

Since perception of social interaction is defined in terms of task-related conflict, relationship conflict, responsiveness of others, and shared identity, four specific hypotheses were tested in this study. Discussion of these hypotheses and their statistical results are presented below.

5.3.6.5.2 H 5.1: Task-Related Conflict will negatively influence Cooperative Perception of the Task.

Based on arguments established in the theory section, it was expected that higher levels of task-related conflict would negatively affect cooperative perception of the task. According to table 5.1, this hypothesized relationship was statistically significant ($p < 0.05$) only in meeting 4. Thus, contrary to what was expected, it appeared that task-related conflict had no significant impact on perceptions of the task (as being cooperative or conflictive) over time.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	-0.0290	-0.0790	-0.0280	**-0.1160**	0.0570
P-Level	0.3525	0.0944	0.3563	**0.0278**	0.1095

Table 5.1 – The Effects of Task-Related Conflict on Cooperative Perception of the Task.

Figure 5.1 depicts the profiles of this relationship over time. Results suggest that the impact of task-related conflict on cooperative perception did not exhibit a consistent pattern of change.

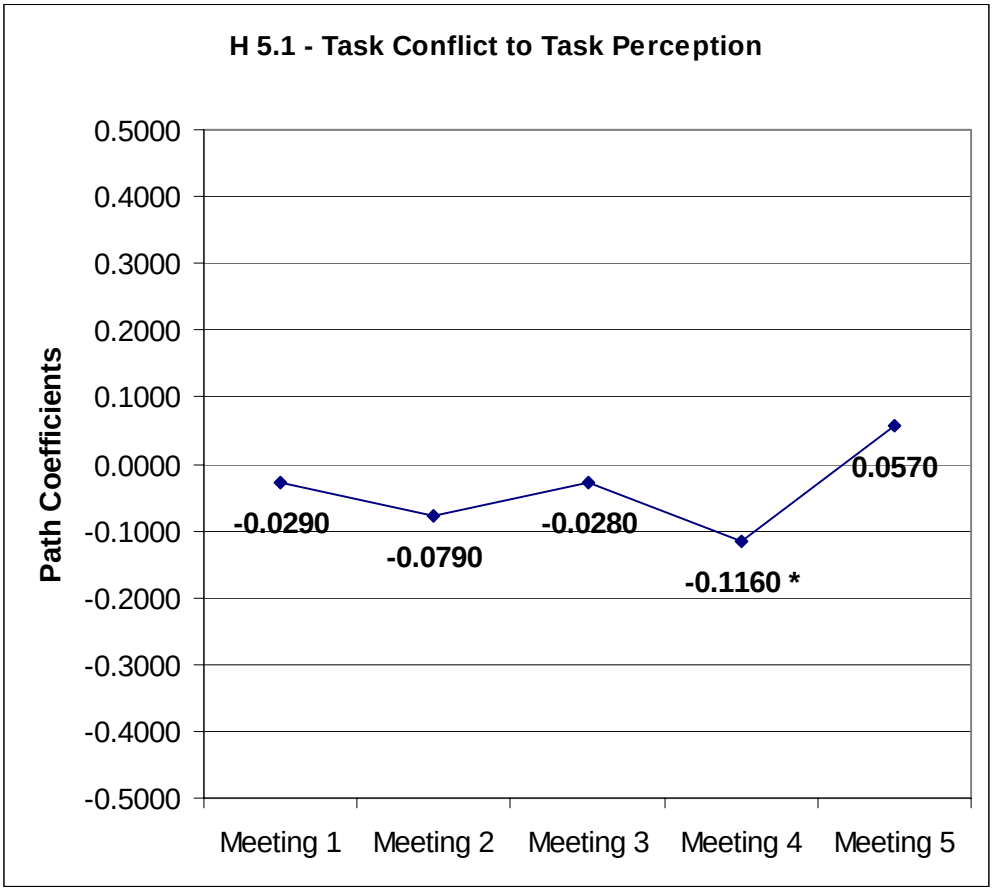


Figure 5.1 – Relationship between Task-Related Conflict and Cooperative Perception of the Task (over time).

5.3.6.5.3 H 5.2: Relationship Conflict will negatively influence Cooperative Perception of the Task.

The second component of social interaction - relationship conflict - was also expected to negatively affect cooperative perception of the task. Specifically, the more members experienced relationship conflict, the fewer members would perceive the task as being cooperative. Table 5.2 shows that this relationship was statistically significant during the entire project. In meeting 4, the relationship was significant at the $p < 0.05$ level, while in other meetings, the results were significant at the $p <$

0.01 level. Table 5.2 also confirms the expected negative relationship between these two variables over time. Therefore, this hypothesis was strongly supported across all five meetings.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**-0.2660**	**-0.1590**	**-0.2200**	**-0.1440**	**-0.2130**
P-Level	**0.0006**	**0.0059**	**0.0039**	**0.0217**	**0.0002**

Table 5.2 – The Effects of Relationship Conflict on Cooperative Perception of the Task.

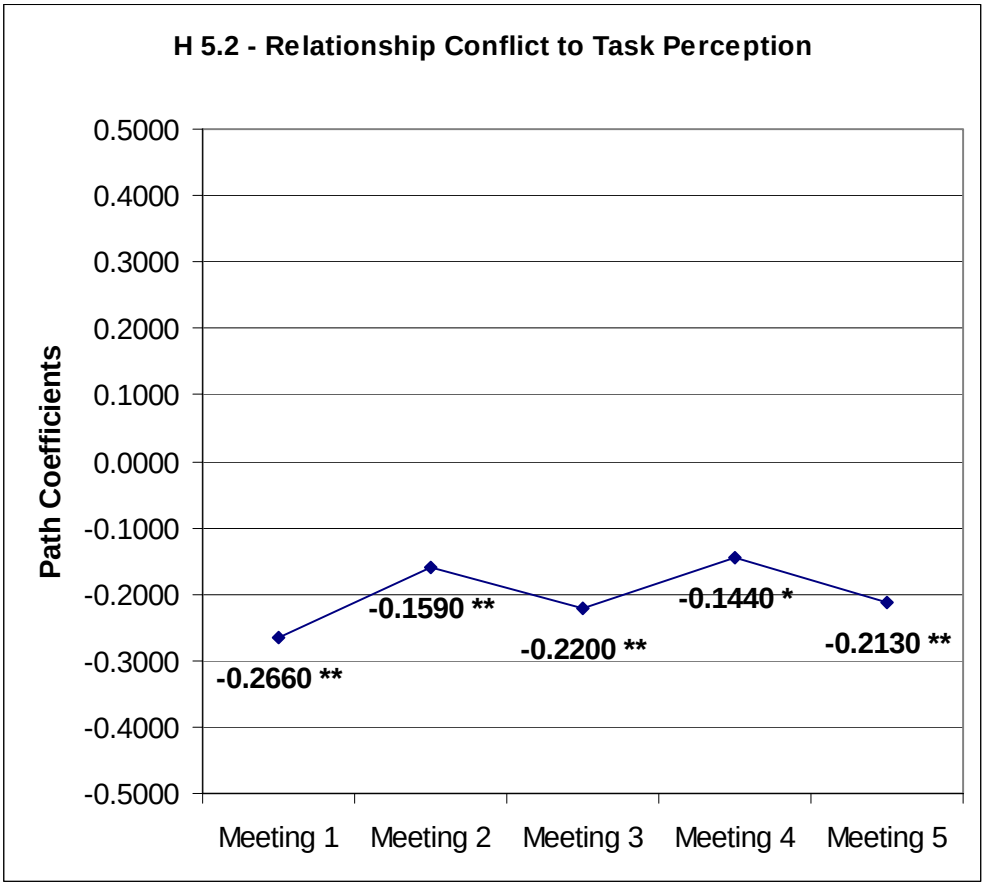


Figure 5.2 – Relationship between Relationship Conflict and Cooperative Perception of the Task (over time).

5.3.6.5.4 H 5.3: Responsiveness of Others will positively influence Cooperative Perception of the Task.

Responsiveness of others was also expected to influence cooperative perceptions of the task; however, contrary to the previous hypothesis, this relationship was theorized as being positive over all sessions. Thus, the more members perceived others as being responsive, the more members would perceive the task as being cooperative. As expected, Table 5.3 shows that this relationship was statistically significant during the entire project. Specifically, in meeting 3, the relationship was significant at the $p < 0.05$ level, while in the other meetings the results were significant at the $p < 0.01$ level. In addition, Table 5.3 confirms the expected positive relationship between these two variables over time. Thus, this hypothesis was strongly supported across all five meetings.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.1750**	**0.2410**	**0.1440**	**0.2510**	**0.2410**
P-Level	**0.0049**	**0.0001**	**0.0208**	**0.0004**	**0.0007**

Table 5.3 – The Effects of Responsiveness of Others on Cooperative Perception of the Task.

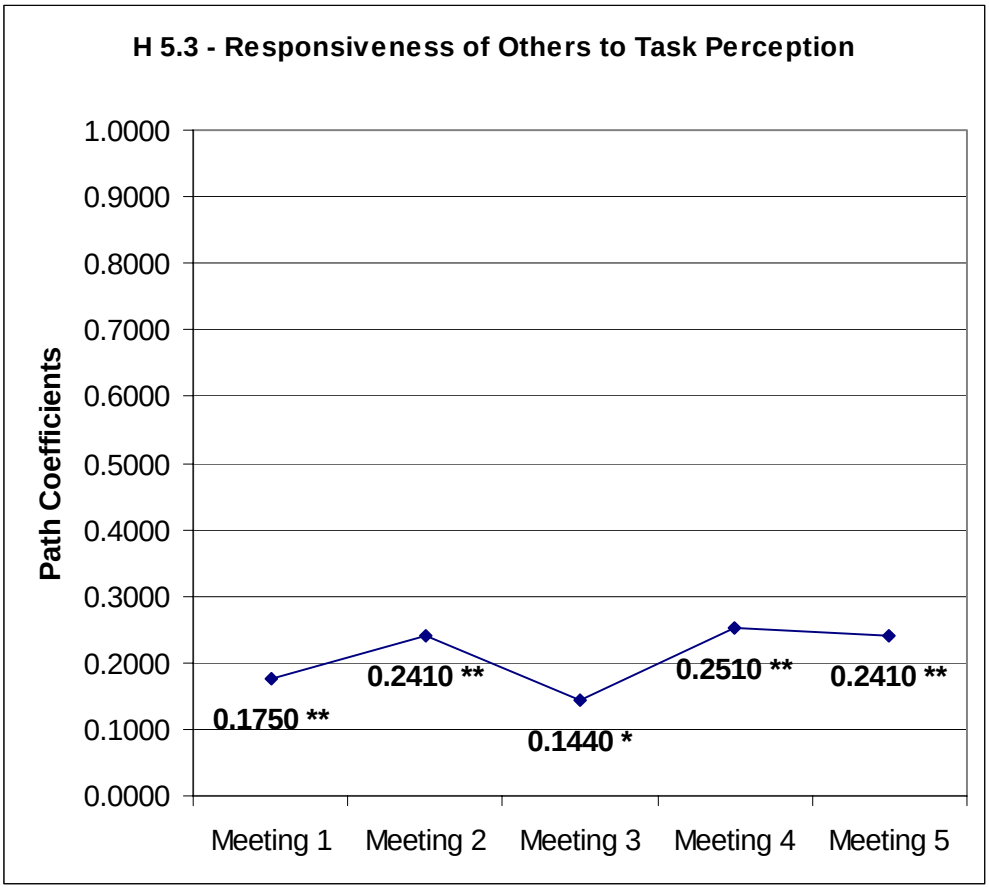


Figure 5.3 – Relationship between Responsiveness of Others and Cooperative Perception of the Task (over time).

5.3.6.5.5 H 5.4: Perception of Shared Identity will positively influence Cooperative Perception of the Task.

As shown in Table 5.4, individuals who had high levels of shared identity also perceived the task as being cooperative throughout the entire project. Since this hypothesis was strongly supported ($p<0.01$) across all five meetings, this pattern of behavior confirms what was predicted in the research model.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.2300**	**0.3590**	**0.3010**	**0.3070**	**0.3360**
P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Table 5.4 – The Effects of Shared Identity on Cooperative Perception of the Task.

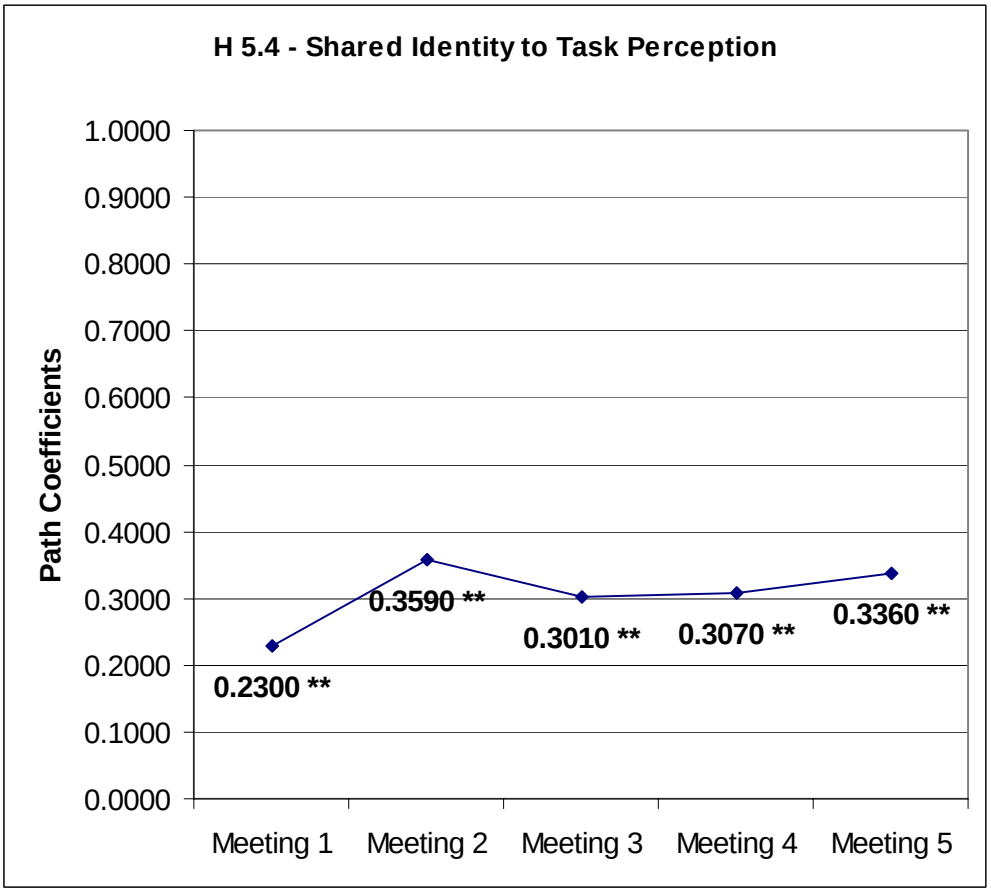


Figure 5.4 – Relationship between Shared Identity and Cooperative Perception of the Task (over time).

Overall, the influence of the three components of social interaction (i.e., relationship conflict, responsiveness of others, and shared identity) had a significant

impact on how the task was perceived. This suggests that social contribution of the task is a key factor in understanding group behavior.

5.3.6.6 The impact of the Virtual Setting on Perceptions of Social Interaction

This study has also hypothesized that the virtual setting would influence perceptions of social interaction. In other words, members develop perceptions about their social interaction based on the setting in which they are working. Specifically, it was theorized that members of virtual teams would experience different perceptions of social interaction compared to members of collocated teams. Thus, the following general hypothesis was proposed:

5.3.6.6.1 H6: Over time, members of virtual teams will develop different perceptions of social interaction compared to members of collocated teams.

In order to understand the impact of the virtual setting on social interaction, this study established four specific hypotheses. Discussion of these hypotheses and their statistical results are presented below.

5.3.6.6.2 H 6.1: The Virtual Setting will positively influence Task-Related Conflict.

At early stages of group interaction, members of a virtual team have fewer cues to communicate, gather information about others, and evaluate other's attitudes in comparison to members of collocated teams. However, as members of a virtual team progress in their project using communication technologies, it is expected that they adjust themselves to this working setting and adapt existing

media to fit their own needs (Walther, 1992). In this sense, this study hypothesized that the virtual setting will positively influence task-related conflict. Specifically, members operating in virtual teams will experience more task-related conflict than those members of collocated groups. This happens because members of virtual teams initially have fewer multiples cues in comparison to collocated teams. However, it was also expected that as members of virtual team progress in their project, the strength of this relationship would reduce given that virtual team members will adapt to the available media.

Table 6.1 shows statistically significant results in three meetings. For instance, this hypothesis was supported in meeting 1 ($p<0.01$), meeting 2 ($p<0.01$), and meeting 5 ($p < 0.05$). Thus, this hypothesis was moderately supported across all meetings. In addition, according to the profiles of this relationship depicted in Figure 6.1, there is a clear pattern of change during the entire project. **A visual inspection of the graph suggests that the relationship strengthened over time**. Furthermore, in the last meeting the relationship became inversely related.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.2650**	**0.1200**	0.0430	0.0350	**-0.0960**
P-Level	**0.0000**	**0.0057**	0.2020	0.2617	**0.0285**

Table 6.1 – The Effects of the Virtual Setting on Task-Related Conflict.

The pattern of change indicated in Figure 6.1 confirms expectation in that over time members of virtual team adapts to the available technologies so that their perceptions are less influenced by the technology per se. Thus, while in the first meetings the virtual setting positively influenced task-related conflict by the final meeting the virtual setting was found to negatively influence of task-related conflict.

In other words, initially, members of virtual team experienced high amounts of task-related conflict. However, in subsequent stages of group development task-related conflict decreased over time up to a point where the relationship between these two variables became inverse.

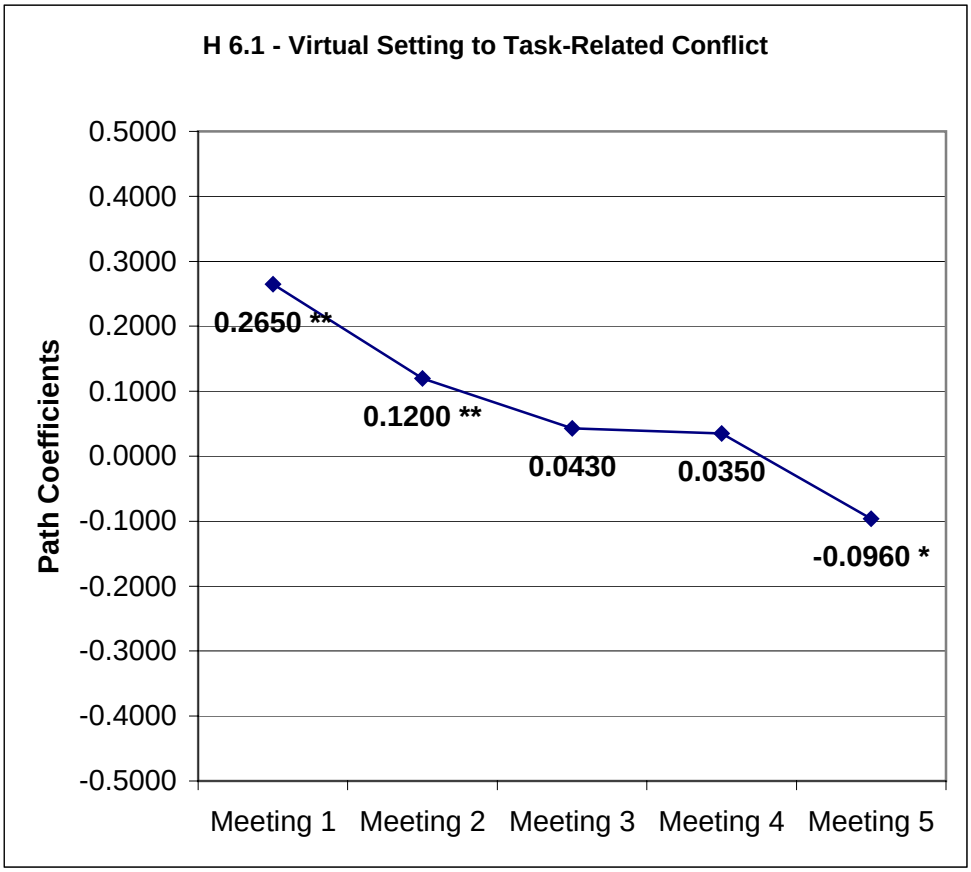


Figure 6.1 – Relationship between Virtual Setting and Task-Related Conflict (over time).

5.3.6.6.3 H 6.2: The Virtual Setting will positively influence Relationship Conflict.

Based on earlier arguments, the virtual setting was expected to positively affect relationship conflict. According to results shown in Table 6.2, this

hypothesized relationship was statistically significant ($p < 0.01$) in meetings 1 and 2. Thus, in the initial stages of group development it appeared that the virtual setting influenced member's perceptions of relationship conflict.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.2310**	**0.1310**	**0.0190**	**0.0040**	**-0.0590**
P-Level	**0.0000**	**0.0040**	0.3455	0.4697	0.1249

Table 6.2 – The Effects of the Virtual Setting on Relationship Conflict.

As with the previous hypothesis, the relationship between setting and perceptions of relationship conflict was inversely related in the last meeting. Thus, as members progressed with their project over time, the effects of the setting on relationship conflict dissipated.

Figure 6.2 depicts the profiles of this relationship over time. Results suggest a similar pattern of change between the virtual setting and both task-related conflict and relationship conflict. This reinforces the idea that over time members of virtual teams adapt to available technologies up to a point where its effects are less pronounced – at least in terms of conflict.

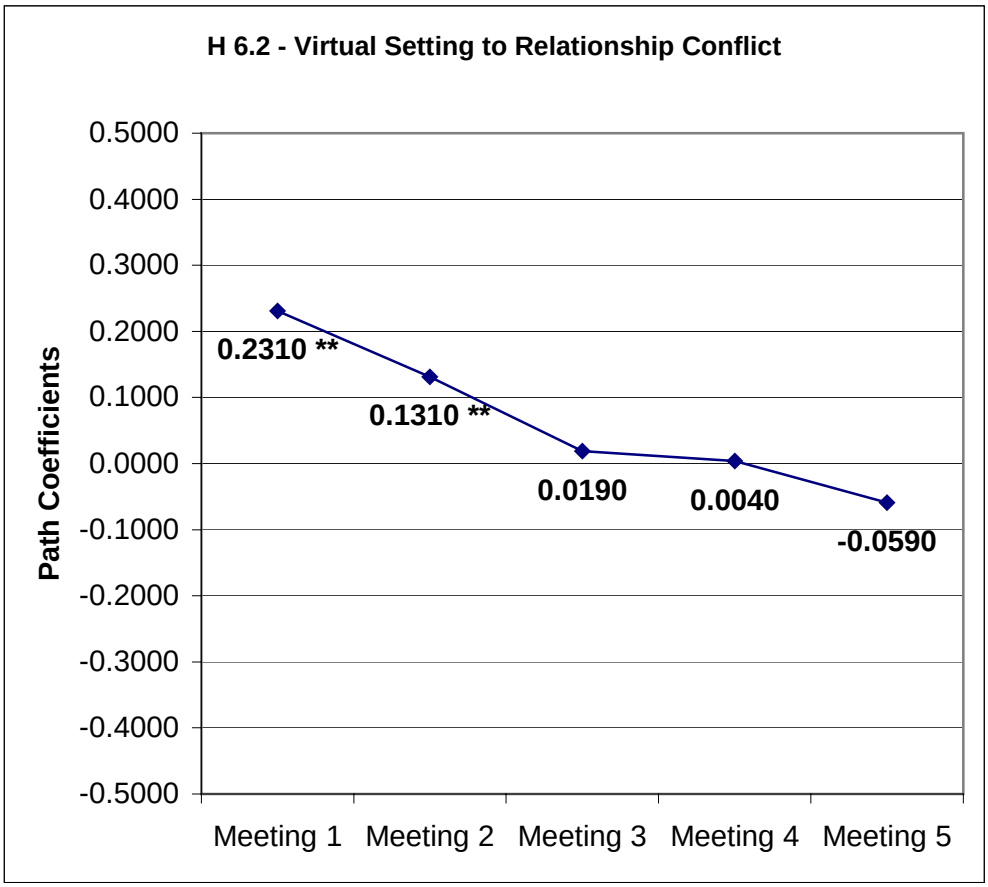


Figure 6.2 – Relationship between Virtual Setting and Relationship Conflict (over time).

5.3.6.6.4 H 6.3: The Virtual Setting will negatively influence Responsiveness of Others.

It was also expected that members working in virtual teams would perceive other members as being less responsive. Results presented in Figure 6.3 confirm this hypothesis for the entire group project ($p < 0.01$). Therefore, individuals in a virtual setting consistently perceived other members as being not responsive. Thus,

the hypothesis was supported and the direction of the relationship was negative as predicted.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**-0.2580**	**-0.2190**	**-0.0990**	**-0.1480**	**-0.1810**
P-Level	**0.0000**	**0.0000**	**0.0104**	**0.0002**	**0.0000**

Table 6.3 – The Effects of the Virtual Setting on Responsiveness of Others.

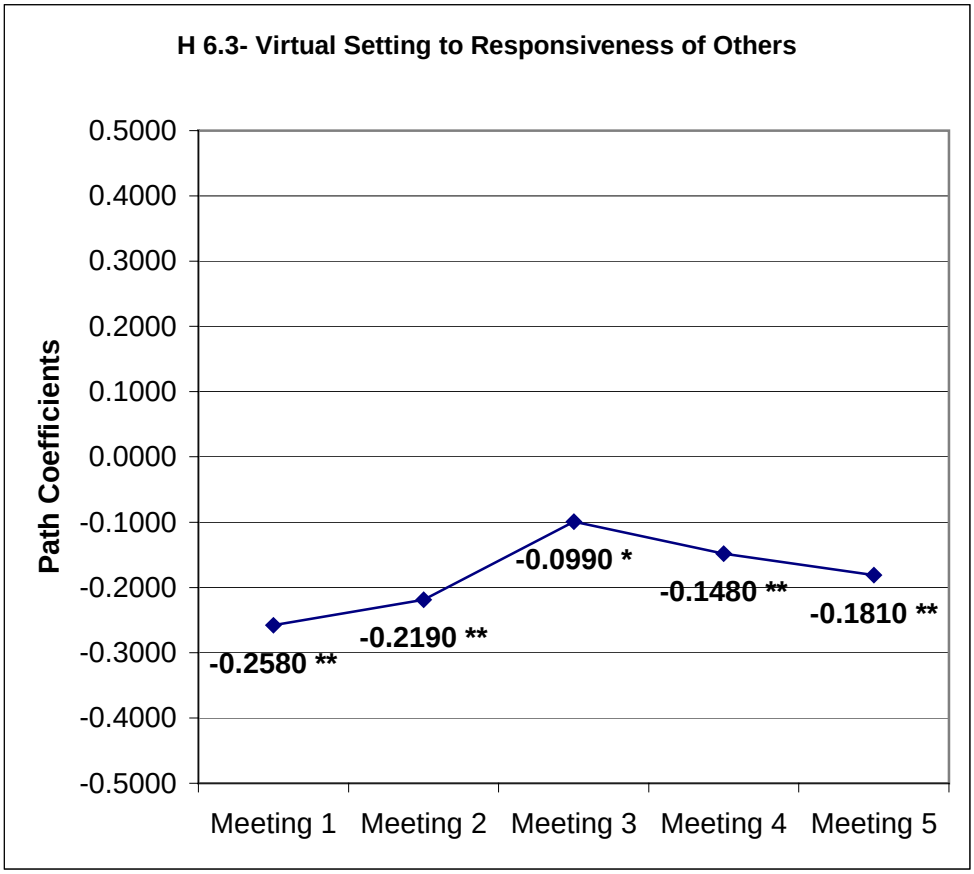


Figure 6.3 – Relationship between Virtual Setting and Responsiveness (over time).

A visual inspection in Figure 6.3 suggests that the impact of the setting on responsiveness of others exhibited changes over time. Interestingly, the strength

while still significant, weakened up to meeting 3 (the midpoint of the group project) and then strengthened from meeting 3 to meeting 5. In other words, in the first half of the group project the strength of the relationship decreased, while in the second half the strength of the relationship increased.

5.3.6.6.5 H 6.4: The Virtual Setting will negatively influence Shared Identity.

Based on arguments established in the theory section, it was expected that the setting would negatively affect shared identity since virtual members have limited bandwidth to convey communication cues, at least in the initial stages. According to results shown in Table 6.4, this hypothesized relationship was supported ($p < 0.01$) during the entire project.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**-0.2940**	**-0.2430**	**-0.1310**	**-0.1730**	**-0.2260**
P-Level	**0.0000**	**0.0000**	**0.0028**	**0.0000**	**0.0000**

Table 6.4 – The Effects of the Virtual Setting on Shared Identity.

In addition, as shown in Table 6.4, this relationship was positive as proposed earlier. Thus, it confirms the fact that members working in the virtual setting experience consistently less shared identity compared to their collocated counterparts. Figure 6.4 depicts the profiles of this relationship over time. Results suggest that the impact of the virtual setting on shared identity exhibited a pattern similar to its relationship with responsiveness of others. The strength of the relationship decreased until the midpoint, then it increased in the second half of the group project.

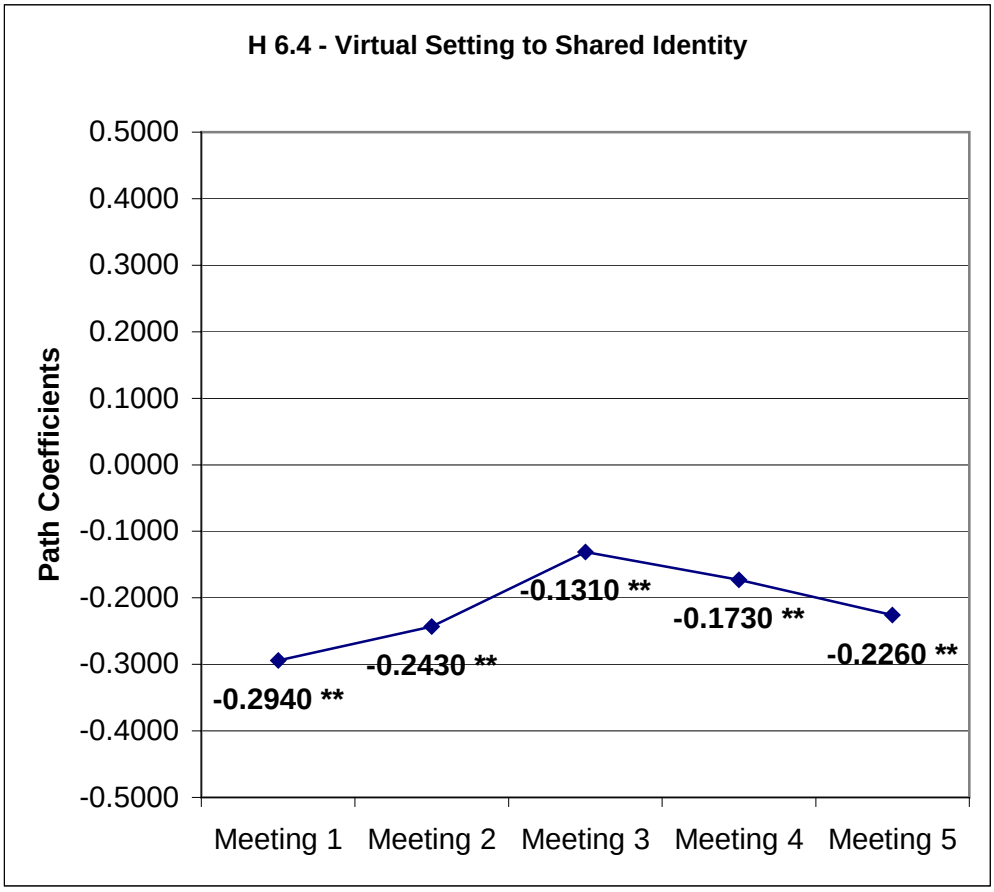


Figure 6.4 – Relationship between Virtual Setting and Shared Identity (over time).

5.3.6.7 The impact of Trust Behavior on Intermediate Outcomes

Studies on virtual teams have provided evidence about the positive impact of group process variables on task outcome. Given that trust behavior is an important group process variable in the context of virtual teams, this study hypothesizes that individuals with high levels of trust behavior will also have better outcomes in terms

of task outcome and satisfaction with outcomes. Thus, the following general hypothesis was proposed:

5.3.6.7.1 H7: Trust Behavior will positively influence Task Outcome and Satisfaction with Outcomes.

For the purpose of this study, task outcome and satisfaction with the process were measured in each of the five meetings. In the next two sections, a discussion of these hypotheses is presented.

5.3.6.7.2 H 7.1: Trust Behavior will positively influence Satisfaction with Outcomes.

According to Table 7.1, the positive impact of trust behavior on satisfaction with outcomes was significant in all meetings ($p<0.01$). In addition, the profiles of this relationship depicted in Figure 7.1 show a decreasing pattern during the initial four meetings, with significant increase in the last meeting. Furthermore, as predicted, the relationship was positively related across all meetings.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.2100**	**0.1920**	**0.1800**	**0.1780**	**0.2800**
P-Level	**0.0000**	**0.0000**	**0.0001**	**0.0008**	**0.0000**

Table 7.1 – The Effects of Trust Behavior on Satisfaction Outcomes.

Results shown above confirmed our expectation that trust behavior is an important predictor of satisfaction with outcomes. In all meetings of the group project, the more individuals exhibited trust behavior, the more individuals were satisfied they were with outcomes.

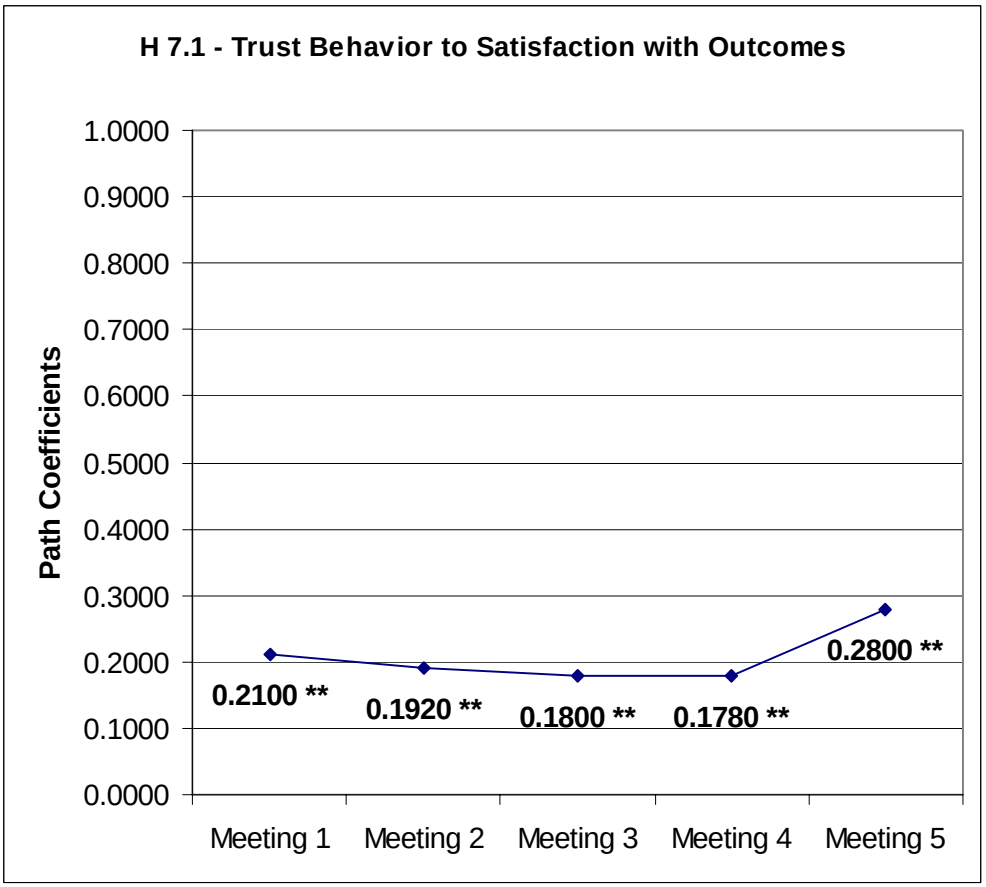


Figure 7.1 – Relationship between Trust Behavior and Satisfaction with Outcomes (over time).

5.3.6.7.3 H 7.2: Trust Behavior will positively influence Task Outcome.

This study also hypothesized that trust behavior will positively affect task outcomes. However, as shown in Table 7.2, this hypothesized relationship was supported only in the last meeting ($p < 0.01$). Thus, in the initial stages of group development members' trust behavior did not affect task outcomes significantly.

	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	-0.0320	0.0370	0.0320	0.0480	**0.1220**
P-Level	0.2270	0.1538	0.1902	0.1536	**0.0021**

Table 7.2 – The Effects of Trust Behavior on Task Outcome.

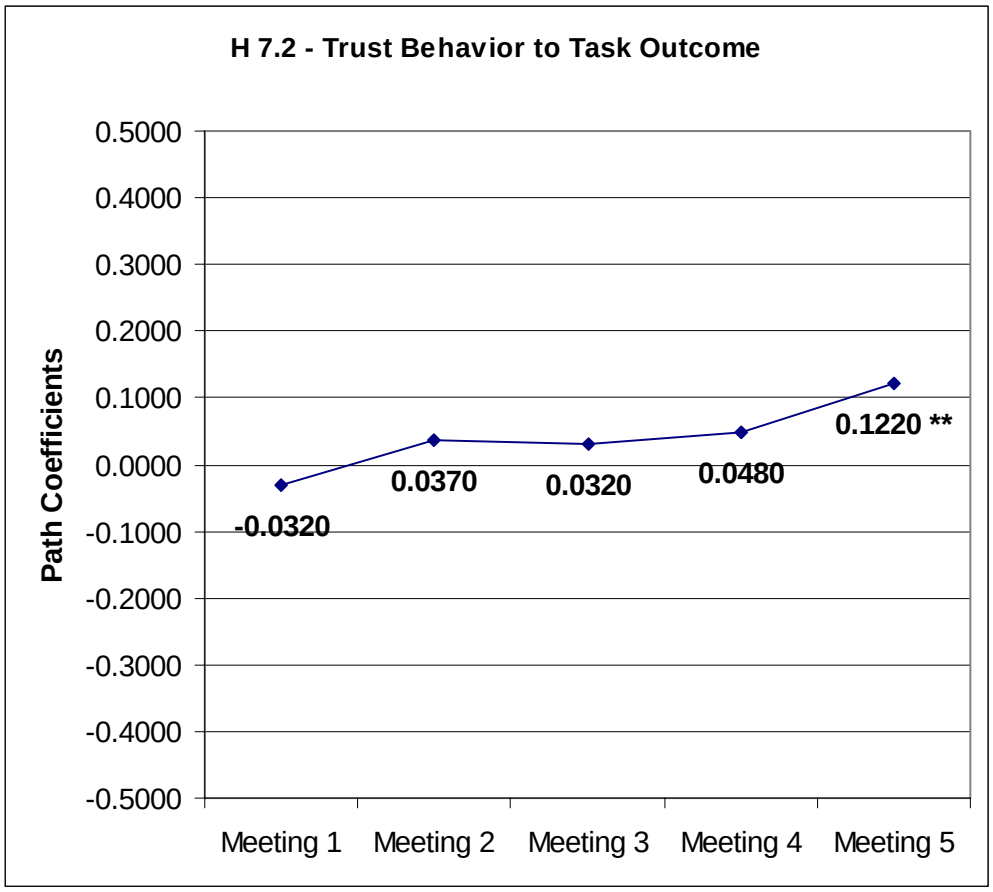


Figure 7.2 – Relationship between Trust Behavior and Task Outcome (over time).

Interestingly, contrary to what was expected, the two constructs were inversely related in the first meeting. However, as time passed (from meeting 2 to meeting 5), the relationship became positive (as expected in the theory section) and

by the last meeting became significant. Overall, the impact of trust behavior on satisfaction with outcomes was strongly supported in all meetings, while its impact on task outcomes was minimally supported.

5.3.6.8 The impact of Outcomes on Perceptions of Social Interaction

This study hypothesized that outcomes would influence perception of social interaction. In other words, participants with positive prior previous outcomes (in terms of satisfaction with outcomes and task outcomes) would also experience positive perceptions of social interaction (in terms of task-related conflict, relationship conflict, responsiveness of others, and shared identity). Thus, the following general hypothesis was proposed:

5.3.6.8.1 H8: Over time, task outcomes and satisfaction with outcomes will positively influence perceptions of social interaction.

In order to analyze the impact of satisfaction with outcomes on perceptions of social interaction, this study established four specific hypotheses related to each of the four components of social interaction -- task-related conflict, relationship conflict, responsiveness of others, and shared identity.

These relationships were analyzed by looking at how outcomes of a given meeting affected perceptions of social interaction in a subsequent meeting. For example, task outcome of meeting 1 was expected to positively affect perceptions of social interaction in meeting 2, discussion of the results related to these hypotheses are presented below.

5.3.6.8.2 H 8.1a: Satisfaction with Outcomes will negatively influence Task-Related Conflict.

Table 8.1a shows the results of the impact of satisfaction with outcomes on task-related conflict. Results were significant ($p < 0.01$) in all meetings providing strong support for this hypothesis for the entire project. In addition, according to the profiles depicted in Figure 8.1a, the pattern was consistently, if somewhat progressively weakened, negative.

	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**-0.2490**	**-0.2720**	**-0.1840**	**-0.1950**
P-Level	**0.0000**	**0.0000**	**0.0002**	**0.0004**

Table 8.1a – The Effects of Satisfaction with Outcomes on Task-Related Conflict.

The pattern of change indicated in Figure 8.1a confirms expectations in that satisfaction with outcomes and task-related conflict are inversely correlated.

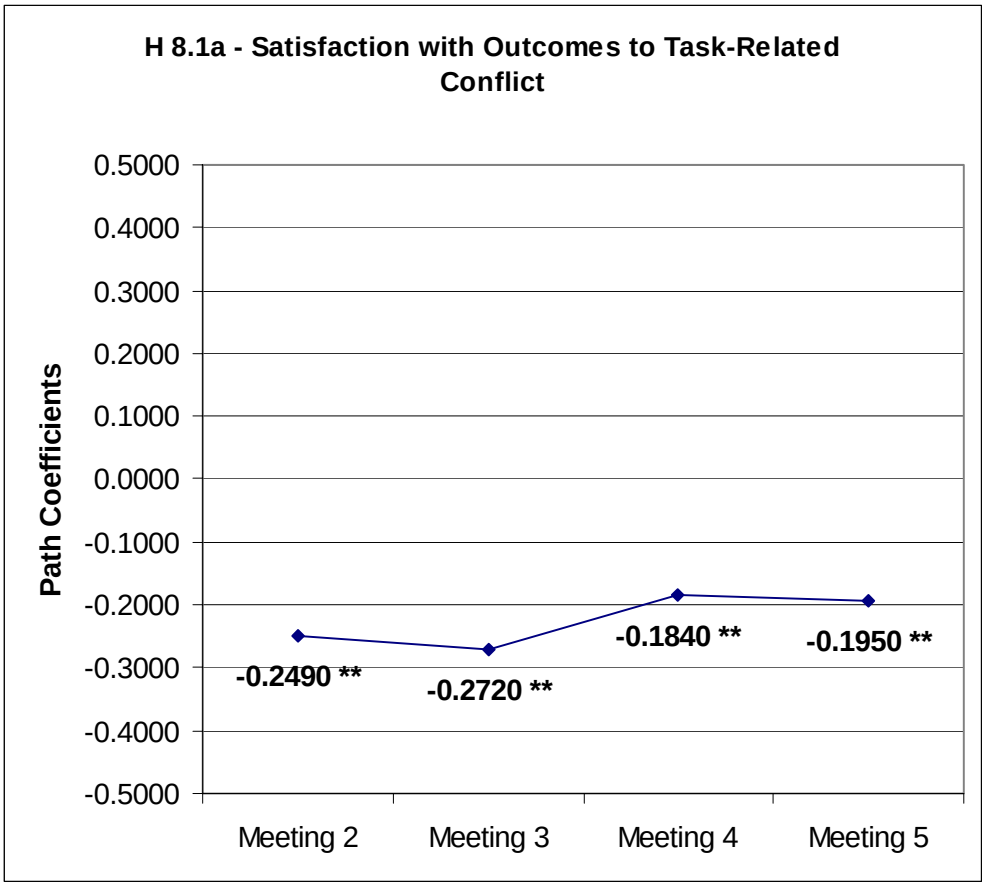


Figure 8.1a – Relationship between Satisfaction with Outcomes and Task-Related Conflict (over time).

5.3.6.8.3 H 8.1b: Satisfaction with Outcomes will negatively influence Relationship Conflict.

Based on arguments in the previous paragraphs, it was theorized that satisfaction with outcomes would negatively affect relationship conflict. According to the results shown in Table 8.2a, this hypothesized relationship was statistically significant ($p < 0.01$) in all meetings. Therefore, it appears that members' perceptions of relationship conflict were affected by satisfaction with outcomes

during all stages of group development. Thus, this hypothesis was strongly supported for the entire project.

Table 8.1b – The Effects of Satisfaction with Outcomes on Relationship Conflict.

	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**-0.2690**	**-0.3300**	**-0.2740**	**-0.2500**
P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Figure 8.1b depicts the profiles of this relationship over time. This relationship exhibits patterns of change that are similar to the one described previously. Overall, these results suggest that over time satisfaction with outcomes is an important predictor of relationship conflict.

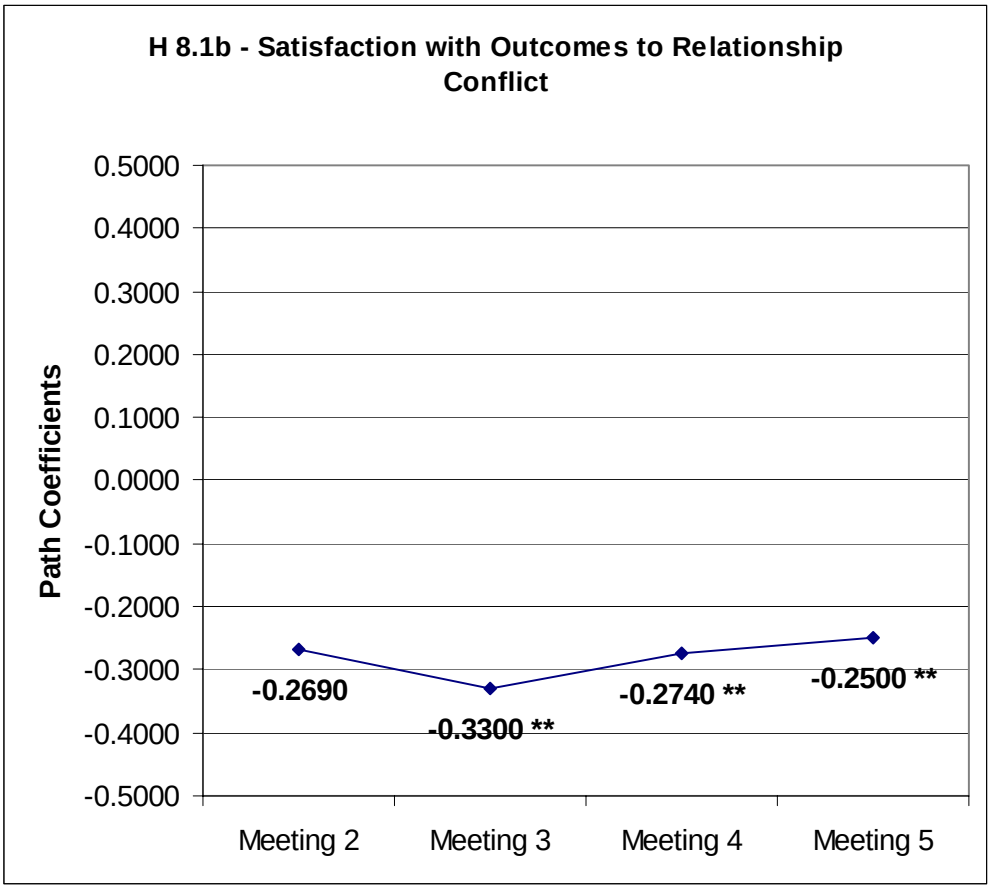


Figure 8.1b – Relationship between Satisfaction with Outcomes and Relationship Conflict (over time).

5.3.6.8.4 H 8.1c: Satisfaction with Outcomes will positively influence Responsiveness of Others.

It was also expected that members with high levels of satisfaction with outcomes would also perceive others as being highly responsive. Results presented in Figure 8.3a confirmed this hypothesis for the entire duration of group project ($p < 0.01$). Individuals who experienced high levels of satisfaction with outcomes perceived fellow members as being highly responsive. Thus, this hypothesis was

strongly supported. In addition, as predicted, the direction of the relationship was positive in all meetings.

	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.4270**	**0.5290**	**0.5210**	**0.5530**
P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Table 8.1c – The Effects of Satisfaction with Outcomes on Responsiveness of Others.

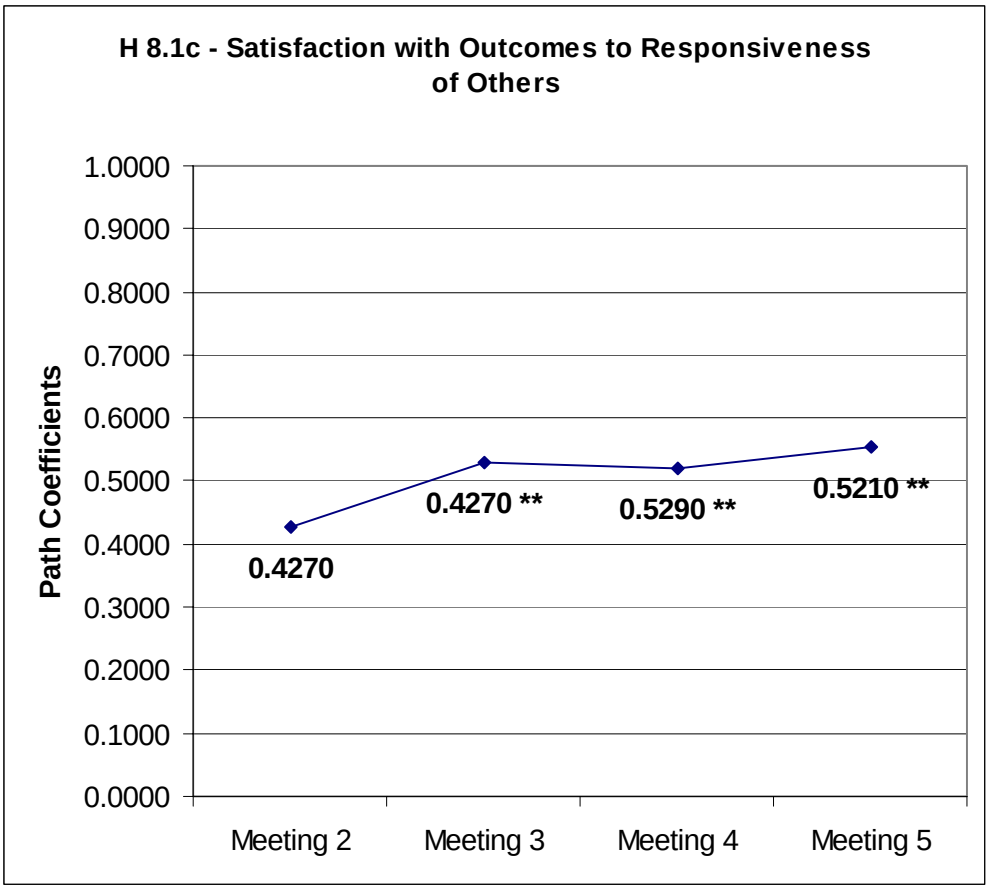


Figure 8.1c – Relationship between Satisfaction with Outcomes and Responsiveness of Others (over time).

A visual inspection in Figure 8.1c suggests that the impact of satisfaction with outcomes on responsiveness of others strengthened over time. These results

suggest that satisfaction with outcomes was an important predictor of responsiveness.

5.3.6.8.5 H 8.1d: Satisfaction with Outcomes will positively influence Shared Identity.

Similar to the previous relationship results, members with high levels of satisfaction with outcomes were expected to perceive high levels of shared identity. Members' positive experiences with group outcomes would lead to greater feelings of closeness among group members since members will perceive themselves as sharing similar values and beliefs. According to results shown in table 8.4a, this hypothesized relationship was strongly supported ($p < 0.01$) during the entire project. In addition, this relationship was positive as expected.

	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.4760**	**0.5370**	**0.5650**	**0.5820**
P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Table 8.1d – The Effects of Satisfaction with Outcomes on Shared Identity.

Figure 8.1d depicts the profiles of this relationship over time. Results suggest that the impact of satisfaction with outcomes on shared identity was similar to its impact on the responsiveness of others. Thus, it confirmed that members with high satisfaction experienced high levels of shared identity, an effect that increased over time.

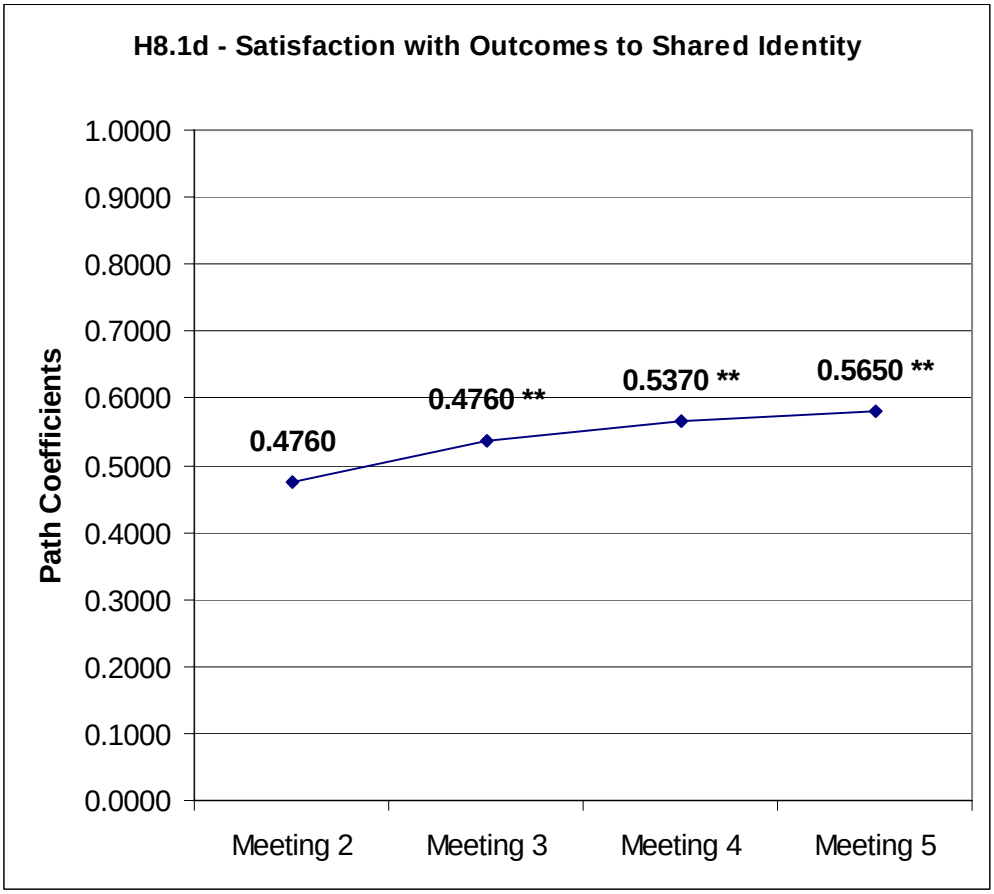


Figure 8.1d – Relationship between Satisfaction with Outcomes and Shared Identity (over time).

5.3.6.8.6 H 8.2a: Task Outcome will negatively influence Task-Related Conflict.

Table 8.2a shows the statistical results of the relationship between task outcome and task-related conflict. Results were significant in the last two meetings. In addition, a visual inspection in Figure 8.2a suggests that there was a clear pattern of change over time. Specifically, the strength of this relationship consistently increased over time. Furthermore, the relationship was inversely related as argued

in the theory section. Finally, results suggest that task outcome was a determinant of task-related conflict after the midpoint of group interaction.

	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	-0.0470	-0.0710	**-0.1260**	**-0.1120**
P-Level	0.0784	0.0616	**0.0065**	**0.0053**

Table 8.2a – The Effects of Task Outcome on Task-Related Conflict.

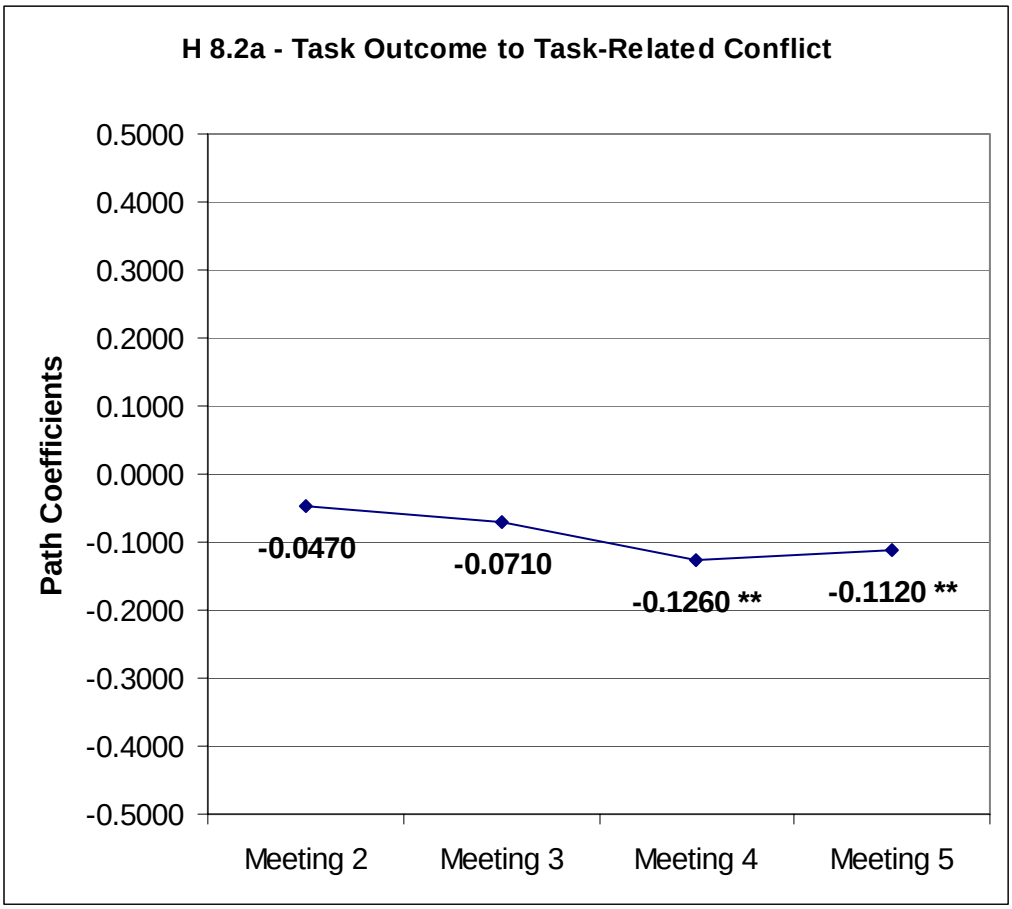


Figure 8.2a – Relationship between Task Outcome and Task-Related Conflict (over time).

5.3.6.8.7 H 8.2b: Task Outcome will negatively influence Relationship Conflict.

According to Table 8.2b, the effect of task outcome on relationship conflict was significant ($p < 0.01$) in meetings 2, 3 and 4. These results suggest that task outcome is an important determinant of members' of relationship conflict in the initial stages of group development. Overall, this hypothesis was moderately supported. In addition, as predicted, the relationship between these two variables was negative in that members with better task outcomes experienced lower relationship conflict. A visual inspection in Figure 8.2b suggests changes in the profiles of this relationship over time. While, in the initial meetings the strength of this relationship decreased, in the last meeting there was an incremental pattern.

	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**-0.0860**	**-0.0800**	**-0.1560**	-0.0490
P-Level	**0.0153**	**0.0471**	**0.0056**	0.1572

Table 8.2b – The Effects of Task Outcome on Relationship Conflict.

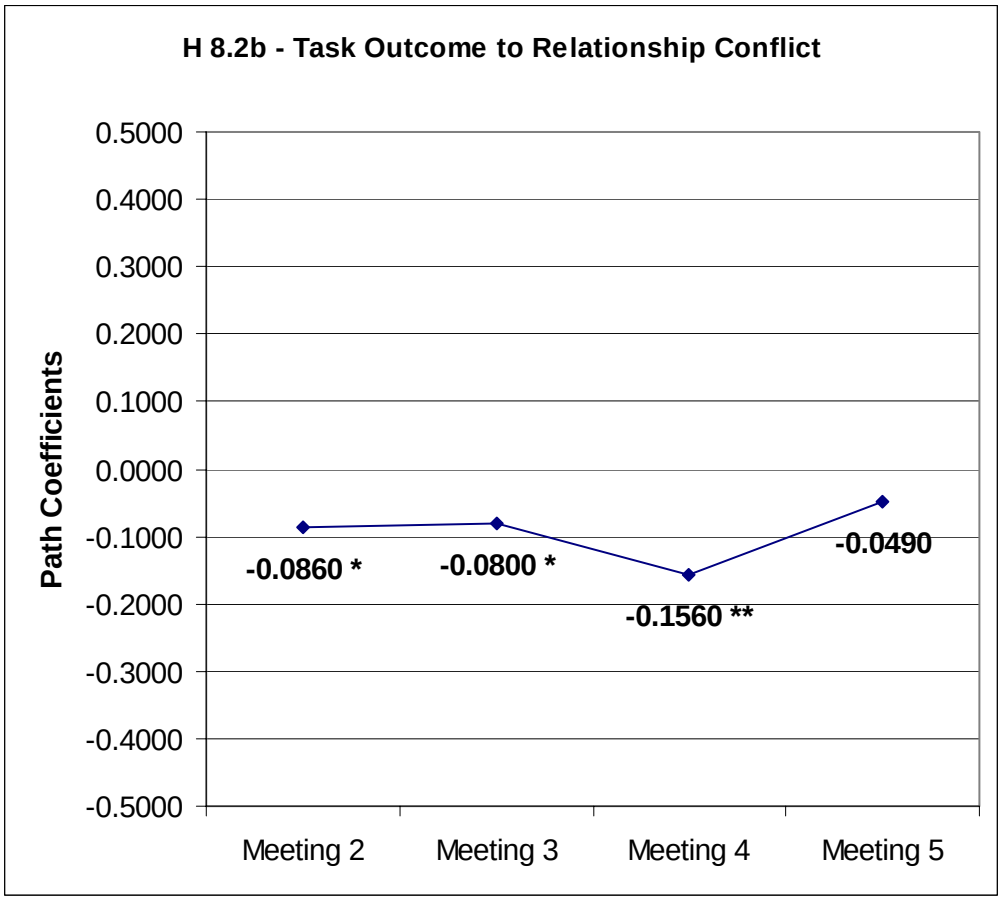


Figure 8.2b – Relationship between Task Outcome and Relationship Conflict (over time).

5.3.6.8.8 H 8.2c: Task Outcome will positively influence Responsiveness of Others.

Given that responsiveness of others reflects the extent to which members perceive others as engaging in the group work, theoretical arguments suggest that better the task outcome, the more others will be perceived as being responsive. In other words, members will perceive their partners to be more responsive to their requests when they experience better task outcomes. This hypothesis was confirmed only in meeting 3 ($p < 0.01$).

	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	0.0110	**0.0910**	0.0750	-0.0160
P-Level	0.3911	**0.0053**	0.0587	0.3057

Table 8.2c – The Effects of Task Outcome on Responsiveness of Others.

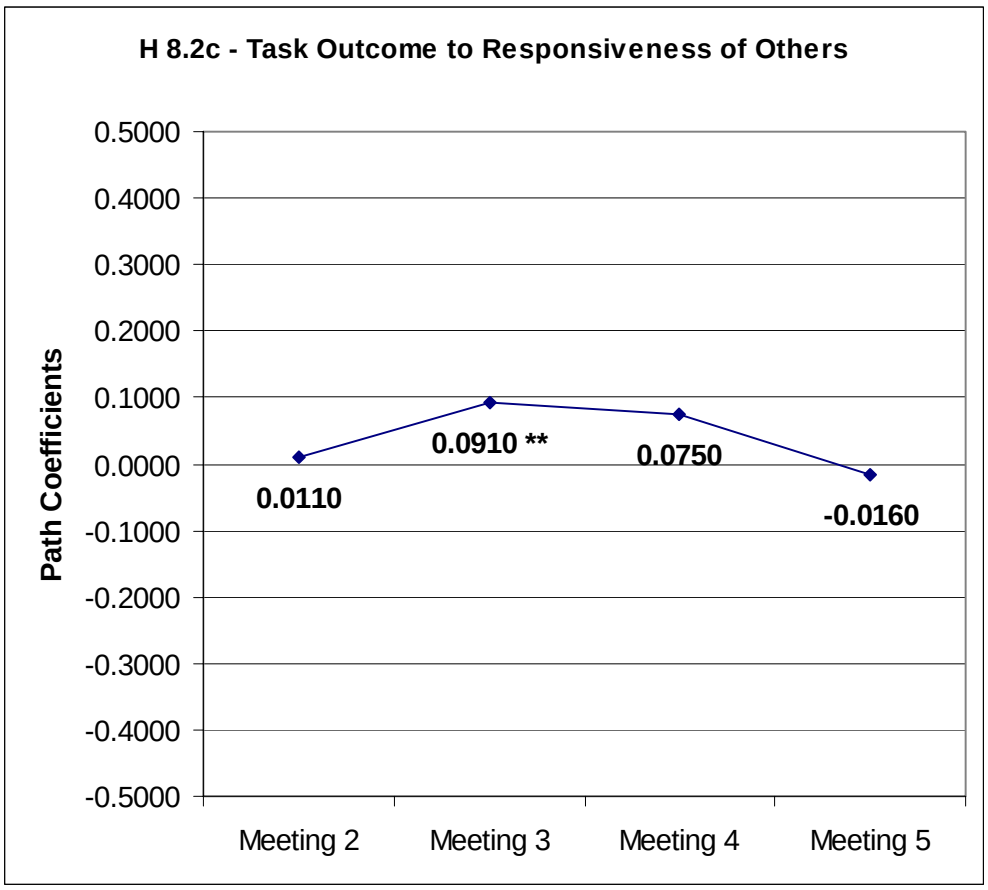


Figure 8.2c – Relationship between Task Outcome and Relationship Conflict (over time).

5.3.6.8.9 H 8.2d: Task Outcome will positively influence Shared Identity.

As described earlier, task outcome were also expected to have a positive impact on shared identity. In other words, shared identity was expected to be higher for those members who experienced better task outcomes. According to results

shown in Table 8.4b, this hypothesized relationship was supported in meetings 2 ($p < 0.05$) and 3 ($p < 0.01$).

	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Path Coefficient	**0.0820**	**0.1030**	0.0220	-0.0250
P-Level	**0.0135**	**0.0030**	0.3247	0.2358

Table 8.2d – The Effects of the Task Outcome on Shared Identity.

A visual inspection in Figure 8.2d suggests that the impact of perception of task outcome on shared identity exhibited a pattern of change similar to that of the relationship between the task outcome and responsiveness of others. The strength of the relationship increased until the midpoint; then it decreased in the second half of group interaction.

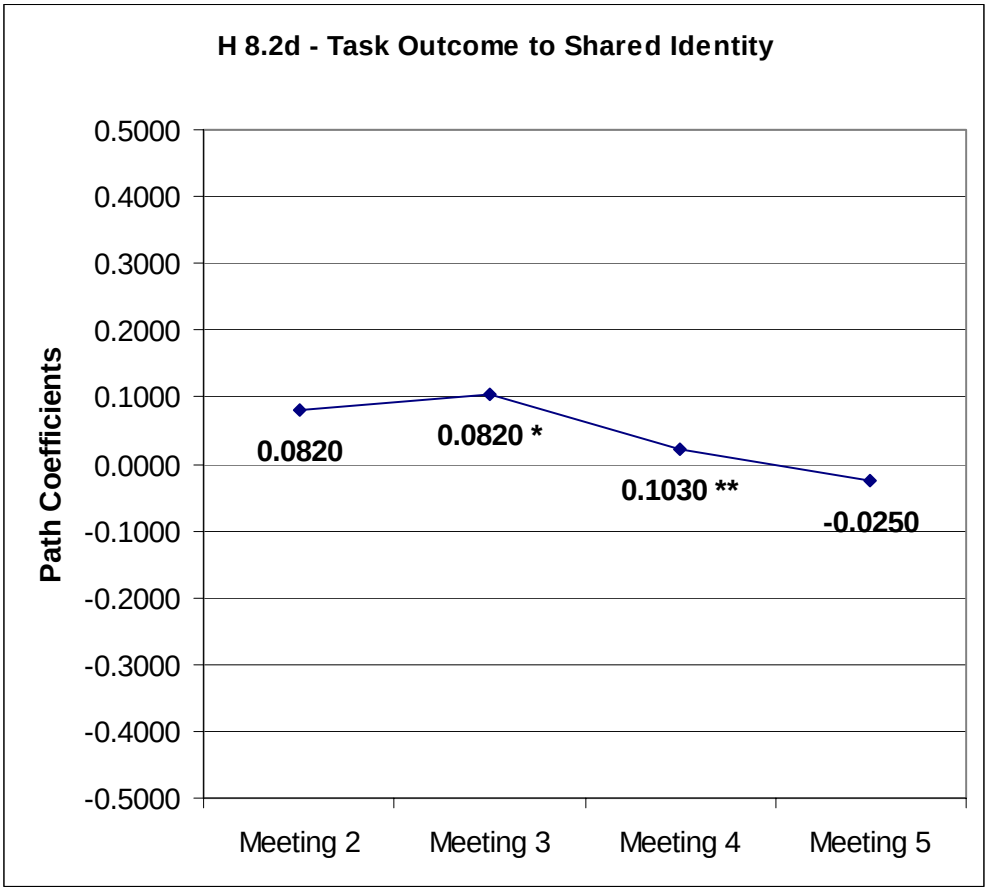


Figure 8.2d – Relationship between Task Outcome and Shared Identity (over time).

5.4 POST-HOC ANALYSIS

5.4.1 Repeated Measures

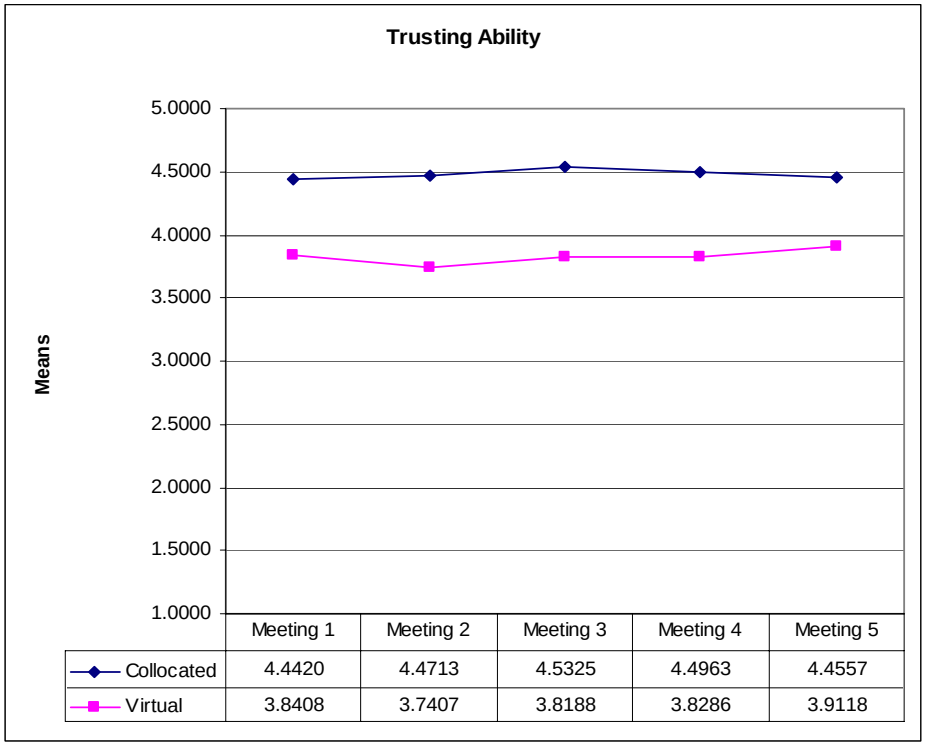
This section presents the results of repeated-measures analysis of variance by reporting Pillai's statistics used to compare patterns of change between virtual and collocated teams of the constructs included in the research model during the entire project (five meetings). This analysis was conducted because we expected that some of these constructs to evolve over time and looking just in the path model we are not able to capture such changes. Results are reported in three parts. The first part describes trust related constructs – trusting ability, trusting integrity, trusting benevolence, trustor's propensity to trust, and trust behavior. The second part deals with components of task perception and perceptions of social interaction – task-related conflict, relationship conflict, responsiveness of others, and shared identity. Finally, the results concerning outcomes – satisfaction with outcomes and task outcomes – are presented.

5.4.1.1 Trust Related Constructs

This section describes the differences in trust between collocated and virtual teams in the terms of trusting ability, trusting integrity, trusting benevolence, trustor's propensity to trust, and trust behavior experienced during the entire project. These differences in profiles across the five meetings were tested using a repeated-measures analysis of variance technique.

5.4.1.1.1 Trusting Ability, Integrity and benevolence

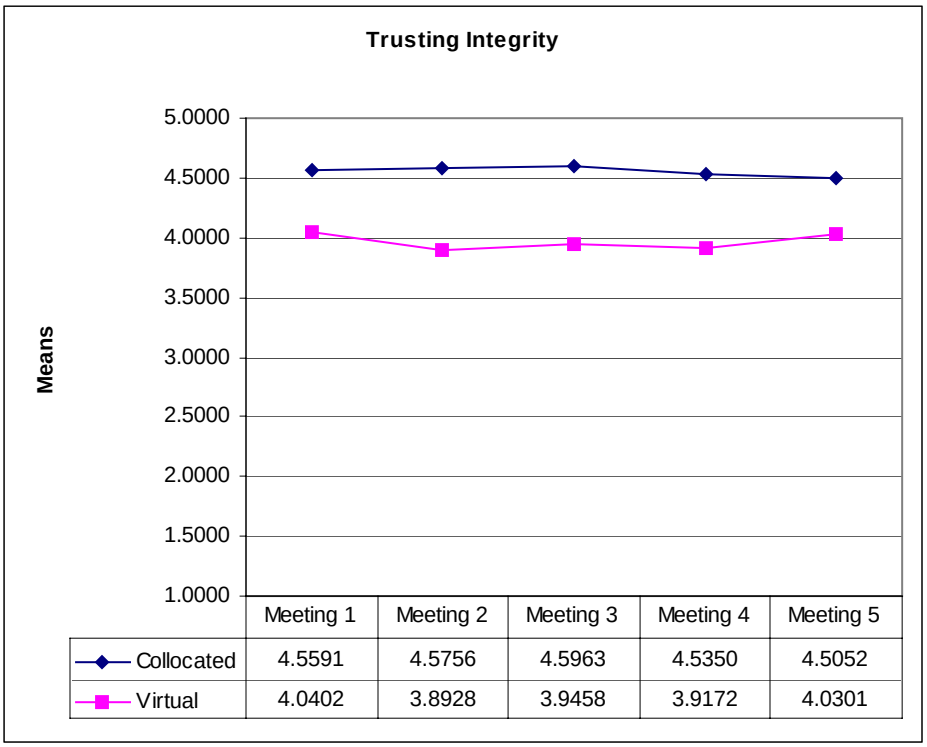
Trusting ability experienced by the groups over time had a Pillai's statistic of 0.027 with an F-value of 2.470, which was significant at the alpha = 0.05 level. In other words, virtual and collocated groups reported significant differences among treatments in the level of trusting ability over time. Figure 5.10 depicts the profiles of the two environments with respect to trusting ability across all five meetings. The results suggested that collocated teams had greater trusting ability than the virtual teams initially and continued it over time. However, in the final stages of the project the profiles slightly appeared to converge between the two groups.



	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Collocated	4.4420	4.4713	4.5325	4.4963	4.4557
Virtual	3.8408	3.7407	3.8188	3.8286	3.9118

Figure 5.10 – Profiles of Trusting Ability (over time)

With respect to the profiles of trusting integrity, the Pillai's statistic was 0.037 with an F-value of 3.495, which was significant at the alpha = 0.01 level. These results suggest that virtual and collocated groups experienced significant differences over time in the level of trusting integrity. As Figure 5.11 suggests, similar to the results of trusting ability, group means indicated that collocated teams experienced higher trusting integrity than the virtual teams initially and maintained the advantage over time. In addition, at the final stages of the project there was a slight convergence between profiles of the two groups.

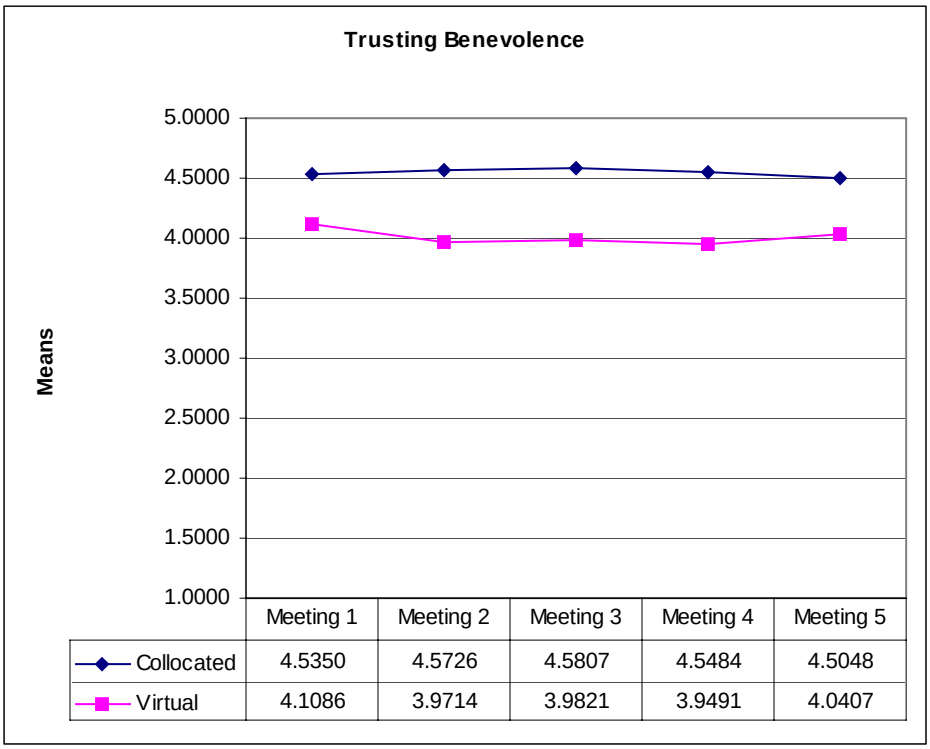


	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Collocated	4.5591	4.5756	4.5963	4.5350	4.5052
Virtual	4.0402	3.8928	3.9458	3.9172	4.0301

Figure 5.11 – Profiles of Trusting Integrity (over time)

Trusting benevolence, the third component of trusting beliefs, had a Pillai's statistic of 0.033 with an F-value of 3.087, which was significant at the alpha = 0.05

level. Therefore, groups experienced significant differences between treatments in terms of trusting benevolence. Figure 5.12 presents the pattern of change over time and the group means. The profiles appear similar to the patterns exhibited with trusting ability and integrity, wherein at the final stages of the project there was convergence between trusting benevolence of the two groups. Furthermore, collocated teams had greater trusting benevolence compared to the virtual teams initially and maintained this advantage over time. Also, as seen before, over time trusting benevolence seemed to converge between the two groups.

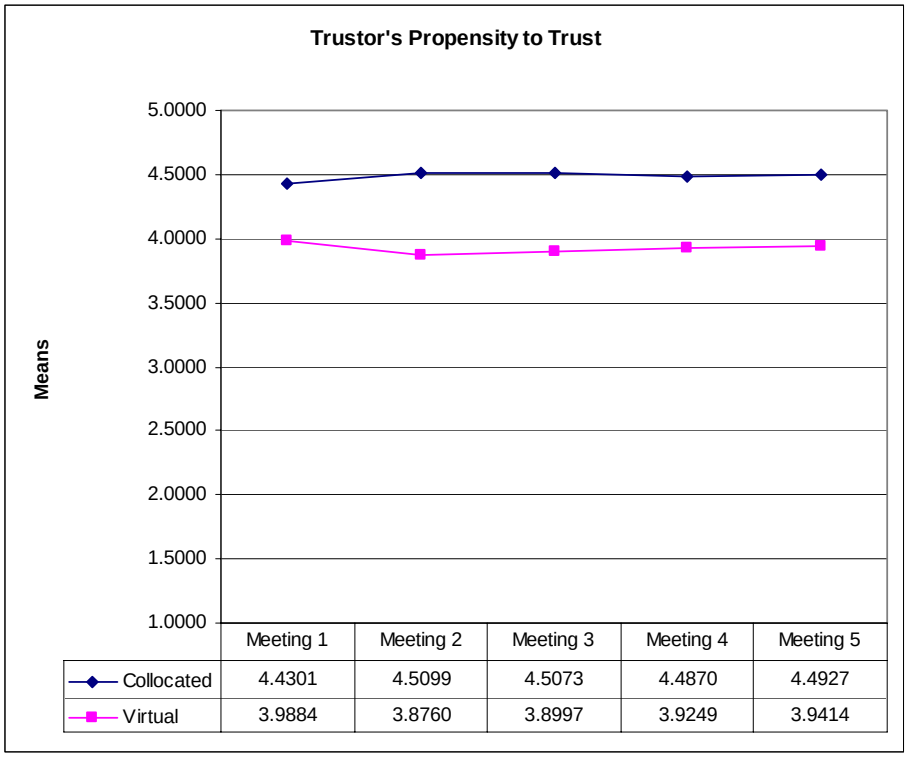


	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Collocated	4.5350	4.5726	4.5807	4.5484	4.5048
Virtual	4.1086	3.9714	3.9821	3.9491	4.0407

Figure 5.12 – Profiles of Trusting Benevolence (over time)

5.4.1.1.2 Trustor's Propensity to Trust

With respect to the profiles of trustor's propensity to trust, the value of Pillai's was 0.024 with an F-value of 2.223, which was not significant at the 0.05 alpha. Hence, no significant differences were observed over time meaning that the profiles did not differ significantly between the two treatments. Therefore, the trustor's propensity to trust did not differ over time across the two treatments. This result is consistent with the theoretical assumptions in that the trustor's propensity to trust is an individual characteristic developed throughout one's life rather than a behavioral outcome that is a result of the immediate setting where group interaction takes place.

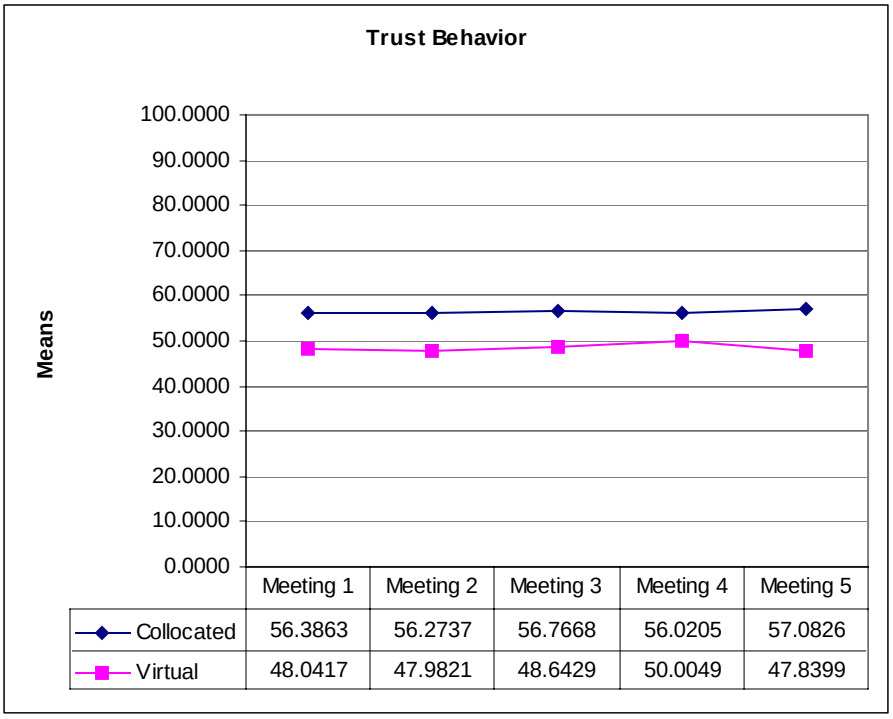


	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Collocated	4.4301	4.5099	4.5073	4.4870	4.4927
Virtual	3.9884	3.8760	3.8997	3.9249	3.9414

Figure 5.13 – Profiles of Trustor's Propensity to Trust Integrity (over time)

5.4.1.1.3 Trust Behavior

Another trust related construct examined in this study concerned the amount of trust behavior exhibited by team members during the group process. This variable was measured by asking participants what percentage of their grade they wanted to be based on their group effort rather than their individual effort.



	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Collocated	56.3863	56.2737	56.7668	56.0205	57.0826
Virtual	48.0417	47.9821	48.6429	50.0049	47.8399

Figure 5.14 – Profiles of Trust Behavior (over time)

The group means are presented in Figure 5.14. Pillai's statistic of 0.009 with an F-value of 0.775 was not significant at the alpha = 0.05 level. Therefore, the results suggest that groups did not experience significant differences in the level of trust behavior between the two treatments. In other words, they suggest that all

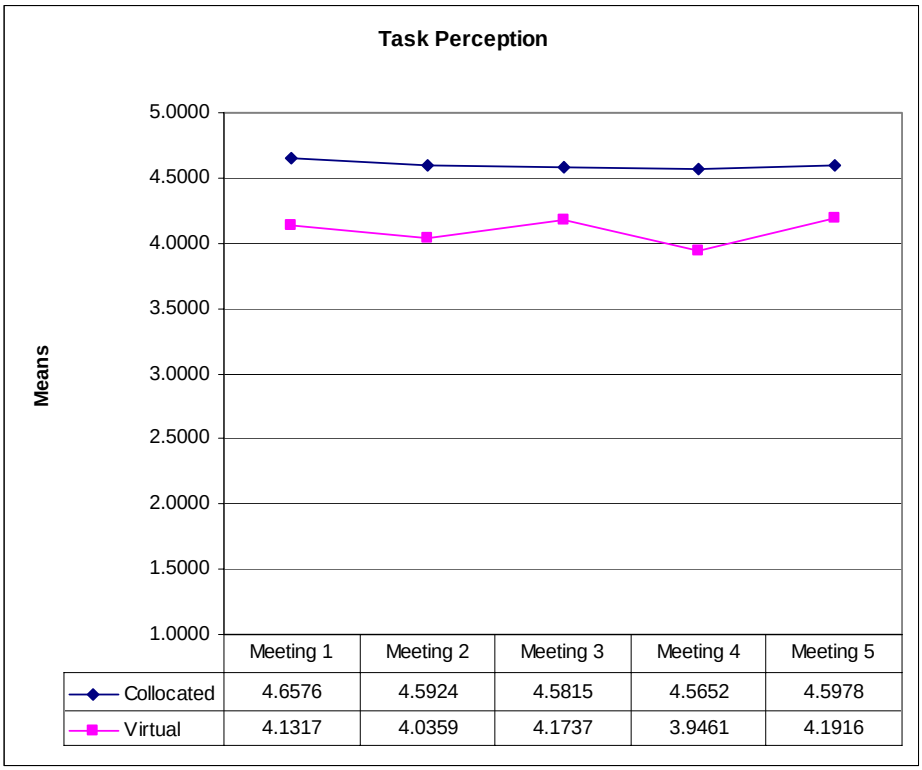
groups, regardless of the setting, developed similarly over time in terms of trust behavior as the task progressed.

5.4.1.2 Task Perception and Social Interaction Perception

This section describes the differences between collocated and virtual teams in terms of the task perception and the social interaction perceptions defined in terms of task-related conflict, relationship conflict, responsiveness of others, and shared identity. Differences in profiles across the five meetings were tested using a repeated-measures nested analysis of variance (RMN-Anova) technique.

5.4.1.2.1 Task Perception

The RMN-Anova results (Pillai's statistic of 0.019 with an F-value of 1.715) were not significant at alpha = 0.05 level, indicating no differences over time with regard to perceptions of the task. Thus, the profiles of perceptions of the task did not differ between the two treatments over time.



	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
Collocated	4.6576	4.5924	4.5815	4.5652	4.5978
Virtual	4.1317	4.0359	4.1737	3.9461	4.1916

Figure 5.15 – Profiles of Task Perception (over time)

5.4.1.2.2 Perceptions of Social Interaction

Figure 5.16 illustrates the task-related conflict profiles for both groups over the entire project. The results suggest that groups experienced significant differences between the two treatments in the level of task-related conflict experienced over time. Initially participants of virtual teams experienced significantly higher task-related conflict than did participants of collocated teams (Pillai's statistic of 0.045 with an F-value of 4.177, significant at the alpha = 0.01 level). Furthermore, task-related conflict increased among virtual teams over time but declined to initial levels by the final meeting. In addition, task-related conflict increased continuously over time so that the final meeting they were similar to the level experienced by the

virtual teams. These results suggest a convergence between the two groups in relation to perceptions of task-related conflict.

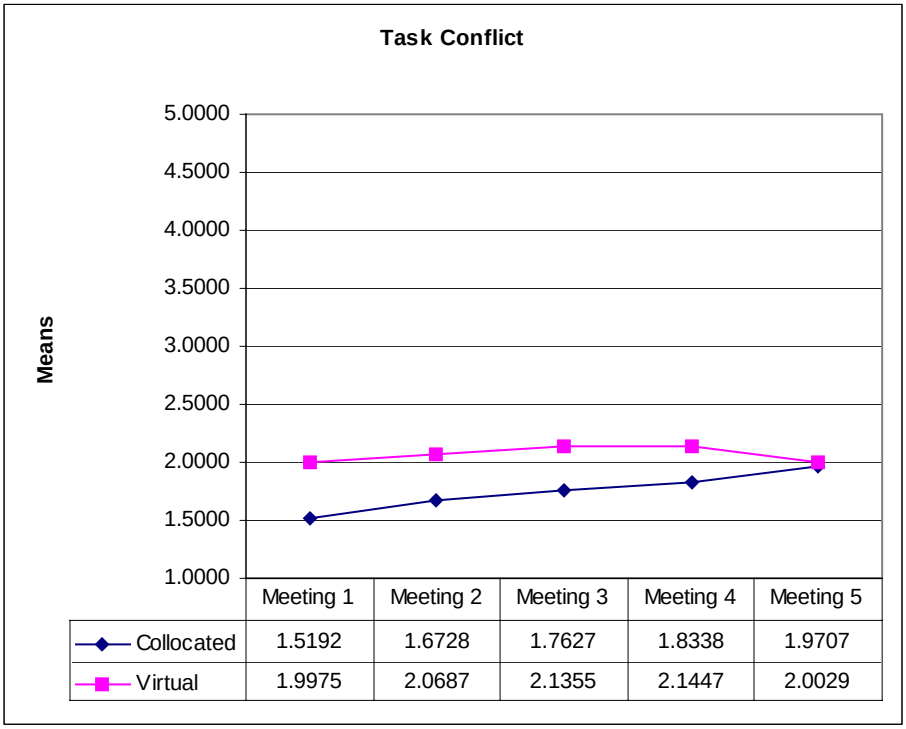


Figure 5.16 – Profiles of Task-Related Conflict (over time)

Relationship conflict did not differ across treatments over the five meetings. As shown in Figure 5.17, its pattern was not statistically significant at alpha = 0.05 level (Pillai's statistic of 0.018 with an F-value of 1.678), indicating no differences over time with regard to relationship conflict.

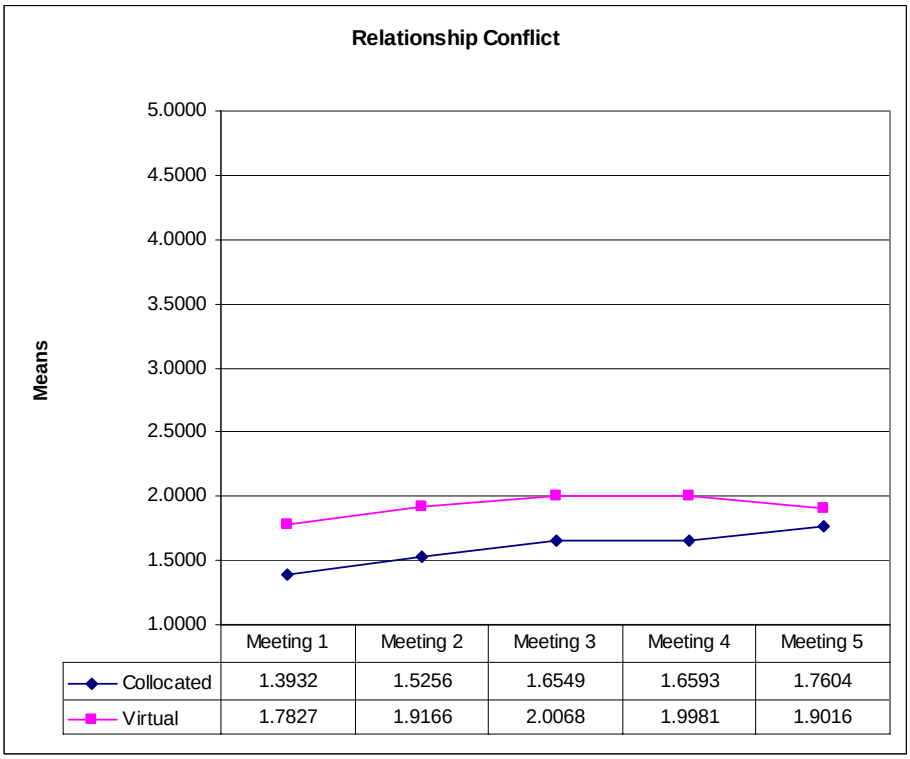


Figure 5.17 – Profiles of Relationship Conflict (over time)

Results shown in Figure 5.18 suggest that members of virtual teams perceived fellow members as being less responsive than did members of collocated teams. However, such differences between the two treatments were not statistically significant at alpha = 0.05 level (Pillai's statistic of 0.019 with an F-value of 1.779), indicating no differences over time with regard to the responsiveness of others. Thus, perceptions of responsiveness of others did not differ over time between the two treatments.

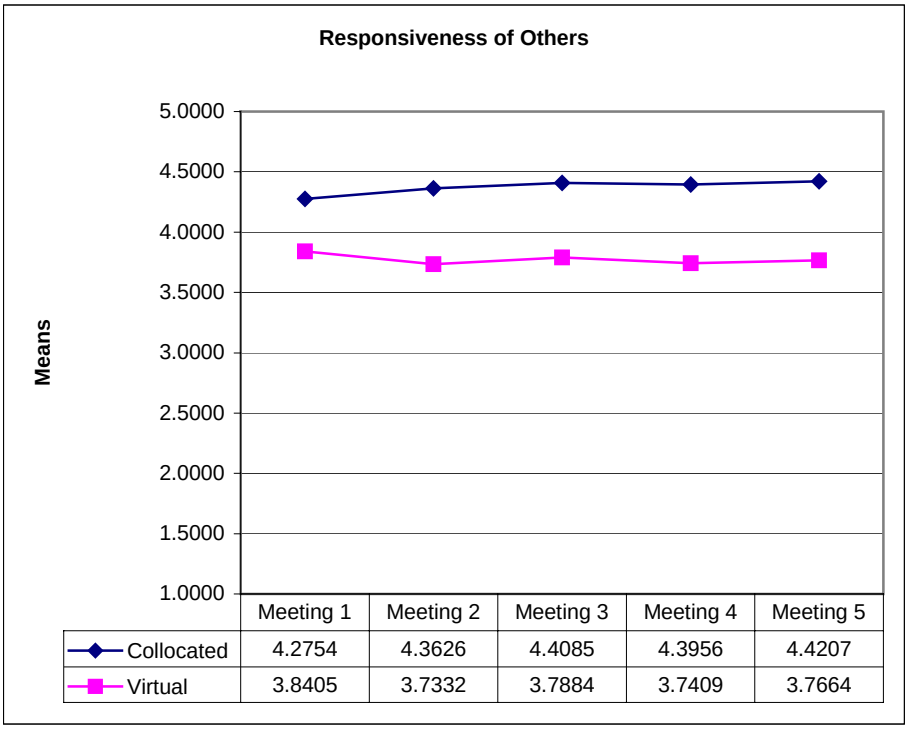


Figure 5.18 – Profiles of Responsiveness of Others (over time)

RM-Anova results indicated that the value of Pillai's statistic of 0.030 with an F-value of 2.777, which was significant at the alpha = 0.05 level. Therefore, groups experienced significant differences in shared identity between the two treatments over time, as shown by the profiles in Figure 5.19. The results suggest that collocated teams experienced higher levels of shared identity than did virtual teams over time. In addition, perceptions of shared identity among members of virtual teams seemed to be constant compared to members of collocated teams who exhibited increasingly higher levels of shared identity over time.

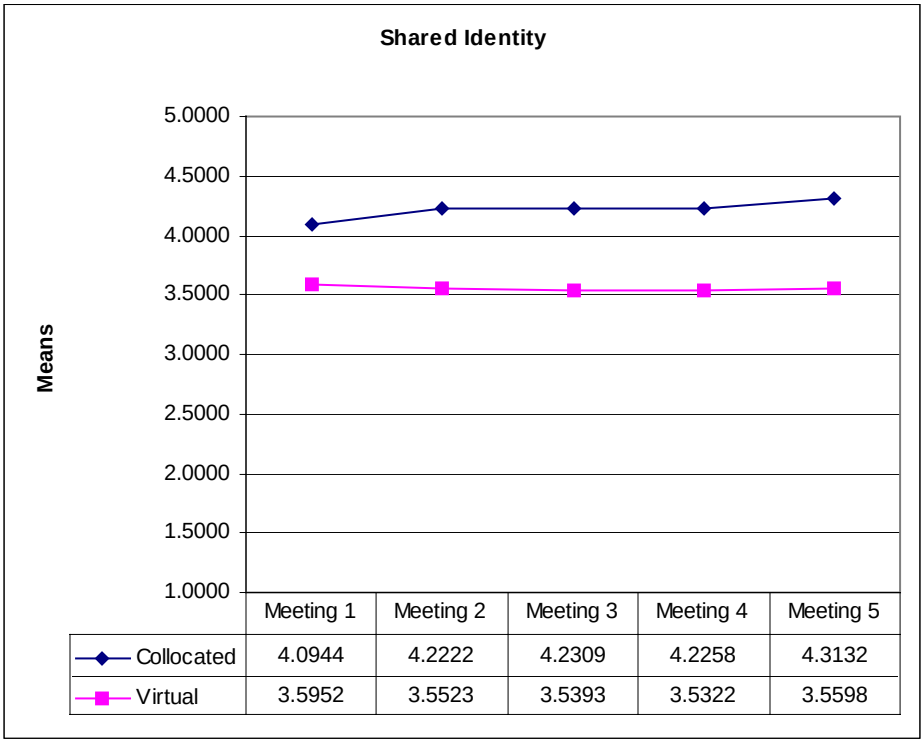


Figure 5.19 – Profiles of Shared Identity (over time)

5.4.1.3 Satisfaction with Outcomes and Task Outcomes

With respect to the profiles of satisfaction with outcomes, statistical a Pillai's statistic of 0.023 with an F-value of 2.087 was not significant at the alpha = 0.05 level. Therefore, groups did not experience significant differences over time between the two treatments.

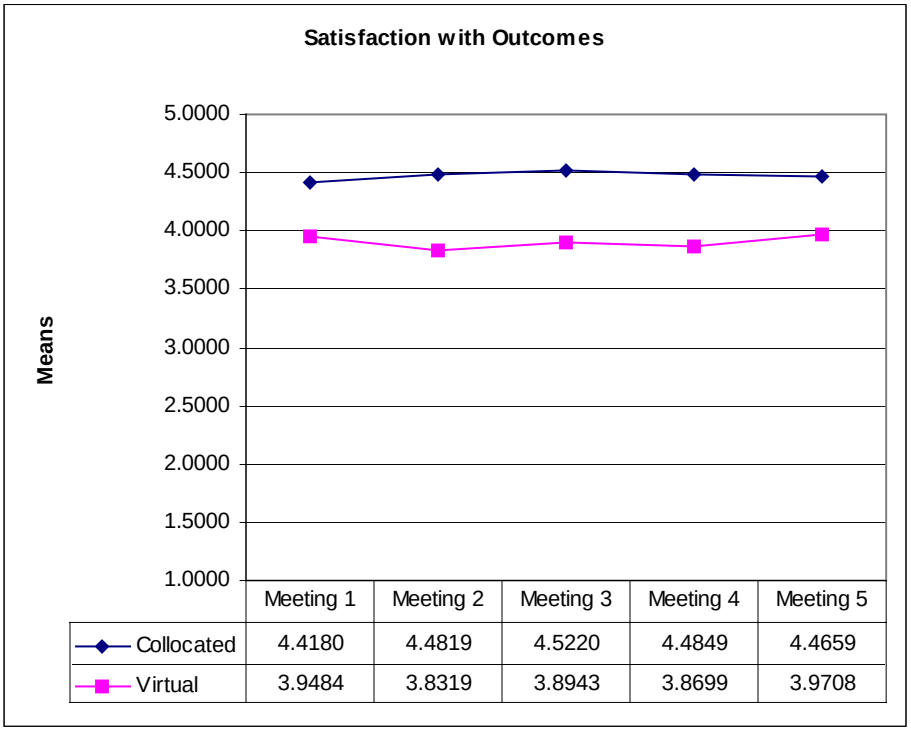


Figure 5.20 – Profiles of Satisfaction with Outcomes (over time)

With respect to task outcomes, RM-Anova resulted in a Pillai's statistic of 0.060 with an F-value of 5.728, which was significant at the alpha = 0.01 level. These results suggest that groups experienced significant differences over time between the two treatments in terms of task outcomes. Figure 5.21 suggests that collocated teams scored higher than virtual teams initially and maintained this advantage over time. In addition, performance declined continuously over time for the two treatments as teams progressed with the task.

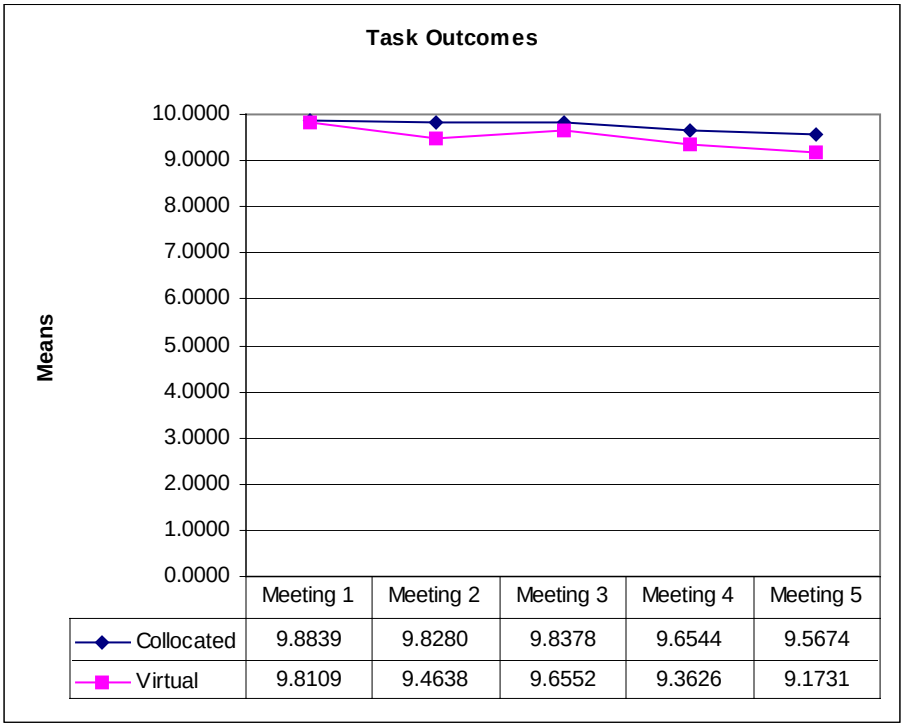


Figure 5.21 – Profiles of Task Outcomes (over time)

5.4.2 Path Analysis at the Group Level

Earlier we presented and discussed statistical results of the hypothesized relationships at the individual level. This level of analysis was adopted due to the fact that the research model focused on dyadic relationships among team members. Therefore, the survey instruments asked individuals' perceptions about their relationships within the group, including trust. However, to provide a group-level view of these relationships, we conducted post-hoc analysis by aggregating data at the group level. This analysis was done by calculating the averages of the survey responses by group. The usable sample at this level consisted of 105 groups (53 collocated groups and 52 virtual groups).

Since our primary objective was to compare the results of the individual and group levels of analysis, this section describes similarities and differences between these two approaches. The results are reported in three parts. The first part presents a summary of the hypotheses tests across all five meetings at the group level. The second part presents the path model for each meeting at the group level along with a summary of the similarities and differences between these results and those at the individual level. The third part summarizes the path coefficient scores of the two approaches (individual and group).

5.4.2.1 Summary of hypotheses tests at the group level

This section describes results of the path analysis performed on all relationships in the research model. The hypothesized relationships were tested using PLS software by aggregating survey responses by group. Their results are summarized in Tables 5.4.2.1 (a), 5.4.2.1 (b) and 5.4.2.1 (c).

HYPOTHESIS		RESULTS				
Trusting Beliefs and Trust Behavior		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H1.1:	Trusting ability will positively influence trust behavior.	Unsupported	Unsupported	**Supported**	Unsupported	Unsupported
H1.2:	Trusting integrity will positively influence trust behavior.	Unsupported	**Supported**	Unsupported	Unsupported	Unsupported
H1.3:	Trusting benevolence will positively influence trust behavior.	Unsupported	Unsupported	Unsupported	Unsupported	Unsupported
Trustor's Propensity to Trust and Trusting Beliefs		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H2.1:	A trustor's propensity to trust will positively influence trusting ability.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H2.2:	A trustor's propensity to trust will positively influence trusting integrity.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H2.3:	A trustor's propensity to trust will positively influence trusting benevolence.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
Task Perception and Trusting Beliefs		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H3.1:	Cooperative perception of the task will positively influence trusting ability.	**Supported**	Unsupported	Unsupported	**Supported**	Unsupported
H3.2:	Cooperative perception of the task will positively influence trusting integrity.	Unsupported	Unsupported	Unsupported	Unsupported	Unsupported
H3.3:	Cooperative perception of the task will positively influence trusting benevolence.	Unsupported	Unsupported	Unsupported	Unsupported	Unsupported

Table 5.4.2.1 (a) – Summary of Results by Meeting.

HYPOTHESIS		RESULTS				
Perceptions of Social Interaction and Trusting Beliefs		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H4.1a	Task conflict will negatively influence trusting ability.	Unsupported	Unsupported	Unsupported	Unsupported	Unsupported
H4.1b	Task conflict will negatively influence trusting integrity.	Unsupported	Unsupported	Unsupported	Unsupported	**Supported**
H4.1c	Task conflict will negatively influence trusting benevolence.	Unsupported	Unsupported	Unsupported	**Supported**	Unsupported
H4.2a	Relationship conflict will negatively influence trusting ability.	Unsupported	Unsupported	Unsupported	Unsupported	Unsupported
H4.2b	Relationship conflict will negatively influence trusting integrity.	Unsupported	Unsupported	**Supported**	Unsupported	Unsupported
H4.2c	Relationship conflict will negatively influence trusting benevolence.	Unsupported	Unsupported	**Supported**	Unsupported	Unsupported
H4.3a	Responsiveness of others will positively influence trusting ability.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H4.3b	Responsiveness of others will positively influence trusting integrity.	**Supported**	Unsupported	Unsupported	**Supported**	**Supported**
H4.3c	Responsiveness of others will positively influence trusting benevolence.	**Supported**	Unsupported	**Supported**	Unsupported	**Supported**
H4.4a	Shared identity will positively influence trusting ability.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H4.4b	Shared identity will positively influence trusting integrity.	**Supported**	**Supported**	**Supported**	**Supported**	Unsupported
H4.4c	Shared identity will positively influence trusting benevolence.	**Supported**	**Supported**	**Supported**	**Supported**	Unsupported
Perceptions of the social interaction and Task Perception		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H5.1	Task conflict will negatively influence cooperative perception of the task.	Unsupported	Unsupported	Unsupported	**Supported**	Unsupported
H5.2	Relationship conflict will negatively influence cooperative perception of the task.	Unsupported	**Supported**	**Supported**	Unsupported	**Supported**
H5.3	Responsiveness of others will positively influence cooperative perception of the task.	**Supported**	**Supported**	Unsupported	**Supported**	**Supported**
H5.4	Shared identity will positively influence cooperative perception of the task.	**Supported**	**Supported**	**Supported**	Unsupported	**Supported**

Table 5.4.2.1 (b) – Summary of Results by Meeting (contd.).

HYPOTHESIS		RESULTS				
Setting and Perceptions of the Social Interaction		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H6.1	The virtual setting will positively influence task conflict.	**Supported**	**Supported**	Unsupported	Unsupported	Unsupported
H6.2	The virtual setting will negatively influence relationship conflict.	**Supported**	**Supported**	Unsupported	Unsupported	Unsupported
H6.3	The virtual setting will positively influence responsiveness of others.	**Supported**	**Supported**	Unsupported	**Supported**	**Supported**
H6.4	The virtual setting will negatively influence shared identity.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
Trust Behavior and Outcomes		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H7.1	Trust behavior will positively influence satisfaction with outcomes.	**Supported**	**Supported**	**Supported**	**Supported**	**Supported**
H7.2	Trust behavior will positively influence task outcomes.	Unsupported	Unsupported	Unsupported	Unsupported	**Supported**
Outcomes and Perceptions of the Social Interaction.		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H8.1a:	Satisfaction with outcomes will negatively influence relationship conflict.	na	**Supported**	**Supported**	**Supported**	**Supported**
H8.1b:	Satisfaction with outcomes will positively influence shared identity.	na	**Supported**	**Supported**	**Supported**	**Supported**
H8.1c:	Satisfaction with outcomes will negatively influence task conflict.	na	**Supported**	**Supported**	**Supported**	**Supported**
H8.1d:	Satisfaction with outcomes will positively influence responsiveness of others.	na	**Supported**	**Supported**	**Supported**	**Supported**
H8.2a:	Task outcome will negatively influence relationship conflict.	na	Unsupported	Unsupported	**Supported**	Unsupported
H8.2b:	Task outcome will positively influence shared identity.	na	**Supported**	**Supported**	Unsupported	Unsupported
H8.2c:	Task outcome will negatively influence task conflict.	na	Unsupported	Unsupported	**Supported**	**Supported**
H8.2d:	Task outcome will positively influence responsiveness of others.	na	Unsupported	Unsupported	Unsupported	Unsupported

Table 5.4.2.1 (c) – Summary of Results by Meeting (contd.).

In the next section, five complete models including all hypothesized relationships are presented. A discussion of these results at the group level

compared to the results at the individual level (presented earlier in this chapter) is also provided.

5.4.2.2 Path Model for Meeting 1

The overall model in Figure 1, presents the path coefficients for all hypothesized relationships during the first meeting. Overall, 17 out of 33 hypothesized relationships were supported.

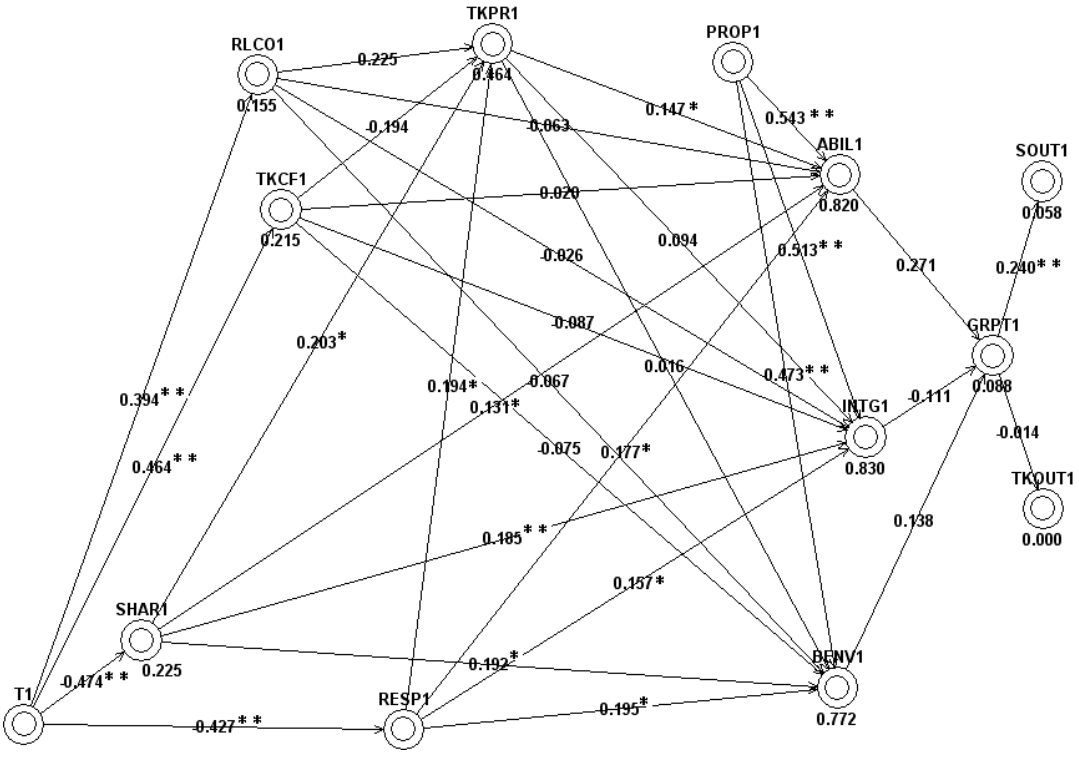


Figure 5.4.2 (1) – Path Model for Meeting 1 at the Group Level
(** p < 0.01 and * p < 0.05)

As in the individual level of analysis, the hypotheses about relationships between trustor's propensity to trust and trusting beliefs were fully supported. The relationships between task perception and trusting beliefs had somewhat different

results when compared to the individual analysis. For instance, the effect of task perception on trusting integrity was not significant in the group analysis whereas the effect of task perception on trusting benevolence was not significant in both analyses.

Similar to the results of the individual analysis, the hypotheses about relationships between perceptions of social interaction and trusting beliefs were partially supported. Specifically, both responsiveness of others and shared identity affected all components of trusting beliefs. However, different from the individual level of analysis, the relationship between relationship conflict and trusting benevolence was not significant.

Furthermore, the relationships between perceptions of social interaction and task perceptions were similar to those obtained in the individual analysis. The only difference was related to the relationship between relationship conflict and task perception, which was not significant at the group level. Thus, the impact of both responsiveness of others and shared identity on task perception was significant, while the impact of both task-related conflict and relationship conflict on task perception was not significant.

The relationships between setting and perceptions of social interaction and between trust behavior and outcomes were similar to those observed in the individual level. Specifically, the setting had a significant effect on all dimensions of social interaction, while the effect of trusting ability on trust behavior was significant.

Finally, as depicted in Figure 1, none of the three components of trusting beliefs had a significant impact on trust behavior, while at the individual level of analysis, the relationship between trusting ability and trust behavior was significant.

5.4.2.3 Path Model for Meeting 2

Figure 2 presents results for all relationships during meeting 2. In this meeting, 21 out of 41 hypothesized relationships were supported. Similar to meeting 1, the effect of a trustor's propensity to trust had a significant effect on all components of trusting beliefs. This result is identical to the results at the individual level.

In addition, satisfaction with outcomes had a significant effect on all four components of perceptions of social interaction. However, task outcome had a significant effect only on the shared identity component of perceptions of social interaction. The only difference between the two levels of analysis was related to the relationship between task outcome and relationship conflict. This relationship was significant at the individual level, but not at the group level.

Furthermore, identical to the individual level of analysis, the effect of the setting was significant on all components of perceptions of social interaction. Also, the effect of trust behavior on satisfaction with outcomes was significant, while the effect of trust behavior on task outcome was not significant.

The relationships between perceptions of social interaction and trusting beliefs differed from the individual level as follows: First, relationship conflict had no

significant impact on both trusting integrity and trusting benevolence. Second, responsiveness of others had no significant effect on both trusting integrity and trusting benevolence.

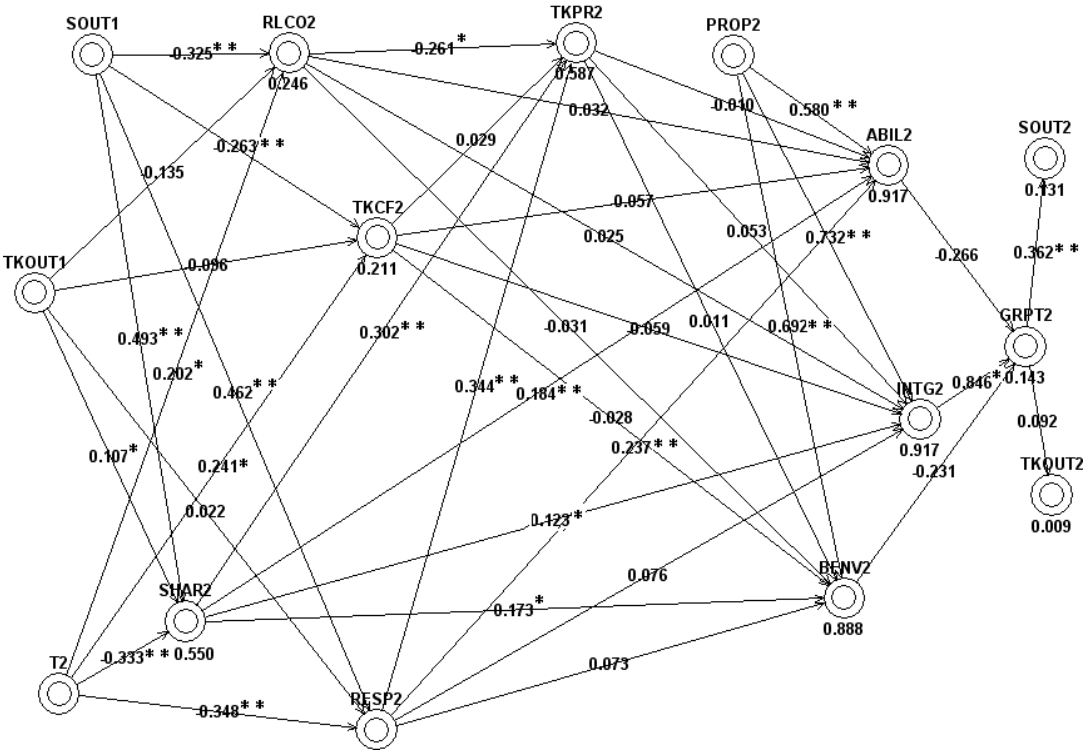


Figure 5.4.2 (2) – Path Model for Meeting 2

(** p < 0.01 and * p < 0.05)

Furthermore, similar to the individual level of analysis, only one relationship between trusting beliefs and trust behavior was significant. However, while at the group level the significant path was between trusting integrity and trust behavior, at the individual level was between trusting ability and trust behavior.

Finally, relationships between task perception and all three components of trusting beliefs were not significant, while at the individual level two of these relationships – with trusting ability and trusting integrity -- were significant.

5.4.2.4 Path Model for Meeting 3

In meeting 3, the number of hypothesized relationships supported was 20. Similar to meeting 2, the effect of a trustor's propensity to trust on all components of trusting beliefs was significant and the effect of trust behavior on satisfaction with outcomes was significant; however, the effect of trust behavior on task outcomes was not significant.

The effects of the setting on components of perceptions of social interaction were generally similar to those in the individual analysis. While the effect of the setting on shared identity was significant, its effect on both task-related conflict and relationship conflict was not significant. Contrary to the individual analysis, the effect of the setting on responsiveness of others was not significant.

In meeting 3, the impact of previous outcomes on perceptions of social interaction was significant in most cases with the following exceptions: task-related conflict, responsiveness of others, and relationship conflict. At the individual level of analysis the last two relationships were significant.

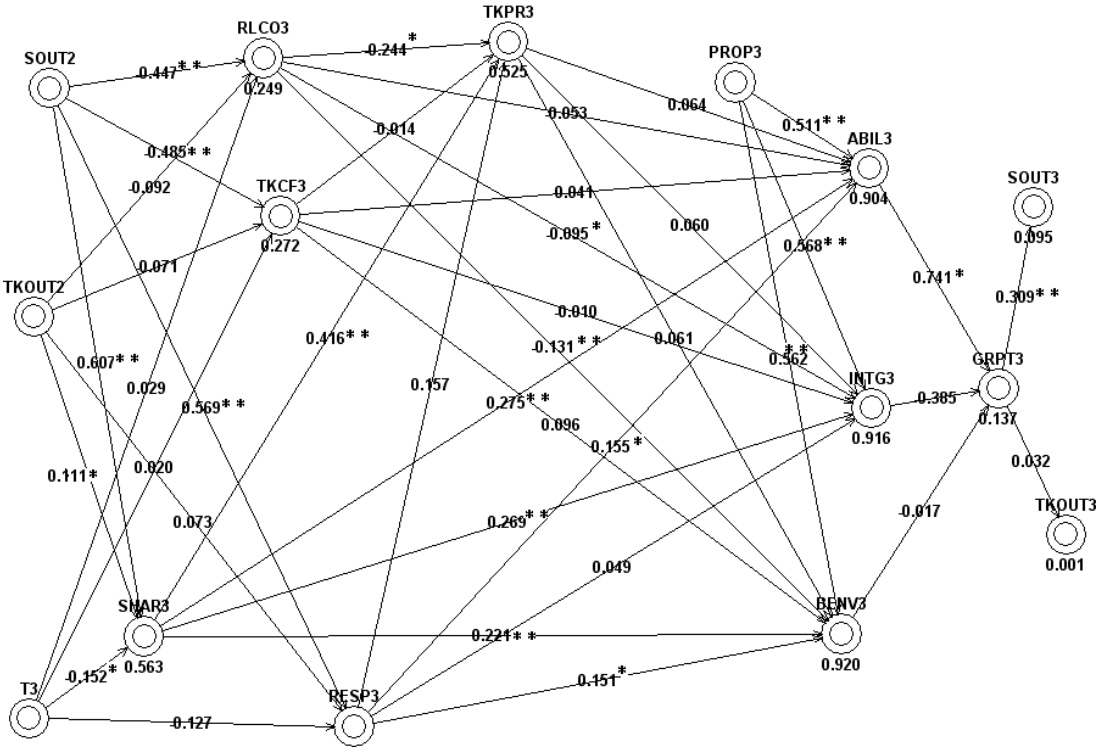


Figure 5.4.2 (3) – Path Model for Meeting 3

(** p < 0.01 and * p < 0.05)

Furthermore, the impact of perceptions of social interaction on trusting beliefs was also similar to those obtained at the individual level of analysis as described below. The impacts of task-related conflict on both trusting integrity and trusting benevolence were not significant. However, the effects of relationship conflict on both trusting integrity and trusting benevolence were significant. The impact of shared identity on all three components of trusting beliefs was significant. Finally, the effect of responsiveness of others on both trusting ability and trusting benevolence was significant. However, contrary to the individual level of analysis, the following relationships were not significant: a) task-related conflict and trusting

ability, b) relationship conflict and trusting ability, c) responsiveness of others and trusting integrity.

Trusting beliefs had somewhat different impacts on trust behavior at the group level of analysis. Specifically, the effect of trusting ability on trust behavior was significant, while the effect of trusting integrity on trust behavior was not significant.

Once again, as in meeting 2, none of the relationships between task perception and all three components of trusting beliefs was significant, while at the individual level of analysis the relationships between cooperative perception of the task and both trusting ability and trusting integrity were significant.

Finally, the effect of perceptions of social interaction on cooperative perceptions of the task was similar to that in the individual level of analysis with one exception. The relationship between responsiveness of others and cooperative perceptions of the task was not significant.

5.4.2.5 Path Model for Meeting 4

In meeting 4, as depicted in Figure 4, 27 out of the 41 hypothesized relationships were significant. Several relationships had identical results to those obtained at the individual level of analysis. These relationships are: a trustor's propensity to trust with the three components of trusting beliefs, setting with all components of perceptions of social interaction, trust behavior and the two

components of outcomes, and previous outcomes with all components of perceptions of social interaction.

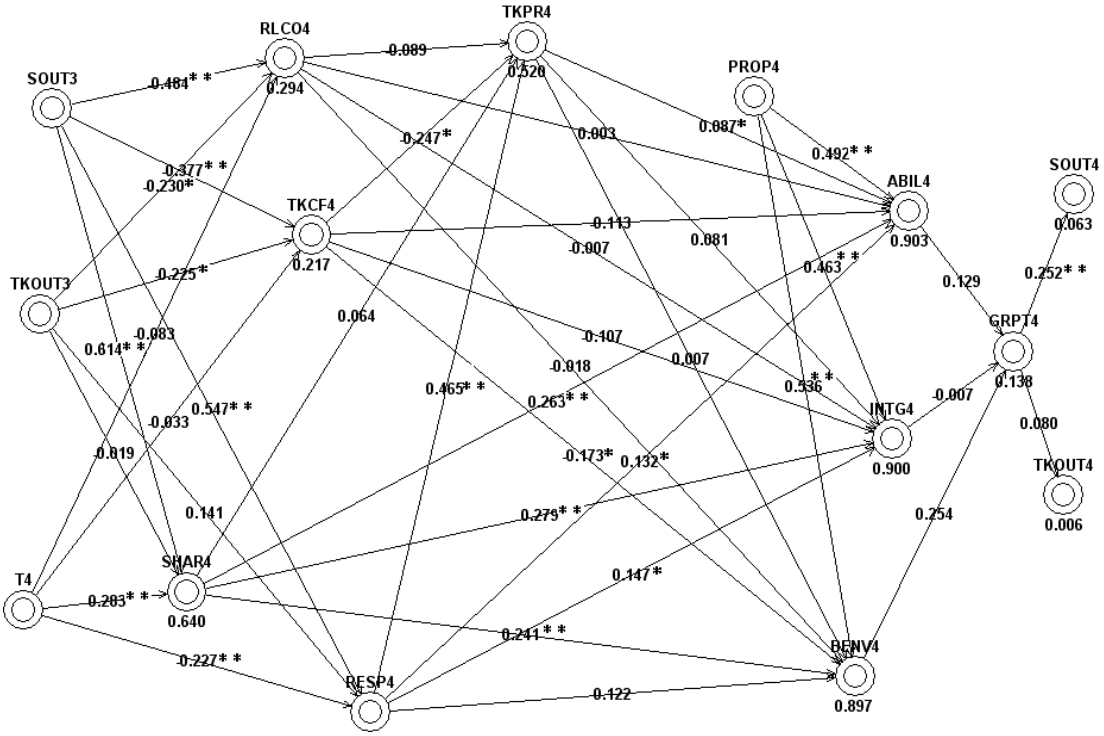


Figure 5.4.2 (4) – Path Model for Meeting 4

(** p < 0.01 and * p < 0.05)

The relationships that were different from those in the individual analysis are as follows: First, the effects of both trusting ability and trusting integrity on trust behavior were not significant. Second, the relationship between cooperative perception of the task and trusting ability was also not significant. Third, the relationship between task-related conflict and trusting benevolence was significant.

Finally, the following relationships differed from the individual level: First, task-related conflict had no significant effect on trusting ability. Second, relationship

conflict had no significant impact on all three components of trusting beliefs. Third, responsiveness of others had no significant effect on trusting benevolence. Finally, both relationship conflict and shared identity had no significant impact on cooperative perception of the task.

5.4.2.6 Path Model for Meeting 5

Figure 5 depicts the results from meeting 5. In this final stage of the group project, 20 out of the 41 hypothesized relationships were significant. Overall, several results were similar to those at the individual level of analysis. The few results that differed from the individual analysis are described below.

First, the relationship between trusting ability and trust behavior was not significant. Second, as in meeting 2 and 3, the relationships between cooperative perceptions of the task and the three components of trusting beliefs were not significant. Third, the impact of task-related conflict on trusting integrity was significant. Fourth, the impact of relationship conflict on trusting ability was not significant. Finally, the effects of shared identity on trusting integrity and the setting on task-related conflict were not significant.

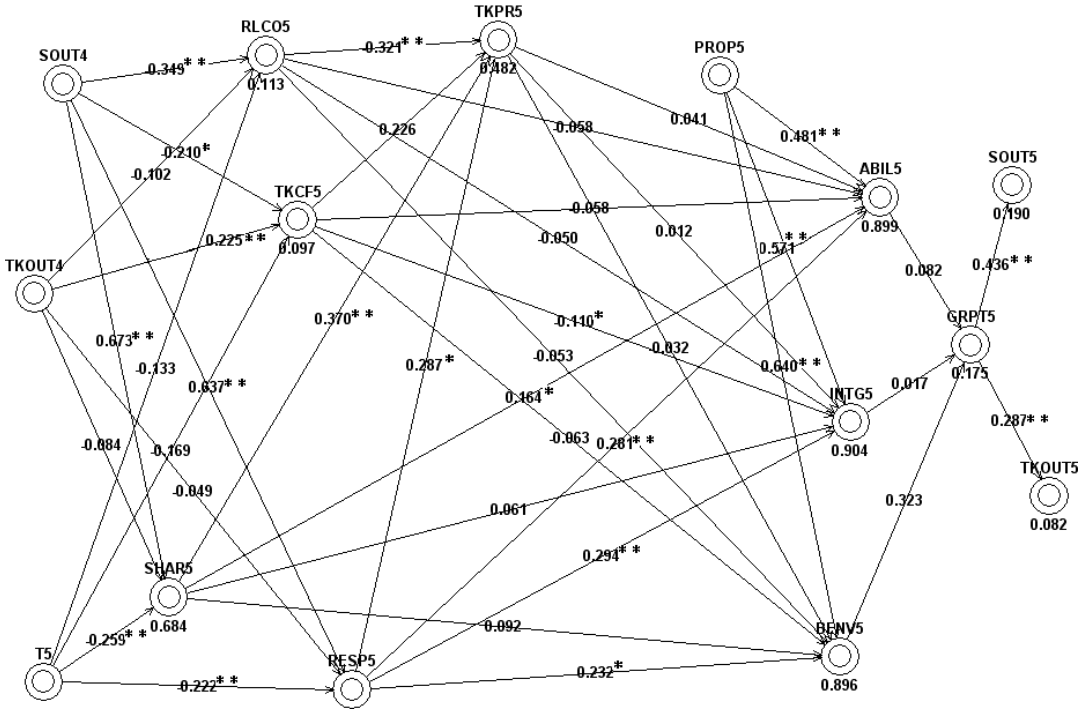


Figure 5.4.2 (5) – Path Model for Meeting 5

(** p < 0.01 and * p < 0.05)

5.4.2.7 Summary of results at the individual and group level

Below we present a summary table describing the over time results of all relationships tested in the model. While the first five meetings present results obtained at the individual level, the last five meetings shown results at the group level. This table helps us to compare differences across the two level of analysis.

		BY INDVIDUALS					BY GROUPS				
		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H1.1	Path Coefficient	**0.3080**	**0.2670**	**0.6090**	**0.6990**	**0.4400**	0.2710	-0.2660	**0.7410**	0.1290	0.0820
	P-Level	**0.0017**	**0.0067**	**0.0000**	**0.0000**	**0.0010**	0.1694	0.1813	**0.0342**	0.3794	0.3932
H1.2	Path Coefficient	-0.1250	-0.0140	**-0.2840**	**-0.4180**	-0.1120	-0.1110	**0.8460**	-0.3850	-0.0070	0.0170
	P-Level	0.1680	0.4604	**0.0118**	**0.0023**	0.2637	0.3601	**0.0164**	0.2260	0.4933	0.4828
H1.3	Path Coefficient	0.0500	-0.0050	-0.1120	-0.0390	-0.0190	0.1380	-0.2310	-0.0170	0.2540	0.3230
	P-Level	0.3422	0.4848	0.1888	0.3682	0.4553	0.2946	0.2135	0.4805	0.1442	0.1635
H2.1	Path Coefficient	**0.4860**	**0.5330**	**0.5070**	**0.5160**	**0.6110**	**0.5430**	**0.5800**	**0.5110**	**0.4920**	**0.4810**
	P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
H2.2	Path Coefficient	**0.5180**	**0.6030**	**0.5540**	**0.5770**	**0.6050**	**0.5130**	**0.7320**	**0.5680**	**0.4630**	**0.5710**
	P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
H2.3	Path Coefficient	**0.5230**	**0.6300**	**0.5940**	**0.5970**	**0.6470**	**0.4730**	**0.6920**	**0.5620**	**0.5360**	**0.6400**
	P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**
H3.1	Path Coefficient	**0.1150**	**0.0480**	**0.0500**	**0.0510**	**0.0630**	**0.1470**	-0.0100	0.0640	**0.0870**	0.0410
	P-Level	**0.0002**	**0.0324**	**0.0123**	**0.0191**	**0.0068**	**0.0154**	0.4072	0.0867	**0.0327**	0.1794
H3.2	Path Coefficient	**0.0870**	**0.0600**	**0.0480**	**0.0490**	**0.0480**	0.0940	0.0530	0.0600	0.0810	0.0120
	P-Level	**0.0061**	**0.0195**	**0.0268**	**0.0278**	**0.0275**	0.0582	0.1612	0.0776	0.0618	0.3824
H3.3	Path Coefficient	0.0480	0.0330	0.0360	0.0300	**0.0500**	0.0160	0.0110	0.0610	0.0070	-0.0320
	P-Level	0.0760	0.1637	0.0874	0.1304	**0.0214**	0.4262	0.4195	0.0657	0.4582	0.2446
H4.1a	Path Coefficient	-0.0100	0.0140	**0.0530**	-0.0400	0.0150	0.0200	-0.0570	0.0410	-0.1130	-0.0580
	P-Level	0.3969	0.3167	**0.0373**	0.0615	0.3070	0.4222	0.1548	0.2694	0.0949	0.1343
H4.1.b	Path Coefficient	-0.0630	-0.0150	0.0110	**-0.0760**	-0.0040	-0.0870	-0.0590	-0.0100	-0.1070	**-0.1100**
	P-Level	0.0791	0.3107	0.3822	**0.0058**	0.4565	0.1854	0.1179	0.4276	0.1241	**0.0357**
H4.1c	Path Coefficient	0.0000	-0.0020	0.0250	-0.0770	-0.0240	-0.0750	-0.0280	0.0960	**-0.1730**	-0.0630
	P-Level	0.5000	0.4827	0.2335	0.0863	0.2324	0.2607	0.3136	0.0537	**0.0400**	0.1512
H4.2a	Path Coefficient	-0.0430	-0.0350	**-0.0790**	-0.0310	**-0.0600**	-0.0630	0.0320	-0.0530	0.0030	-0.0580
	P-Level	0.1412	0.1554	**0.0083**	0.1646	**0.0269**	0.2730	0.3072	0.1837	0.4869	0.1502
H4.2b	Path Coefficient	-0.0250	**-0.0660**	**-0.0920**	-0.0140	-0.0560	-0.0260	0.0250	**-0.0950**	-0.0070	-0.0500
	P-Level	0.2935	**0.0427**	**0.0093**	0.3377	0.1008	0.3931	0.3190	**0.0456**	0.4722	0.1936
H4.2c	Path Coefficient	**-0.1150**	**-0.0850**	**-0.0870**	-0.0430	-0.0430	-0.0670	-0.0310	**-0.1310**	-0.0180	-0.0530
	P-Level	**0.0062**	**0.0408**	**0.0098**	0.2066	0.1042	0.2995	0.3241	**0.0089**	0.4356	0.1833
H4.3a	Path Coefficient	**0.2620**	**0.2620**	**0.2750**	**0.1930**	**0.1720**	**0.1770**	**0.2370**	**0.1550**	**0.1320**	**0.2810**
	P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0001**	**0.0011**	**0.0334**	**0.0034**	**0.0481**	**0.0190**	**0.0041**
H4.3b	Path Coefficient	**0.2280**	**0.1970**	**0.2530**	**0.1530**	**0.2390**	**0.1570**	0.0760	0.0490	**0.1470**	**0.2940**
	P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0003**	**0.0000**	**0.0356**	0.2032	0.3108	**0.0280**	**0.0039**
H4.3c	Path Coefficient	**0.2360**	**0.1610**	**0.2210**	**0.1700**	**0.2130**	**0.1950**	0.0730	**0.1510**	0.1220	**0.2320**
	P-Level	**0.0000**	**0.0008**	**0.0004**	**0.0002**	**0.0000**	**0.0395**	0.1989	**0.0490**	0.0541	**0.0159**
H4.4a	Path Coefficient	**0.1280**	**0.1690**	**0.1760**	**0.2340**	**0.1490**	**0.1310**	**0.1840**	**0.2750**	**0.2630**	**0.1640**
	P-Level	**0.0002**	**0.0000**	**0.0000**	**0.0000**	**0.0066**	**0.0119**	**0.0017**	**0.0011**	**0.0040**	**0.0192**
H4.4b	Path Coefficient	**0.1400**	**0.1220**	**0.1140**	**0.2080**	**0.0940**	**0.1850**	**0.1230**	**0.2690**	**0.2790**	0.0610
	P-Level	**0.0001**	**0.0004**	**0.0004**	**0.0000**	**0.0406**	**0.0037**	**0.0494**	**0.0058**	**0.0008**	0.2285
H4.4c	Path Coefficient	**0.1240**	**0.1130**	**0.1020**	**0.1470**	0.0720	**0.1920**	**0.1730**	**0.2210**	**0.2410**	0.0920
	P-Level	**0.0006**	**0.0050**	**0.0018**	**0.0003**	0.0678	**0.0328**	**0.0136**	**0.0048**	**0.0031**	0.1119
H5.1	Path Coefficient	-0.0290	-0.0790	-0.0280	**-0.1160**	0.0570	-0.1940	0.0290	-0.0140	**-0.2470**	0.2260
	P-Level	0.3525	0.0944	0.3563	**0.0278**	0.1095	0.1604	0.4231	0.4578	**0.0397**	0.0534
H5.2	Path Coefficient	**-0.2660**	**-0.1590**	**-0.2200**	**-0.1440**	**-0.2130**	-0.2250	**-0.2610**	**-0.2440**	-0.0890	**-0.3210**
	P-Level	**0.0006**	**0.0059**	**0.0039**	**0.0217**	**0.0002**	0.1298	**0.0423**	**0.0268**	0.3004	**0.0048**
H5.3	Path Coefficient	**0.1750**	**0.2410**	**0.1440**	**0.2510**	**0.2410**	**0.1940**	**0.3440**	0.1570	**0.4650**	**0.2870**
	P-Level	**0.0049**	**0.0001**	**0.0208**	**0.0004**	**0.0007**	**0.0425**	**0.0032**	0.1884	**0.0002**	**0.0165**
H5.4	Path Coefficient	**0.2300**	**0.3590**	**0.3010**	**0.3070**	**0.3360**	**0.2030**	**0.3020**	**0.4160**	0.0640	**0.3700**
	P-Level	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0279**	**0.0021**	**0.0060**	0.3373	**0.0031**
H6.1	Path Coefficient	**0.2650**	**0.1200**	0.0430	0.0350	**-0.0960**	**0.4640**	**0.2410**	0.0200	-0.0330	-0.1690
	P-Level	**0.0000**	**0.0057**	0.2020	0.2617	**0.0285**	**0.0000**	**0.0185**	0.4267	0.3784	0.0976
H6.2	Path Coefficient	**0.2310**	**0.1310**	**0.0190**	**0.0040**	**-0.0590**	**0.3940**	**0.2020**	0.0290	-0.0830	-0.1330
	P-Level	**0.0000**	**0.0040**	0.3455	0.4697	0.1249	**0.0000**	**0.0430**	0.3952	0.2081	0.1470
H6.3	Path Coefficient	**-0.2580**	**-0.2190**	**-0.0990**	**-0.1480**	**-0.1810**	**-0.4270**	**-0.3480**	-0.1270	**-0.2270**	**-0.2220**
	P-Level	**0.0000**	**0.0000**	**0.0104**	**0.0002**	**0.0000**	**0.0000**	**0.0000**	0.0904	**0.0015**	**0.0036**
H6.4	Path Coefficient	**-0.2940**	**-0.2430**	**-0.1310**	**-0.1730**	**-0.2260**	**-0.4740**	**-0.3330**	**-0.1520**	**-0.2830**	**-0.2590**
	P-Level	**0.0000**	**0.0000**	**0.0028**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0263**	**0.0000**	**0.0003**
H7.1	Path Coefficient	**0.2100**	**0.1920**	**0.1800**	**0.1780**	**0.2800**	**0.2400**	**0.3620**	**0.3090**	**0.2520**	**0.4360**
	P-Level	**0.0000**	**0.0000**	**0.0001**	**0.0008**	**0.0000**	**0.0060**	**0.0000**	**0.0003**	**0.0070**	**0.0000**
H7.2	Path Coefficient	-0.0320	0.0370	0.0320	0.0480	**0.1220**	-0.0140	0.0920	0.0320	0.0800	**0.2870**
	P-Level	0.2270	0.1538	0.1902	0.1536	**0.0021**	0.4138	0.0878	0.3736	0.2178	**0.0008**

Table (a) – Results across different levels of analysis

		BY INDVIDUALS					BY GROUPS				
		Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5	Meeting 1	Meeting 2	Meeting 3	Meeting 4	Meeting 5
H8.1a	Path Coefficient	**n/a**	**-0.2490**	**-0.2720**	**-0.1840**	**-0.1950**	**n/a**	**-0.2630**	**-0.4850**	**-0.3770**	**-0.2100**
	P-Level	n/a	**0.0000**	**0.0000**	**0.0002**	**0.0004**	n/a	**0.0027**	**0.0000**	**0.0003**	**0.0374**
H8.1b	Path Coefficient	**n/a**	**-0.2690**	**-0.3300**	**-0.2740**	**-0.2500**	**n/a**	**-0.3250**	**-0.4470**	**-0.4840**	**-0.3490**
	P-Level	n/a	**0.0000**	**0.0000**	**0.0000**	**0.0000**	n/a	**0.0005**	**0.0000**	**0.0000**	**0.0013**
H8.1c	Path Coefficient	**n/a**	**0.4270**	**0.5290**	**0.5210**	**0.5530**	**n/a**	**0.4620**	**0.5690**	**0.5470**	**0.6370**
	P-Level	n/a	**0.0000**	**0.0000**	**0.0000**	**0.0000**	n/a	**0.0000**	**0.0000**	**0.0000**	**0.0000**
H8.1d	Path Coefficient	**n/a**	**0.4760**	**0.5370**	**0.5650**	**0.5820**	**n/a**	**0.4930**	**0.6070**	**0.6140**	**0.6730**
	P-Level	n/a	**0.0000**	**0.0000**	**0.0000**	**0.0000**	n/a	**0.0000**	**0.0000**	**0.0000**	**0.0000**
H8.2a	Path Coefficient	**n/a**	-0.0470	-0.0710	**-0.1260**	**-0.1120**	**n/a**	-0.0960	-0.0710	**-0.2250**	**-0.2250**
	P-Level	n/a	0.0784	0.0616	**0.0065**	**0.0053**	n/a	0.1103	0.2594	**0.0259**	**0.0036**
H8.2b	Path Coefficient	**n/a**	**-0.0860**	**-0.0800**	**-0.1560**	-0.0490	**n/a**	-0.1350	-0.0920	**-0.2300**	-0.1020
	P-Level	n/a	**0.0153**	**0.0471**	**0.0056**	0.1572	n/a	0.0907	0.2271	**0.0137**	0.1334
H8.2c	Path Coefficient	**n/a**	0.0110	**0.0910**	0.0750	-0.0160	**n/a**	0.0220	0.0730	0.1410	-0.0490
	P-Level	n/a	0.3911	**0.0053**	0.0587	0.3057	n/a	0.3481	0.1163	0.0771	0.2404
H8.2d	Path Coefficient	**n/a**	**0.0820**	**0.1030**	0.0220	-0.0250	**n/a**	**0.1070**	**0.1110**	-0.0190	-0.0840
	P-Level	n/a	**0.0135**	**0.0030**	0.3247	0.2358	n/a	**0.0422**	**0.0227**	0.3830	0.1095

Table (b) – Results across different levels of analysis (contd.)

6. DISCUSSION

This chapter discusses the major findings of this study by looking at changes over time in terms of the relationships between variables and the impact of technology on group processes. The chapter is organized into two sections: The first section discusses on relationships with significant results in two or more consecutive meetings. The second section discusses the effects of the setting (virtual vs. collocated) on social interactions over time as indicated in the repeated measures analysis.

6.1 CHANGES IN RELATIONSHIPS OVER TIME

This section discusses changes in the relationships between variables by grouping them into three conceptual categories (i.e., consistent effects, progressive changes, and punctuated changes) based on their pattern of behavior over time. The set of relationships included in these three categories had significant path coefficients in two or more consecutive meetings during the entire group project. The first category – consistent effects over time – includes those set of relationships where path coefficients remained stable across the five meetings of the group project. Specifically, the set of relationships included in this category changed less than 10% across all five meetings. The second category – progressive changes over time – includes those hypothesized relationships in which the path coefficients exhibited either an increasing or a decreasing pattern of change over time. Specifically, these set of relationships exhibited a rate of change of over 25% during

the entire project. The third category – punctuated changes over time – includes those set of relationships which changed direction over the course of the study.

6.1.1 CONSISTENT EFFECTS

The following relationships which displayed a constant pattern during the entire duration of the group project are discussed below:

- Trustor's Propensity to Trust with Trusting Integrity;
- Cooperative Perceptions of the Task with Trusting Ability and Integrity;
- Perceptions of Social Interaction with Trusting Beliefs; and
- Satisfaction with Outcomes with Relational Conflict and Task-Related Conflict.

6.1.1.1 The Effects of a Trustor's Propensity to Trust on Trusting Integrity

As discussed earlier, a trustor's propensity to trust refers to an individual's tendency to trust others based on his/her own personality characteristics developed over the years. Thus, when the trustor has little or no information to evaluate other's behavior and attitudes, the trustor relies on inherent traits such as his/her upbringing to place trusting integrity on others (Mayer, et al., 1995; McKnight, et al., 1996). Often, such tendencies result in "giving the benefit of the doubt" to unknown others, particularly where the circumstances warrant it (e.g., Mayer, et al., 1995). As a

result, this study proposed that a trustor's propensity to trust would positively influence trusting integrity.

As predicted, the effects of a trustor's propensity to trust on trusting integrity were significant and positive across all five meetings indicating that the trustor's tendency to trust others was an important predictor of trusting integrity during the entire project. The reasons for such consistent effects are explored below.

Groups were randomly formed in both experimental conditions (virtual and collocated); members did not have any knowledge about their partners and had no experience working together prior to this experiment. As a result, they did not have knowledge about others' integrity. Given this lack of information about others in the group, it is likely that members relied on their own cultural and social experiences developed over the years to place trusting integrity on others. In other words, where members had a high propensity to trust others they were likely to view their group members as having integrity and placing their trust (based on such perceptions of integrity) on them.

Such results corroborate previous theoretical assertions (e.g., Mayer, et al.'s 1995) in that the effects of a trustor's propensity to trust on trusting integrity may not change in short periods of group interaction. In other words, since integrity refers to the extent to which a trustor perceives the trustee as sharing a common set of values, given the limited time in which members worked on the project (five meetings), members' own prior experiences and cultural values still played a

significant role in determining the extent to which members perceived others as being trustworthy in terms of integrity.

6.1.1.2 The Effects of Cooperative Perception of the Task on Trusting Beliefs

As expected, cooperative perceptions of the task positively and constantly affected trusting ability and integrity during the entire project. In other words, members who perceived the task as being cooperative also perceived others as being trustworthy in terms of being able to perform well on the task and having high values. These results are explained below.

As described earlier, the database project consisted of five meetings. At the beginning of each meeting, each group member received limited task instructions along with critical information to the execution of other members' tasks. In this case, the task structure required members to collaborate with each other by sharing and exchanging their individual task information. As a result, it is likely that those members who perceived the task as being cooperative also perceived their partners as being task competent since their partners provided the necessary information to complete the task.

Furthermore, at the end of each meeting, members were required to combine their efforts and help the group produce a collective solution. In order to do so, members also had to choose one group member to combine their individual task outcomes. In other words, cooperative perceptions of the task (i.e., the way members made sense of the task grading format and interpreted group interaction

when making decision about the partner they would rely on to post the group's solutions) influenced the amount of trusting ability and integrity (i.e., task-related competence and high moral values) they placed on others.

These results, then, support theoretical notions in that members' perceptions of others are based on interpretations of the social situations in which they are embedded (Berger and Luckmann, 1967; Granovetter, 1985). More specifically, cooperative perceptions of the task were likely based on member's efforts to share and exchange task-related information along with their collaborative solutions. These positive perceptions of the task then fostered perceptions of trusting beliefs in terms of trusting ability and integrity.

6.1.1.3 The Effects of Perceptions of Social Interaction on Trusting Beliefs

As articulated in the theory section, group members develop or change trust expectations about their partners based on the results of each other's actions experienced when working together. These experiences, in turn, provide group members with a more accurate expectation of group behavior (Butter, 1999; Lewicki and Bunker, 1995). Subscribing to these assumptions, we hypothesized that perceptions of social interaction would influence trusting beliefs – the extent to which members perceive their partners as being trustworthy. The specific relationships between perceptions of social interaction and trusting beliefs that exhibited a consistent pattern during the entire project are described below.

6.1.1.3.1 The Effects of Relationship Conflict on Trusting Benevolence

Relationship conflict refers to hostile socio-emotional attitudes exhibited among group members. Since it is targeted at persons within the group, its consequences affect group work by generating a negative work environment (Deutsch, 1969). When a member faces personal attacks from other members of the group, his or her perceptions of trusting benevolence about others may suffer. In other words, a member will be less likely to perceive others as being willing to do good when he/she perceives relationship conflict during group interaction. As a result, we hypothesized that relationship conflict would negatively influence trusting benevolence.

As shown earlier the impact of relationship conflict on trusting benevolence was significant and negative in the initial three meetings. Also, the strength of the relationship remained relatively constant over time. In other words, the more group members experienced relationship conflict, the less group members developed trusting benevolence about others. However, since this hypothesized relationship was supported only in the initial three meetings it seemed that as group interactions evolved over time, the impact of relationship conflict on trusting benevolence dissipated. We discuss these results below.

As discussed earlier, group members did not know each other prior to working on the project. As a result, in the initial meetings, they likely spent a proportionately greater amount of time focusing on socio-emotional exchanges in order to learn about other's. The focus on a group's social needs may have resulted

in members exhibiting greater relationship conflict, which, in turn, influenced the amount of trust benevolence they placed on others in the early stages of group development. However, once relational ties were established (i.e., in the subsequent phases of group interaction), groups and members shifted their focus from relational development to the task at hand such that the impact of relationship conflict on trusting benevolence, while still negative, ceased to be significant.

These results support TIP in that, over time, groups pass through different phases engaging in several activities – some related to the task and others not (McGrath, 1991). In fact, as indicated by previous research (e.g., Miranda and Bostrom, 1993), group conflict unfolded differently as a result of group's members' interactions over time. In this study, while at the early stages of group work members spent time focusing on getting to know each other in order to maintain the group's social needs (in addition to accomplishing its task), socio-emotional issues were more prominent and relationship conflict was an important and early predictor of trusting benevolence. Subsequently, as teams evolved, it is likely that they shifted their focus from socio-emotional issues to the task at hand, thus dissipating the impact of relationship conflict on trusting benevolence over time.

6.1.1.3.2 The Effects of Responsiveness of Others on Trusting Beliefs

When working in groups, in order to fulfill both group well-being and task related needs, members communicate and interact with each other by exchanging personal and task related information. Thus, responsiveness of others - the extent to which a member is responsive to others' requests (Gefen and Ridings, 2002) - was

included in the research model as an important component of perceptions of social interaction. Specifically, it reflects the reciprocal nature of interactions (i.e., when people perceive others as being responsive to their requests by responding quickly and often), which is generally associated with perceptions of cooperation among team members – a key element in the development of trust. In this sense, we expected that responsiveness of others would positively influence trusting beliefs over time.

As shown earlier, responsiveness of others positively and significantly influenced trusting integrity, benevolence, and ability during the entire project. In other words, members who viewed others as being more responsive also perceived them as being trustworthy along a variety of dimensions. Thus, in this context, responsiveness of others played a key role by providing members the ability to develop an understanding of other's behavior (Gabarro, 1978), thereby influencing how members perceived others' ability, integrity, and benevolence. These results are examined below.

As described earlier, each meeting required members to exchange task-related instructions so that they could efficiently work on their own tasks. In addition, at the end of each meeting groups had to combine members' individual contributions to the task into a final group solution. In this scenario, not only did members spend time synchronizing their activities to reach a final solution but they also decided which member would be in charge of the process. Therefore, given that groups had only 75 minutes per session to address their social and task needs,

it is likely that group members perceived quicker responses as important elements to predict others' trusting beliefs. In other words, the task structures and time constraints imposed on the group may have resulted in the responsiveness of others being an important determinant of perceptions about others' trusting beliefs.

Since responsiveness of others was a critical element for members to develop both socio-emotional and task-related ability about their partners over time, these results confirm TIP arguments in that during the course of this project members communicated and exchanged information based both on socio-emotional and task needs (McGrath, 1991). In addition, these results build on similar findings reported by Saunders and Jones (1990). While they provided evidence that managers behavior and patterns of reliance were influenced by the extent to which they perceived a source as being responsive to their requests, our study suggests that not only managers but also members of a work group may exhibit this pattern of behavior over time. In other words, over time, established patterns of interaction (i.e., reflective behaviors and attitudes) among group members influence the manner in which they develop perceptions about their partners.

Finally, the impact of responsiveness of others on trusting beliefs was constant over time. Thus, members perceived responsiveness of others as an important indicator of trusting beliefs regardless of the group development phase. In other words, members were constantly evaluating their partners' attitudes and behavior based on previous patterns of interaction defined in terms of responsiveness of others. These findings, then, suggest that the extent to which

members perceive others as being responsive to their requests influences the amount of trusting beliefs they place on others. Regardless of the stage of group development and whether groups are focusing on socio-emotional needs or task demands, responsiveness of others appears to have constant and significant effect on members' trust perceptions about their partners.

6.1.1.3.3 The Effects of Shared Identity on Trusting Ability

Shared identity reflects the extent to which members identify themselves with their partners as they engage in group interactions over time (Mannix et al. p. 237). It is a positive outcome of group behavior and influences individuals evaluations of others actions and behavior (Levine and Moreland, 1987) in that the more group members perceive shared identity, the more they feel a sense of "groupness". Thus, we expected that shared identity would positively influence perceptions about others' trusting ability. As predicted, trusting ability was significantly impacted by shared identity during the entire project. We discuss the implications of these results below.

In this study, members of all teams had to use file-sharing functionalities to exchange database files, posting functionalities to share their solutions, and database tools to complete the project. In addition, members did not have knowledge of others' task competencies and capabilities prior to working on the project.

In this case, then, all groups relied extensively on the use of technological tools, which served as a mechanism for members to develop perceptions about

others' task expertise built up via shared experiences across treatments. Specifically, members were constantly evaluating and comparing each other's capability to address specific demands of the task and general requirements of the project. Thus, shared identity developed over time influenced the extent to which members placed trusting ability when they perceived others as possessing similar technological expertise. In other words, members likely develop trust towards those who they identify as possessing similar skills related to the task at hand.

These results provide important theoretical implications. First, relational development in terms of shared social construction was built up over time among the group members (Wei, 1997), thus it is an important relational aspect of group interaction that can accelerate the development of trust. Second, the result of the group's shared experiences influences how members perceive others around them. In other words, human social order is produced through interpersonal negotiations and implicit understandings that are built up via shared communication exchanges and experiences. These social mechanisms act as interpretation processes through which group members make patterns of meanings out of their activities (Berger et al., 1967). Finally, in both collocated and computer-supported teams, positive perceptions of "groupness" led to process gains, including ability-based trust, as suggested by TIP theory (McGrath, 1984). In other words, regardless of the characteristics of the setting, group members' perceptions of shared identity over time seemed to be an important and stable predictor of trust (based on the ability of others). Given that the task required participants to constantly use technological tools, these results suggest that members placed ability-based trust on partners

whom they identify as sharing similar notions on how to address the task needs by using these technological tools.

6.1.1.4 The Effects of Satisfaction with Outcomes on Relationship Conflict and Task-Related Conflict

We articulated that social interaction perceptions in terms of relationship conflict and task-related conflict would change over time as a result of on-going interactions and experiences. Thus, in groups that meet more than once, perceptions of the social interaction are likely to be influenced by outcomes of previous interactions (Granovetter, 1985; Shapiro, 1987).

Participants in this research project were asked to work on a database project with five deliverables, which was to be turned in at the end of each week. As a result, the research model included the feedback effects of group satisfaction with outcomes on subsequent perceptions of social interaction. Since satisfaction with outcomes is a positive outcome of group behavior, we hypothesized that members who were more satisfied with outcomes would also perceive less relationship conflict and task-related conflict.

Results shown earlier indicate that the effects of satisfaction with outcomes (from the previous session) on both task-related conflict and relationship conflict were significant during the entire project. In other words, members who were more satisfied with outcomes also perceived less relationship conflict and task-related conflict. We discuss these results below.

At the end of each meeting, group members had to choose one member to post the final version of their group project. Therefore, it is likely that if the chosen member did a good job posting the group's final solution by checking and revising each member's own contribution and putting together all solutions, members perceived less task-related conflict. Such members, who were satisfied with the adopted selection process, are also likely to have perceived less relationship conflict.

In addition, since the path coefficients of this relationship remained constant during the entire project, our results suggest that as groups spend time working together, even though different group interaction processes unfold, their level of satisfaction was an important and constant predictor of relationship conflict and task related conflict.

6.1.2 PROGRESSIVE CHANGES

This section describes results of the path analysis that exhibited a consistent upward (or downward) trend over time. Specifically, the hypothesized relationships included in this category were significant in two or more consecutive meetings and values of the path coefficients changed more than 25% during the entire project. These relationships are described in the next section.

6.1.2.1 The Effects of the Virtual Setting on Relationship Conflict and Task-Related Conflict

Early studies on computer-supported groups suggested that, due to the effects of inherent technological capabilities, groups that communicate only through

communication technologies tend to be more focused on the task-related issues (Daft and Lengel, 1984; Short, et al., 1976). Moreover, recent theoretical developments have suggested that virtual teams are able to exhibit relational development when more time is available for the group to interact (Walther, 1992). These assumptions, thus, imply that in the initial stages of group development virtual teams have to spend a greater amount of time adjusting their communication style to overcome fewer opportunities available to convey multiples cues in comparison than do collocated teams.

As we expected, the virtual setting positively affected both relationship conflict and task-related conflict over time. Surprisingly, as shown earlier, our study indicated that the virtual setting significantly impacted relationship conflict in the initial two meetings. In other words, it appears that virtual teams exhibited relational development in the form of relationship conflict from the start. These results, thus, not only extend the empirical findings that social structures emerge in lean environments (e.g., Chidambaram, 1996) but also establish new theoretical insights in that virtual teams were able to address socio-emotional needs from the very early stages of group development. Below we discuss these findings.

An explanation for these findings is that the easy-to-use web system enabled virtual teams to quickly use the technology to fit their own needs. As discussed earlier, the virtual teams used Yahoo! Groups - a web-based collaborative system that allows participants to communicate by exchanging messages. Thus, the communication patterns used resembled those already embedded in the

participants' daily life, such as e-mail exchanges. Recall that subjects of this study were students who already had their own email account provided by the university. Typically, these students use their email accounts to exchange information with their classmates and/or friends on both class related issues and personal matters. Furthermore, the wide availability and use of web systems such as chat rooms and discussion groups may have led students to perceive Yahoo! Groups as an easy-to-use tool and allowed them to easily adapt it to their own needs.

In addition, the training provided to participants before they started working on the project may have also played a critical role in accelerating the development of relational factors. For instance, the training session emphasized the use of the communication tools by requiring participants to use this feature repeatedly before working on the actual project. Hence, the combination of the web-based communication tool and the extensive training on the system functionalities may have worked as a mechanism to foster members' ability to address their group's social needs, thereby allowing them to experience conflict right from the start.

Another interesting finding relates to the behavioral pattern of the relationship between the virtual setting and task-related conflict over time. As shown earlier, the virtual setting positively influenced task-related conflict in the initial two meetings. Interestingly, however, this relationship became negative in the last meeting. Thus, while these findings are consistent with previous research (xxx) in that the virtual setting has initial negative effects on task-related conflict, the fact that, in the final meeting, the relationship between virtual setting and task-related

conflict became negative suggests that virtual teams not only overcame technological constraints (as predicted) but also were able to manage conflict in a lean environment such that they took advantage of the virtual setting structures to reduce task-related conflict over time.

6.1.3 PUNCTUATED CHANGES

This section describes relationships that exhibited punctuated changes over time. Specifically, path analysis results suggested an increasing trend in the strength of the relationship in the initial meetings. However, as groups reached the mid point of their life, these relationships reversed trend.

6.1.3.1 The Effects of the Virtual Setting on Responsiveness of Others and Shared Identity

As argued earlier, the setting in which people are embedded influences the way they interact (Granovetter, 1985) by imposing certain communication parameters and constraints (Lewicki and Bunker, 1995). Consequently, different from collocated teams, perceptions of social interaction in virtual teams are likely to differ due to the fact that communication is enabled only through technological means (Daft and Lengel, 1984; O'Hara-Devereaux and Johansen, 1994; Short, et al., 1976). However, as virtual teams cope with technological constraints these negative effects may dissipate over time (Walther, 1992). In this study, as suggested, virtual teams perceived others as being less responsive and having less shared identity than collocated teams, but as they interacted and made use of the technology, negative perceptions decreased over time.

As shown ealier, the virtual setting significantly impacted perceptions of others' responsiveness and shared identity across all five meetings. Moreover, the pattern of these relationships changed over time. Specifically, the relationships, while negative, improved during the first half of group work. Then, starting with the third meeting, groups went through a transition period, which reversed this trend during the second half of group work. Below we discuss these changes over time in light of the punctuated equilibrium model (Gersick, 1988; Gersick, 1989; Gersick, 1991) and Time Interaction and Performance theory (McGrath, 1991).

Specifically, groups went through an initial period of exploration (Gersick, 1988) where they were struggling to overcome the constraints of the media. During this initial period it is likely that group members, in addition to understanding their context, they also spent time gathering information about each other (McGrath, 1991).

In this study, then, it is likely that in the first half way of group work participants focused on socio-emotional exchanges in order to build relational perceptions about their partners with whom they have never worked before. These patterns are consistent with the behavior of other virtual teams, which tended to spend considerable amounts of time addressing social needs in the early stages of group development (Walther, 1992). Then, virtual teams worked to adapt the technology to fit their needs exhibiting relational development in the process. Thus, the negative effects of the virtual setting on both responsiveness of others and shared identity decreased consistently over time – at least initially.

However, these improvements stopped at the midpoint of the group's life. Thus, the third meeting represented a turning point, i.e., the period when members suddenly became aware of the time elapsed and the few weeks left to complete the project. Recall that, in this project, the group life span was five weeks and groups experienced major changes in their behavioral pattern in the third meeting. In the transition period, members likely became aware of the fact that the group would soon be dissolved, thereby triggering new dynamics of group development that were observed in the last two meetings.

In this second phase of group development groups members had already gotten acquainted with the technology, task procedures, and their partners. Specifically, members had developed an understanding of the communication style and procedures adopted by their partners. They also discovered ways on how to best use the technology to interact with each other. Specifically, virtual teams spent time searching for alternative ways that enabled them to rely less on other's work in order to complete their own task. In other words, they adopted new working strategies and started to pace themselves toward the project deadline by mainly focusing on the task at hand.

As a result, the fact that members were able to manage the available resources to limit their need for other's contributions so that they could quickly work on their on task promoted an environment where members experienced feelings of reduced group identity. In addition, this limited need for other's participation on their own tasks reduced the engagement in communication exchanges among partners.

This behavioral pattern, in turn, served to lower perceptions of how responsive others were to the group.

6.1.3.2 The Effects of Trusting Ability on Trust Behavior

This section discusses the significant effects of trusting ability on trust behavior over time. While trusting ability is the extent to which members perceive others as possessing a set of capabilities necessary to perform well in a task, trust behavior – in this study defined as an objective measure of trust - is the actual amount of trust placed on others. As anticipated, trusting ability impacted trust behavior positively during the entire project. In other words, the amount of trust that members placed on their partners was influenced by the extent to which they perceived their team members as possessing appropriate skills and competencies to do well in the task at hand. Furthermore, the strength of this relationship reflected punctuated changes as group interaction processes unfolded over time. Specifically, after the first meeting there was a slight decrease in the relationship, but then it displayed an increasing trend for the next two sessions. These results, thus, not only provide empirical evidence about the effects of ability on trust behavior but also suggest that these effects unfold differently as groups interact over time. Below we discuss these findings.

Initially, as argued earlier, members did not know each other and focused on technological issues to cope with social need; thus, the first phase of group development reflected a reduction in the effects of trusting ability on trust behavior. However, at the second meeting, members realized that the tasks required

extensive use of computer technology. Consequently, members placed trust in others based on how well they perceived their partners as being able to use these tools. This change in member's cognitive behavior defined a new phase of group work.

However, once groups realized that there was only one more meeting left to complete the project, they experienced a second rupture (i.e., punctuated equilibrium) in the relationship between trusting ability and trust behavior. While these major changes in behavioral patterns are usually evident in the midpoint of a group's life, the timing may vary based on the schedule that is more salient for each group (Gersick, 1988). Thus, in this case, groups experienced transitional periods after the first and the fourth meetings. As a result, groups had an opportunity to review, change, and adopt new processes so that they could complete the project. Under these new working strategies, the effects of trusting ability on trust behavior declined since member's became aware that the group would be soon dissolved, and this allowed them to disassociate themselves easily. Also, as they approached the end of the project they discovered novel ways about how to best deal with the task by reducing the need for their partners' contributions. Thus, members found ways to reduce their reliance on the ability of others.

In summary, the longitudinal effects of perceived ability on trust behavior reflected a punctuated equilibrium model (Gersick, 1988; Gersick, 1989; Gersick, 1991). Initially the members reliance on ability was relatively low due to their focus on socio-emotional issues task. As groups evolved, they shifted their focus from

socio-emotional to task needs, thus increasing their reliance on ability to place trust in others. Finally, once they reached the final phases of group work, they looked forward to disassociating themselves from the group by figuring out ways to rely less on their partners, thereby reducing the role of ability in predicting trust behavior.

6.2 PERCEPTIONS OF SOCIAL INTERACTION ACROSS TREATMENTS

This section discusses the impact of technology on group processes over time as reported in the post hoc repeated measures ANOVA. Specifically, we focus on the variations of perceptions of social interaction (i.e., relationship conflict, task-related conflict, responsiveness of others, and shared identity) across treatments (i.e., virtual vs. collocated).

6.2.1 Task-Related Conflict

In this study, virtual groups and collocated groups reported significant differences with regard to perceptions of task-related conflict. Specifically, initially participants of virtual teams experienced significantly higher task-related conflict than did participants of collocated teams. However, over time, while task-related conflict increased continuously in collocated teams, it declined in the final meeting in the virtual teams. As a result, the final stages of group development indicated a convergence in task-related conflict across treatments. Below we explain these findings.

In this study, at the early stages of group development, virtual teams were more task oriented than collocated groups because they had to deal with the initial

technological constraints that limited their opportunities to convey socio-emotional content. Given that task-related conflict reflects a task-oriented context where members raise new issues and offer new alternatives on how to best accomplish task demands (Deutsch, 1969), it is likely that groups more focused on the task also experienced more task-related conflict. Consequently, as expected, at the initial stages of group interaction virtual teams perceived more task-related conflict than did collocated teams. Over time, however, as virtual teams were able to adapt and use the technology (DeSanctis and Poole, 1994; Poole and DeSanctis, 1990) to meet their relational needs (Walther, 1992), socio-emotional information was exchanged among members, thereby reducing their perceptions of task-related conflict in the final meetings of the project.

In the collocated teams, however, groups exchanged socio-emotional content from the start, but as they advanced through the group developmental phases and became aware of the time left to complete the task, they became more task oriented, thus increasing perceptions of task-related conflict. As a result of the different behavioral patterns between the two groups, perceptions of task-related conflict converged across treatments over time so that both virtual and collocated teams reported similar perceptions of task-related conflict in the last stage of group development.

6.2.2 Shared Identity

Groups experienced significant differences in shared identity between the two treatments over time. Overall, collocated teams experienced more shared

identity than did virtual teams over time. However, perceptions of shared identity among members of virtual teams were constant compared to members of collocated teams who exhibited increasingly higher levels of shared identity over time. We interpret these results as follows.

The fact that members of the virtual team experienced less shared identity in comparison to the collocated teams over time is related to the fact that members of the virtual team had fewer clues to identity others personality characteristics and intentions, at least initially. Theoretical arguments support the notion that users of computer-supported technologies can overcome these initial technological barriers; given enough time. Thus, relational development happens only if groups have sufficient time to exchange socio-emotional communication in lean environments (Chidambaram, 1996; Walther, 1992). In this study, the limited amount of time provided for group interaction may have constrained the development of shared identity in virtual teams. Groups had to get instructions on the task, work together, understand task instructions, and continuously deliver task outcomes within 75 minutes each time they met. In other words, while virtual teams viewed shared identity as an important determinant of trusting ability, they likely did not have enough time to develop shared identity.

In addition, during this experiment, members of virtual teams remained relatively anonymous compared to their collocated counterparts. In other words, while the structures imposed by the setting helped collocated teams accelerate the development of shared identity they slowed such development in virtual teams.

Furthermore, the fact that shared identity in the virtual teams presented a relatively flat trend over time may be explained using Jarvenpaa, et al.'s (1998) findings. In their study they found that the trust that occurred in the initial periods of group interaction was maintained throughout the entire group life. As with trust, it is likely that shared identity was largely affected by the initial tone of virtual teams in the early moments of group development so that initial perceptions of shared identity remained constant during the entire project.

6.2.3 Relationship Conflict and Responsiveness of Others

As discussed earlier, groups did not differ across treatments in their profiles of relationship conflict and responsiveness of others over time. Below we provide interpretations that explain the behavioral pattern of these two variables over time.

The task was specifically tailored for this study and did not require members to engage in controversial issues. Thus, while different types of tasks may engender different group processes (McGrath, et al., 1993; Poole, et al., 1985), it is likely that the task setting used in this study stimulated members to combine their efforts, thus minimizing differences in socio-emotional conflict across treatments. Also, since participants met only five times; this short amount of time may not have been enough to capture differences in perceptions of relationship conflict and responsiveness of others.

Another possible interpretation may be that results were, in large part, due to the nature of the experiment. Recall that members of virtual teams did not meet face to face and each meeting was limited to seventy-five minutes. In this context, we

expected that members of virtual teams would perceive responsiveness of others as a critical mechanism for group interaction since they would have to quickly read and exchange task related information from the start. Because of this, prior to working on the project, all teams went through an extensive training program, which focused on how groups could quickly use the technology in ways that would enable them to immediately respond to other's requests. Thus, it is likely that the training provided enabled virtual teams to better understand the available mechanisms for the group to interact and quickly respond to others' requests, as is the case in the collocated teams. As a result, participants' responsiveness of others did not differ across treatments.

6.3 SUMMARY

This chapter described the major findings of this study by grouping results into three major categories: consistent effects, progressive changes, and punctuated changes. Each category explained the behavioral pattern of the most significant relationships included in the research model. In addition, at the end, the chapter provided a discussion on the effects of the virtual setting on perceptions of social interaction over time.

7. CONCLUSIONS

This chapter is organized into three sections. The first describes implications for research. The second section discusses implications for management. Finally, the third section discusses limitations of this study.

7.1 IMPLICATIONS FOR RESEARCH

While several scholars (e.g., Lipnack and Stamps, 2000) have described the importance of trust in virtual teams, little empirical evidence exists about the mechanisms that engender the development of trust in virtual teams. This study provides such evidence by examining social structures and their effects on trust over a six-week period in which 103 teams completed a database project.

A key finding of this study relates to ability-based trust as a critical predictor of trust behavior over time. This finding adds a new insight to the way we view virtual teams because prior research has identified only integrity and benevolence as the major determinants of trust behavior (e.g., Jarvenpaa, et al., 1998; Kanawattanachai and Yoo, 2002). Moreover, our results also indicate that ability-based trust affected trust behavior differently over time. These differential effects reflect punctuated changes that occurred during different phases.

Even though all participants had gained the task-related knowledge they needed prior to working on the project, participants in both virtual and collocated teams spent a significant amount of time dealing with web-based tools importing and exporting database objects and sharing task-related information. Thus, it is

likely that group members tended to place trust in others based on the extent to which they perceived their partners as possessing the ability to effectively complete the task in this web-enabled setting. In other words, the contextual characteristics of the project engendered the need for ability-based trust among members. Therefore, extending the findings of previous studies (e.g., Jarvenpaa, et al., 1998; Kanawattanachai and Yoo, 2002), we suggest that different work settings and task demands are likely to require different types of trusting beliefs in the process of trust behavior formation.

The importance of ability in the formation of trust behavior may also be related to the fact that this study employed an objective measure of trust by asking participants what percentage of their own grade they wanted to be based on others' contributions to the task. While previous studies employed relied on perceptual measures of trust behavior, the research instrument used in this study may offer a more accurate measure of trust behavior since it has real consequences for the participants. Thus, our results highlight the need for the adoption of objective measures of trust when addressing group processes and outcomes.

Having described the relationship between trusting ability and trust behavior, we now examine the key elements that explained trusting ability: cooperative perceptions of the task and shared identity. Cooperative perceptions of the task significantly and constantly impacted trusting ability during the entire project in that both virtual and collocated teams consistently related cooperative perceptions of the

task to high evaluations of others' ability to perform the task. These results are important for several reasons.

First, they support a social constructionist notion of the task in that perceptions are conceived as the result of member's making sense of their situation and interpreting their context over time (Berger et al., 1967). The social constructionist perspective allows us to view task characteristics as an organizational element subject to human interpretation (Robey and Azevedo, 1991).

Second, while several studies have manipulated task, to date, none has focused on perceptions of the task and their effects on group processes. This study, thus, contributes to the literature by providing evidence that the way members perceive the task influences how they view their partners' abilities and the extent they place trust on others.

Finally, given that cooperative perceptions of the task did not differ across treatments (i.e., the setting did not influence members' perceptions of the task), it is likely that while members made sense of and interpreted their situations, the structural mechanisms used in this study promoted similar perceptions across teams. Thus, since cooperative perceptions of the task were found to be an important determinant of trusting ability, we suggest that future research study the role of other structural components as they are viewed by participants when examining their behavior and outcomes over time.

For example, in this study all participants received the same kind of task information. While this experimental procedure may have stimulated members to cooperate equally with each other; thereby enabling us to control for extraneous effects, we suggest that future research provide different types of task information to members. Such manipulation may foster different perceptions among members, resulting in different behaviors and outcomes over time.

In addition, each task was designed in a way that both virtual and collocated teams would be able to finish it within the 75-minute time limit. While tasks may require different amounts of time in different settings, thus engendering different process and perceptions across teams over time, we suggest future research employing tasks that may require members to operate under higher levels of time pressure.

The other important antecedent of trusting ability was shared identity. Results suggested that groups who experienced greater shared identity also perceived their partners as possessing more trusting ability. Moreover, virtual teams experienced less shared identity than did collocated teams during the entire project. In addition, over time, perceptions of shared identity increased in collocated teams while they remained relatively constant in virtual teams. These findings offer important insights to the study of virtual teams for the reasons discussed below.

As discussed earlier, virtual teams were able to quickly adapt to technological constraints by exhibiting relational development from the start. These group processes, however, did not contribute to improved perceptions of shared

identity. In other words, while shared identity was found to be an important mechanism to leverage trust in both collocated and virtual teams, it is likely that virtual teams needed other social structures (along with relational development) to increase shared identity over time. Virtual teams may require more time to interact and more opportunities to exchange personal identification.

Finally, since shared identity was revealed to be an important predictor of trusting ability, future research should examine mechanisms that promote shared identity in virtual teams. Based on the discussion above, manipulating members' identification across different teams, studying virtual teams for longer time, and providing flexible technological structures may help us to better understand this phenomenon.

Another important contribution of our study is the empirical evidence that the outcomes of past interactions influences group interaction in subsequent phases (Zucker, 1986). For instance, despite the fact that in the last decade the literature has emphasized the importance of group outcomes, to a large extent, most studies have viewed this as an outcome variable only and not as an important aspect of feedback.

Our results suggest that satisfaction with outcomes significantly influences the development of member's perceptions about conflict over time. In other words, members who were more satisfied with their group outcomes also perceived less conflict within their group. These findings highlight the importance of using research models that incorporate feedback mechanisms when studying virtual teams. The

longitudinal approach provides a methodology that enables us to observe how components of feedback -- social interaction and trust mechanisms -- evolve over time.

When looking closely at the patterns of relationship conflict, it is particularly interesting to note that relationship conflict was also influenced by the virtual setting over time. More specifically, a finer-grained interpretation of these results indicates a clear distinction between the impact of the virtual setting and previous outcomes on relationship conflict over time. Specifically, the virtual setting affected perceptions of conflict only in the initial phases of group development, while satisfaction with outcomes impacted conflict during the entire project. A few caveats are in order in interpreting these results. For one, while members' either reinforced or changed their individual perceptions about relationship conflict as a result of the setting and ongoing interactions, discussions, and experiences, it is likely that, over time, the effects of the virtual setting dissipated while a groups' outcomes became the primary element on which members relied to develop perceptions about their interaction. A second point to be emphasized is that, these results corroborate previous theoretical assertions in that, over time, groups adapt to the technological structures such that the virtual setting had its impact on perceptions of conflict reduced, if not eliminated.

Also important point for researchers to note is the nature of the task context used in this study. In particular, the database project (or adapted versions of it), which was specifically tailored to meet our research requirements, may help

researchers to extend this study by addressing other critical variables in virtual teams. Specifically, this project allowed us to employ an experiment where students could apply the knowledge gained during the semester and learn how to work in virtual teams while the researcher was able to observe all teams and gather longitudinal data on group processes and outcomes.

Another important outcomes for theorists relates to the way the mechanisms of trust unfolded over time. For example, while the relationship between the virtual setting and shared identity exhibited punctuated changes in the third meeting (exactly the midpoint of the project), the relationship between trusting ability and trust behavior experienced the transitional period in the fourth meeting. This difference in temporal milestones indicates that changes in some relationships depend on changes in other relationships to materialize. Thus, as one set of relationships change they may subsequently trigger an attendant change in another set of relationships.

A final comment relates to the importance of using a combination of theoretical perspectives to explain group behavioral patterns over time. This study examined several group process and outcome variables in a complex set of relationships. Since several relationships unfolded differently over time, the various theories used in our study helped us to better understand how the antecedents and outcomes of trust evolved over time. Therefore, the integration of these theoretical lenses to explain and understand trusting mechanisms and their relationships to

trust behavior and group outcomes moves us toward a more comprehensive theoretical approach to trust in virtual teams.

One aspect of the study especially worthy of note refers to the impact of the virtual setting on shared identity and responsiveness of others. Here, the punctuated equilibrium model and Social Information Processing Theory allowed us to understand different facets of group dynamics that occurred when groups experienced transitional periods. While the punctuated perspective explained why groups exhibited distinct group developmental phases, the social processing perspective helped us understand the behavioral patterns that unfolded in each of these phases. Therefore, we encourage future research to apply multiple theoretical lenses when studying group development processes longitudinally.

7.2 IMPLICATIONS FOR PRACTICE

While research on virtual teams has spanned more than two decades, to a large extend, practitioners still rely on common sense and trial-by-error (Lipnack and Stamps, 2000) when trying to understand and manage people working across space, time, and organizations. This approach may reflect the lack of a cumulative body of scientific work that would allow managers to fully understand the critical components of this complex organizational form. Previous studies have suggested that the development of trust and its mechanisms may reveal important insights to managing virtual teams effectively. This study represents a step in this direction.

Based on our results, we have argued that due to the high demands for technological use during the project, participants perceived others ability to perform

as an important predictor of trust behavior. Thus, managers need to educate team members' abilities and skills prior to project commencement, so members of virtual teams can begin placing their trust in their unseen partners.

In addition, our results indicated that a trustor's propensity to trust influenced trust formation during the entire project. In other words, teams that meet for a short period of time with members that have never worked together before were likely to rely on their propensity to trust others when placing their trust on their partners. In this sense, we suggest managers to pay attention whether individual characteristics of virtual team members satisfy expected levels of trust when forming short-term virtual teams. In other words, if the development of trust is critical to the task at hand, managers may form teams with members that posses high individual disposition to trust others, thus speeding up the process of trust formation among partners.

Results suggested that groups were able to quickly adapt and use technological tools by exchanging socio-emotional information even at the very early stages of group interaction. We argued that these results reflect the regular use of web-based systems (such as e-mail and instant-messaging) that were very familiar to the participants. Thus, since the quick exchange of socio-emotional tone may enable team members to rapidly focus on the task, managers may benefit by employing tools that resemble technologies that are already widely available and extensively used in an organization.

7.3 LIMITATIONS

As with any study, this one has its limitations. First, the sample was composed of college students rather than business professionals. While studies argue that the use of students may limit the applicability of such results to organizational settings, we dealt with this issue by adopting the following procedures. Contrary to using business cases that may not represent students' level of expertise, we developed a task that required specific knowledge delivered to students during the semester prior to working on the project. We also included the project as part of the students' course work so that task outcomes were relevant for their grade. These procedures allowed us to both stimulate students' participation and engage them in a working scenario that reflected their reality.

Second, due to the research design in which group members had to meet at the same time, subjects of both conditions (virtual and collocated) met in the same room. While this research procedure may have minimized the differences between collocated and virtual teams, members of the virtual teams were distributed in the room in such a way that they could not see and talk to their partners during the entire project. Manipulation check performed during the experiment indicated that members of the virtual teams did not know their team members during the entire project.

A third limitation is that the project lasted only five weeks, while projects in real organizations may take longer periods to be completed. In this case, we

encourage future research to extend this study for a larger duration within an organizational setting.

A fourth limitation might be attributed to the use of an experimental approach. Contrary to case or field studies, controlled experiments offer limited power to generalize their findings. However, the use of experiments provides strong internal validity so that we can build a cumulative body of scientific evidence. Also related to the methodology, this study used a single method to investigate the relationships described in the research model. Future efforts should attempt to extend this study by employing triangulation methods to explain this phenomenon.

Finally, the data analysis reported is based on all five meetings of the group project. A further analysis of the data gathered in this study may examine only the initial four meetings. It is possible that subjects behaved very differently in the last meeting due to the fact that it was the last day of class during the semester.

To summarize the results of this study, we established the importance of ability in predicting trust behavior, and showed that an objective measure of trust may best capture trust developments over time. In addition, we have highlighted the major mechanisms of trust development in virtual teams by including cooperative perceptions of the task, shared identity, and group's previous outcomes. These mechanisms evolved and interacted with each other over time by engendering different processes and outcomes.

BIBLIOGRAPHY

Applegate, L. M., Konsynski, B. R., & Nunamaker, J. F. 1986. A group decision support system for idea generation and issue analysis in organization planning. Paper presented at the Proceedings of the First Conference on Computer Supported Cooperative Work, Austin, Texas.

Arrow, H., McGrath, J. E., & Berdahl, J. L. 2000. Small groups as complex systems: Formation, coordination, development, and adaptation (1st ed.). Thousand Oaks, CA: Sage Publications.

Bales, R. F. 1950. Interaction process analysis: a method for the study of small groups. (1st ed.). Cambridge, Mass.: Addison-Wesley Press.

Bales, R. F. & Strodtbeck, F. L. 1951. Phases in group problem-solving. Journal of Abnormal & Social Psychology, 46: 485-495.

Barber, M. 1983. The logic and limits of trust. New Brunswick, NJ: Rutgers University Press.

Barnard, C. I. 1938. The functions of the executive. Cambridge, Mass.: Harvard University Press.

Benbasat, I. & Lim, L.-H. 1993. The effects of group, task, context, and technology variables on the usefulness of group support systems: a meta-analysis of experimental studies. Small Group Research, 24(4): 430-462.

Berger, P. L. & Luckmann, T. 1967. The social construction of reality : a treatise in the sociology of knowledge. Garden City, N.Y.: Doubleday.

Berscheid, E. 1994. Interpersonal Relationships. Annual Review of Psychology, 45: 79-129.

Bigley, G. A. & Pearce, J. L. 1998. Straining for shared meaning in organization science: Problems of trust and distrust. Academy of Management Review, 23(3): 405-421.

Blau, P. M. 1968. Social exchange, International Encyclopedia of the Social Sciences, Vol. 7: 452-457. New York: Free Press.

Boon, S. D. & Holmes, J. G. 1991. The dynamics of interpersonal trust: Resolving uncertainty in the face of risk. In R. A. Hinde & J. Groebel (Eds.), Cooperation and prosocial behaviour: 190-211. Cambridge: Cambridge University Press.

Burke, K. & Chidambaram, L. 1999. How much bandwidth is enough? A longitudinal examination of media characteristics and group outcomes. MIS Quarterly, 23(4): 557-580.

Butler, J.-K. & Cantrell, R. S. 1984. A behavioral decision theory approach to modeling dyadic trust in superiors and subordinates. Psychological-Reports, 55(1): 19-28.

Butler, J.-K. 1991. Toward understanding and measuring conditions of trust: Evolution of a conditions of trust inventory. Journal-of-Management, 17(3): 643-663.

Campbell, D. T., Stanley, J. C., & Gage, N. L. 1981. Experimental and quasi-experimental designs for research. Boston, Massachussets: Houghton Mifflin.

Carlson, J. R. & Zmud, R. W. 1999. Channel expansion theory and the experiential nature of media richness perceptions. Academy of Management Journal, 42(2): 153-170.

Carter, L. F. 1950. Group structures and interaction as a function of task, personality, and goal. Rochester, NY: University of Rochester.

Chidambaram, L., Bostrom, R. P., & Wynne, B. E. 1991. A longitudinal study of the impact of Group Decision Support Systems on group development. Journal of Management Information Systems, 7(3): 7-26.

Chidambaram, L. 1996. Relational development in computer-supported groups. MIS Quarterly, 20(2): 143-165.

Chidambaram, L. & Bostrom, R. P. 1997. Group development (I): A review and synthesis of development models. Group Decision and Negotiation, 6(2): 159-187.

Coleman, J. S. 1990. Foundations of social theory. Cambridge, Mass.: Belknap Press of Harvard University Press.

Conklin, J. & Begeman, M. 1988. gIBIS: a hypertext tool for exploratory policy discussion. Paper presented at the Proceedings of The Second Conference on Computer Supported Cooperative Work, Portland, OR.

Cook, J. & Wall, T. 1980. New work attitude measures of trust, organizational commitment and personal need non-fulfilment. Journal-of-Occupational-Psychology, 53(1): 39-52.

Daft, R. L. & Lengel, R. H. 1984. Information richness: a new approach to managerial behavior and organization design. Research in Organizational Behavior, 6: 191-233.

Davis, F. D. 1989. Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology. MIS Quarterly, 13(3): 319-340.

Dennis, A. R., George, J. F., Jessup, L. M., Nunamaker, J. F., Jr., & Vogel, D. R. 1988. Information technology to support electronic meetings. MIS Quarterly, 12(4): 591-619.

Dennis, A. R., Valacich, J. S., Connolly, T., & Wynne, B. E. 1996. Process structuring in electronic brainstorming. Information Systems Research, 7(2): 268-277.

DeSanctis, G. & Poole, M. S. 1994. Capturing the complexity in advanced technology use: adaptive structuration theory. Organization Science, 5(2): 121-147.

Deutsch, M. 1960. The effect of motivational orientation upon trust and suspicion. Human Relations, 13: 123-139.

Dickson, G. W., Partridge, J.-E. L., & Robinson, L. H. 1993. Exploring modes of facilitative support for GDSS technology. MIS Quarterly, 17(2): 173-194.

Erikson, E. H. 1968. Identity: Youth and Crisis. New York: W. W. Norton.

Etzioni, A. 1988. The moral dimension: Towards a new economics. New York: Free Press.

Fishbein, M. & Ajzen, I. 1975. Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research. Reading, MA: Addison-Wesley Press.

Frost, T., Stimpson, D.-V., & Maughan, M.-R. 1978. Some correlates of trust. Journal-of-Psychology, 99(1): 103-108.

Gabarro, J. J. 1978. The development of trust, influence and expectations. In A. G. Athos & J. J. Gabarro (Eds.), Interpersonal behavior: communication and understanding in relationships: 290-303. Englewood Cliffs, NJ: Prentice-Hall, Inc.

Galegher, J. & Kraut, R. E. 1994. Computer-mediated communication for intellectual teamwork: an experiment in group writing. Information Systems Research, 5(2): 110-138.

Gallupe, R. B. 1985. The impact of task difficulty on the use of a group decision support system. Unpublished Ph.D., University of Minnesota.

Gambetta, D. 1988. Can we trust?, Trust : making and breaking cooperative relations: 213-237. New York: Basil Blackwell.

Garfinkel, H. 1963. A conception of, and experiments with, "trust" as a condition of stable concerned actions. In O. J. Harvey (Ed.), Motivation and social interaction: Cognitive determinant: 187-239. New York: Ronald Press.

Gefen, D. 2000. E-commerce: the role of familiarity and trust. Omega-International Journal of Management Science, 28(6): 725-737.

Gersick, C. J. G. 1988. Time and transition in work teams toward a new model of group development. Academy of Management Journal, 31(1): 9-41.

Gersick, C. J. G. 1989. Making Time: Predictable Transitions In Task Groups. Academy of Management Journal, 32(2): 274-309.

Gersick, C. J. G. 1991. Revolutionary Change Theories: A Multilevel Exploration of the Punctuated Equilibrium Paradigm. Academy of Management Review, 16(1): 10-36.

Giddens, A. 1979. Central problems in social theory: Action, structure, and contradiction in social analysis. Berkeley, CA: University of California Press.

Goldsteen, R., Schoor, J. K., & Goldsteen, K. S. 1989. Longitudinal study of appraisal at Three Mile Island: Implications for life event research. Social Science and Medicine, 28: 389-398.

Gopal, A., Bostrom, R. P., & Chin, W. W. 1992. Applying adaptive structuration theory to investigate the process of group support systems use. Journal of Management Information Systems, 9(3): 45.

Granovetter, M. 1985. Economic action and social structure: The problem of embeddedness. American Journal of Sociology, 91: 481-510.

Gruenfeld, D. H. & Hollingshead, A. B. 1993. Sociocognition in work groups: The evolution of group integrative complexity and its relation to task performance. Small Group Research, 24(3): 383-405.

Hart, K.-M., Capps, H. R., Cangemi, J.-P., & Caillouet, L.-M. 1986. Exploring organizational trust and its multiple dimensions: A case study of General Motors. Organization-Development-Journal, 4(2): 31-39.

Hiltz, S. R., Johnson, K., & Turoff, M. 1986. Experiments in group decision making: communication process and outcome in face-to-face versus computerized conferences. Human Communication Research, 13(2): 225-252.

Hollingshead, A. B., McGrath, J. E., & Oconnor, K. M. 1993. Group Task-Performance and Communication Technology - a Longitudinal-Study of Computer-Mediated Versus Face-to-Face Work Groups. Small Group Research, 24(3): 307-333.

Hosmer, L. T. 1995. Trust: The connecting link between organizational theory and philosophical ethics. Academy of Management Review, 20(2): 379-403.

Hovland, C. I., Janis, I. L., & Kelley, H. H. 1953. Communication and Persuasion. New Haven: CT: Yale University Press.

Huber, G. P. 1990a. A theory of the effects of advanced information technologies on organizational design, intelligence, and decision making. In J. Fulk & C. Steinfield (Eds.), Organizations and Communication Technology, 1st ed.: 237-274. Newbury Park, CA: Sage Publications.

Huber, G. P. 1990b. A Theory of the Effects of Advanced Information Technologies on Organizational Design, Intelligence, and Decision-Making. Academy of Management Review, 15(1): 47-71.

Hwang, H.-G. & Guynes, J. 1994. The effects of group size on group performance in computer-mediated decision making. Information & Management, 26(4): 189-198.

Jang, C. Y., Steinfield, C., & Pfaff, B. 2002. Virtual team awareness and groupware support: an evaluation of the TeamSCOPE system. International Journal of Human-Computer Studies, 56(1): 109-126.

Jarvenpaa, S. L., Knoll, K. E., & Leidner, D. E. 1998. Is anybody out there? Antecedents of trust in global virtual teams. Journal of Management Information Systems, 14(4): 29-64.

Jarvenpaa, S. L. & Leidner, D. E. 1999. Communication and trust in global virtual teams. Organization Science, 10(6): 791-815.

Johnson-George, C. & Swap, W. 1982. Measurement of specific interpersonal trust: Construction and validation of a scale to assess trust in a specific other. Journal of Personality and Social Psychology, 43: 1306-1317.

Jones, A.-P., James, L.-R., & Bruni, J.-R. 1975. Perceived leadership behavior and employee confidence in the leader as moderated by job involvement. Journal-of-Applied-Psychology, 60(1): 146-149.

Kanawattanachai, P. & Yoo, Y. 2002. Dynamic nature of trust in virtual teams. Journal of Strategic Information Systems, 11(3-4): 187-213.

Kent, R. N. & McGrath, J. E. 1985. Task and group characteristics as factors influencing group performance. Journal of Experimental Social Psychology, 5: 429-440.

Kiesler, S., Siegel, J., & McGuire, T. W. 1984. Social psychological aspects of computer-mediated communication. American Psychologist, 39(10): 1123-1134.

Kiesler, S., Zubrow, D., Moses, A. M., & Geller, V. 1985. Affect in computer-mediated communication: An experiment in synchronous terminal-to-terminal discussion. Human-Computer Interaction, 1: 77-104.

Kramer, R. M. & Tyler, T. R. 1995. Trust in organzations: Frontiers of theory and research. California: Sage Publications, Inc.

Kramer, R. M. & Tyler, T. R. (Eds.). 1996. Trust in organizations: frontiers of theory and research (1st ed.). Thousand Oaks, CA: Sage Publications.

Larzelere, R. E. & Huston, T. L. 1980. The dyadic trust scale: Toward understanding interpersonal trust in close relationships. Journal of Marriage and the Family, 42(3): 595-604.

Laughlin, P. L. & Shippy, T. A. 1983. Collective induction. Journal of Personality and Social Psychology, 45: 94-100.

Laughlin, P. L., VanderStoep, S. W., & Hollingshead, A. B. 1991. Collective versus individual induction: Recognizition of truth, rejection of error, and collective information processing. Journal of Personality and Social Psychology, 61: 50-67.

Lewicki, R. J. & Bunker, B. B. 1995. Trust in relationships: A model of development and decline. In B. B. Bunker & J. Z. Rubin & Associates (Eds.), Conflict, cooperation, and justice: 133-173. San Francisco: Jossey-Bass Publishers.

Lewis, J. D. & Weigert, A. J. 1985. Trust as social reality. Social Forces, 63(4): 967-985.

Lindskold, S. 1978. Trust development, the GRIT proposal, and the effects of conciliatory acts on conflict and cooperation. Psychological Bulletin, 85(4): 772-793.

Lipnack, J. & Stamps, J. 2000. Virtual teams: people working across boundaries with technology (2nd ed.). New York, NY: John Wiley & Sons.

Lonchamp, J. & Muller, F. 2001. Computer-supported deliberations for distributed teams. Innovative Internet Computing Systems, Proceedings, 2060: 167-174.

Luhmann, N. 1979. Trust and power. Chichester: Wiley.

Markus, M. L. 1994. Electronic Mail as the Medium of Managerial Choice. Organization Science, 5(4): 502-527.

Mayer, R. C., Davis, J. H., & Schoorman, F. D. 1995. An Integrative Model of Organizational Trust. Academy of Management Review, 20(3): 709-734.

Maznevski, M. L. & Chudoba, K. M. 2000. Bridging space over time: Global virtual team dynamics and effectiveness. Organization Science, 11(5): 473-492.

McAllister, D. J. 1995. Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. Academy of Management Journal, 38(1): 24-59.

McGrath, J. E. 1984. Groups: interaction and performance. Englewood Cliffs, NJ: Prentice-Hall.

McGrath, J. E. 1991. Time, interaction, and performance (TIP): a theory of groups. Small Group Research, 22(2): 147-174.

McGrath, J. E., Arrow, H., Gruenfeld, D. H., Hollingshead, A. B., & O'Connor, K. M. 1993. Groups, tasks, and technology: the effects of experience and change. Small Group Research, 24(3): 406-420.

McKnight, D. H., Cummings, L. L., & Chervany, N. L. 1996. Trust formation in new organizational relationships. MISRC Working Paper, 2001(05-29-2001): 1-22.

McKnight, D. H., Cummings, L. L., & Chervany, N. L. 1998. Initial trust formation in new organizational relationships. Academy of Management Review, 23(3): 473-490.

Miranda, S. M. & Bostrom, R. P. 1993. The impact of group support systems on group conflict and conflict management. Journal of Management Information Systems, 10(3): 63-95.

Mishra, A. K. 1996. Organizational responses to crisis: the centrality of trust. In R. M. Kramer & T. R. Tyler (Eds.), Trust in organizations: frontiers of theory and research, 1st ed.: 261-287. Thousand Oaks, CA: Sage Publications.

Mortensen, M. & Hinds, P. J. 2001. Conflict and shared identity in geographically distributed teams. International Journal of Conflict Management, 12(3): 212-238.

Muhlfelder, M., Klein, U., S., S., & Luczak, H. 1999. Teams without trust? Investigations in the influence of video-mediated communication on the origin of trust among cooperating persons. Behaviour & Information Technology, 18(5): 349-360.

O'Connor, K. M., Gruenfeld, D. H., & McGrath, J. E. 1993. The experience and effects of conflict in continuing work groups. Small Group Research, 24(3): 362-382.

O'Hara-Devereaux, M. & Johansen, R. 1994. Globalwork: bridging distance, culture, and time (1st ed.). San Francisco, CA: Jossey-Bass Publishers.

Ouchi, W. G. 1979. A conceptual framework for the design of organizational control mechanisms. Management Science, 25: 833-848.

Parsons, T. 1951. The social system. Glencoe, IL: Free Press.

Poole, M. S., Seibold, D. R., & McPhee, R. D. 1985. Group decision-making as a structurational process. Quarterly Journal of Speech, 71(1): 74-102.

Poole, M. S. & DeSanctis, G. 1990. Understanding the use of group decision support systems: the theory of adaptive structuration. In J. Fulk & C. W. Steinfield (Eds.), Organizations and Communication Technology: 173-193. Newbury Park, CA: Sage Publications.

Potter, R. E. & Balthazard, P. A. 2000. Supporting integrative negotiation via computer mediated communication technologies: an empirical example with geographically dispersed Chinese and American negotiators. Journal of International Consumer Marketing, 12(4): 7-32.

Powell, A. L. 2000. Antecedents and outcomes of team commitment in a global, virtual environment. Unpublished Doctor of Philosophy, Indiana University, Bloomington, IN.

Qureshi, S. 1998. Supporting a network way of working in an electronic social space. Group Decision and Negotiation, 7(5): 399-416.

Rempel, J. K., Holmes, J. G., & Zanna, M. P. 1985. Trust in Close Relationships. Journal of Personality and Social Psychology, 49(1): 95-112.

Roby, T. B. & Lanzetta, J. T. 1957. Considerations in the analysis of group tasks. Psychological Bulletin, 55: 88-101.

Rotter, J. B. 1967. A new scale for the measurement of interpersonal trust. Journal of Personality, 35(4): 651-665.

Rotter, J. B. 1971. Generalized expectancies for interpersonal trust. The American Psychologist, 26(5): 443-452.

Ryssen, S. V. & Godar, S. H. 2000. Going international without going international: multinational virtual teams. Journal of International Management, 6: 49-60.

Sarbaugh-Thompson, M. & Feldman, M. S. 1998. Electronic mail and organizational communication: Does saying "hi" really matter? Organization Science, 9(6): 685-698.

Sarker, S., Valacich, J. S., & Sarker, S. 2000. An exploration of trust in virtual teams using three perspectives. Paper presented at the Proceedings of the 2000 Americas Conference on Information Systems, Long Beach, CA.

Saunders, C. & Jones, J. W. 1990. Temporal sequences in information acquisition for decision making: A focus on source and medium. Academy of Management Review, 15(1): 29.

Schlichter, J., Koch, M., & Burger, M. 1998. Workspace awareness for distributed teams. Coordination Technology for Collaborative Applications, 1364: 199-218.

Selznick, P. 1992. The moral commonwealth: Social theory and the promise of community. Berkeley: University of California Press.

Shapiro, S. P. 1987. The social control of interpersonal trust. American Journal of Sociology, 93(3): 623-658.

Short, J., Williams, E., & Christie, B. 1976. The social psychology of telecommunications. New York: Wiley.

Sitkin, S. B. & Roth, N. L. 1993. Explaining the limited effectiveness of legalistic "remedies" for trust/distrust. Organization Science, 4(3): 367-392.

Steiner, I. D. 1972. Group processes and productivity: New York: Academic Press.

Straus, S. G. & McGrath, J. E. 1994. Does the Medium Matter - the Interaction of Task Type and Technology on Group-Performance and Member Reactions. Journal of Applied Psychology, 79(1): 87-97.

Trevino, L. K., Daft, R. L., & Lengel, R. H. 1990. Understanding Managers' Media Choices: A symbolic interactionist perspective. In J. Fulk & C. Steinfield (Eds.), Organizations and Communication Technology, 1st ed.: 71-94. Newbury Park, CA: Sage Publications.

Turoff, M., Hiltz, S. R., Bahgat, A. N. F., & Rana, A. R. 1993. Distributed group support systems. MIS Quarterly, 17(4): 399-417.

Vallee, J., Johansen, R., Lipinski, H., & Wilson, T. 1977. Group communication through computers. Menlo Park, CA: Institute for the Future.

Vician, C. & DeSanctis, G. 2000. The impact of role training in a user-driven group support system environment. Group Decision and Negotiation, 9(4): 275-296.

Vogel, D. R., van Genuchten, M., Lou, D., Verveen, S., van Eekout, M., & Adams, A. 2001. Exploratory research on the role of national and professional cultures in a distributed learning project. Ieee Transactions on Professional Communication, 44(2): 114-125.

Walther, J. B. 1992. Interpersonal Effects in Computer-Mediated Interaction - A Relational Perspective. Communication Research, 19(1): 52-90.

Walther, J. B. & Burgoon, J. K. 1992. Relational Communication in Computer-Mediated Interaction. Human Communication Research, 19(1): 50-88.

Walther, J. B. 1996. Computer-mediated communication: impersonal, interpersonal, and hyperpersonal interaction. Communication Research, 23(1): 3-43.

Watson, R. T., DeSanctis, G., & Poole, M. S. 1988. Using a GDSS to facilitate group consensus: some intended and unintended consequences. MIS Quarterly, 12(3): 463-477.

Wei, H. 1997. A re-examination of media richness theory: realizing rich communication in a lean CMC medium. Unpublished Doctor of Philosophy, National University of Singapore, Singapore.

Williams, E. 1975. Medium or message? Communications medium as a determinant of interpersonal evaluation. Sociometry, 38(1): 119-130.

Williams, E. 1977. Experimental comparisons of face-to-face and mediated communication: A review. Psychological Bulletin, 84(5): 963-976.

Zucker, L.-G. 1986. Production of trust: Institutional sources of economic structure, 1840-1920. Research in Organizational Behavior, 8: 53-111.

APPENDIX A – RESEARCH CONSENT FORM

INFORMED CONSENT FORM FOR RESEARCH BEING CONDUCTED UNDER THE AUSPICES OF THE UNIVERSITY OF OKLAHOMA-NORMAN CAMPUS

INTRODUCTION: This study is entitled, "Towards an Integrative Theory of Trust in Virtual Teams: The Role of Task Perception, Virtual Setting, Technology, and Time." The person(s) directing the project is Mr. Andre L. Araujo under the direction of Dr. Laku Chidambaram, Price College of Business, University of Oklahoma. This document defines the terms and conditions for consenting to participate in this study.

DESCRIPTION OF THE STUDY: During the semester you will be asked to complete a survey six times. 1) a pre-meeting questionnaire, 2) survey 1, 3) survey 2, 4) survey 3, 5) survey 4, 6) survey 5. Each time, the survey should take less than 10 minutes; over the course of the semester completing the survey should take no more than 60 minutes of your time.

At the end of the semester students of each section who filled out the survey forms will have a chance to win a free $10.00 OU Bookstore gift certificate that will be randomly drawn at the end of the last meeting. This drawing procedure will be in class and will occur in the following way: First, the user ids of all students who participated in the survey will be in a plastic bag. Second, the researcher will ask one of the students present in the class to pick one paper from the plastic bag. Third, the gift certificate will be given to the student who has the user id drawn from the plastic bag.

In order to know what students will compete for the free $10.00 OU Bookstore gift certificate, at the end of each survey form students are asked to provide their OU 4x4 code. After the drawing procedure has occurred and the gift certificate has been given to the winner student, the researcher will destroy these codes so that there will be no way to connect students' code and/or name with the survey responses.

RISKS AND BENEFITS: The key benefit to you will be the chance to win a free $10.00 OU Bookstore gift certificate. No risks beyond those experienced in routine daily life are anticipated with this research project.

CONDITIONS OF PARTICIPATION: Participation in the study is voluntary. Refusal to complete survey instruments will involve no penalty or loss of benefits to which you are otherwise entitled. Furthermore, you may discontinue participation at any time without penalty of loss of benefits to which you are otherwise entitled.

CONFIDENTIALITY: The findings from this research will be presented in aggregate form with no information specifically identifying you or any other participant in order to ensure confidentiality.

CONTACT FOR QUESTION ABOUT THE STUDY: If you have questions about the study, you may contact:
Name: Andre L. Araujo
Email: altaraujo@ou.edu
Daytime Phone: (405) 325.1659
College/Department: Price College of Business Administration/MIS Division
Campus Mailing Address: 307E Adams Hall

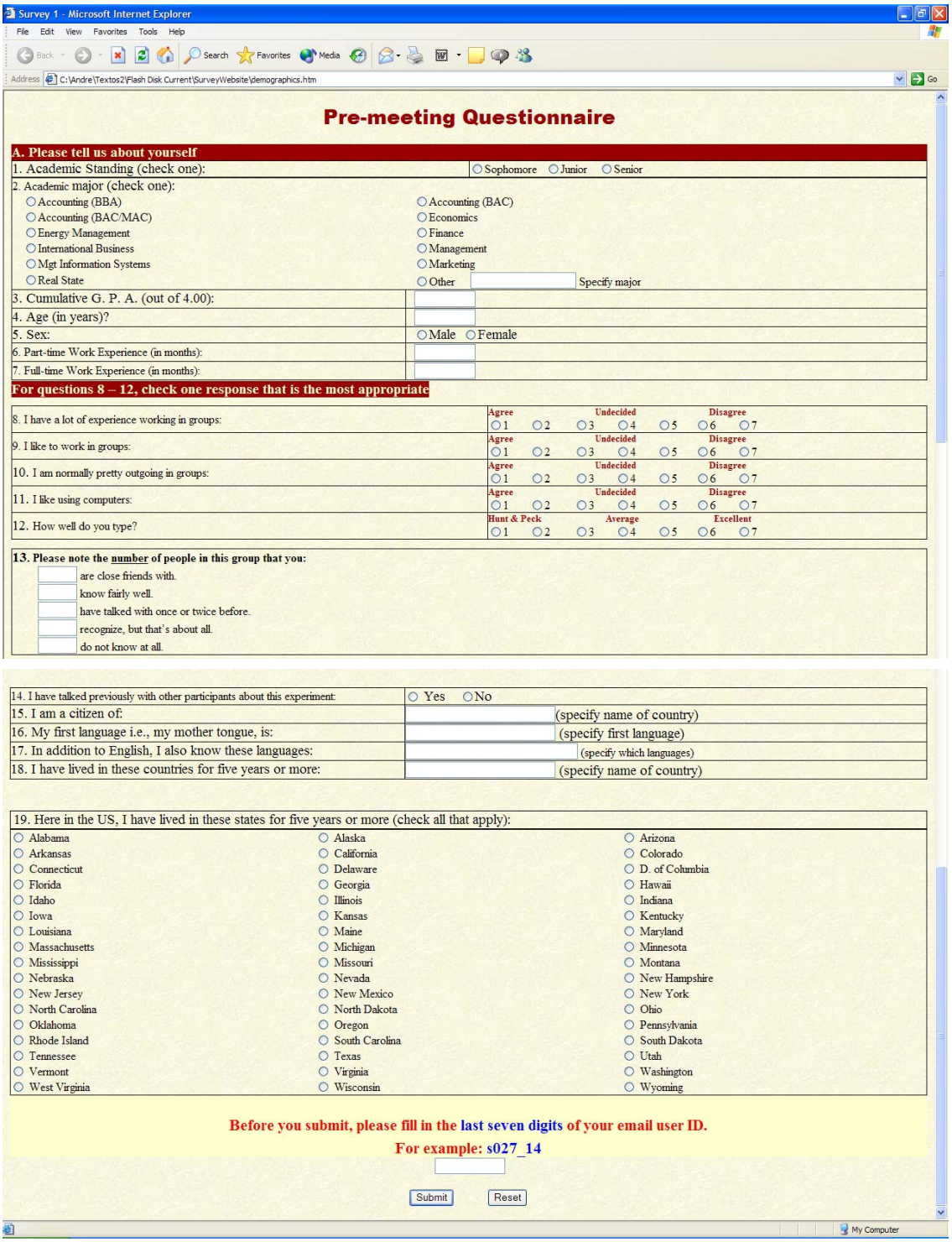
Name: Dr. Laku Chidambaram
Email: laku@ou.edu
Daytime Phone: (405) 325.8013
College/Department: Price College of Business Administration/MIS Division
Campus Mailing Address: 305C Adams Hall

For inquires about your rights as a research participant, contact the University of Oklahoma-Norman Campus Institutional Review Board (OU-NC IRB) at (405) 325.8110 or irb@ou.edu.

PARTICIPANT ASSURANCE: I have read and understand the terms and conditions of this study and I hereby agree to participate in the above-described research study. I understand my participation is voluntary and that I may withdraw at any time without penalty.

_____	_____
Signature of Participant	Date
_____	_____
Printed Name of Participant	Researcher Signature

APPENDIX B – DEMOGRAPHIC QUESTIONNAIRE



Survey 1 - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address C:\Andre\Textos2\Flash Disk Current\SurveyWebsite\demographics.htm

Pre-meeting Questionnaire

A. Please tell us about yourself

1. Academic Standing (check one): ○ Sophomore ○ Junior ○ Senior

2. Academic major (check one):

○ Accounting (BBA)	○ Accounting (BAC)
○ Accounting (BAC/MAC)	○ Economics
○ Energy Management	○ Finance
○ International Business	○ Management
○ Mgt Information Systems	○ Marketing
○ Real State	○ Other _____ Specify major

3. Cumulative G. P. A. (out of 4.00): _____

4. Age (in years)? _____

5. Sex: ○ Male ○ Female

6. Part-time Work Experience (in months): _____

7. Full-time Work Experience (in months): _____

For questions 8 – 12, check one response that is the most appropriate

8. I have a lot of experience working in groups:	Agree ○1	○2	○3	Undecided ○4	○5	○6	Disagree ○7
9. I like to work in groups:	Agree ○1	○2	○3	Undecided ○4	○5	○6	Disagree ○7
10. I am normally pretty outgoing in groups:	Agree ○1	○2	○3	Undecided ○4	○5	○6	Disagree ○7
11. I like using computers:	Agree ○1	○2	○3	Undecided ○4	○5	○6	Disagree ○7
12. How well do you type?	Hunt & Peck ○1	○2	○3	Average ○4	○5	○6	Excellent ○7

13. Please note the number of people in this group that you:

_____ are close friends with.
_____ know fairly well.
_____ have talked with once or twice before.
_____ recognize, but that's about all.
_____ do not know at all.

14. I have talked previously with other participants about this experiment: ○ Yes ○ No

15. I am a citizen of: _____ (specify name of country)

16. My first language i.e., my mother tongue, is: _____ (specify first language)

17. In addition to English, I also know these languages: _____ (specify which languages)

18. I have lived in these countries for five years or more: _____ (specify name of country)

19. Here in the US, I have lived in these states for five years or more (check all that apply):

○ Alabama	○ Alaska	○ Arizona
○ Arkansas	○ California	○ Colorado
○ Connecticut	○ Delaware	○ D. of Columbia
○ Florida	○ Georgia	○ Hawaii
○ Idaho	○ Illinois	○ Indiana
○ Iowa	○ Kansas	○ Kentucky
○ Louisiana	○ Maine	○ Maryland
○ Massachusetts	○ Michigan	○ Minnesota
○ Mississippi	○ Missouri	○ Montana
○ Nebraska	○ Nevada	○ New Hampshire
○ New Jersey	○ New Mexico	○ New York
○ North Carolina	○ North Dakota	○ Ohio
○ Oklahoma	○ Oregon	○ Pennsylvania
○ Rhode Island	○ South Carolina	○ South Dakota
○ Tennessee	○ Texas	○ Utah
○ Vermont	○ Virginia	○ Washington
○ West Virginia	○ Wisconsin	○ Wyoming

Before you submit, please fill in the last seven digits of your email user ID.

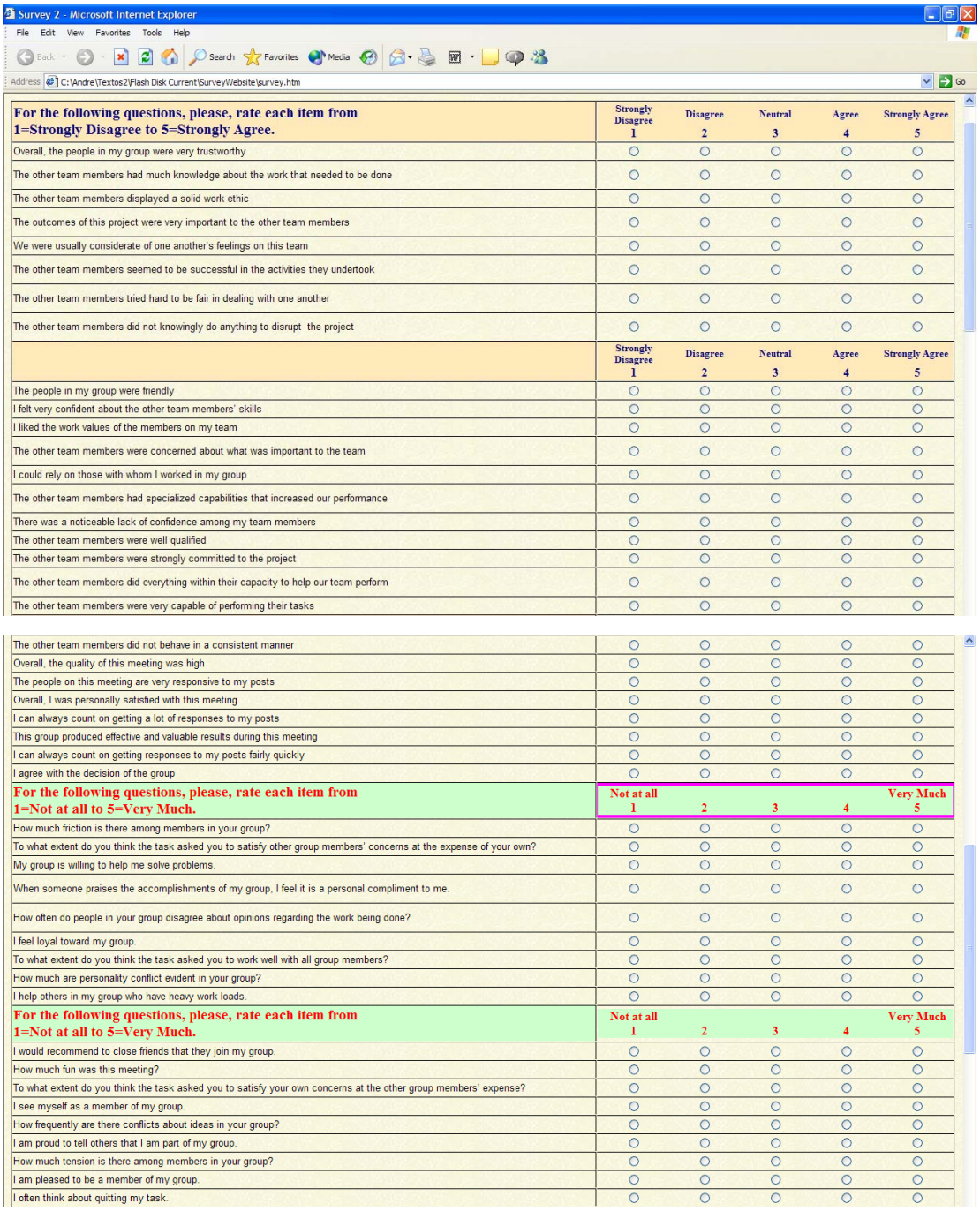
For example: s027_14

_____

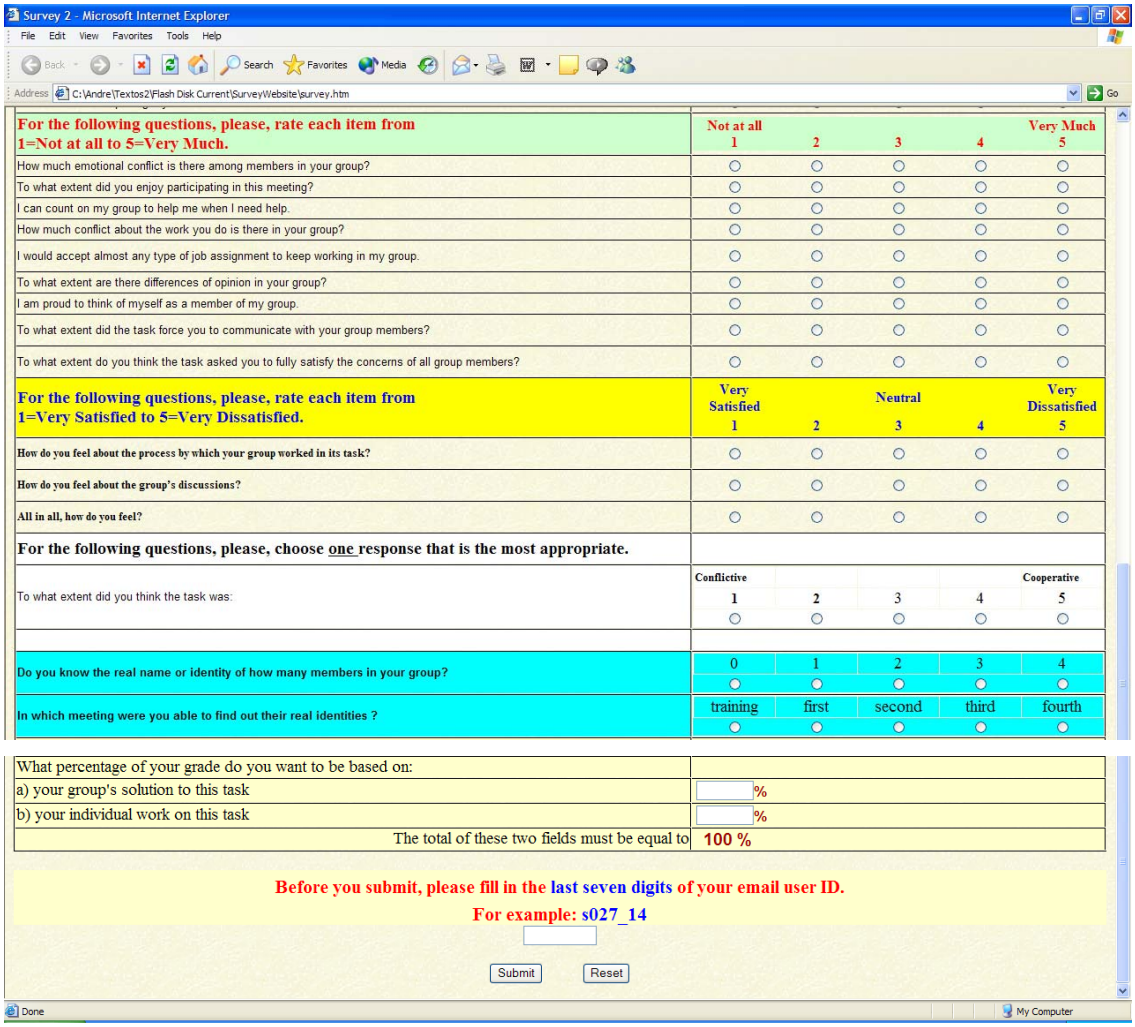
Submit Reset

My Computer

APPENDIX C – POST-MEETING QUESTIONNAIRE



For the following questions, please, rate each item from 1=Strongly Disagree to 5=Strongly Agree.	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
Overall, the people in my group were very trustworthy	○	○	○	○	○
The other team members had much knowledge about the work that needed to be done	○	○	○	○	○
The other team members displayed a solid work ethic	○	○	○	○	○
The outcomes of this project were very important to the other team members	○	○	○	○	○
We were usually considerate of one another's feelings on this team	○	○	○	○	○
The other team members seemed to be successful in the activities they undertook	○	○	○	○	○
The other team members tried hard to be fair in dealing with one another	○	○	○	○	○
The other team members did not knowingly do anything to disrupt the project	○	○	○	○	○
	Strongly Disagree 1	Disagree 2	Neutral 3	Agree 4	Strongly Agree 5
The people in my group were friendly	○	○	○	○	○
I felt very confident about the other team members' skills	○	○	○	○	○
I liked the work values of the members on my team	○	○	○	○	○
The other team members were concerned about what was important to the team	○	○	○	○	○
I could rely on those with whom I worked in my group	○	○	○	○	○
The other team members had specialized capabilities that increased our performance	○	○	○	○	○
There was a noticeable lack of confidence among my team members	○	○	○	○	○
The other team members were well qualified	○	○	○	○	○
The other team members were strongly committed to the project	○	○	○	○	○
The other team members did everything within their capacity to help our team perform	○	○	○	○	○
The other team members were very capable of performing their tasks	○	○	○	○	○
The other team members did not behave in a consistent manner	○	○	○	○	○
Overall, the quality of this meeting was high	○	○	○	○	○
The people on this meeting are very responsive to my posts	○	○	○	○	○
Overall, I was personally satisfied with this meeting	○	○	○	○	○
I can always count on getting a lot of responses to my posts	○	○	○	○	○
This group produced effective and valuable results during this meeting	○	○	○	○	○
I can always count on getting responses to my posts fairly quickly	○	○	○	○	○
I agree with the decision of the group	○	○	○	○	○
For the following questions, please, rate each item from 1=Not at all to 5=Very Much.	**Not at all 1**	**2**	**3**	**4**	**Very Much 5**
How much friction is there among members in your group?	○	○	○	○	○
To what extent do you think the task asked you to satisfy other group members' concerns at the expense of your own?	○	○	○	○	○
My group is willing to help me solve problems.	○	○	○	○	○
When someone praises the accomplishments of my group, I feel it is a personal compliment to me.	○	○	○	○	○
How often do people in your group disagree about opinions regarding the work being done?	○	○	○	○	○
I feel loyal toward my group.	○	○	○	○	○
To what extent do you think the task asked you to work well with all group members?	○	○	○	○	○
How much are personality conflict evident in your group?	○	○	○	○	○
I help others in my group who have heavy work loads.	○	○	○	○	○
For the following questions, please, rate each item from 1=Not at all to 5=Very Much.	**Not at all 1**	**2**	**3**	**4**	**Very Much 5**
I would recommend to close friends that they join my group.	○	○	○	○	○
How much fun was this meeting?	○	○	○	○	○
To what extent do you think the task asked you to satisfy your own concerns at the other group members' expense?	○	○	○	○	○
I see myself as a member of my group.	○	○	○	○	○
How frequently are there conflicts about ideas in your group?	○	○	○	○	○
I am proud to tell others that I am part of my group.	○	○	○	○	○
How much tension is there among members in your group?	○	○	○	○	○
I am pleased to be a member of my group.	○	○	○	○	○
I often think about quitting my task.	○	○	○	○	○


Survey 2 - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address C:\Andre\Textos2\Flash Disk Current\SurveyWebsite\survey.htm
Go
For the following questions, please, rate each item from 1=Not at all to 5=Very Much.
Not at all 1 2 3 4 Very Much 5
How much emotional conflict is there among members in your group?
To what extent did you enjoy participating in this meeting?
I can count on my group to help me when I need help.
How much conflict about the work you do is there in your group?
I would accept almost any type of job assignment to keep working in my group.
To what extent are there differences of opinion in your group?
I am proud to think of myself as a member of my group.
To what extent did the task force you to communicate with your group members?
To what extent do you think the task asked you to fully satisfy the concerns of all group members?
For the following questions, please, rate each item from 1=Very Satisfied to 5=Very Dissatisfied.
Very Satisfied 1 2 Neutral 3 4 Very Dissatisfied 5
How do you feel about the process by which your group worked in its task?
How do you feel about the group's discussions?
All in all, how do you feel?
For the following questions, please, choose one response that is the most appropriate.
To what extent did you think the task was:
Conflictive 1 2 3 4 Cooperative 5
Do you know the real name or identity of how many members in your group?
0 1 2 3 4
In which meeting were you able to find out their real identities ?
training first second third fourth
What percentage of your grade do you want to be based on:
a) your group's solution to this task
%
b) your individual work on this task
%
The total of these two fields must be equal to 100 %
Before you submit, please fill in the last seven digits of your email user ID.
For example: s027_14
Submit
Reset
Done
My Computer





VIRTUAL TEAM PROJECT

MIS 2113

Best Memories Database

© Araujo, 2003
University of Oklahoma
Michael F. Price College of Business
Division of MIS
Norman, OK 73019
Phone: (405) 325-1659
Fax: (405) 325-7482
E-mail: altaraujo@ou.edu

****
*** **OVERALL DESCRIPTION** *
****

PROJECT PHASE	INSTRUCTOR ROLE	TEAM ROLE
TRAINING SESSION (October 27 and 29) **DO PRACTICE EXERCISE USING Yahoo!Groups and Access**	Provide instructions on how to use technology a) Explain how to use yahoo@groups.com b) Explain how to work individually and then import Access Objects c) Conduct one practice exercise d) Collect exercise outcome	Read instructions Communication enforcement: a) get to know each other b) work on a small group project
FIRST MEETING (November 03 and 05) **CREATE ACCESS TABLES**	a) Provide instructions on the task b) Send different individual tasks to each member. Each member will receive unique information that is relevant to another team member (i.e., Primary Key) c) Collect Homework	Read instructions, work on the task and post task solution Communication enforcement: a) get information on primary keys from other members b) put all tables together
SECOND MEETING (November 10 and 12) **DEVELOP FORMS**	a) Provide instructions on the task and database current version containing tables with data and relationships b) Send different cliparts and individual tasks to each member. Each member will receive a clipart that is relevant to another team member c) Collect Homework	Read instructions, work on the task and post task solution Communication enforcement: a) get clipart from other members b) decide on the background color c) decide on the note message d) put all forms together
THIRD MEETING (November 17 and 19) **- ADD COMMAND BUTTONS TO THE FORMS** **- ENTER ONE NEW RECORD INTO EVERY TABLE**	a) Provide instructions on the task and database current version b) Send manual: Instructions on Adding Command Buttons to only one member c) Send information on records to be added to members. Each member will receive unique information that is relevant to another team member (i.e., records to be entered and instruction's manual) d) Send a unique database for each member containing only tables and forms relevant to their specific task d) Collect Homework	Read instructions, work on the task and post task solution Communication enforcement: a) get instruction's manual b) get information on records to be entered c) decide on the font color d) put all forms together

FOURTH MEETING **(December 01 and 03)** **DEVELOP REPORTS**	a) Provide instructions on the task and database current version b) Send different cliparts and individual tasks to each member. Each member will receive a clipart that is relevant to another team member c) Collect Homework	Read instructions, work on the task and post task solution <u>Communication enforcement:</u> a) get clipart from other members b) put all reports together
FIFTH MEETING **(December 08 and 10)** **ADD MACRO COMMANDS TO THE SWITCHBOARD**	a) Provide instructions on the task and database current version b) Send manual: Instructions on Adding Macros to only one member. Thus, he/she will have to share this information with other group members c) Send different macros and individual tasks to each member. Each member will receive a macro that is relevant to another team member d) Collect Homework	Read instructions, work on the task and post task solution <u>Communication enforcement:</u> a) get instruction's manual b) get information on macros to be entered b) put all macros together

****
*** **TRAINING SESSION** *
****

INTRODUCTION

Best Memories, Inc. is a company that sells antique products. Debra Schmidt, the owner of the company, wants to implement a computer database to keep track of its customers and products. Mr. Steve, one of her managers has knowledge on conceptual and logical modeling but has no experience on developing and implementing Access-based systems.

Debra hired several groups to develop this database system project. The project will consist of five phases and at the end of every phase she will provide a grade that reflects the assessment of that specific project phase. At the end of the project she will decide on the best group project.

Congratulations!!! Debra has contacted your MIS 2113 instructor who told her that what your group is learning in class provides the skills necessary for her project. Your job is to develop and implement an Access-based system that meets her company needs following instructions provided by her manager Mr. Steve.

When working on Debra's project you will be using **Microsoft Access®** database and **Yahoo!® Groups** web-page communication tool interface. Thus, in this meeting spend your time learning how to use the technology and getting to know your group members.

To do so, your first step is to check your email in order to download information on this training session. Please access your Yahoo email account at **http://www.yahoo.com** and download (SAVE AS …) the task description in your desktop. When downloading your file use the option "Download Without Scan" and then "Save". When you finish, move to the top of the yahoo screen and **Sign Out** from your yahoo email account. Then access your group homepage at **http://groups.yahoo.com**.

In this meeting, you will work on the following learning activities:

- **Section 1 –** how to access Yahoo! Groups website using the email account and password that was given to you.
- **Section 2 -** how to communicate with your group members using Yahoo! Groups.
- **Section 3 -** how to download files from the Yahoo! Groups website.

- **Section 4 –** work on a practice exercise (i.e., creation of a report) using the database downloaded from the Yahoo! Groups website.
- **Section 5 –** how to upload files into the Yahoo! Groups website.
- **Section 6 –** how to import objects from other Access databases combining them into a single database.

****

*** Yahoo!® Groups INSTRUCTIONS ***

****

André L. Araujo

University of Oklahoma
Michael F. Price College of Business
Division of MIS
Norman, OK 73019
Phone: (405) 325-1659
Fax: (405) 325-7482
E-mail: altaraujo@ou.edu

October, 2003
Version 3.00

SECTION 1 - HOW TO START USING YAHOO!® GROUPS.

You have been added to a group at Yahoo! Groups, a free, easy-to-use email group service. As a member of this group, you may send messages to the entire group, store and share files, coordinate events, and more.

Step 1.1 - To start using Yahoo! Groups, please visit **http://groups.yahoo.com** and follow the steps below. When Yahoo! Groups homepage opens click on the **Registered Users → Sign In!** button (Registered users Sign in!) as shown in figure 1.

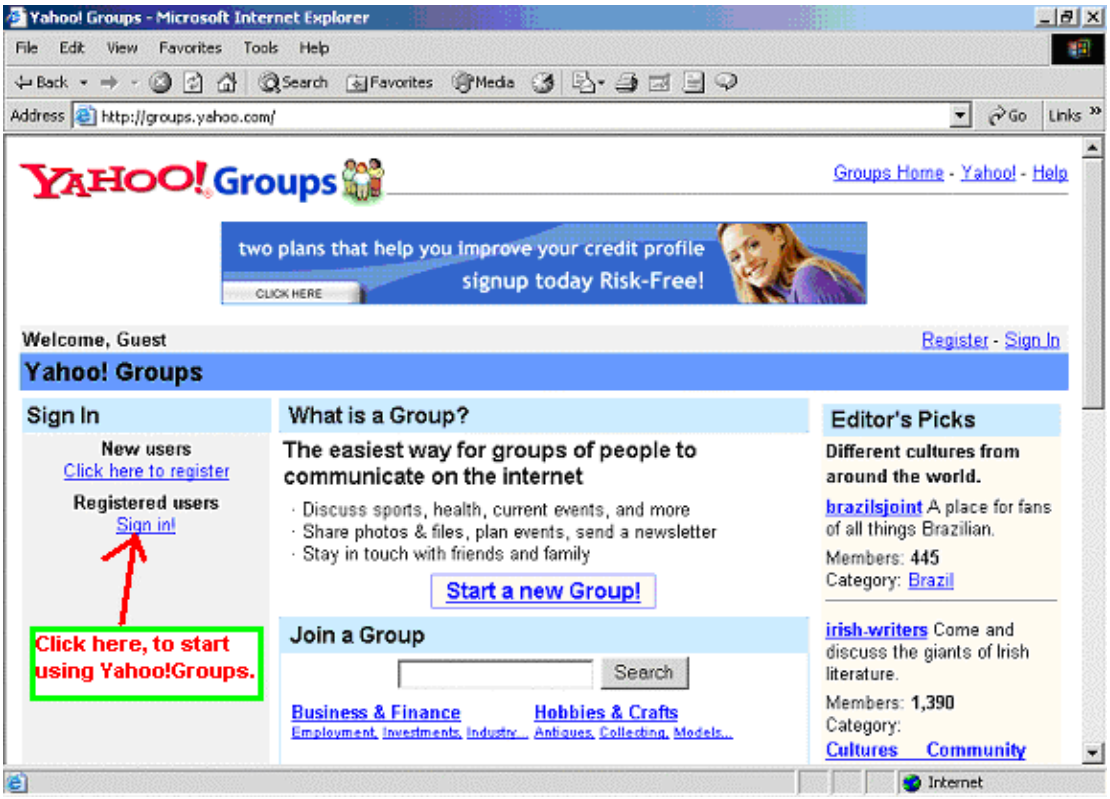


Figure 1 – Signing in Yahoo! Groups step 1.1.

Step 1.2 – In the **Groups Sign In** homepage type the email and password that was given to you (see example in figure 2). After typing your email and password, click on the button **Sign In (** Sign In **)**.

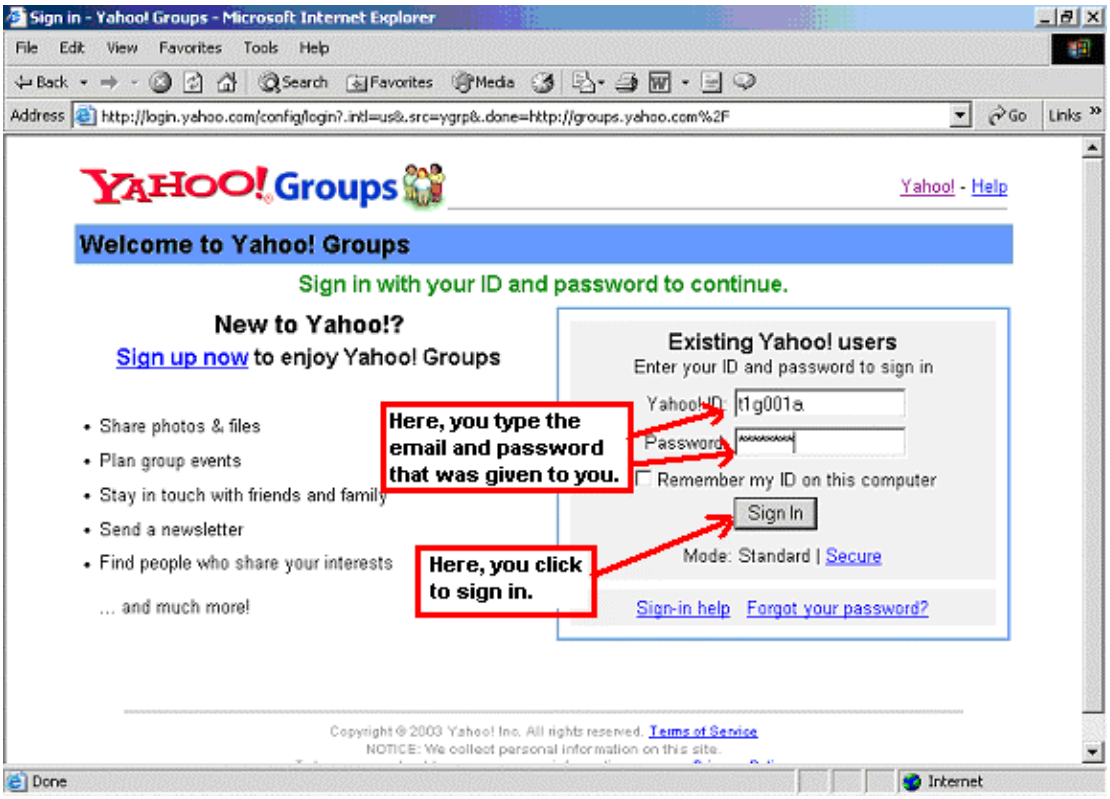


Figure 2 – Signing in Yahoo! Groups step 1.2.

Now, you should have a screen similar to figure 3 with your group's name appearing at the top of the page. This is the group that you will be working with until the end of this project.

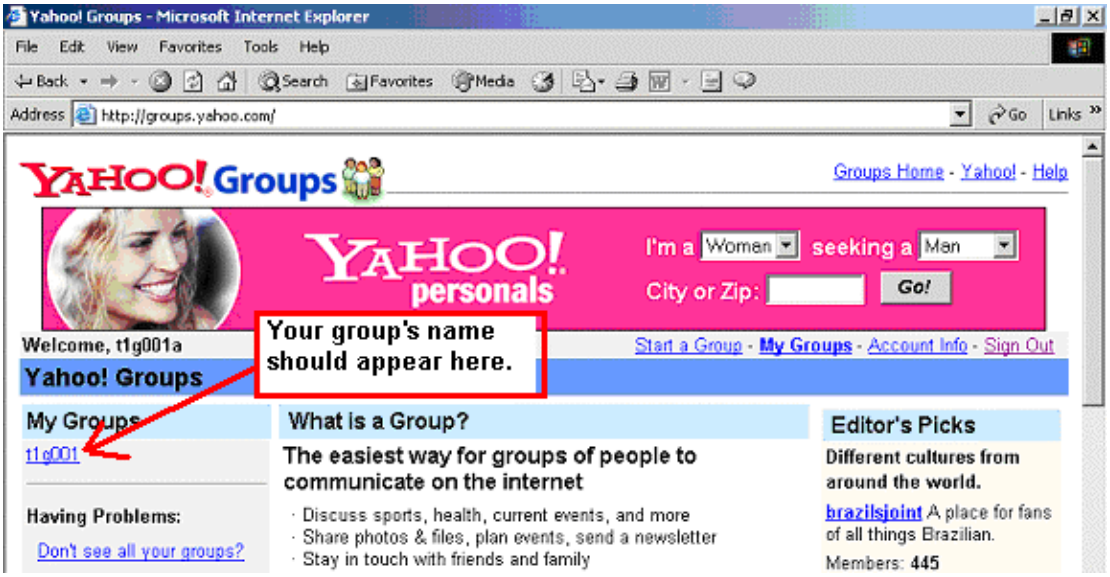


Figure 3 – Result of the Signing in process step 1.2.
Step 1.3 – To access your group homepage you need to select the group that appears at the top left side of the screen (see example in figure 4).



Figure 4 – Selecting the group you are participating

After selecting the group, you will have a screen similar to figure 5. This is your group homepage. You have options such as *messages, files, photos, and members*. Please take a moment to look at the information you have in this screen. You will find the description of your group and the most recent messages posted by your group members.

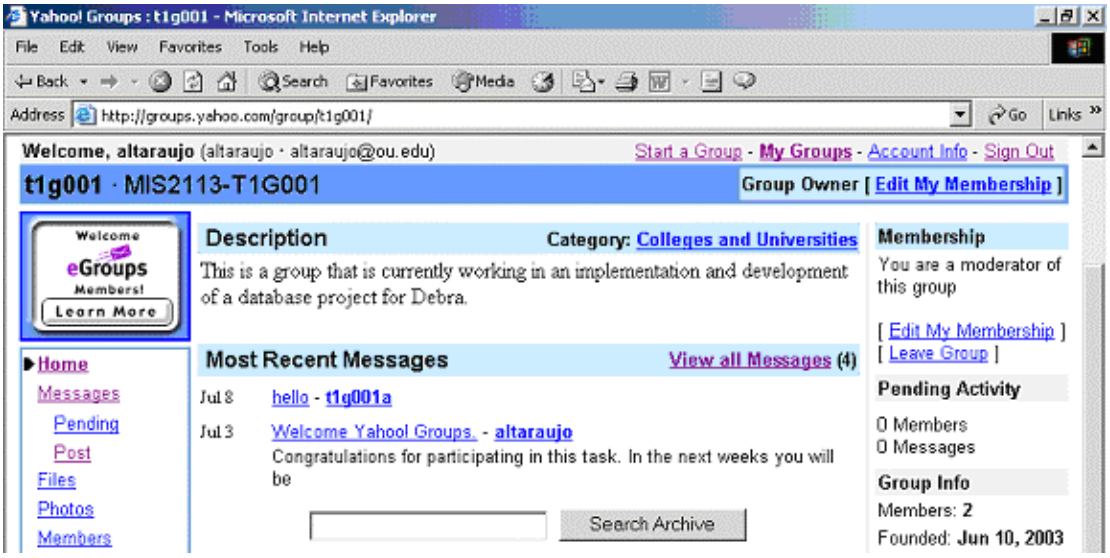


Figure 5 - Result of the "Signing In" process step 1.3.

Step 1.4 – Now that you are successfully connected to your group, please send a greeting message for all your group members so that you can start interacting with them. In the next section you will find information on how to send a message to your group members. ***Have fun!***

SECTION 2 - HOW TO COMMUNICATE WITH YOUR GROUP MEMBERS.

In order to send a message to your group members you can follow the steps below.

Step 2.1 – Click on the Post option as shown in figure 6.

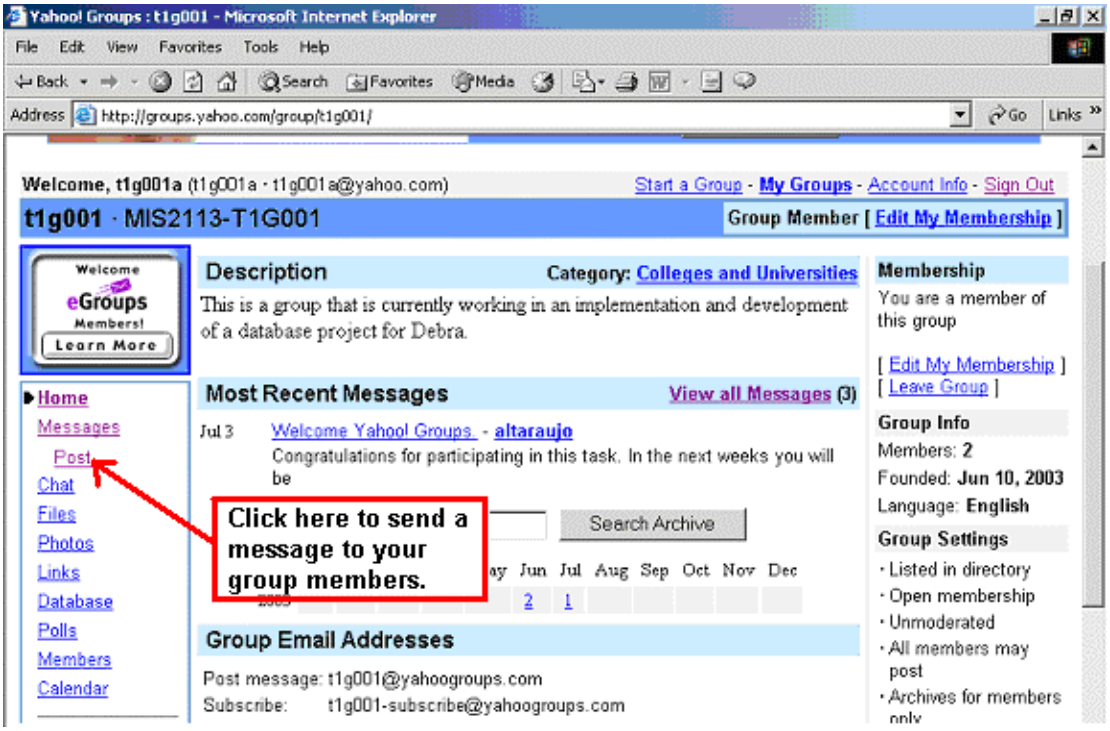


Figure 6 – Sending (posting) a message to all group members

Step 2.2 – Follow the next steps to **send a greeting message to your group members**.

Step 2.3 – Type a short message in the subject line, type the complete message as shown in figure 7, then click Send button (Send).

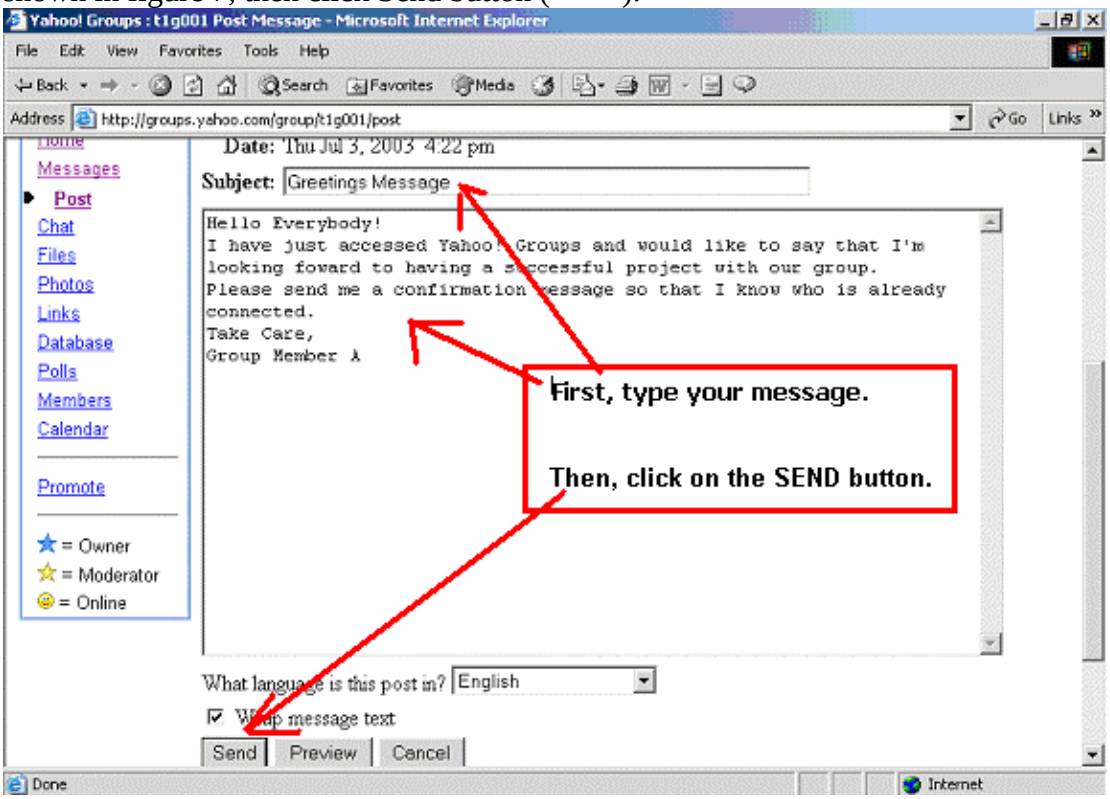


Figure 7 – Sending (posting) a message to all group members

Step 2.4 – To view current messages posted by your group members you need to click on the Messages option (Messages) located in the left side of your screen (see figure 7). Then, the system updates your screen with the most recent posted messages.

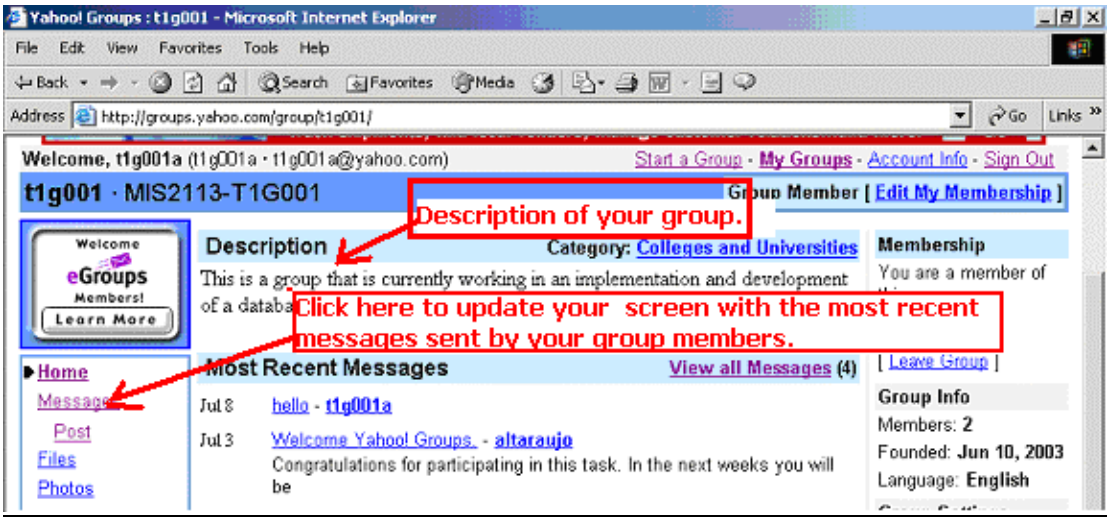
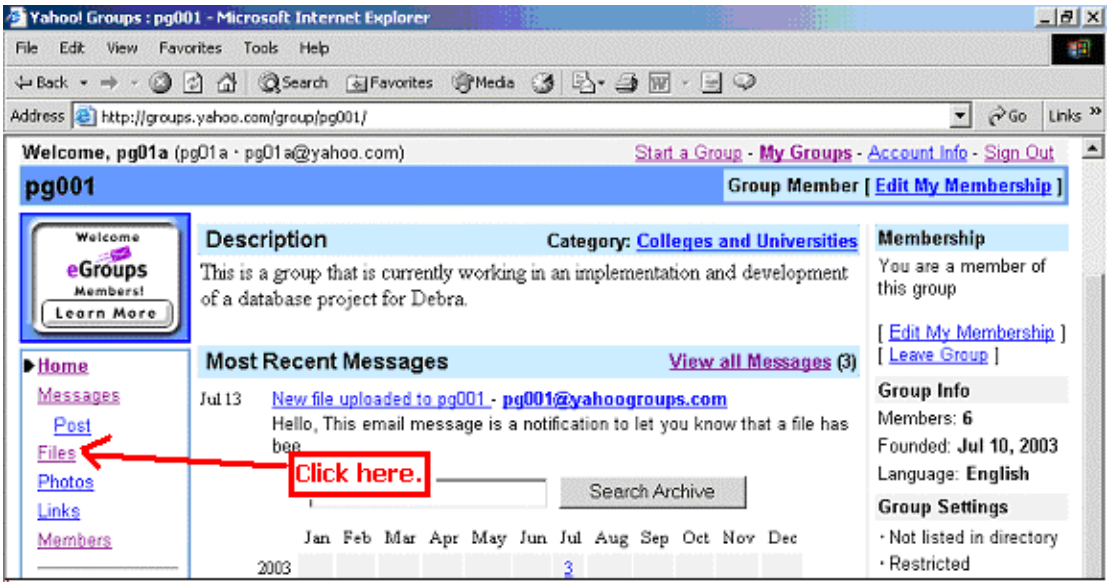


Figure 8 – Updating the screen with the most recent messages sent by all group members

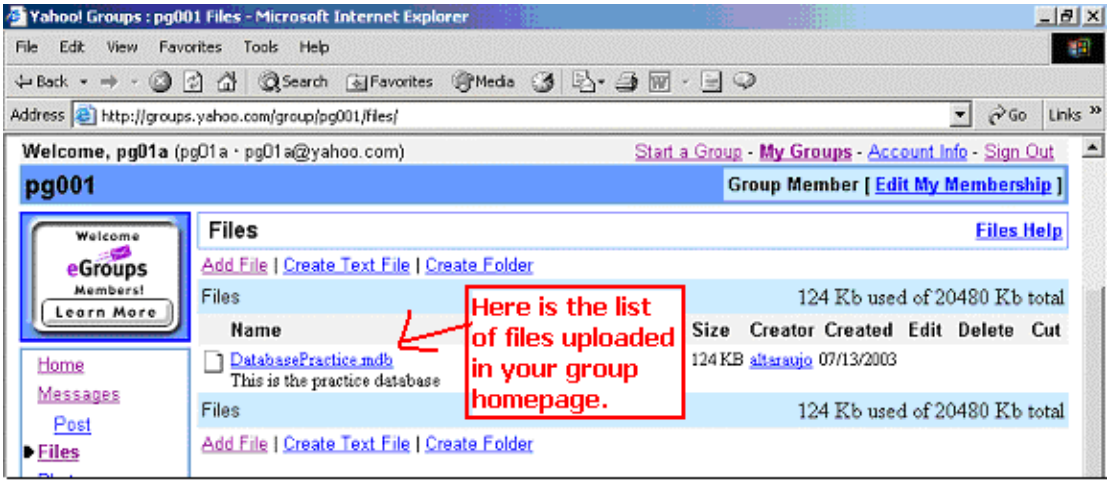
SECTION 3 - HOW TO DOWNLOAD FILES

Steps 3.1 and 3.2 describe how to download files from the Yahoo! Groups website so that you can look and work on files that have been posted by your group members.

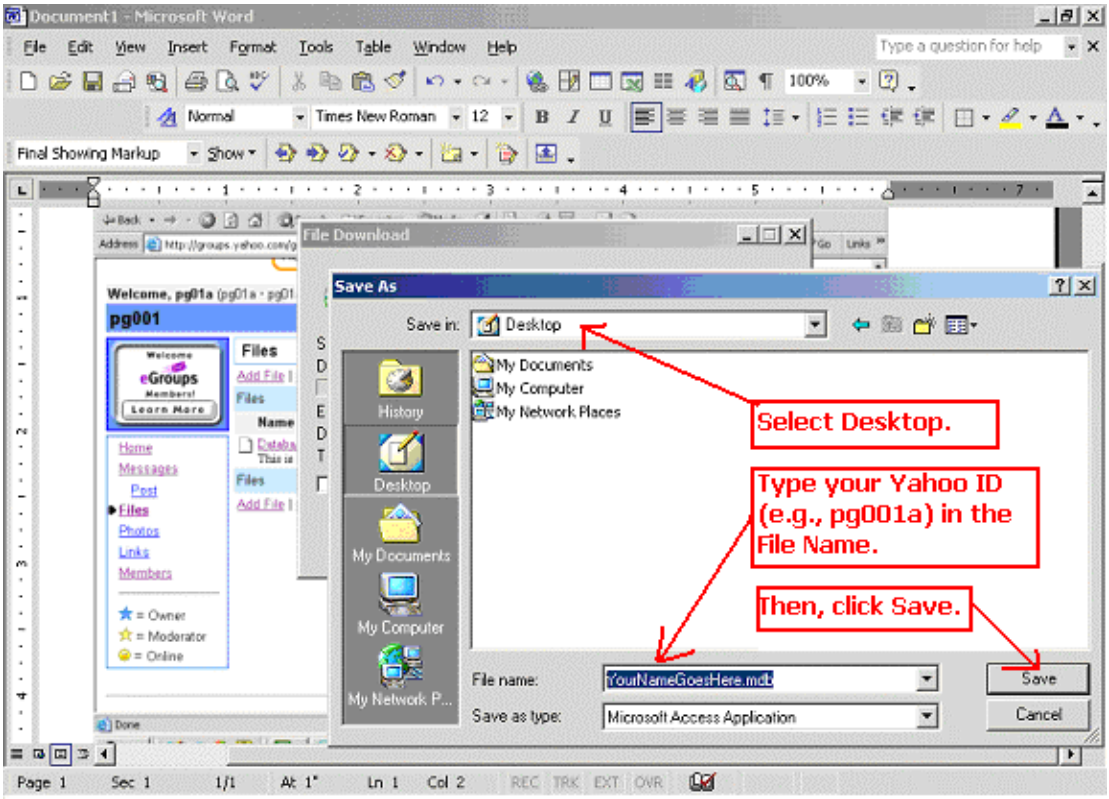
Step 3.1 – Click on the Files option so that you can see all files that have been posted in your group homepage.



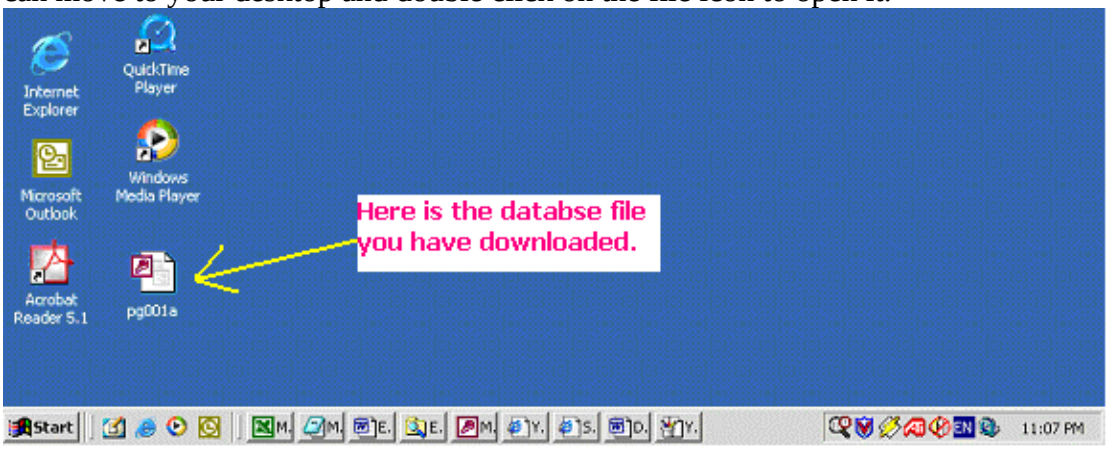
Once you have clicked on Files you should have a list of all files posted in your group homepage as shown in the figure below.



Step 3.2 – Now, download the file "DatabasePractice.mdb" by clicking on it. Select the SAVE button in the File Download screen. Then, save it in your desktop by selecting the Desktop folder. **Before saving the file, assign your Yahoo ID, for example, mis2113_g001a as the database name (see figure below).**
When the Download Complete Screen opens, you need to click on the Close button.



Now, that you have downloaded the database file named as your Yahoo User ID, you can move to your desktop and double click on the file icon to open it.

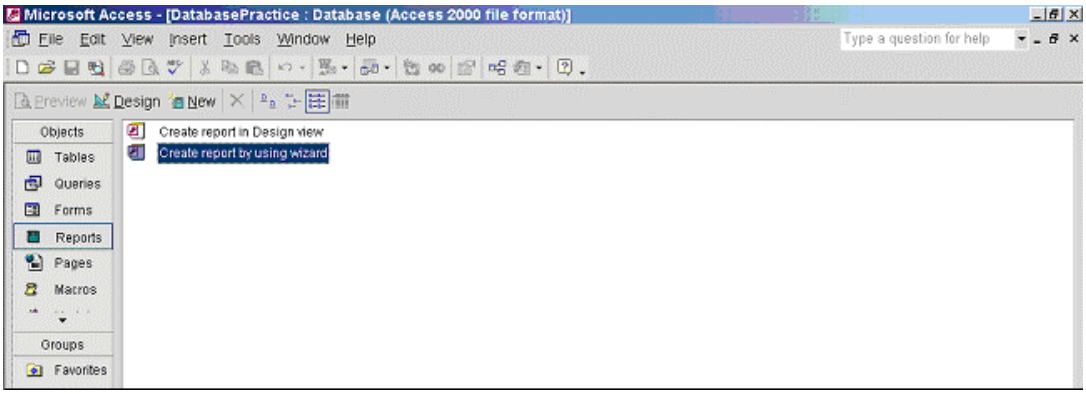


Step 3.3 – Using the message board communicate with your group members and ask them if they were able to download the database. Also, in case you couldn't download it, ask them to help you. Finally, ask the file names they have chosen.

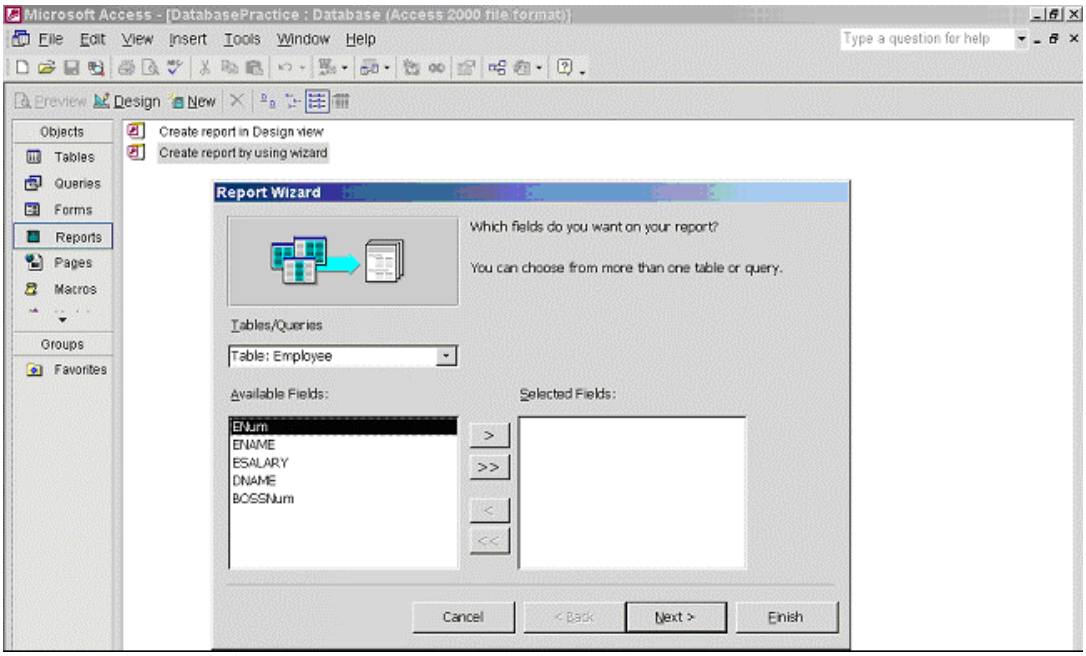
SECTION 4 – CREATING A REPORT

Your next task is to create a report by using wizard following instructions below.

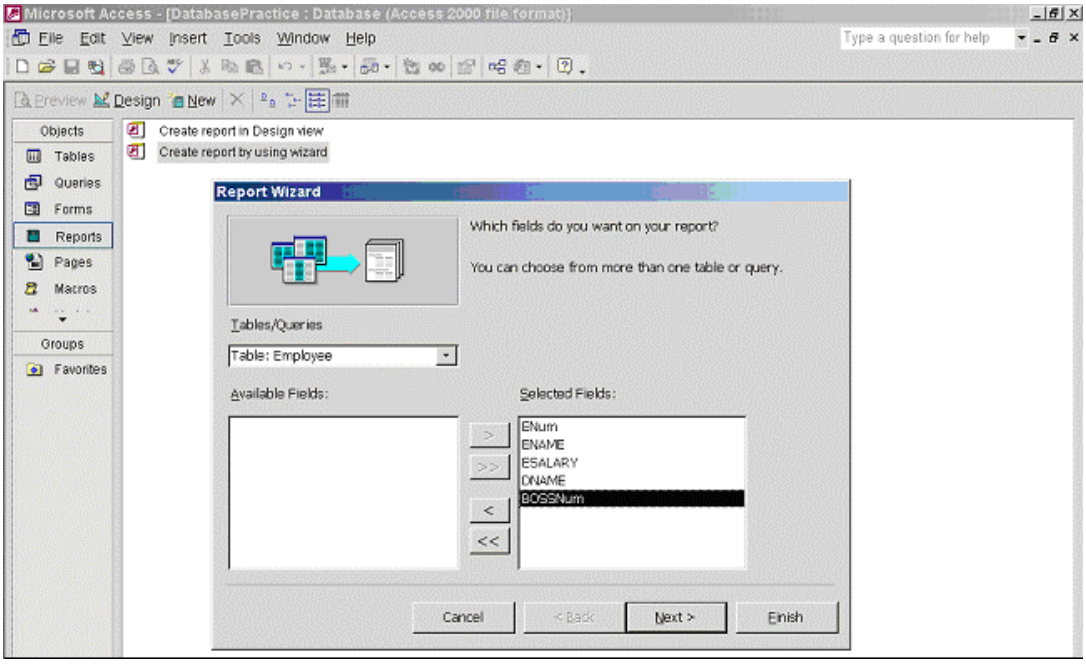
Step 4.1 - Open the database and click on the Reports button in the Database window as shown in Figure below.



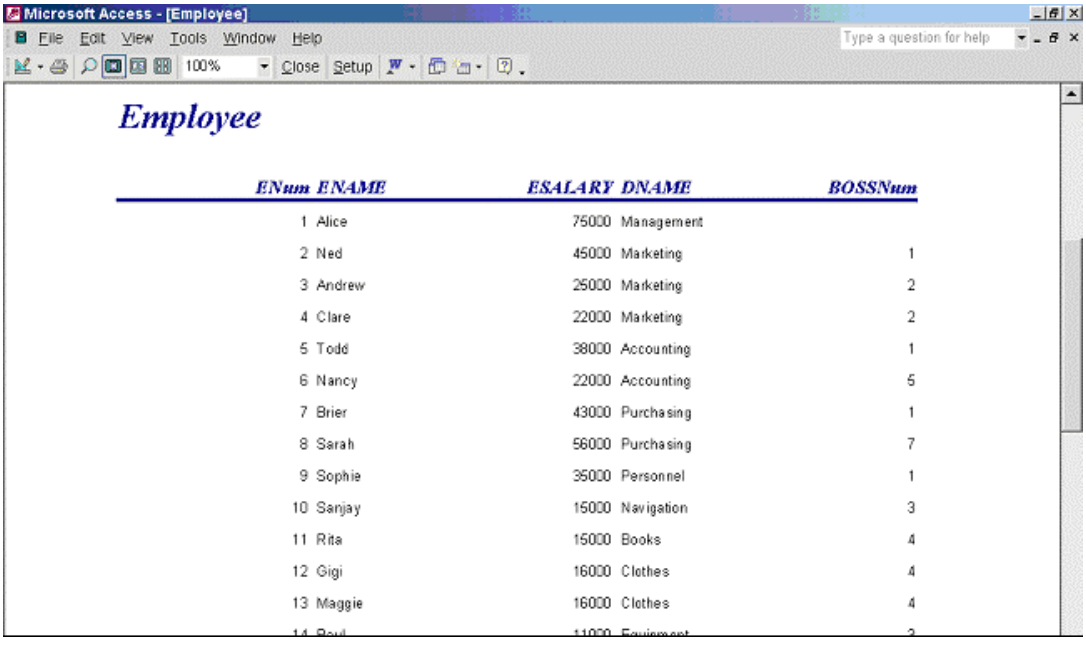
Step 4.2 – Select the option Create report by using wizard as the means for creating the report (see Figure below).



Step 4.3 – Move all the fields (Enum, ENAME, ESALARY, DNAME, and BOSSNum) from the Available Fields box to the Selected Fields Box as shown in the Figure below. Then click on the Finish button (Finish).



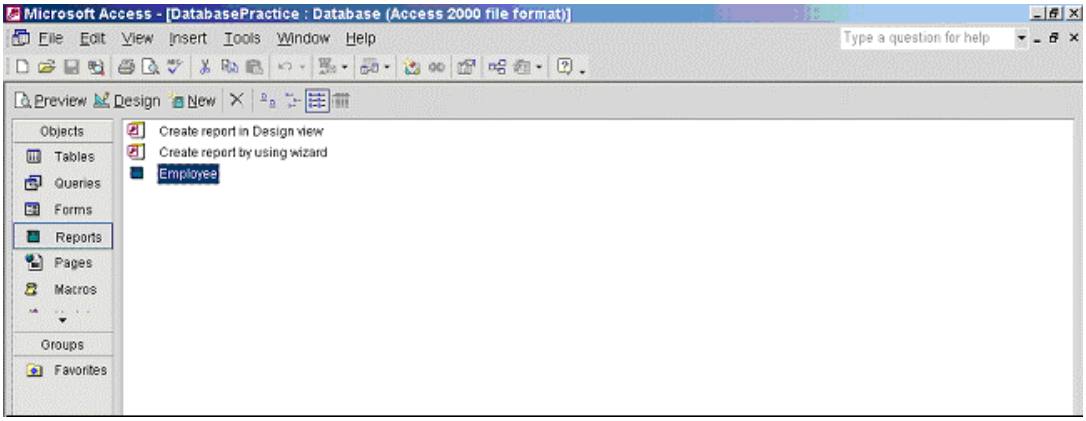
Step 4.4 – After clicking on the Finish button, you should be able to see the screen below. After looking at the report, you can close it.



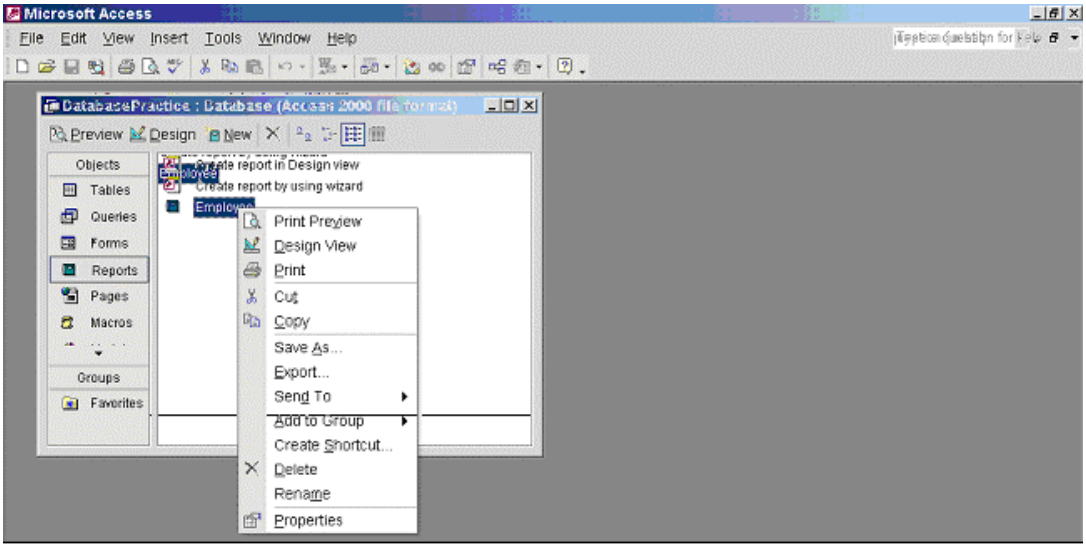
Employee

ENum	ENAME	ESALARY	DNAME	BOSSNum
1	Alice	75000	Management	
2	Ned	45000	Marketing	1
3	Andrew	25000	Marketing	2
4	Clare	22000	Marketing	2
5	Todd	38000	Accounting	1
6	Nancy	22000	Accounting	5
7	Brier	43000	Purchasing	1
8	Sarah	56000	Purchasing	7
9	Sophie	35000	Personnel	1
10	Sanjay	15000	Navigation	3
11	Rita	15000	Books	4
12	Gigi	16000	Clothes	4
13	Maggie	16000	Clothes	4
14	Paul	11000	Equipment	3

Step 4.5 – After closing the report window you will see the report you have just created in the Database window as shown in figure below.



Step 4.6 – Now, highlight Employee report and then right click on your mouse. It should appear a set of options as shown below. Then, select Rename option and change the report name for your Yahoo User ID (e.g., pg001a).

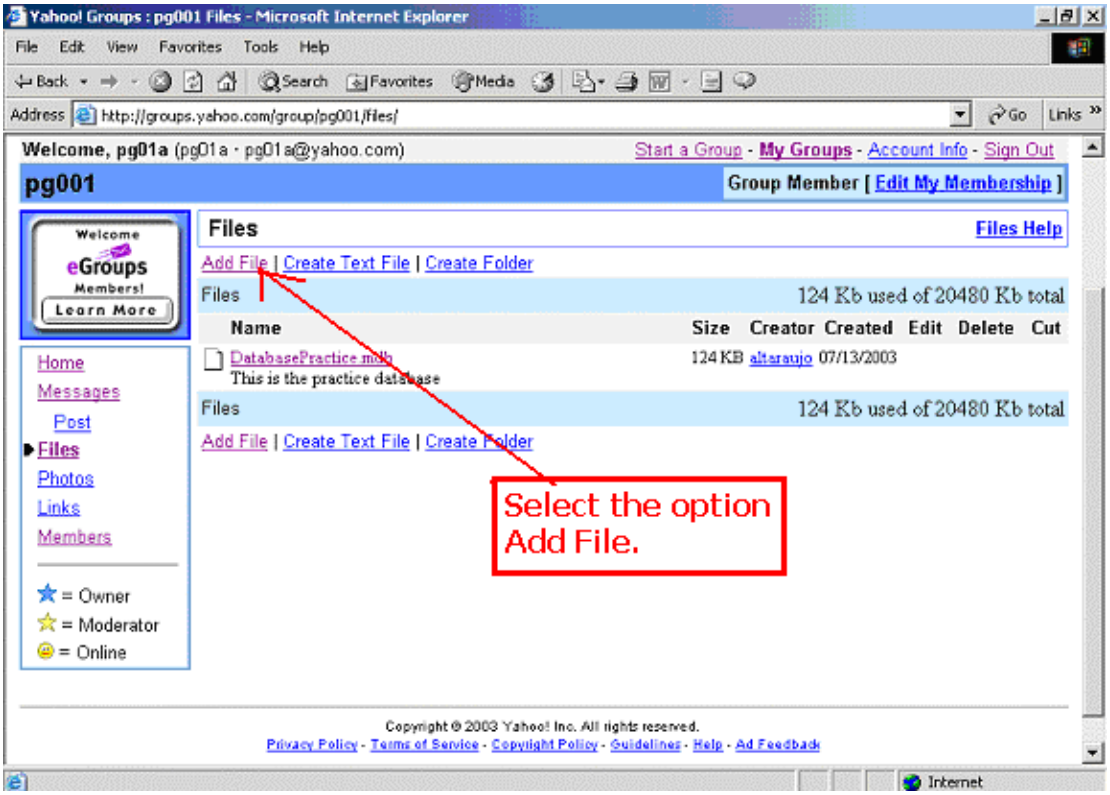


In the next section you will learn how to upload your database into the Yahoo! Groups website so that your group members can download and see the work you have done. Following, you will learn how to merge several reports into a single database (i.e., how to import objects developed by other group members into a final database).

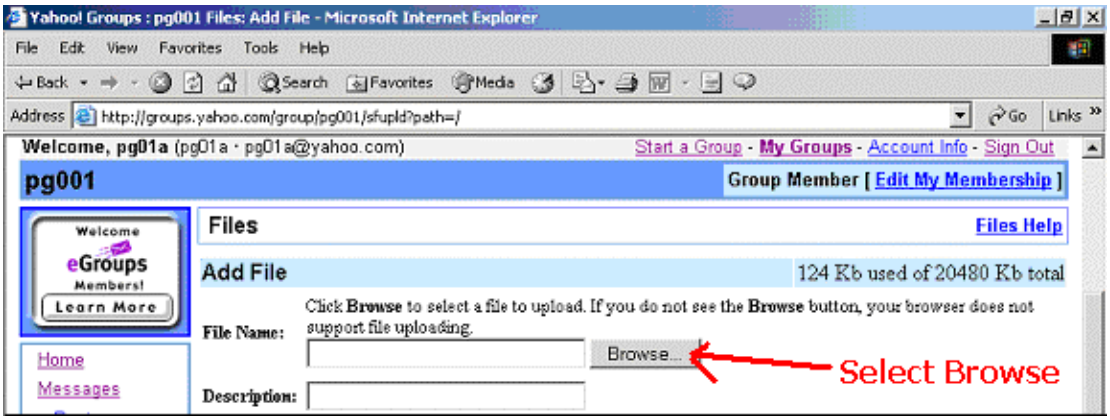
SECTION 5 - HOW TO UPLOAD FILES

Steps 5.1 through 5.5 describe how to upload files from the Yahoo! Groups website so that you can share your files with your group members.

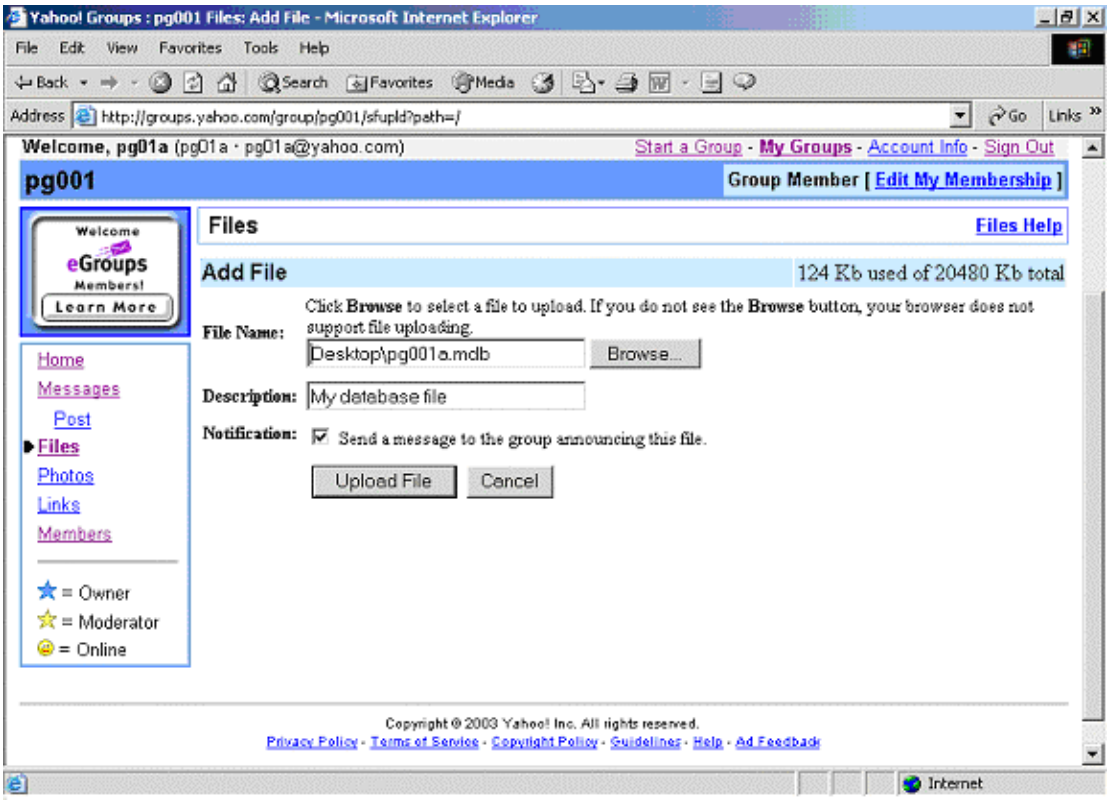
Step 5.1 – Click on the Files option so that you can see all files of your group homepage. Then, select the option ADD FILE as shown below.



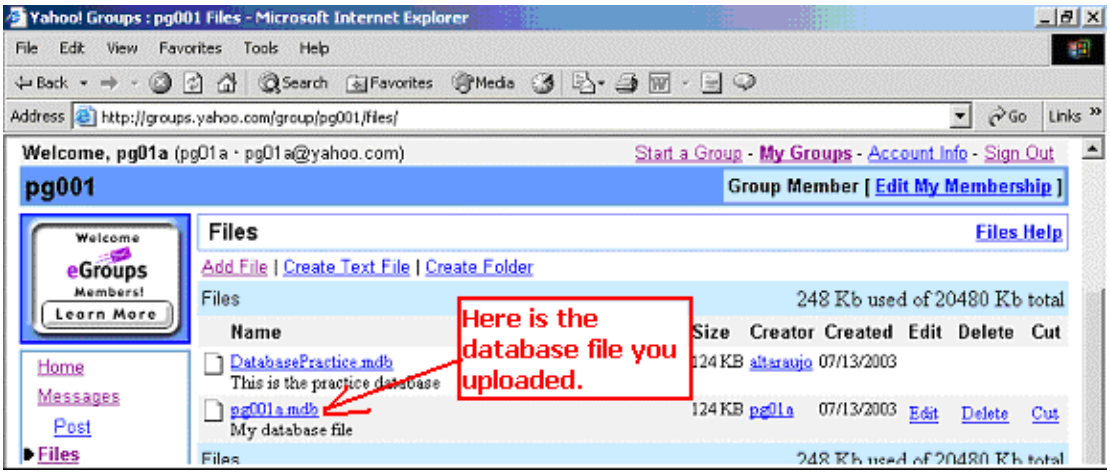
Step 5.2 – When the Add Files window opens, you need to click on the Browse button so that you can select your new database that is in the desktop as shown in the figure below.



Step 5.3 – After selecting your file from the desktop as shown in the figure, type the description of your file and check the option "Send a message to the group announcing this file" (i.e., Notification: ☑ Send a message to the group announcing this file.) so that your group members will receive a message informing that you have uploaded a file. Then, click on the Upload File button (Upload File).



Step 5.4 – Now that you have uploaded your file you should see the list of files including the file you have just uploaded.



Step 5.5 – Now, communicate with your group members and see if you can download the files they have uploaded. Also, talk with them about the database you have uploaded and check if they were able to see your work.

Step 5.6 – Now, either you or your group needs to upload a database with all reports into the FILES section of the Yahoo! Groups website.

In case your group decides to post a unique solution for all group members, you will have to communicate with them in order to select the person who will be responsible to put all tables together into a single database file called **DatabasePracticeFinal.mdb** and upload it into Yahoo! Groups homepage.

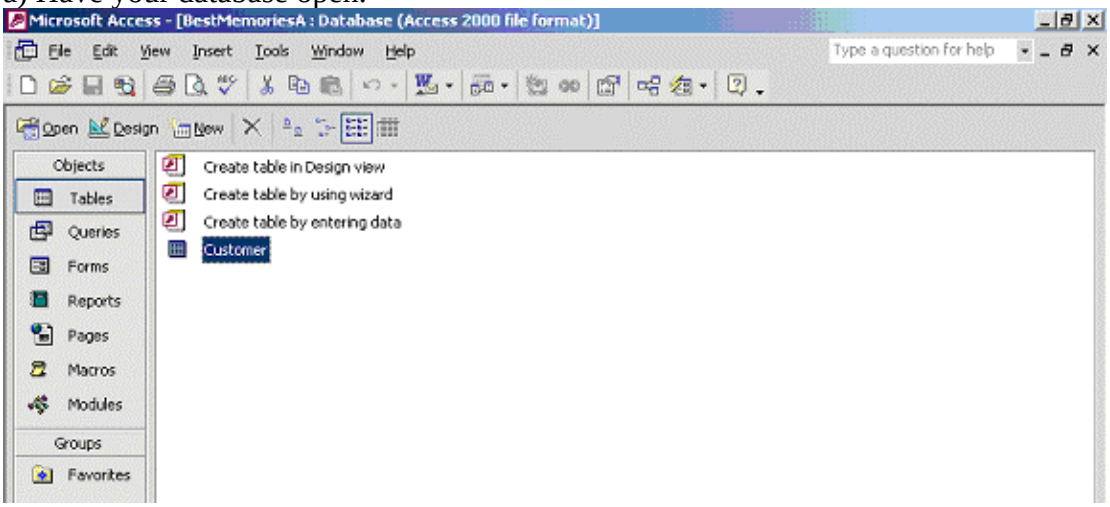
In case you decide to post your own solution the database has to be named as your user ID (e.g., mis2113g0XXy). But, remember that your database must contain all reports developed by your group members.

In the next section you will learn how to import several objects into a single database so that you can accomplish the task described above.

SECTION 6 - HOW TO IMPORT OBJECTS FROM OTHER ACCESS DATABASES

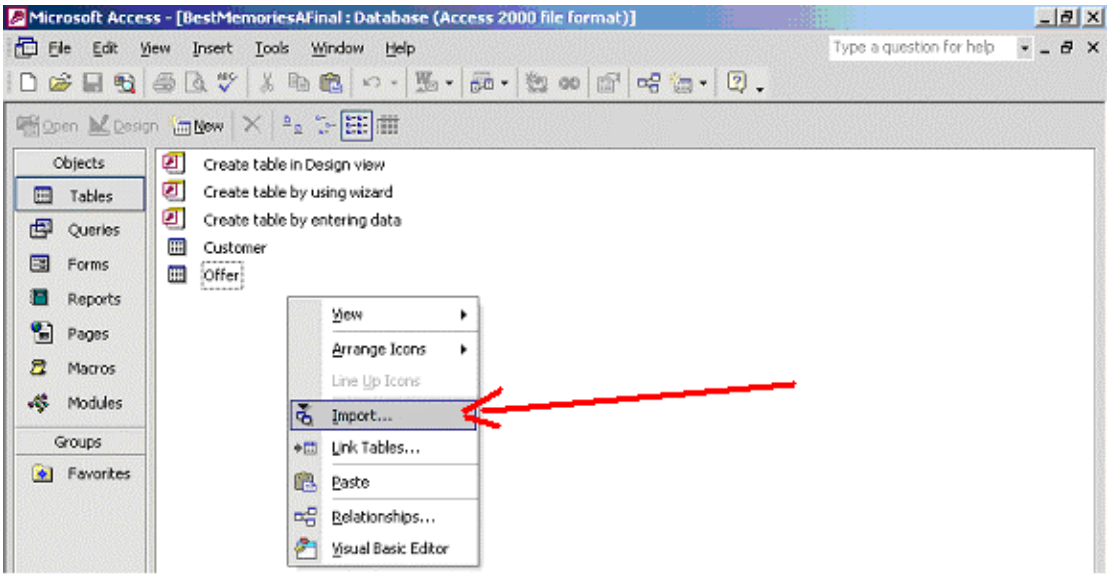
Step 6.1

a) Have your database open.



b) Click the right button of your mouse.

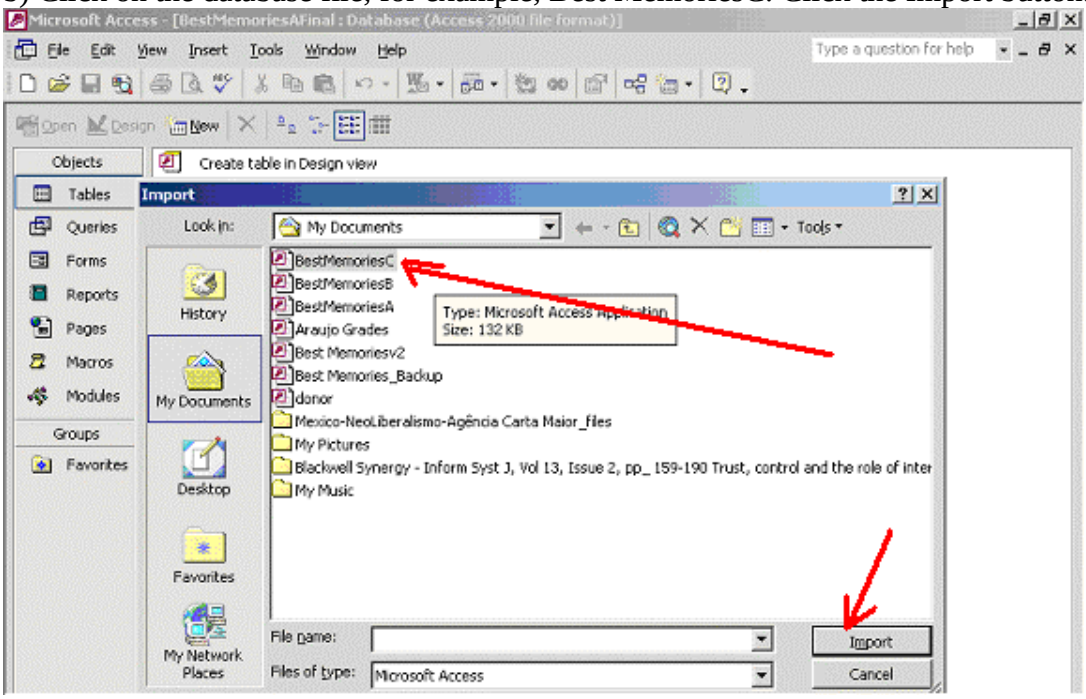
c) Then, select the option Import as shown in figure below.



Step 6.2

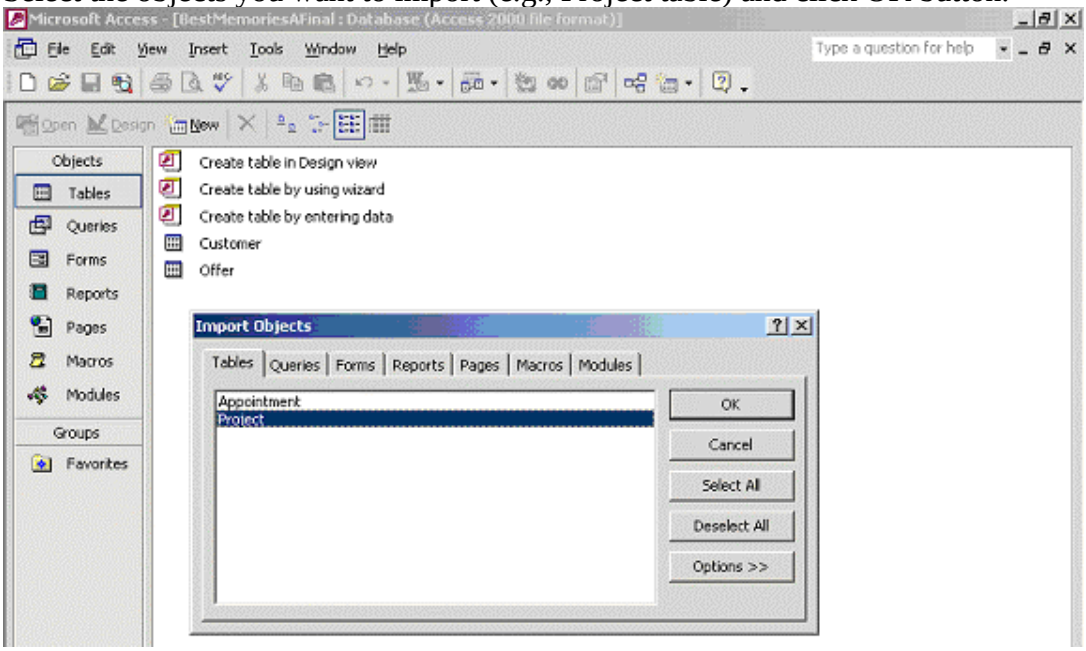
a) Select the folder which contains the other database from where you want to import an object (i.e., forms, macros, reports, tables, etc.)

b) Click on the database file, for example, Best MemoriesC. Click the Import button.



Step 6.3

Select the objects you want to import (e.g., Project table) and click OK button.



****
*** **FIRST MEETING** *
****

Hi Everyone!

My name is Debra and I am the president of Best Memories, Inc. As you all already know I am improving my business and have hired several groups to develop a database project for my company. Based on your instructor's recommendations your group has been selected. Therefore, I believe that (you) your group has all skills necessary to compete for the best project.

I have developed a project plan for your group. The project will last five days. In each day you will be working in different activities. Also, after each meeting, Sr. Steve – my manager - and I will evaluate your work, the progress you have made and will report your grade prior to the next meeting. So, we will participate during the process giving our suggestions and ideas. In doing so, we believe that (you) your group will have better chances to succeed in this project. Now that you have learned how to use the web system tools (i.e., Yahoo! Groups) and also have got acquainted with your fellow team members let's start our mission.

In this meeting we need (you) your group to create several tables and their fields. Every table is part of the conceptual model developed by Sr. Steve who has sent an email to each member of your group describing the tables to be created. Therefore, your first step is to check your email in order to download information on what table Sr. Steve wants you to create. To do so, access your Yahoo email account at **http://www.yahoo.com** and download (SAVE AS …) the task description in your desktop. When downloading your file use the option "Download Without Scan" and then "Save". When you finish, move to the top of the yahoo screen and **Sign Out** from your yahoo email account. Then access your group homepage at http://groups.yahoo.com.

At the end of this meeting, either you or your group needs to upload a database with all tables into the FILES section of the Yahoo! Groups website. In case your group decides to post a unique solution for all group members, you will have to communicate with them in order to select the person who will be responsible to put all tables together into a single database file called **BestMemoriesFinal.mdb** and upload it into Yahoo! Groups homepage. In case you decide to post your own solution the database has to be named as your user ID (e.g., mis2113g0XXy). But, remember that your database must contain all tables asked by Sr. Steve and you have to post a message informing the name of your final database so that Debra knows how to evaluate your progress.

In case (you) your group does not finish all tasks by the end of this meeting, please, upload whatever you have done so far and post a message describing what you have done. Your evaluation will be based on what you were able to accomplish.

Dear Student:

In this meeting Sr. Steve needs you to create the CUSTOMER table containing all the fields, their names, and data types exactly as it is described in figure 1.

CUSTOMER	
Field	**Data Type**
CustomerID	Number
Name	Text
Phone	Text
Street	Text
City	Text
State	Text
Zip	Text

Figure 1 - Customer table

Instructions on how to create the CUSTOMER table:

a) Download the database that has been posted in your group's homepage (i.e., Best Memories1) in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_g001a as the database name.
b) Click in the Tables button in the Database window and click in the option CREATE TABLE IN DESIGN VIEW. Please, enter Field Names and Data Types as shown in figure 1.
c) The CustomerID field should be defined as the primary key.
d) Communicate with your team members and share information on your table's primary key field so that they can add this field to their tables in case they need.
e) After entering all fields, save the table naming it CUSTOMER.
   1º) Click in the button to close the table and then Click YES in the prompt message as shown in the figure 3;
   2º) After clicking YES, you will get another prompt window (SAVE AS) asking you to type the table's name. Then, you should type CUSTOMER and click OK.
   3º) As you click OK the CUSTOMER table will be listed right below to the three options to create a table. Then, you are ready to send a copy of your work to your team members.
f) Once you have created this table, remember that you need to find out what are the other tables that Sr. Steve has asked your group members to create so that at the end of this meeting (you) your group can have one single database containing all the tables.

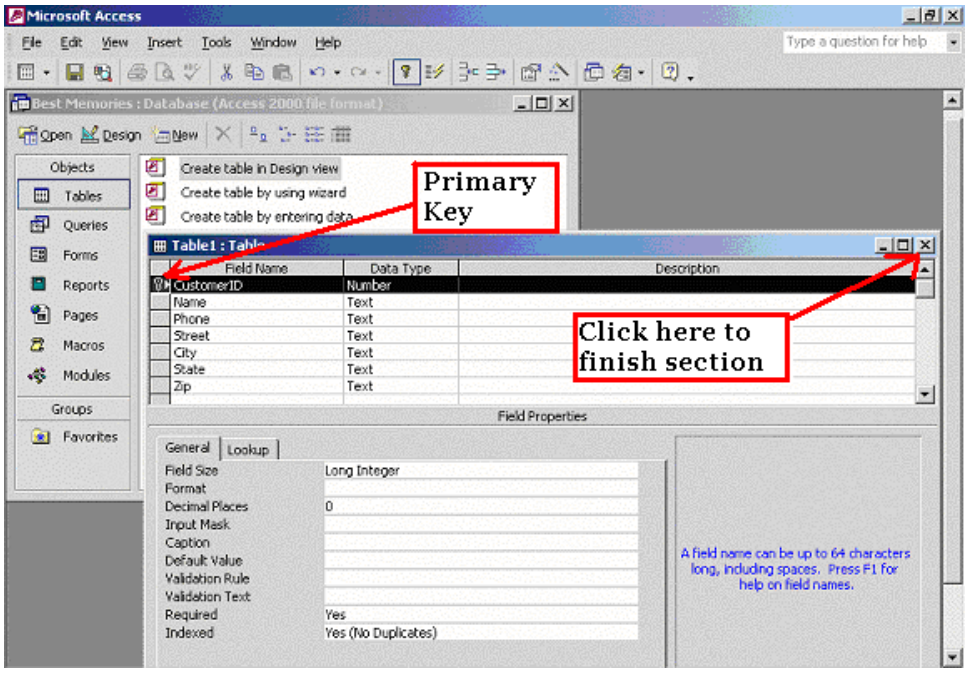


Figure 2: Creating CUSTOMER Table

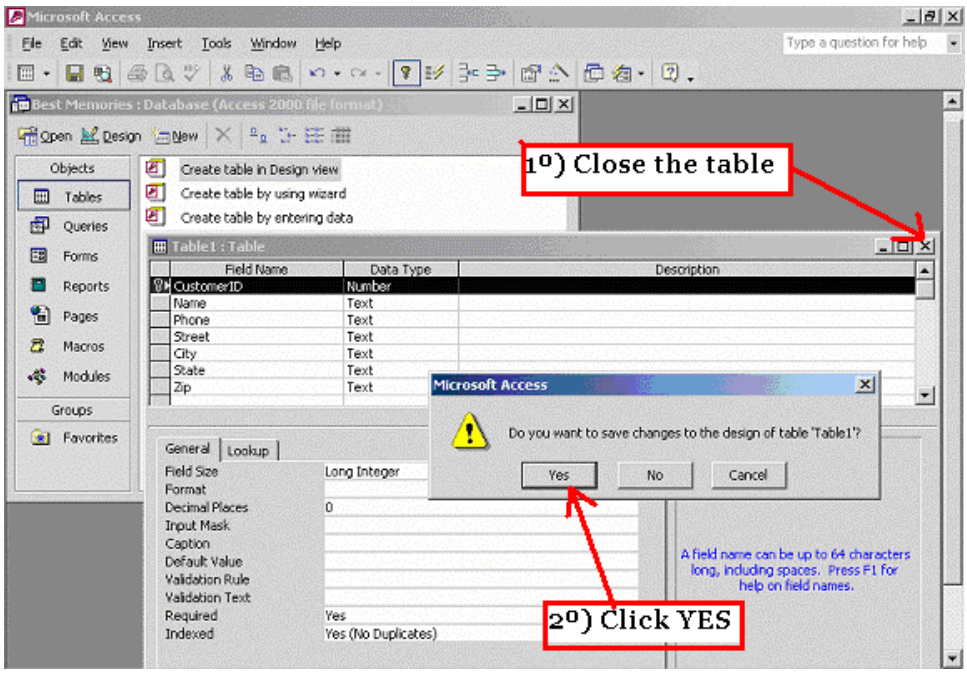


Figure 3: Saving CUSTOMER Table

Dear Student:

In this meeting Sr. Steve needs you to create the ORDER table containing all the fields, their names, and data types exactly as it is described in the figure 1.

In addition, you need to add a field (as shown in red) identical to the primary key field in the customer table. To do so, you need to communicate with your team members to find out who is working on the customer table so that they can provide information on this field. It will have the same name and data type as in the customer table, but this field should not be defined as a primary key of your ORDER table. In case your group members do not have this information, please, check your group's yahoo homepage to verify whether this information has been posted for you.

ORDER	
Field	**Data Type**
OrderNumber	Number
OrderDate	Date/Time
SubTotal	Number
Tax	Number
TotalDue	Number
Comission	Number
Insert Here: Primary Key of Customer	

Figure 1 - Order table

Instructions on how to create the ORDER table:

a) Download the database that has been posted in your group's homepage (i.e., Best Memories) in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_g001a as the database name.
b) Click in the Tables button in the Database window and click in the option CREATE TABLE IN DESIGN VIEW. Please, enter Field Names and Data Types as shown in figure 1.
c) The OrderNumber field should be defined as the primary key.
d) Communicate with your team members and share information on your table's primary key field so that they can add this field to their tables in case they need.
e) Once you finished entering all fields, save the table naming it ORDER.
   1º) Click in the button to close the table and then Click YES in the prompt message as shown in the figure 3;
   2º) After clicking YES, you will get another prompt window (SAVE AS) asking you to type the table's name. Then, you should type ORDER and click OK.
   3º) As you click OK the ORDER table will be listed right below to the three options to create a table. Then, you are ready to send a copy of your work to your team member who will put all tables together.

f) Once you have created this table, remember that you need to find out what are the other tables that Sr. Steve has asked your group members to create so that at the end of this meeting (you) your group can have one single database containing all the tables.

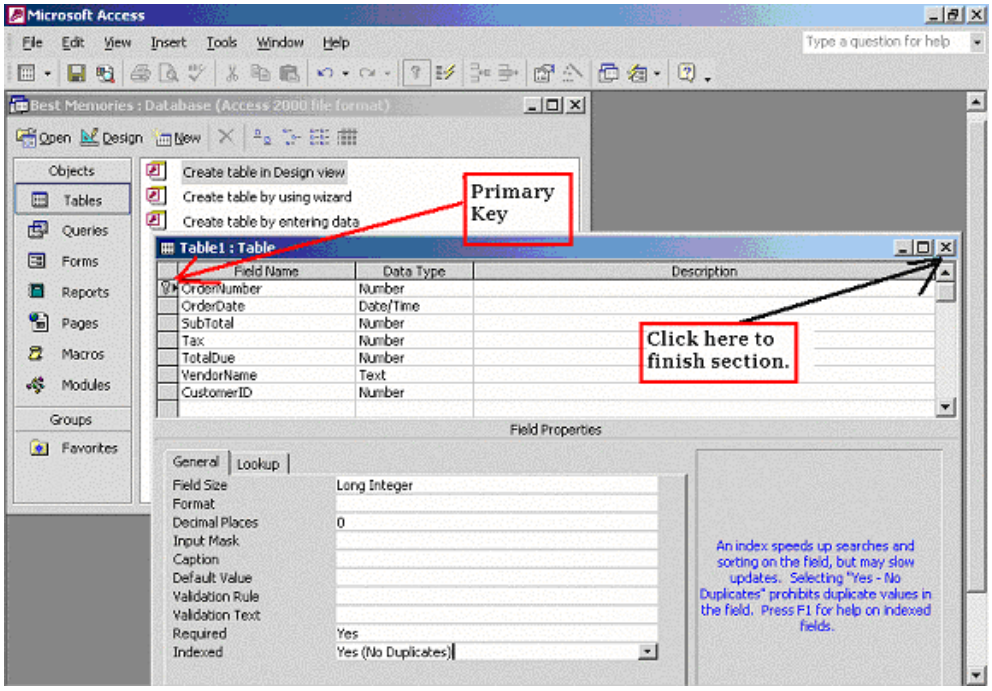


Figure 2: Creating ORDER Table

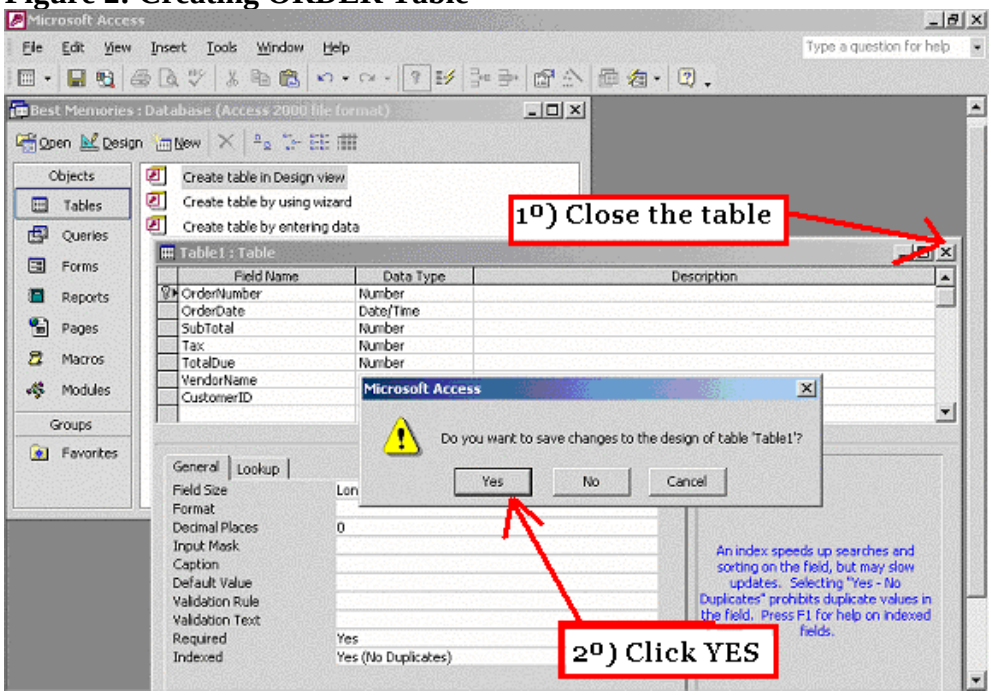


Figure 3: Saving ORDER Table

Dear Student:

In this meeting Sr. Steve needs you to create the ORDERLINE table containing all the fields along with their names and data types exactly as it is described in the figure 1.

In addition, you need to add two extra fields (as shown in red): one field identical to the primary key field of the order table and one field identical to the primary key of the product table. To do so, you need to communicate with your team members to find out who is working on the order and product tables so that they can provide information on these fields. They will both have the same name and data type as in the product and order tables and will be defined as primary keys of your ORDERLINE table as well. In case your group members do not have this information, please, check your group's yahoo homepage to verify whether this information has been posted for you.

ORDERLINE	
Field	**Data Type**
Insert Here: Primary Key of Order	
Insert Here: Primary Key of Product	
QtySold	Number
PriceSold	Number
Discount	Number
TotalPrice	Number
Message	Text

Figure 1 - Orderline table

Instructions on how to create the ORDERLINE table:

a) Download the database that has been posted in your group's homepage (i.e., Best Memories) in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_g001a as the database name.
b) Click in the Tables button in the Database window and click in the option CREATE TABLE IN DESIGN VIEW. Please, enter Field Names and Data Types as shown in figure 1.
c) The OrderNumber and Product Number fields should be defined as the primary key.
d) Communicate with your team members and share information on your table's primary key field so that they can add these fields to their tables in case they need.
e) Once you finished entering all fields, save the table naming it ORDERLINE.
   1º) Click in the button to close the table and then Click YES in the prompt message as shown in the figure 3;

2º) After clicking YES, you will get another prompt window (SAVE AS) asking you to type the table's name. Then, you should type ORDERLINE and click OK.

3º) As you click OK the ORDERLINE table will be listed right below to the three options to create a table. Then, you are ready to send a copy of your work to your team member who will put all tables together.

f) Once you have created this table, remember that you need to find out what are the other tables that Sr. Steve has asked your group members to create so that at the end of this meeting (you) your group can have one single database containing all the tables.

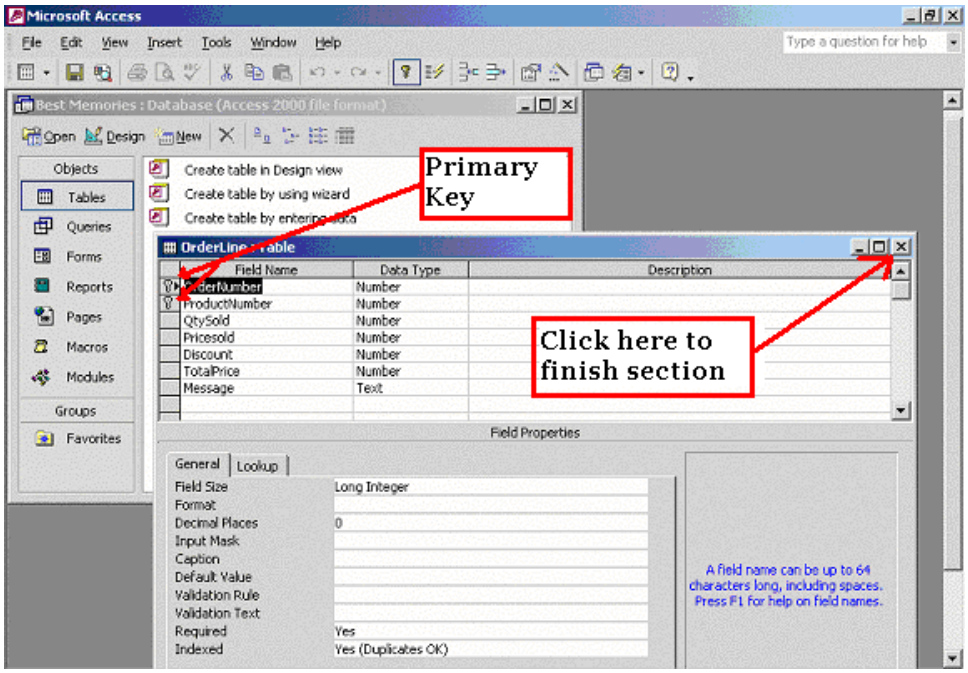


Figure 2: Creating ORDERLINE Table

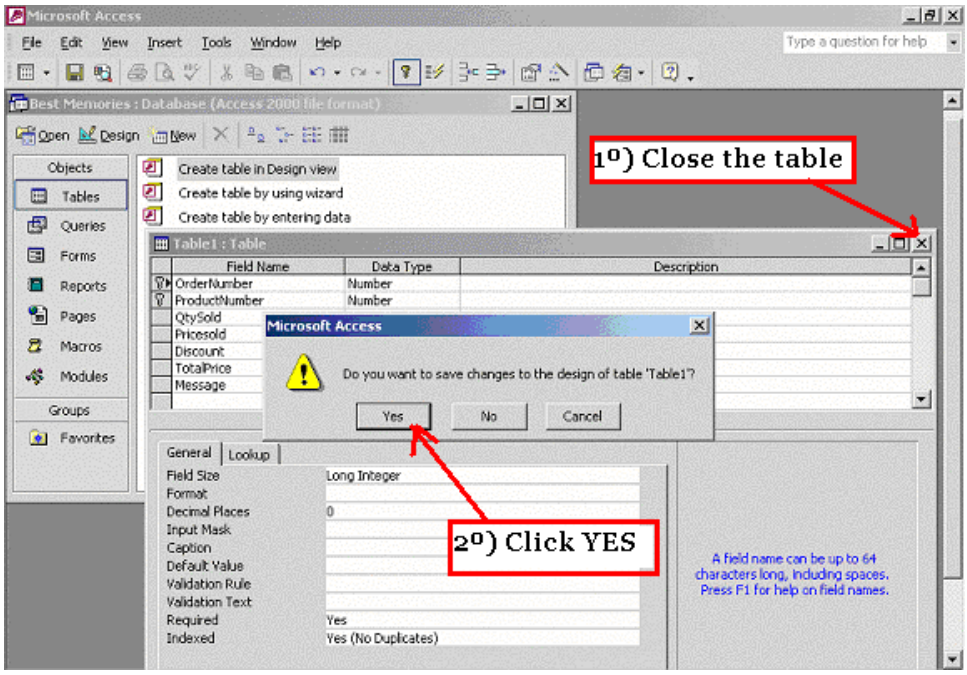


Figure 3: Saving ORDERLINE Table

Dear Student:

In this meeting Sr. Steve needs you to create the PRODUCT table containing all the fields along with their names and data types exactly as it is described in the figure 1.

In addition, you need to add a field (as shown in red) identical to the primary key field in the vendor table. To do so, you need to communicate with your team members to find out who is working on the vendor table so that they can provide information on this field. It will have the same name and data type as in the vendor table, but this field should not be defined as a primary key of your PRODUCT table. In case your group members do not have this information, please, check your group's yahoo homepage to verify whether this information has been posted for you.

PRODUCT	
Field	**Data Type**
ProductNumber	Number
UnitPrice	Number
Description	Text
ProductName	Text
ProductType	Text
QtyOnHand	Number
Insert Here: Primary Key of Vendor	

Figure 1 - Product table

Instructions on how to create the PRODUCT table:

a) Download the database that has been posted in your group's homepage (i.e., Best Memories) in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_g001a as the database name.
b) Click in the Tables button in the Database window and click in the option CREATE TABLE IN DESIGN VIEW. Please, enter Field Names and Data Types as shown in figure 1.
c) The ProductNumber field should be defined as the primary key.
d) Communicate with your team members and share information on your table's primary key field so that they can add this field to their tables in case they need.
e) Once you finished entering all fields, save the table naming it PRODUCT.
   1º) Click in the button to close the table and then Click YES in the prompt message as shown in the figure 3;
   2º) After clicking YES, you will get another prompt window (SAVE AS) asking you to type the table's name. Then, you should type PRODUCT and click OK.
   3º) As you click OK the PRODUCT table will be listed right below to the three options to create a table. Then, you are ready to send a copy of your work to your team member who will put all tables together.

f) Once you have created this table, remember that you need to find out what are the other tables that Sr. Steve has asked your group members to create so that at the end of this meeting (you) your group can have one single database containing all the tables.

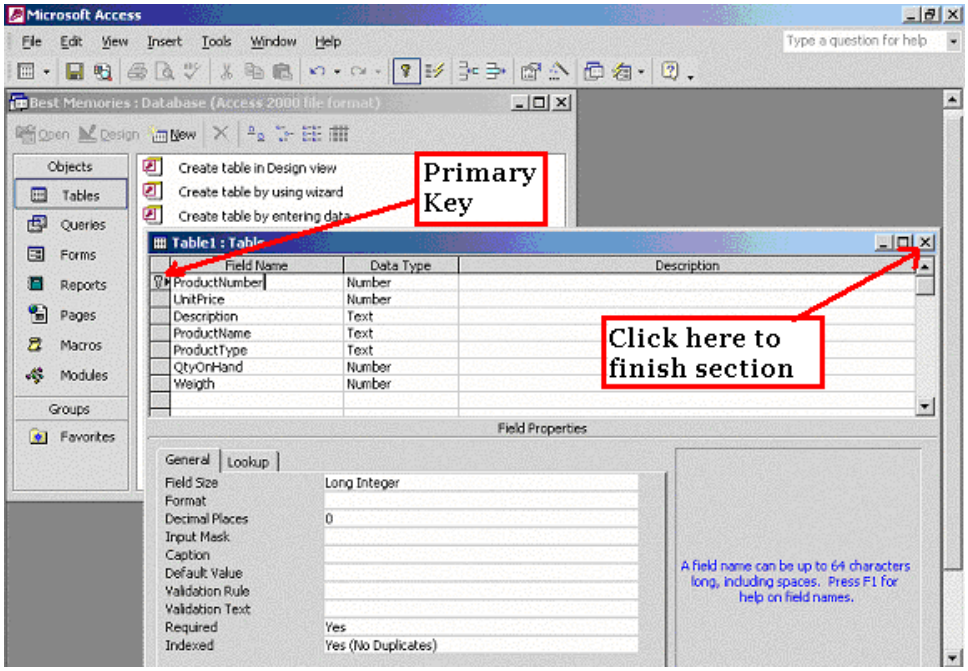


Figure 2: Creating PRODUCT Table

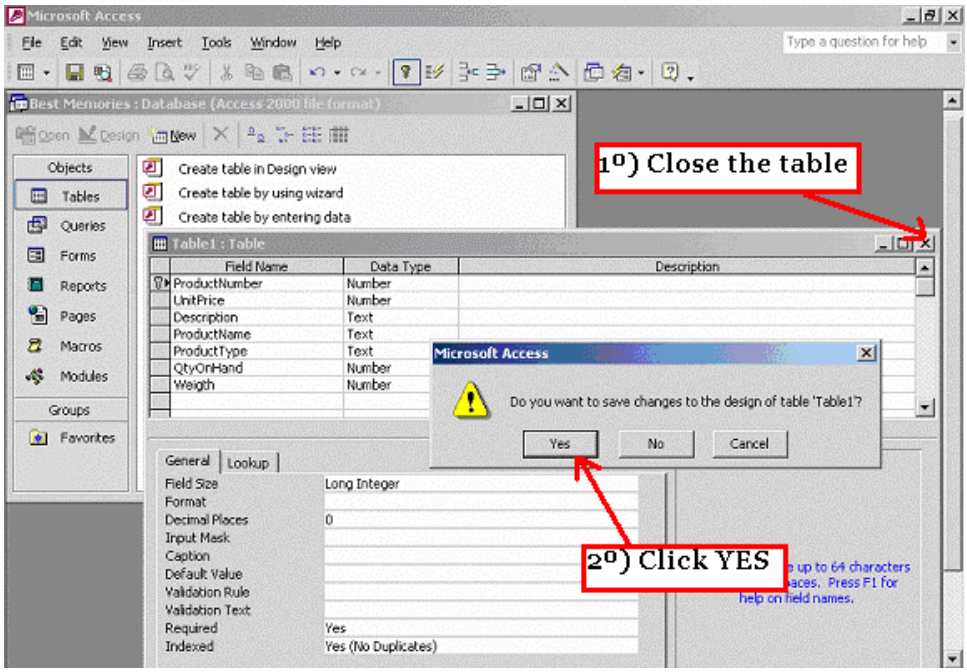


Figure 3: Saving PRODUCT Table

Dear Student:

In this meeting Sr. Steve needs you to create the VENDOR table containing all the fields, their names, and data types exactly as it is described in the figure 1.

VENDOR	
Field	**Data Type**
VendorNumber	Number
Name	Text
Phone	Text
Street	Text
City	Text
State	Text
Zip	Text

Figure 1 – Vendor table

Instructions on how to create the VENDOR table:

a) Download the database that has been posted in your group's homepage (i.e., Best Memories) in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_g001a as the database name.
b) Click in the Tables button in the Database window and click in the option CREATE TABLE IN DESIGN VIEW. Please, enter Field Names and Data Types as shown in figure 1.
c) The VendorID field should be defined as the primary key.
d) Communicate with your team members and share information on your table's primary key field so that they can add this field to their tables in case they need.
e) Once you finished entering all fields, save the table naming it VENDOR.
   1º) Click in the button to close the table and then Click YES in the prompt message as shown in the figure 3;
   2º) After clicking YES, you will get another prompt window (SAVE AS) asking you to type the table's name. Then, you should type VENDOR and click OK.
   3º) As you click OK the VENDOR table will be listed right below to the three options to create a table. Then, you are ready to send a copy of your work to your team member who will put all tables together.
f) Once you have created this table, remember that you need to find out what are the other tables that Sr. Steve has asked your group members to create so that at the end of this meeting (you) your group can have one single database containing all the tables.

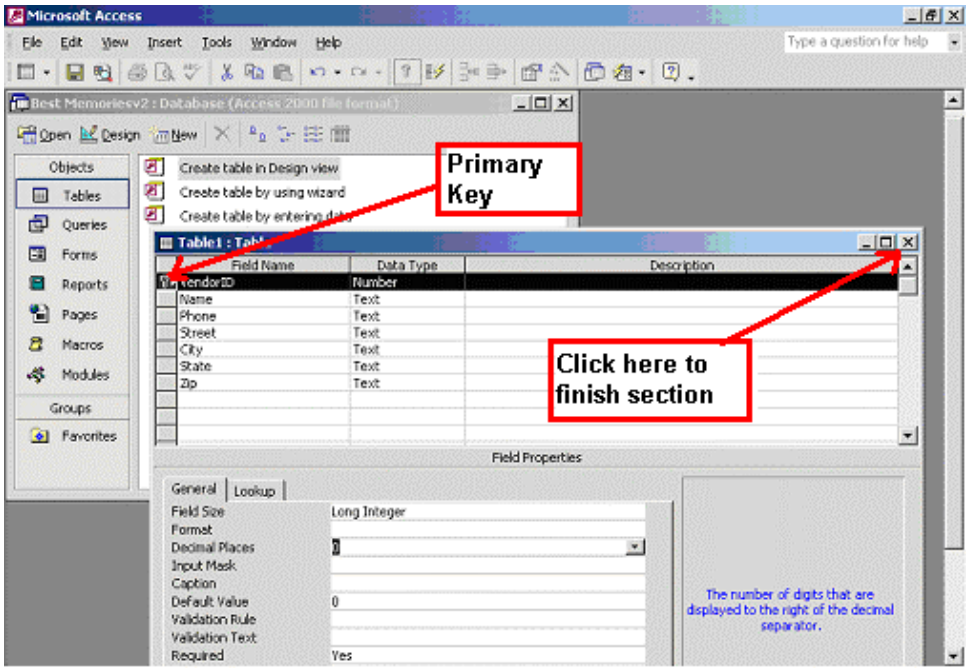


Figure 2: Creating VENDOR Table

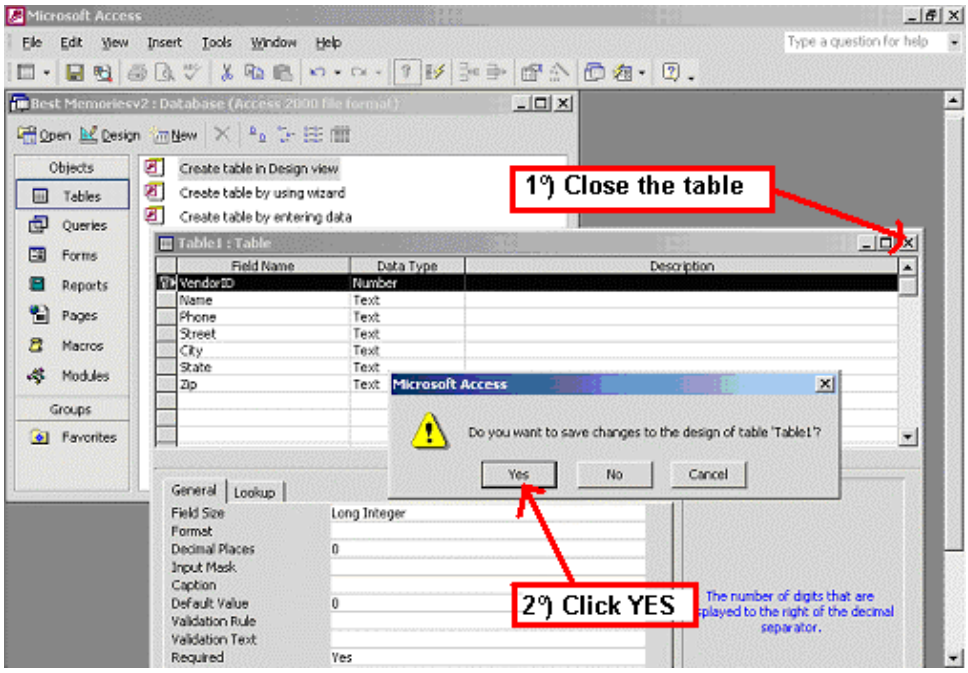


Figure 3: Saving VENDOR Table

MEETING 1 – GRADING

TASK A – CUSTOMER TABLE

Task	Possible Points	Received Points
Enter field CustomerID	1	
Enter field Name	1	
Enter field Phone	1	
Enter field Street	1	
Enter field City	1	
Enter field State	1	
Enter field Zip	1	
CustomerID defined as Primary Key	1	
Total	8	

TASK B– ORDER TABLE

Task	Possible Points	Received Points
Enter field OrderNumber	1	
Enter field OrderDate	1	
Enter field SubTotal	1	
Enter field Tax	1	
Enter field TotalDue	1	
Enter field Comission	1	
Enter field CustomerID	1	
OrderNumber defined as Primary Key	1	
Total	8	

TASK C– ORDERLINE TABLE

Task	Possible Points	Received Points
Enter field OrderNumber	1	
Enter field ProductNumber	1	
Enter field QtySold	1	
Enter field PriceSold	1	
Enter field Discount	1	
Enter field TotalPrice	1	
Enter field Message	1	
OrderNumber and ProductNumber defined as Primary Key	1	
Total	8	

TASK D– PRODUCT TABLE

Task	Possible Points	Received Points
Enter field ProductNumber	1	
Enter field UnitPrice	1	
Enter field Description	1	
Enter field ProductName	1	
Enter field ProductType	1	
Enter field QtyOnHand	1	
Enter field VendorNumber	1	
ProductNumber defined as Primary Key	1	
Total	8	

TASK E– VENDOR TABLE

Task	Possible Points	Received Points
Enter field VendorNumber	1	
Enter field Name	1	
Enter field Phone	1	
Enter field Street	1	
Enter field City	1	
Enter field State	1	
Enter field Zip	1	
VendorNumber defined as Primary Key	1	
Total	8	

FINAL GRADING

Task	Possible Points	Received Points
Task A	8	
Task B	8	
Task C	8	
Task D	8	
Task E	8	
Sub-Total	40	
Number of tables in the final database (2 each)	10	
Total	50	
Adjusted Total (Total / 5)	10	

****

*** SECOND MEETING *

****

Hi Everyone!

Steve and I have analyzed the work (you) your group has done in the last meeting. In order to continue your work, Steve applied his logical and conceptual knowledge of database to establish the relationships between the tables (you) your group has created. Also, he entered several records into the tables so that you (your group) can use them in the next phases of the project. Thus, an updated version (**BestMemories2.mdb**) of your work has been uploaded into the FILES section of the Yahoo! Groups website.

Sr. Steve sent an email to each member of your group describing the work you need to perform. Therefore, your first step is to check your email in order to download information on what Sr. Steve wants you to create. To do so, access your Yahoo email account at **http://www.yahoo.com** and download (SAVE AS …) the task description in your desktop. When downloading your file use the option "Download Without Scan" and then "Save". When you finish, move to the top of the yahoo screen and **Sign Out** from your yahoo email account. Then access your group homepage at http://groups.yahoo.com.

At the end of this meeting, either you or your group needs to upload a database with all tables and forms into the FILES section of the Yahoo! Groups website. In case your group decides to post a unique solution for all group members, you will have to communicate with them in order to select the person who will be responsible to put all tables together into a single database file called **BestMemoriesFinal.mdb** and upload it into Yahoo! Groups homepage. In case you decide to post your own solution the database has to be named as your user ID (e.g., mis2113_gxxxy). But, remember that your database must contain all forms asked by Sr. Steve and you have to post a message informing the name of your final database so that Debra knows how to evaluate your progress.

In case (you) your group does not finish all tasks by the end of this meeting, please, upload whatever you have done so far and post a message describing what you have done. Your evaluation will be based on what you were able to accomplish.

Thank you and Good Luck!
Debra

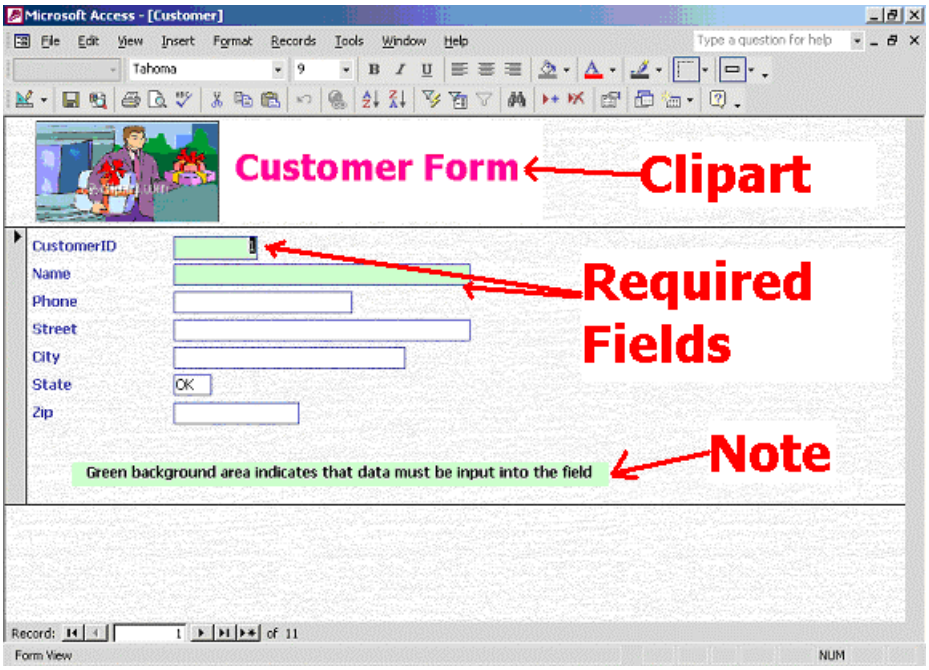
Dear Student:

In this meeting Sr. Steve needs you to create a form similar to the one in the figure below.

First, download the updated version (**BestMemories2.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name.

Second, open the database saved in your desktop, select Forms Object in the Database window. Start with the Form Wizard, and then modify the resulting form as necessary so that your finished form accommodates all of the following:

a) A clip art image in the form header. Note that Sr. Steve has mistakenly sent you a clipart that needs to be inserted into a form being developed by one of your team members. So, please communicate with them members so that you can exchange cliparts until you all have the appropriate clipart for all forms. The header of your form should have a clip art saying "**Customer Form**".
b) A different background color for the required fields CustomerID and Name, to emphasize that the data for these fields must be entered. Your team can chose any background color, but the background color needs to be the same for all forms. Thus, please communicate with your team members to decide which color to use so that all of you will have the same background color.
c) Include a note on the form that indicates the meaning of the color change. Please use the same color and format you used previously. Note: All forms need to have the same message. So, communicate with your team members to type the same message.
d) Once you have created the form, remember that either you or your group needs to upload a final database containing all forms as described in the previous page.


Microsoft Access - [Customer]
File Edit View Insert Format Records Tools Window Help
Type a question for help
Tahoma
9
Customer Form
Clipart
CustomerID
Name
Phone
Street
City
State
OK
Zip
Required Fields
Note
Green background area indicates that data must be input into the field
Record:
1
of 11
Form View
NUM

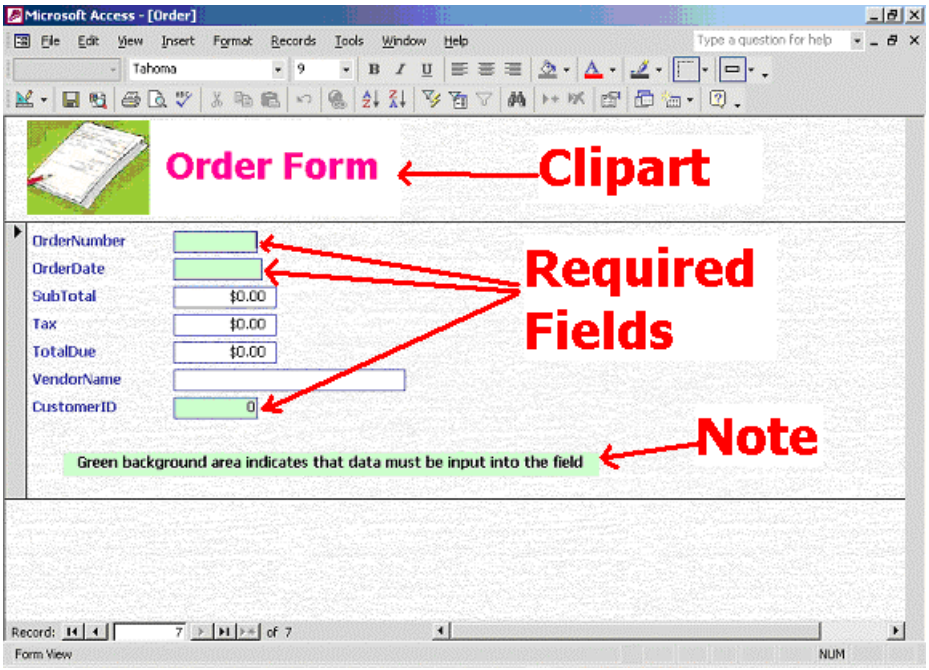
Dear Student:

In this meeting Sr. Steve needs you to create a form similar to the one in the figure below.

First, download the updated version (**BestMemories2.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name.

Second, open the database saved in your desktop, select Forms Object in the Database window. Start with the Form Wizard, and then modify the resulting form as necessary so that your finished form accommodates all of the following:

a) A clip art image in the form header. Note that Sr. Steve has mistakenly sent you a clipart that needs to be inserted into a form being developed by one of your team members. So, please communicate with them members so that you can exchange cliparts until you all have the appropriate clipart for all forms. The header of your form should have a clip art saying "**Order Form**".
b) A different background color for the required fields **OrderNumber, OrderDate**, and **CustomerID** to emphasize that the data for these fields must be entered. Your team can chose any background color, but the background color needs to be the same for all forms. Thus, please communicate with your team members to decide which color to use so that all of you will have the same background color.
c) Include a note on the form that indicates the meaning of the color change. Please use the same color and format you used previously. Note: All forms need to have the same message. So, communicate with your team members to type the same message.
d) Once you have created the form, remember that either you or your group needs to upload a final database containing all forms as described in the previous page.


Microsoft Access - [Order]
File Edit View Insert Format Records Tools Window Help
Type a question for help
Tahoma
9
Order Form
Clipart
OrderNumber
OrderDate
SubTotal
Tax
TotalDue
VendorName
CustomerID
$0.00
$0.00
$0.00
0
Required Fields
Note
Green background area indicates that data must be input into the field
Record: 7 of 7
Form View
NUM

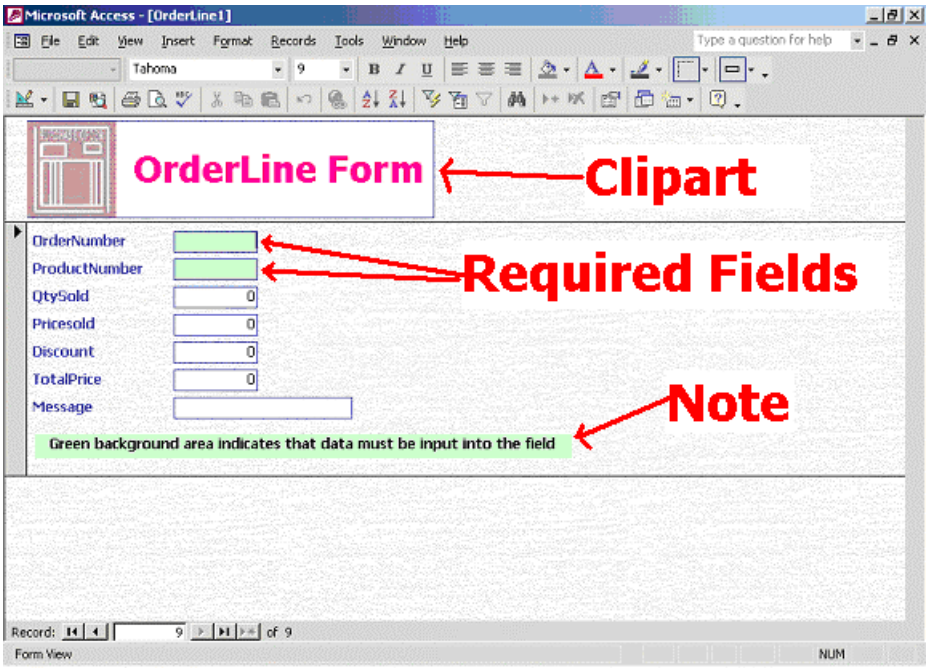
Dear Student:

In this meeting Sr. Steve needs you to create a form similar to the one in the figure below.

First, download the updated version (**BestMemories2.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name.

Second, open the database saved in your desktop, select Forms Object in the Database window. Start with the Form Wizard, and then modify the resulting form as necessary so that your finished form accommodates all of the following:

a) A clip art image in the form header. Note that Sr. Steve has mistakenly sent you a clipart that needs to be inserted into a form being developed by one of your team members. So, please communicate with them members so that you can exchange cliparts until you all have the appropriate clipart for all forms. The header of your form should have a clip art saying "**OrderLine Form**".
b) A different background color for the required fields **OrderNumber** and **ProductNumber**, to emphasize that the data for these fields must be entered. Your team can chose any background color, but the background color needs to be the same for all forms. Thus, please communicate with your team members to decide which color to use so that all of you will have the same background color.
c) Include a note on the form that indicates the meaning of the color change. Please use the same color and format you used previously. Note: All forms need to have the same message. So, communicate with your team members to type the same message.
d) Once you have created the form, remember that either you or your group needs to upload a final database containing all forms as described in the previous page.


Microsoft Access - [OrderLine1]
File Edit View Insert Format Records Tools Window Help
Type a question for help
Tahoma
9
OrderLine Form
Clipart
OrderNumber
ProductNumber
QtySold
Pricesold
Discount
TotalPrice
Message
0
Required Fields
Note
Green background area indicates that data must be input into the field
Record: 9 of 9
Form View
NUM

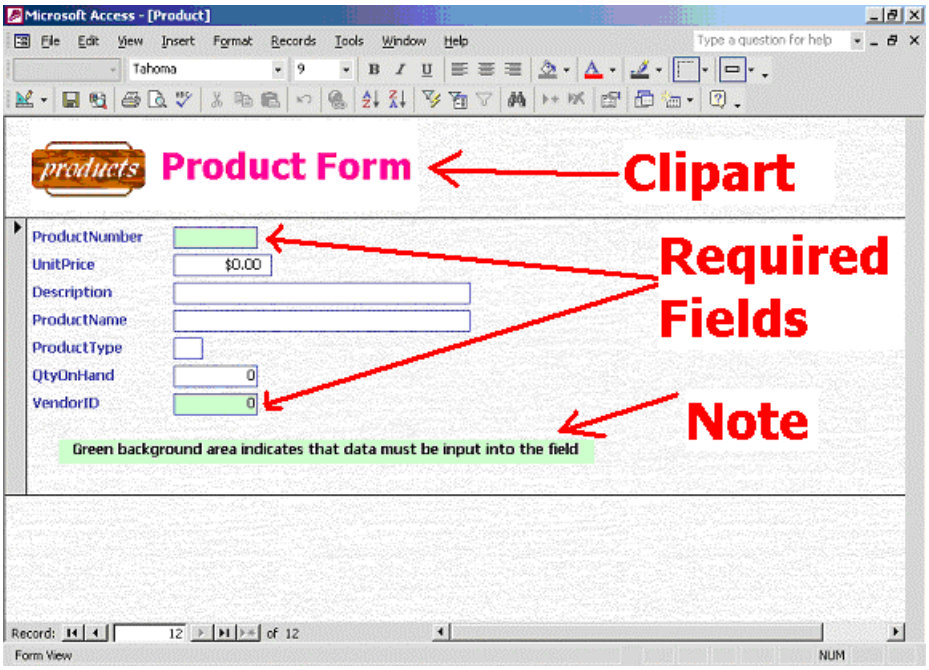
Dear Student:

In this meeting Sr. Steve needs you to create a form similar to the one in the figure below.

First, download the updated version (**BestMemories2.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name.

Second, open the database saved in your desktop, select Forms Object in the Database window. Start with the Form Wizard, and then modify the resulting form as necessary so that your finished form accommodates all of the following:

a) A clip art image in the form header. Note that Sr. Steve has mistakenly sent you a clipart that needs to be inserted into a form being developed by one of your team members. So, please communicate with them members so that you can exchange cliparts until you all have the appropriate clipart for all forms. The header of your form should have a clip art saying "**Product Form**".
b) A different background color for the required fields **ProductNumber** and **VendorID**, to emphasize that the data for these fields must be entered. Your team can chose any background color, but the background color needs to be the same for all forms. Thus, please communicate with your team members to decide which color to use so that all of you will have the same background color.
c) Include a note on the form that indicates the meaning of the color change. Please use the same color and format you used previously. Note: All forms need to have the same message. So, communicate with your team members to type the same message.
d) Once you have created the form, remember that either you or your group needs to upload a final database containing all forms as described in the previous page.


Microsoft Access - [Product]
File Edit View Insert Format Records Tools Window Help
Type a question for help
Tahoma
9
products
Product Form
Clipart
ProductNumber
UnitPrice
$0.00
Description
ProductName
ProductType
QtyOnHand
0
VendorID
0
Required Fields
Note
Green background area indicates that data must be input into the field
Record: 12 of 12
Form View
NUM

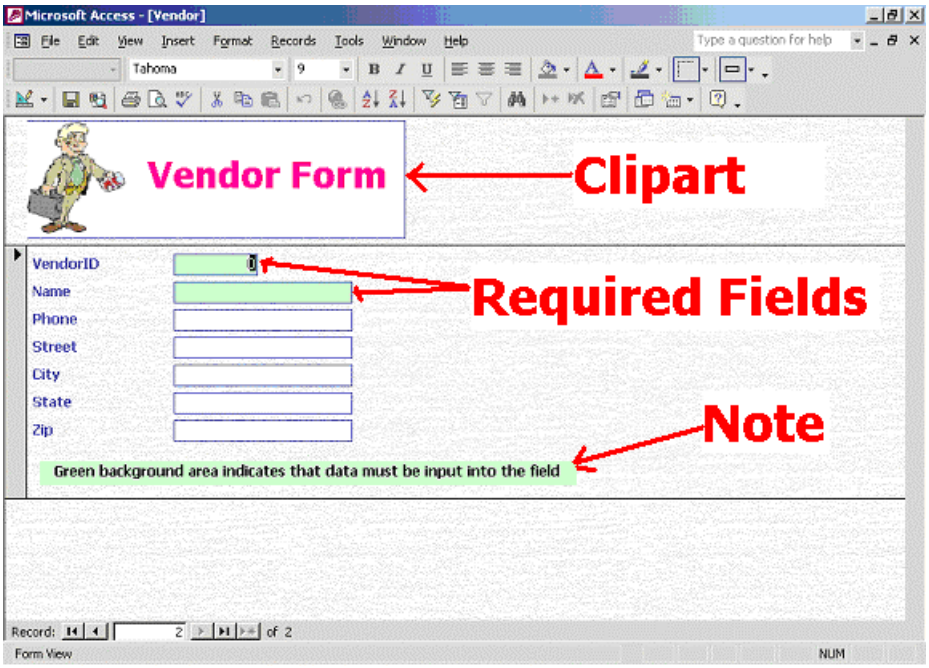
Dear Student:

In this meeting Sr. Steve needs you to create a form similar to the one in the figure below.

First, download the updated version (**BestMemories2.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name.

Second, open the database saved in your desktop, select Forms Object in the Database window. Start with the Form Wizard, and then modify the resulting form as necessary so that your finished form accommodates all of the following:

a) A clip art image in the form header. Note that Sr. Steve has mistakenly sent you a clipart that needs to be inserted into a form being developed by one of your team members. So, please communicate with them members so that you can exchange cliparts until you all have the appropriate clipart for all forms. The header of your form should have a clip art saying "**Vendor Form**".
b) A different background color for the required fields **VendorID** and **Name**, to emphasize that the data for these fields must be entered. Your team can chose any background color, but the background color needs to be the same for all forms. Thus, please communicate with your team members to decide which color to use so that all of you will have the same background color.
c) Include a note on the form that indicates the meaning of the color change. Please use the same color and format you used previously. Note: All forms need to have the same message. So, communicate with your team members to type the same message.
d) Once you have created the form, remember that either you or your group needs to upload a final database containing all forms as described in the previous page.


Microsoft Access - [Vendor]
File Edit View Insert Format Records Tools Window Help
Type a question for help
Tahoma
9
Vendor Form
Clipart
VendorID
Name
Phone
Street
City
State
Zip
Required Fields
Note
Green background area indicates that data must be input into the field
Record:
2
of 2
Form View
NUM

CLIPARTS TO BE SENT TO THE TEAM MEMBERS

Customer Form



Customer Form

Product Form



Product Form

Vendor Form



Vendor Form

Order Form



Order Form

OrderLine Form



OrderLine Form

MEETING 2 – FORMS

TASK A – CUSTOMER FORM

Task	Possible Points	Received Points
Form Created	1	
Clipart Inserted	1	
Background Color for CustomerID	1	
Background Color for Name	1	
Note indicating the meaning of color change	1	
Total	5	

TASK B– ORDER FORM

Task	Possible Points	Received Points
Form Created	1	
Clipart Inserted	1	
Background Color for OrderNumber	1	
Background Color for OrderDate	1	
Note indicating the meaning of color change	1	
Total	5	

TASK C– ORDERLINE FORM

Task	Possible Points	Received Points
Form Created	1	
Clipart Inserted	1	
Background Color for OrderNumber	1	
Background Color for ProductNumber	1	
Note indicating the meaning of color change	1	
Total	5	

TASK D– PRODUCT FORM

Task	Possible Points	Received Points
Form Created	1	
Clipart Inserted	1	
Background Color for ProductNumber	1	
Background Color for VendorNumber	1	
Note indicating the meaning of color change	1	
Total	5	

TASK E– VENDOR FORM

Task	Possible Points	Received Points
Form Created	1	
Clipart Inserted	1	
Background Color for VendorNumber	1	
Background Color for Name	1	
Note indicating the meaning of color change	1	
Total	5	

FINAL GRADING

Task	Possible Points	Received Points
Task A	5	
Task B	5	
Task C	5	
Task D	5	
Task E	5	
Sub-Total	25	
Number of FORMs in the final database (2 each)	10	
Total	35	
Adjusted Total (Total / 3.5)	10	

****
*** **THIRD MEETING** *
****

Hi Everyone!

Steve and I have analyzed the work (you) your group has done in the last meeting. In order to continue your work, Steve applied a unique format to all forms so that we can have a standardized system across different groups that are working in this project. Thus, an updated version of your work has been uploaded into the FILES section of the Yahoo! Groups website.

Sr. Steve sent an email to each member of your group describing the work you need to perform. Therefore, your first step is to check your email in order to download information on what Sr. Steve wants you to create. To do so, access your Yahoo email account at **http://www.yahoo.com** and download (SAVE AS …) the task description in your desktop. When downloading your file use the option "Download Without Scan" and then "Save". When you finish, move to the top of the yahoo screen and **Sign Out** from your yahoo email account. Then access your group homepage at http://groups.yahoo.com.

At the end of this meeting, either you or your group needs to upload a database with all **tables** and **updated forms** into the FILES section of the Yahoo! Groups website. In case your group decides to post a unique solution for all group members, you will have to communicate with them in order to select the person who will be responsible to put all tables together into a single database file called **BestMemoriesFinal.mdb** and upload it into Yahoo! Groups homepage. In case you decide to post your own solution the database has to be named as your user ID (e.g., mis2113_gxxxy). But, remember that your database must contain all forms and buttons asked by Sr. Steve and you have to post a message informing the name of your final database so that Debra knows how to evaluate your progress.

In case (you) your group does not finish all tasks by the end of this meeting, please, upload whatever you have done so far and post a message describing what you have done. Your evaluation will be based on what you were able to accomplish.

Thank you and Good Luck!
Debra

Dear Student:

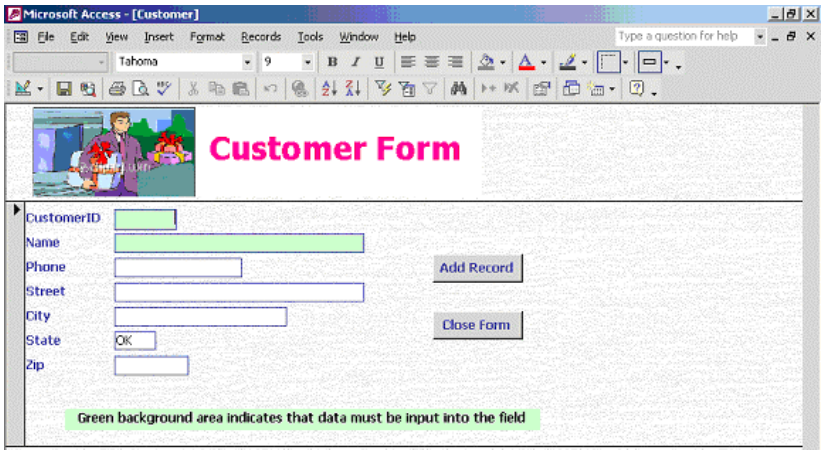
In this meeting Sr. Steve needs you to add two command buttons and a new record into the **CUSTOMER TABLE.**

First, download the updated version (**BM3-MemberA.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

a) Add the following command buttons: **Add Record** and **Close Form**. You can read the Adding Command Buttons manual. In case you have not received this manual, please communicate with you team members so that they can send you a copy.

b) A different font/fore color for the text displayed in the buttons. Your team can choose any color, but the color needs to be the same for all buttons in all forms. Thus, please communicate with your team members to decide which color to use.

c) Using the Add Record button you have just created, please enter a new record into the **CUSTOMER TABLE**. The content of this new record has been sent to one of your group members. So, you need to communicate with them to get this information.



Record to be added into the **VENDOR table.** (This information needs to be shared with your group members).
VendorID = 100; **Name** = your group's name; **Phone** = 1659; **Street** = 'Elm Street'; **City** = 'Norman'; **Sate** = 'OK'; **Zip** = 73071

Note: You can exchange any information you want with your group members, but you **CAN NOT** add (upload) this task description file into FILES section of the Yahoo! Groups website.

Dear Student:

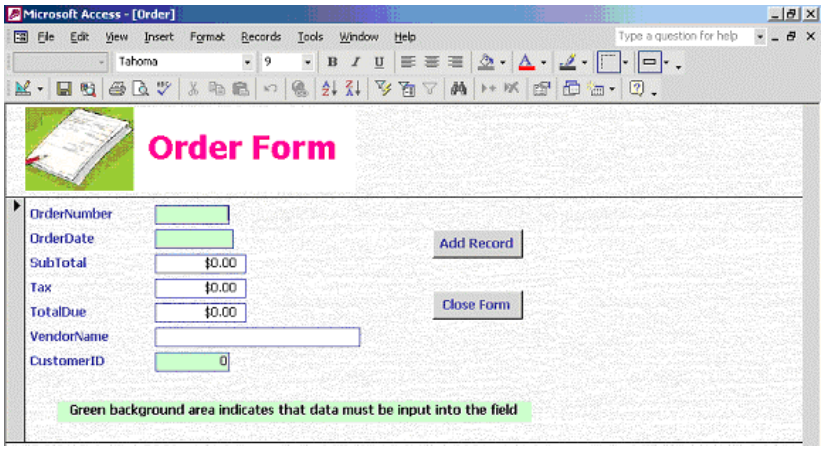
In this meeting Sr. Steve needs you to add two command buttons and a new record into the **ORDER TABLE**.

First, download the updated version (**BM3-MemberB.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

a) Add the following command buttons: **Add Record** and **Close Form**. You can read the Adding Command Buttons manual. In case you have not received this manual, please communicate with you team members so that they can send you a copy.

b) A different font/fore color for the text displayed in the buttons. Your team can choose any color, but the color needs to be the same for all buttons in all forms. Thus, please communicate with your team members to decide which color to use.

c) Using the Add Record button you have just created, please enter a new record into the **ORDER TABLE**. The content of this new record has been sent to one of your group members. So, you need to communicate with them to get this information.



Record to be added into the **CUSTOMER** table. (This information needs to be shared with your group members).
CustomerID = 910; **Name** = your group's name;
Phone = 5268; **Street** = 'Jenkins'; **City** = 'London'; **Sate** = 'GA'; **Zip** = 82200.
Note: You can exchange any information you want with your group members, but you **CAN NOT** add (upload) this task description file into FILES section of the Yahoo! Groups website.

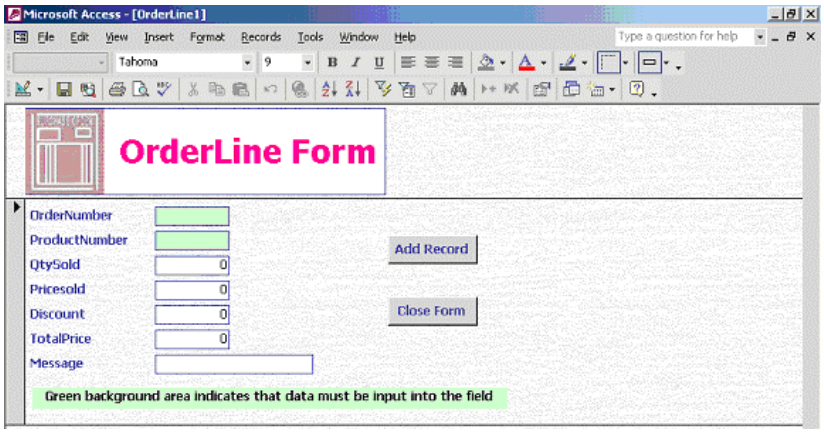
Dear Student:

First, download the updated version (**BM3-MemberC.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

a) Add the following command buttons: **Add Record** and **Close Form**. You can read the Adding Command Buttons manual. In case you have not received this manual, please communicate with you team members so that they can send you a copy.

b) A different font/fore color for the text displayed in the buttons. Your team can choose any color, but the color needs to be the same for all buttons in all forms. Thus, please communicate with your team members to decide which color to use.

c) Using the Add Record button you have just created, please enter a new record into the **ORDERLINE TABLE**. The content of this new record has been sent to one of your group members. So, you need to communicate with them to get this information.



Record to be added into the **ORDER** table. (This information needs to be shared with your group members).
OrderNumber = 6; **OrderDate** = today's date; **SubTotal** = 2,500.00; **Tax** = 250.00; **TotalDue** = 2,750.00; **VendorName** = your instructor's name; **CustomerID** = 910

Note: You can exchange any information you want with your group members, but you **CAN NOT** add (upload) this task description file into FILES section of the Yahoo! Groups website.

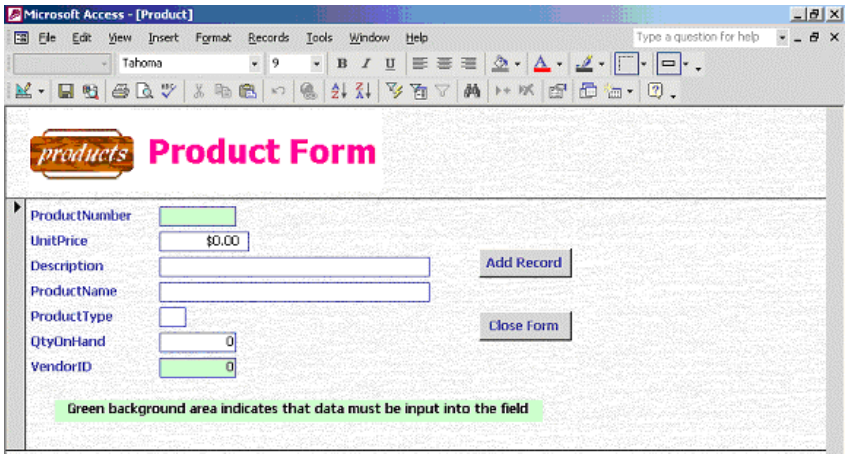
Dear Student:

First, download the updated version (**BM3-MemberD.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

a) Add the following command buttons: **Add Record** and **Close Form**. You can read the Adding Command Buttons manual. In case you have not received this manual, please communicate with you team members so that they can send you a copy.

b) A different font/fore color for the text displayed in the buttons. Your team can choose any color, but the color needs to be the same for all buttons in all forms. Thus, please communicate with your team members to decide which color to use.

c) Using the Add Record button you have just created, please enter a new record into the **PRODUCT TABLE**. The content of this new record has been sent to one of your group members. So, you need to communicate with them to get this information.



Record to be added into the **ORDERLINE** table. (This information needs to be shared with your group members).
OrderNumber = 6; **ProductNumber** = 4
QtySold = 5; **PriceSold** = 500.00; **Discount** = 0; **TotalPrice** = 500.00

Note: You can exchange any information you want with your group members, but you **CAN NOT** add (upload) this task description file into FILES section of the Yahoo! Groups website.

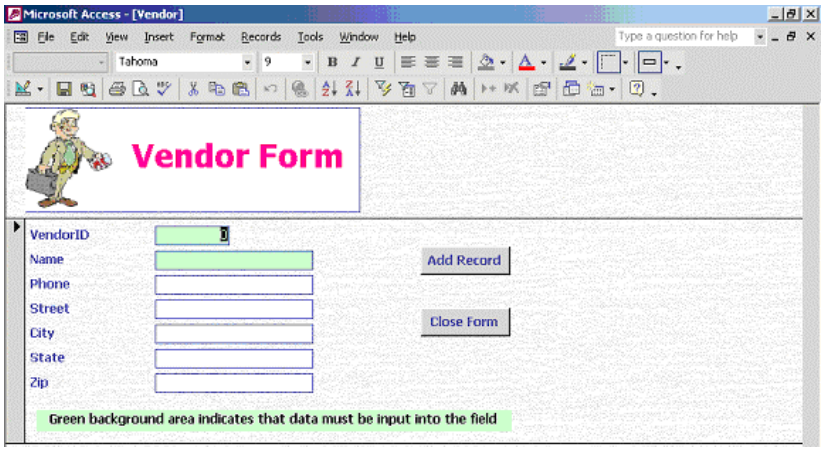
Dear Student:

First, download the updated version (**BM3-MemberE.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

a) Add the following command buttons: **Add Record** and **Close Form**. You can read the Adding Command Buttons manual. In case you have not received this manual, please communicate with you team members so that they can send you a copy.

b) A different font/fore color for the text displayed in the buttons. Your team can choose any color, but the color needs to be the same for all buttons in all forms. Thus, please communicate with your team members to decide which color to use.

c) Using the Add Record button you have just created, please enter a new record into the **VENDOR TABLE**. The content of this new record has been sent to one of your group members. So, you need to communicate with them to get this information.



Record to be added into the **PRODUCT** table. (This information needs to be shared with your group members).
ProductNumber = 11; **UnitPrice** = 1040.00; **Description** = Roman Round hand woven basket; **ProductName** = Miniature Basket; **ProductType** ='A'; **QtyOnHand** = 1; **VendorID** = 100

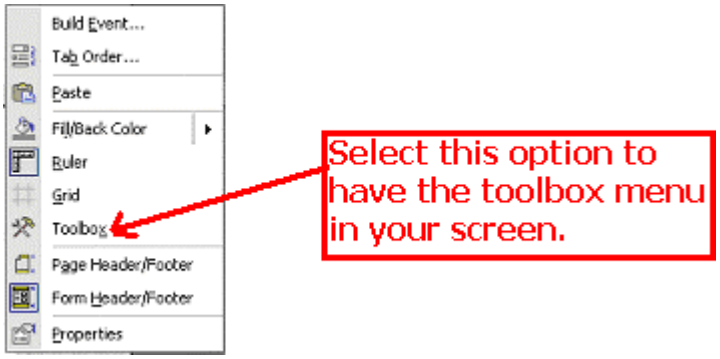
Note: You can exchange any information you want with your group members, but you **CAN NOT** add (upload) this task description file into FILES section of the Yahoo! Groups website.

****** YOU CAN SEND THIS MANUAL TO YOUR TEAM MEMBERS IN CASE THEY NEED *****

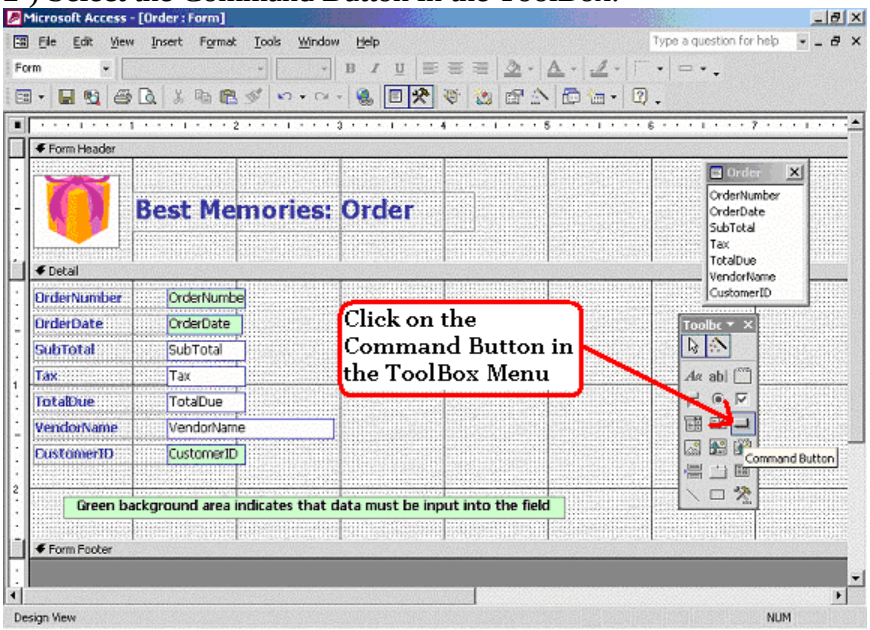
ADDING THE "ADD NEW RECORD" COMMAND BUTTON

Below we describe the steps you need to follow to add the "ADD NEW RECORD" Command Buttons into a form.

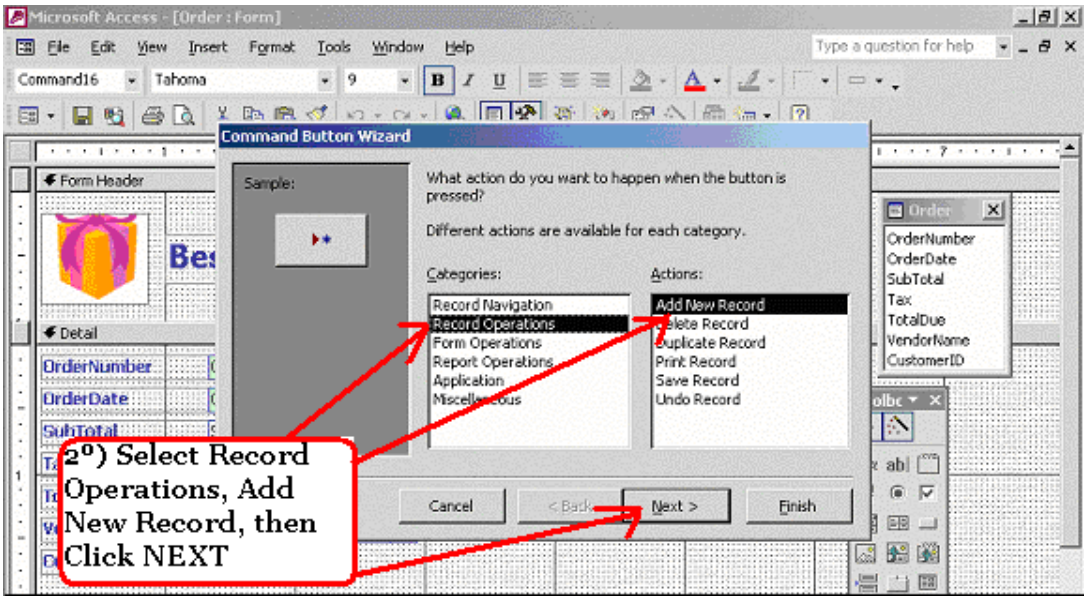
1º) Open the form in the Design View. In case the toolbox menu does not appear in your screen, right-click in your mouse so that it pops up a screen with the Toolbox option as shown below. If you already have the Toolbox Menu, skip to the second step.



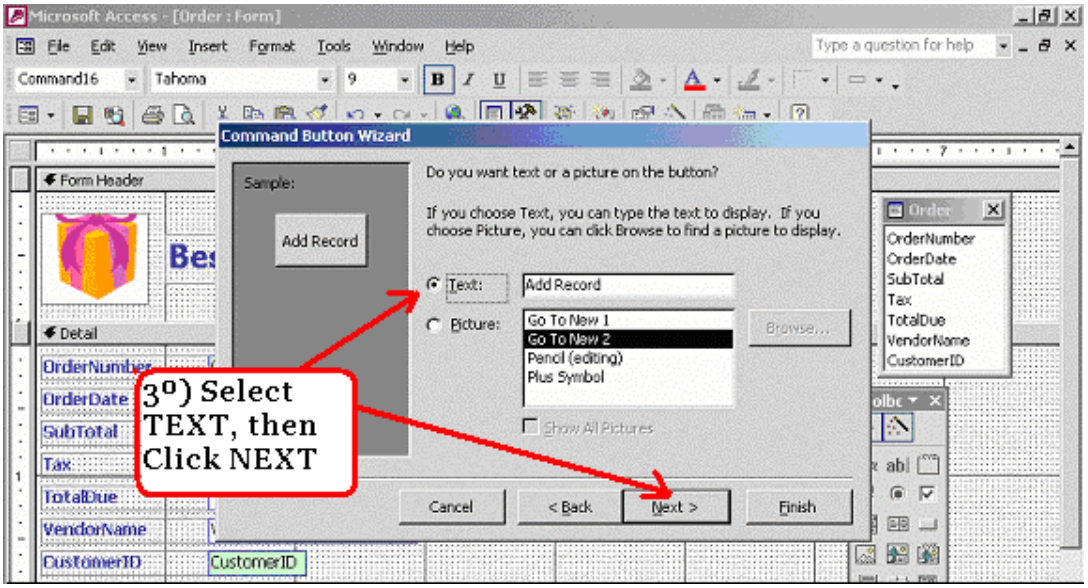
2º) Select the Command Button in the ToolBox.



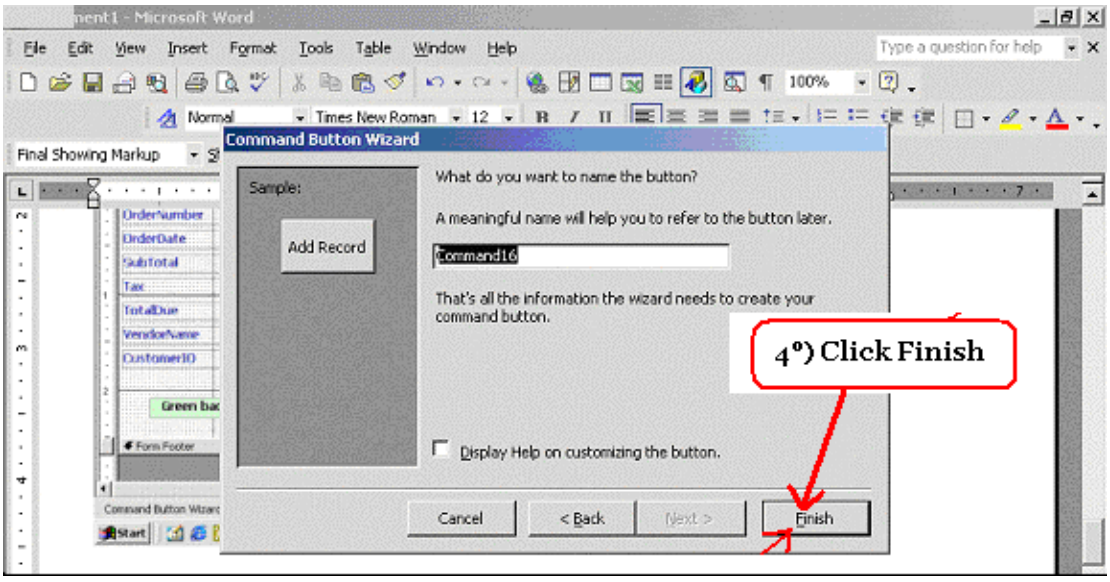
3º) Select Record Operations/Add a new record and then Click Next button.



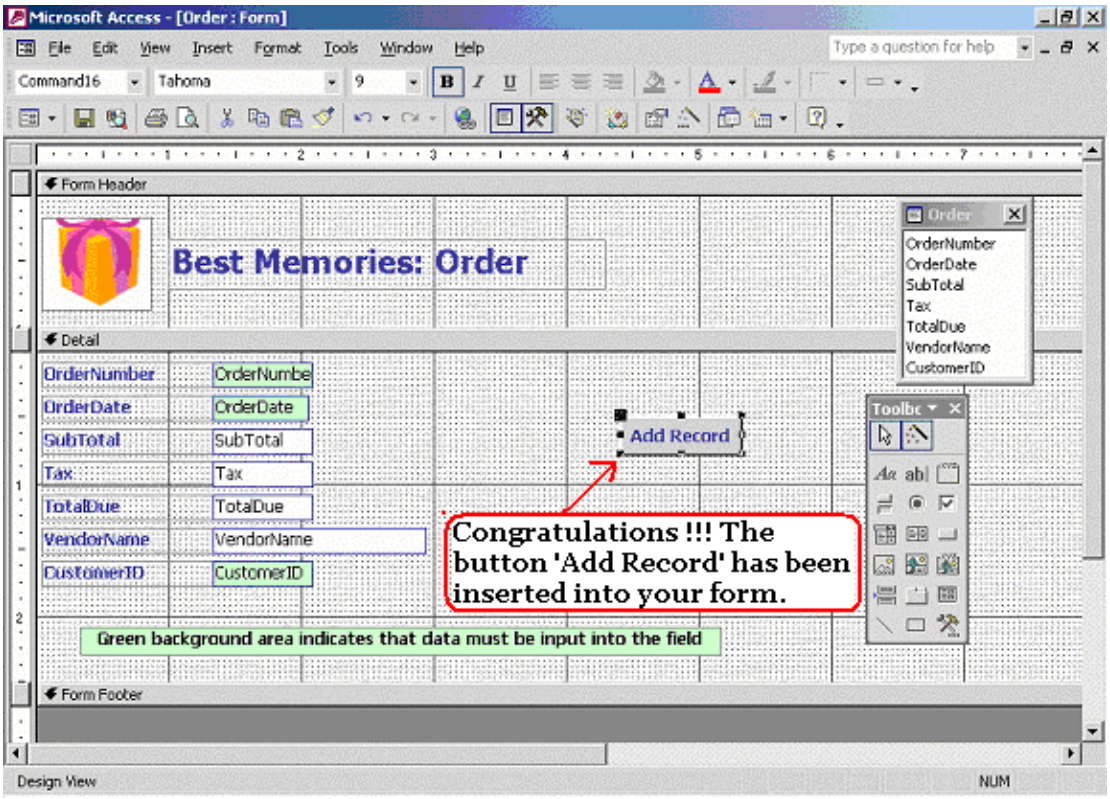
4º) Select Text, then click Next.



5º) Click Finish button.



6º) Command Button Created.



MEETING 3 – BUTTONS AND NEW RECORD

TASK A – CUSTOMER FORM

Task	Possible Points	Received Points
Add Button Created and Working	1	
Close Form Button Created and Working	1	
Color for all buttons in all forms are the same	1	
New Record Entered	1	
Form appearance	1	
Total	5	

TASK B– ORDER FORM

Task	Possible Points	Received Points
Add Button Created and Working	1	
Close Form Button Created and Working	1	
Color for all buttons in all forms are the same	1	
New Record Entered	1	
Form appearance	1	
Total	5	

TASK C– ORDERLINE FORM

Task	Possible Points	Received Points
Add Button Created and Working	1	
Close Form Button Created and Working	1	
Color for all buttons in all forms are the same	1	
New Record Entered	1	
Form appearance	1	
Total	5	

TASK D– PRODUCT FORM

Task	Possible Points	Received Points
Add Button Created and Working	1	
Close Form Button Created and Working	1	
Color for all buttons in all forms are the same	1	
New Record Entered	1	
Form appearance	1	
Total	5	

TASK E– VENDOR FORM

Task	Possible Points	Received Points
Add Button Created and Working	1	
Close Form Button Created and Working	1	
Color for all buttons in all forms are the same	1	
New Record Entered	1	
Form appearance	1	
Total	5	

FINAL GRADING

Task	Possible Points	Received Points
Task A	5	
Task B	5	
Task C	5	
Task D	5	
Task E	5	
Sub-Total	25	
Number of FORMs in the final database (2 each)	10	
Total	35	
Adjusted Total (Total / 3.5)	10	

****
*** **FOURTH MEETING** *
****

Hi Everyone!

Steve and I have analyzed the work (you) your group has done in the last meeting and we have posted an updated version (**BestMemories4.mdb**) of your work into the FILES section of the Yahoo! Groups website. In order to save space in your Yahoo group's homepage, the updated version does not contain the forms you have developed in the previous meeting. So, don't worry, you will not need them at this moment.

In this meeting, Sr. Steve needs you to develop several reports. Sr. Steve sent an email to each member of your group describing the work you need to perform. Therefore, your first step is to check your email in order to download information on what Sr. Steve wants you to create. To do so, access your Yahoo email account at **http://www.yahoo.com** and download (SAVE AS …) the task description in your desktop. When downloading your file use the option "Download Without Scan" and then "Save". When you finish, move to the top of the yahoo screen and **Sign Out** from your yahoo email account. Then access your group homepage at **http://groups.yahoo.com**.

At the end of this meeting, either you or your group needs to upload a database with all tables and new forms into the FILES section of the Yahoo! Groups website. In case your group decides to post a unique solution for all group members, you will have to communicate with them in order to select the person who will be responsible to put all reports together into a single database file called **BestMemoriesFinal.mdb** and upload it into Yahoo! Groups homepage. In case you decide to post your own solution the database has to be named as your user ID (e.g., mis2113_gxxxy). But, remember that your database must contain all reports asked by Sr. Steve and you have to post a message informing the name of your final database so that Debra knows how to evaluate your progress.

In case (you) your group does not finish all tasks by the end of this meeting, please, upload whatever you have done so far and post a message describing what you have done. Your evaluation will be based on what you were able to accomplish.

Thank you and Good Luck!
Debra

Dear Student:

In this meeting Sr. Steve needs you to create a report similar to the one in Figure 1. The design of your report can be slightly different from ours, but it needs to list **ONLY** customers that live in the state of Georgia, i.e., 'GA'. To do so, please, follow the steps below.

First, download the updated version (**BestMemories4.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

Second, in order to list only customers that live in the state of Georgia, you should create a query named as **GA-CUSTOMERS** using the menu option ***Create query by using the Wizard***. You can read the Creating Query manual sent to one of your team members.

After creating the query, you need to click on the Reports button in the Database window, select the menu option ***Create report by using the Wizard*** and select the query you have developed previously.

1. Insert a clip art image in the report header. The clipart you have received belongs to a report being developed by another member of your team. So, communicate with your team members so that you all can have the appropriate clipart for every report.

2. Communicate with your team members to choose one standard color for the labels in the page header (e.g., CustomerID, Name, Phone, ProductNumber, OrderNumber, etc.) in all reports. You don't need to change the color of the clipart.

3. The report should contain ALL fields of the table.

4. List customers in DESCENDING ORDER of CustomerID.

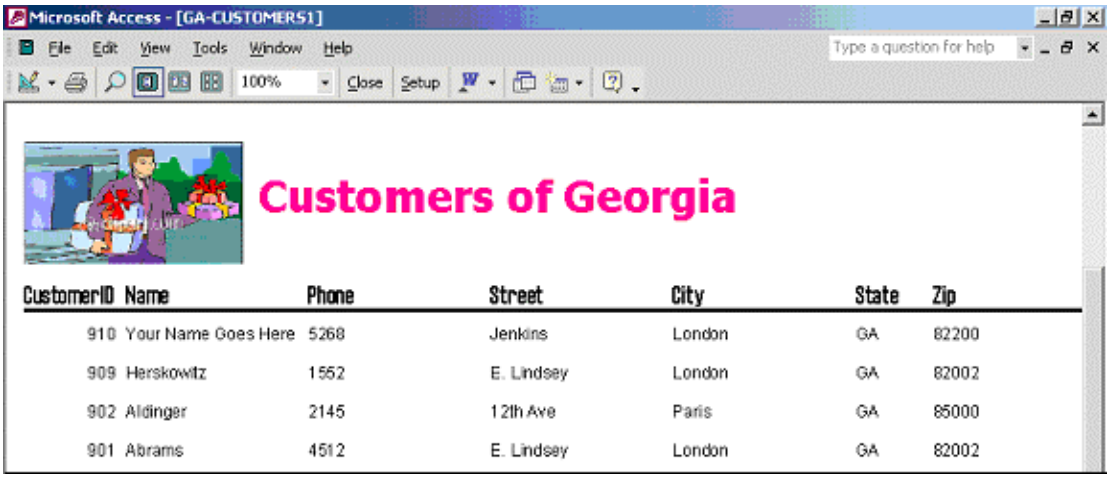


Figure 1 – Customers of Georgia Report

Dear Student:

In this meeting Sr. Steve needs you to create a report similar to the one in Figure 1. The design of your report can be slightly different from ours, but it needs to list **ONLY** products with UnitPrice greater than US$ 1,000.00. To do so, please, follow the steps below.

First, download the updated version (**BestMemories4.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

Second, in order to list only products with UnitPrice greater than US$ 1,000.00, you should create a query named as **PRODUCTS1000** using the menu option ***Create query by using the Wizard***. You can read the Creating Query manual that has been sent to one of your team members.

After creating the query, you need to click on the Reports button in the Database window, select the menu option ***Create report by using the Wizard*** and select the query you have developed previously.

1. Insert a clip art image in the report header. The clipart you have received belongs to a report being developed by another member of your team. So, communicate with your team members so that you all can have the appropriate clipart for every report.

2. Communicate with your team members to choose one standard color for the labels in the page header (e.g., CustomerID, Name, Phone, ProductNumber, OrderNumber, etc.) in all reports. You don't need to change the color of the clipart.

3. The report should contain ALL fields of the table.

4. List products in ASCENDING ORDER of UnitPrice.

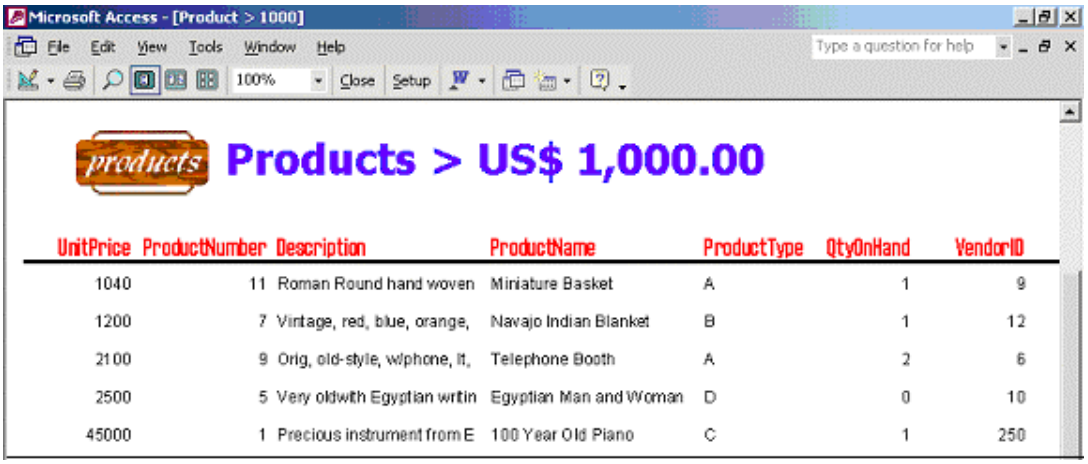


Figure 1 –Products > 1000 Report

Dear Student:

In this meeting Sr. Steve needs you to create a report similar to the one in Figure 1. The design of your report can be slightly different from ours, but it needs to list **ONLY** orders with TotalDue less than US$ 4,000.00. To do so, please, follow the steps below.

First, download the updated version (**BestMemories4.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

Second, in order to list only orders with TotalDue less than US$ 4,000.00, you should create a query named as **ORDERS4000** using the menu option ***Create query by using the Wizard***. You can read the Creating Query manual that has been sent to one of your team members.

After creating the query, you need to click on the Reports button in the Database window, select the menu option ***Create report by using the Wizard*** and select the query you have developed previously.

1. Insert a clip art image in the report header. The clipart you have received belongs to a report being developed by another member of your team. So, communicate with your team members so that you all can have the appropriate clipart for every report.

2. Communicate with your team members to choose one standard color for the labels in the page header (e.g., CustomerID, Name, Phone, ProductNumber, OrderNumber, etc.) in all reports. You don't need to change the color of the clipart.

3. The report should contain ALL fields of the table.

4. List orders in DESCENDING ORDER of TotalDue.

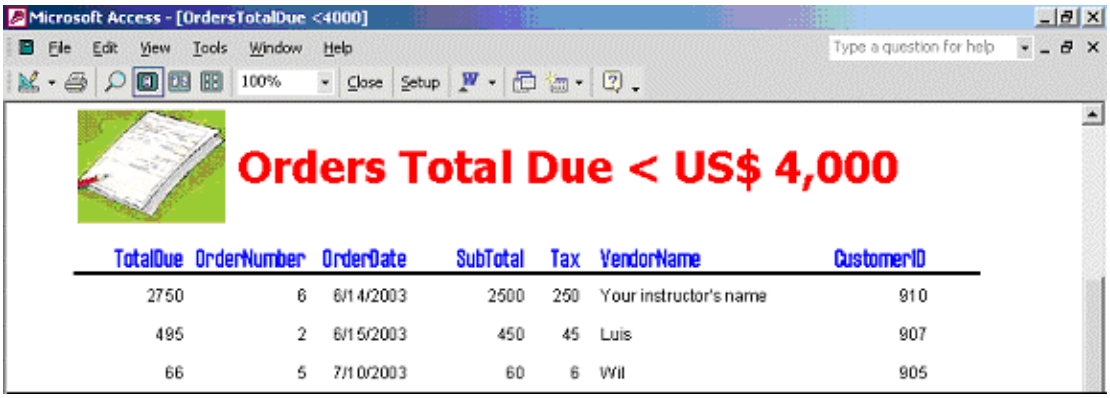


Figure 1 –ORDERS TotalDue < 4000 Report

Dear Student:

In this meeting Sr. Steve needs you to create a report similar to the one in Figure 1. The design of your report can be slightly different from ours, but it needs to list **ONLY** products with ProductType = 'A'. To do so, please, follow the steps below.

First, download the updated version (**BestMemories4.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

Second, in order to list only products with Type = 'A', you should create a query named as **PRODUCTA** using the menu option ***Create query by using the Wizard***. You can read the Creating Query manual that has been sent to one of your team members.

After creating the query, you need to click on the Reports button in the Database window, select the menu option ***Create report by using the Wizard*** and select the query you have developed previously.

1. Insert a clip art image in the report header. The clipart you have received belongs to a report being developed by another member of your team. So, communicate with your team members so that you all can have the appropriate clipart for every report.

2. Communicate with your team members to choose one standard color for the labels in the page header (e.g., CustomerID, Name, Phone, ProductNumber, OrderNumber, etc.) in all reports. You don't need to change the color of the clipart.

3. The report should contain ALL fields of the table.

4. List products in DESCENDING ORDER of ProductNumber.

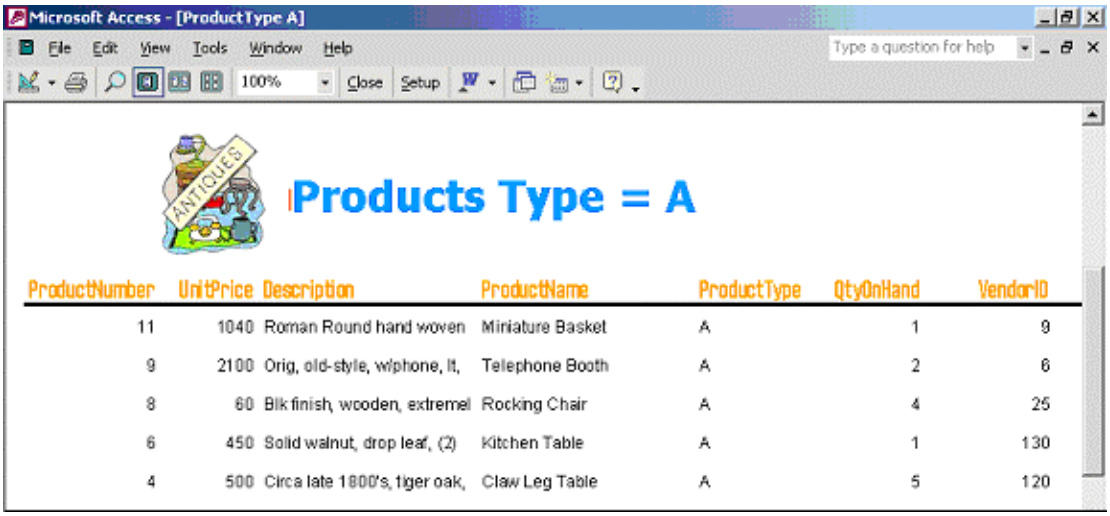


Figure 1 –Product Type = 'A' Report

Dear Student:

In this meeting Sr. Steve needs you to create a report similar to the one in Figure 1. The design of your report can be slightly different from ours, but it needs to list **ONLY** orders with CustomerID = 905. To do so, please, follow the steps below.

First, download the updated version (**BestMemories4.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

Second, in order to list **ONLY** orders with CustomerID = 905, you should create a query named as **ORDERSCUSTOMER905** using the menu option ***Create query by using the Wizard***. You can read the Creating Query manual that has been sent to one of your team members.

After creating the query, you need to click on the Reports button in the Database window, select the menu option ***Create report by using the Wizard*** and select the query you have developed previously.

1. Insert a clip art image in the report header. The clipart you have received belongs to a report being developed by another member of your team. So, communicate with your team members so that you all can have the appropriate clipart for every report.

2. Communicate with your team members to choose one standard color for the labels in the page header (e.g., CustomerID, Name, Phone, ProductNumber, OrderNumber, etc.) in all reports. You don't need to change the color of the clipart.

3. The report should contain ALL fields of the table.

4. List orders in ASCENDING ORDER of OrderDate.

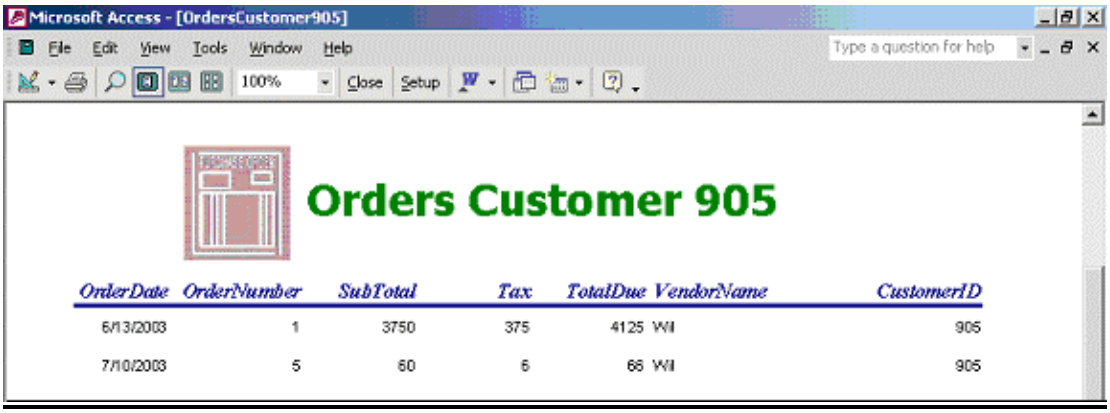


Figure 1 –Orders of Customer 905 Report



Customers of Georgia



Products > US$ 1,000.00



Orders Total Due < US$ 4,000



Products Type = A



Orders Customer 905

****** YOU CAN SEND THIS MANUAL TO YOUR TEAM MEMBERS IN CASE THEY NEED *****

CREATING A NEW QUERY

Below we described steps you need to follow to create queries to be added into the Reports. The example shows how to create a query to list ONLY OrderLine records containing products sold as Gift.

1º) Click the Queries button in the Database window.
2º) Click the option CREATE QUERY BY USING WIZARD.
3º) Select OrderLine table in the Tables/Queries popup menu.

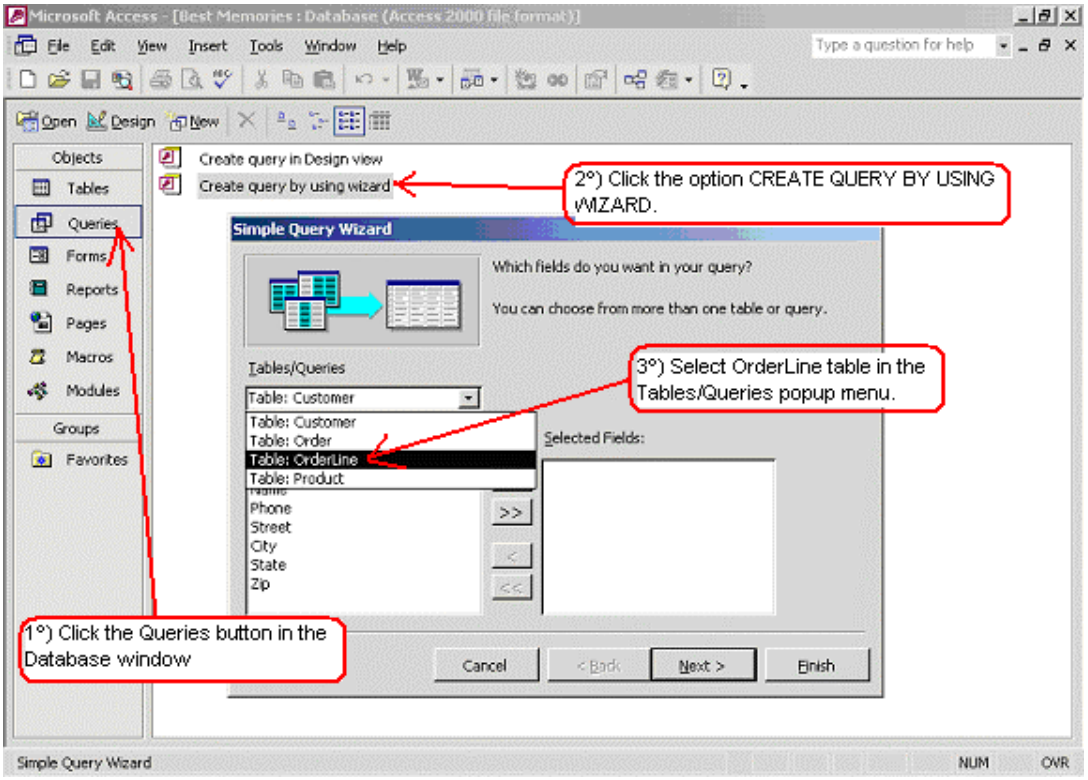
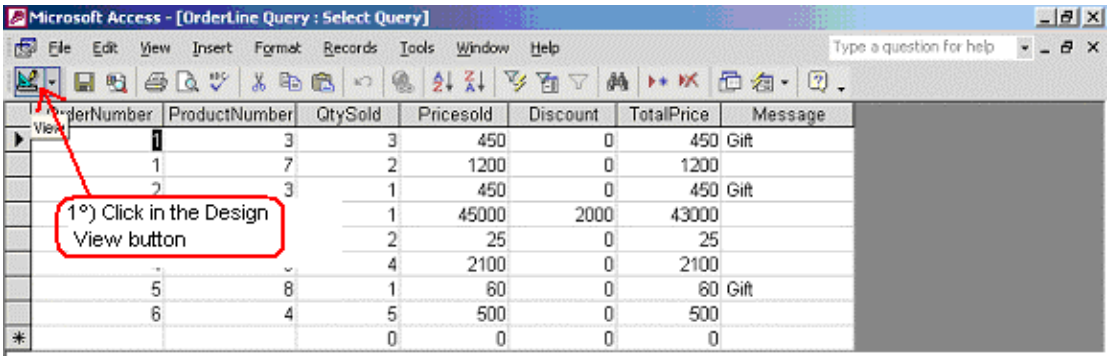


Figure 4.5 – Creating a new query

4º) Move all fields of the OrderLine table from the Available fields area to the Selected Fields area by clicking in the >> Button. Then, Click Next.
6º) In the next window select Details (shows every field of every record) as the answer to the question Would you like a detail or summary query? Then, Click Next.
7º) In the next window chose an appropriate name for your query and then click Finish.

After following the steps described above you should have the query result printed in your screen as shown in the next figure. As you can see, the query listed all OrderLine records. Thus, we still need to program the query to list ONLY OrderLine records containing products sold as Gift. To do so, please, follow the set of steps described below.



OrderNumber	ProductNumber	QtySold	Pricesold	Discount	TotalPrice	Message
1	3	3	450	0	450	Gift
1	7	2	1200	0	1200	
2	3	1	450	0	450	Gift
		1	45000	2000	43000	
		2	25	0	25	
		4	2100	0	2100	
5	8	1	60	0	60	Gift
6	4	5	500	0	500	
		0	0	0	0	

Figure 4.6: Query Result – Selecting the Design View

<u>Steps to program a query to list ONLY OrderLine records containing products sold as Gift.</u>

1º) Select the Design View by clicking in the Design View button.
2º) In the Design View window, type 'Gift' inside of the Criteria Box in the Message Field column.
3º) Click in the RUN button to see the new query result.
4º) Click in the SAVE button to save your query.
5º) Close your query window.
6º) Now you are ready to use this query in any Report.

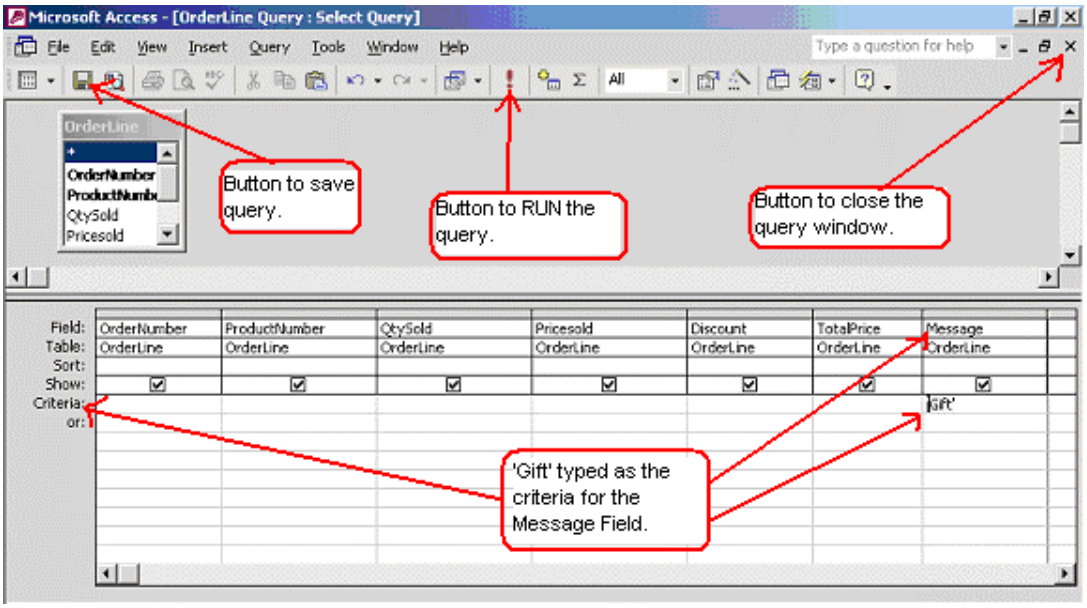


Figure 4.7: Entering a criteria into a query

MEETING 4 – REPORTS

TASK A – CUSTOMERS OF GEORGIA

Task	Possible Points	Received Points
Query GA-CUSTOMERS Created and Working	1	
Clipart **"Customers of Georgia"** Inserted	1	
The same color for all labels in all reports	1	
List all fields of the table	1	
List customers in Descending Order of CustomerID	1	
Total	5	

TASK B– PRODUCTS > US$ 1,000.00

Task	Possible Points	Received Points
Query PRODUCTS1000 Created and Working	1	
Clipart **"Products > Us$ 1,000.00"** Inserted	1	
The same color for all labels in all reports	1	
List all fields of the table	1	
List products in Ascending Order of UnitPrice	1	
Total	5	

TASK C– ORDERS TOTAL DUE < US$ 4,000

Task	Possible Points	Received Points
Query ORDERS4000 Created and Working	1	
Clipart **"Orders Total Due < Us$ 4,000"** Inserted	1	
The same color for all labels in all reports	1	
List all fields of the table	1	
List orders in Descending Order of TotalDue	1	
Total	5	

TASK D– PRODUCTS TYPE = A

Task	Possible Points	Received Points
Query PRODUCTA Created and Working	1	
Clipart **"Products Type = A"** Inserted	1	
The same color for all labels in all reports	1	
List all fields of the table	1	
List products in Descending Order of ProductNumber	1	
Total	5	

TASK E– ORDERS CUSTOMER 905

Task	Possible Points	Received Points
Query ORDERSCUSTOMER905 Created and Working	1	
Clipart **"Orders Customer 905"** Inserted	1	
The same color for all labels in all reports	1	
List all fields of the table	1	
List orders in Ascending Order of OrderDate	1	
Total	5	

FINAL GRADING

Task	Possible Points	Received Points
Task A	5	
Task B	5	
Task C	5	
Task D	5	
Task E	5	
Sub-Total	25	
Number of Reports in the final database (2 each)	10	
Total	35	
Adjusted Total (Total / 3.5)	10	

****
*** **FIFTH MEETING** *
****

Hi Everyone!

Steve and I have analyzed the work (you) your group has done in the last meeting and we have posted an updated version (**BestMemories5.mdb**) of your work into the FILES section of the Yahoo! Groups website.

We realized that many employees who will be using the database system do not have the necessary knowledge to operate the system. Because of that we need to implement a user interface that enables a non-technical person to access the various objects of the Access database in a user friendly fashion. Steve developed a Switchboard containing several menu options to easily access all forms and reports. However, we still need to implement macro commands.

In this meeting, Sr. Steve needs you to **develop several macros**. He sent an email to each member of your group describing the work you need to perform. Therefore, your first step is to check your email in order to download information on what Sr. Steve wants you to create. To do so, access your Yahoo email account at **http://www.yahoo.com** and download (SAVE AS …) the task description in your desktop. When downloading your file use the option "Download Without Scan" and then "Save". When you finish, move to the top of the yahoo screen and **Sign Out** from your yahoo email account. Then access your group homepage at **http://groups.yahoo.com**.

At the end of this meeting, either you or your group needs to upload a database with all **macros** into the FILES section of the Yahoo! Groups website. In case your group decides to post a unique solution for all group members, you will have to communicate with them in order to select the person who will be responsible to put all reports together into a single database file called **BestMemoriesFinal.mdb** and upload it into Yahoo! Groups homepage. In case you decide to post your own solution the database has to be named as your user ID (e.g., mis2113_gxxxy). But, remember that your database must contain all macros asked by Sr. Steve.

In case (you) your group does not finish all tasks by the end of this meeting, please, upload whatever you have done so far and post a message describing what you have done. Your evaluation will be based on what you were able to accomplish.

Thank you and Good Luck!
Debra

Dear Student:

In this meeting Sr. Steve needs you to create an **AUTOXEC macro**. To do so, please, follow the steps below.

First, download the updated version (**BestMemories5.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

1) Create an AUTOXEC macro, which will open automatically the switchboard whenever the database is opened. This macro has also to maximize the switchboard window. See example in figure 1.

2) Once you finish the macro, please send it to the team member who is in charge of including all macros into the main database. Please tell your team member that you have developed a macro that needs to be inserted into the database named as AUTOEXEC.

You can read instructions in the Creating Macro manual. This manual has been sent to your team. In case you have not received this manual, please communicate with your team members so that they can send you a copy. In addition, you can ask your team members to help you on how to develop this macro.

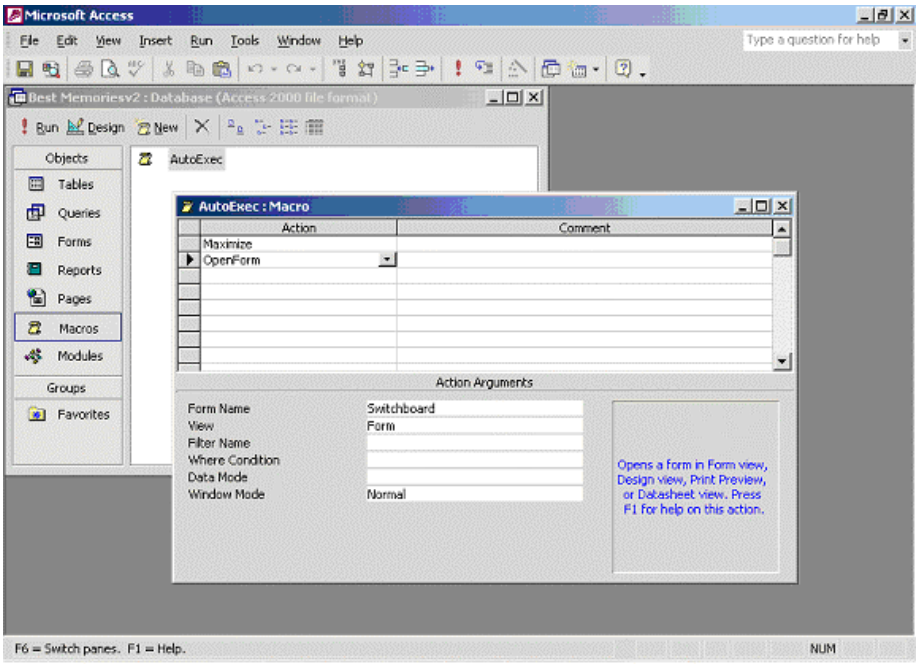


Figure 1 – AutoExec macro

Dear Student:

In this meeting Sr. Steve needs you to create a **PROTOTYPE macro**. To do so, please, follow the steps below.

First, download the updated version (**BestMemories5.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

1) Create a Prototype macro, which displays the message *"We are currently working in this function and it will be implemented in the next version. Sorry for any inconvenience"*. See example in figure 1.

2) Once you finish the macro, please send it to the team member who is in charge of including all macros into the main database. Please tell your team member that you have developed a macro named as PROTOTYPE that needs to be linked to the switchboard option *"Placing Orders Form"*. Thus, whenever a user selects this option, the system will display the Prototype macro containing the message described above.

You can read instructions in the Creating Macro manual. This manual has been sent to your team. In case you have not received this manual, please communicate with your team members so that they can send you a copy. In addition, you can ask your team members to help you on how to develop this macro.

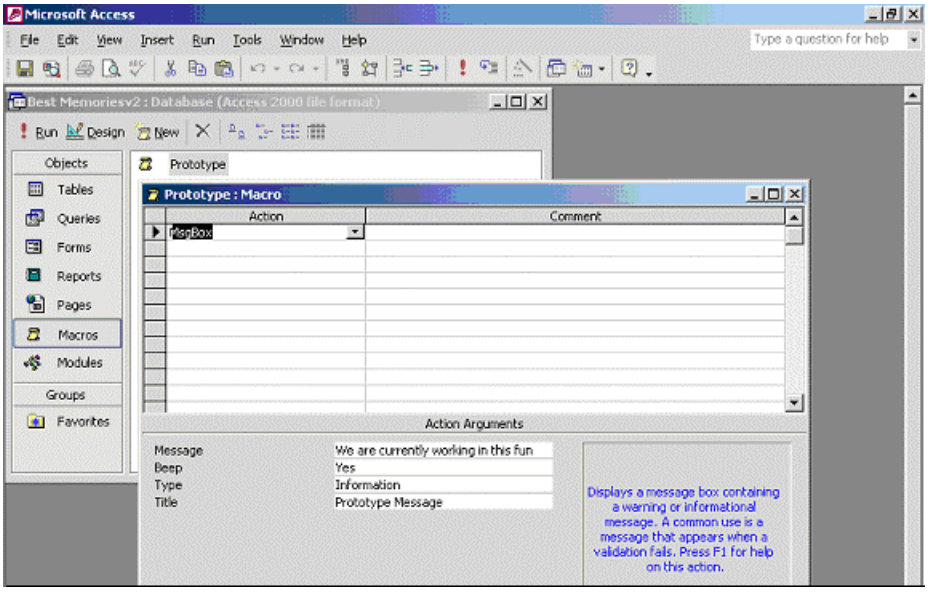


Figure 1 – Prototype macro

Dear Student:

In this meeting Sr. Steve needs you to create an **UNAVAILABLE macro**. To do so, please, follow the steps below.

First, download the updated version (**BestMemories5.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

1) Create a Prototype macro, which displays the message *"This report is temporarily unavailable"*. See example in figure 1.

2) Once you finish the macro, please send it to the team member who is in charge of including all macros into the main database. Please tell your team member that you have developed a macro named as UNAVAILABLE that needs to be linked to the switchboard option *"Report: Products Type A"*. Thus, whenever a user selects this option, the system will display the Unavailable macro containing the message described above.

You can read instructions in the Creating Macro manual. This manual has been sent to your team. In case you have not received this manual, please communicate with your team members so that they can send you a copy. In addition, you can ask your team members to help you on how to develop this macro.

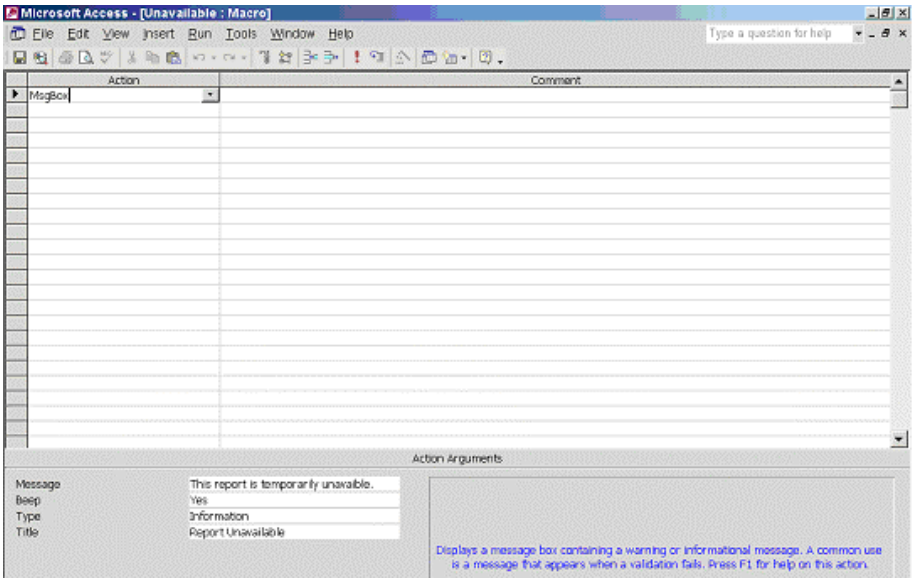


Figure 1 – Unavailable macro

Dear Student:

In this meeting Sr. Steve needs you to create a **BACKUP macro**. To do so, please, follow the steps below.

First, download the updated version (**BestMemories5.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

1) Create a **BACKUP** macro, which displays the message, *"Please, remember to backup the system."*, and closes the database. See example in figure 1.

2) Once you finish the macro, please send it to the team member who is in charge of including all macros into the main database. Please tell your team member that you have developed a macro named as BACKUP that needs to be linked to the switchboard option "EXIT this application". Thus, whenever a user selects this option, the system will display the Prototype macro containing the backup message described above.

You can read instructions in the Creating Macro manual. This manual has been sent to your team. In case you have not received this manual, please communicate with your team members so that they can send you a copy. In addition, you can ask your team members to help you on how to develop this macro.

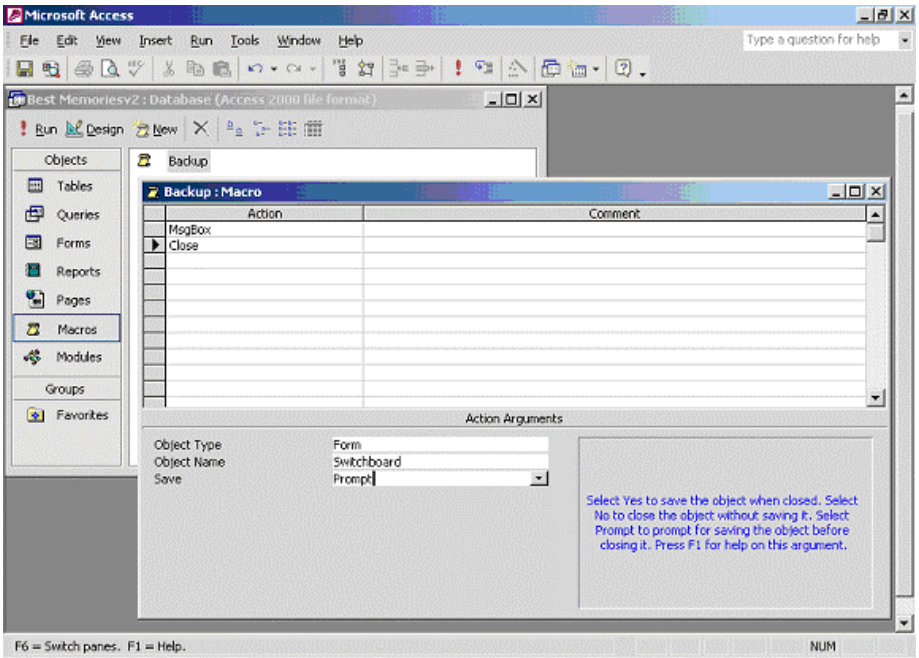


Figure 1 – Backup macro

Dear Student:

In this meeting Sr. Steve needs you to add a clipart. To do so, please, follow the steps below.

First, download the updated version (**BestMemories5.mdb**) of your work from the Yahoo! Groups website in your desktop by selecting desktop in the folder window. Also, assign your Yahoo ID, for example, mis2113_gxxxy as the database name. Then, open the database saved in your desktop and work on the following items:

1) Add a clipart that was provided to your team and your Team's name in the Switchboard. See example in figure 1.

2) Once you finish the previous step, tell your team members that you are ready to insert into the main database all macros they have developed. Here are the macros that you should be receiving: a) An AUTOXEC macro; b) A PROTOTYPE macro; c) A BACKUP macro; and d) An UNAVAILABLE macro. Then, install these macros into the main database. Therefore, you need to communicate with them regarding the macros they are developing. In addition, you can ask your team members to help you on how to develop incorporate their macros into the switchboard.

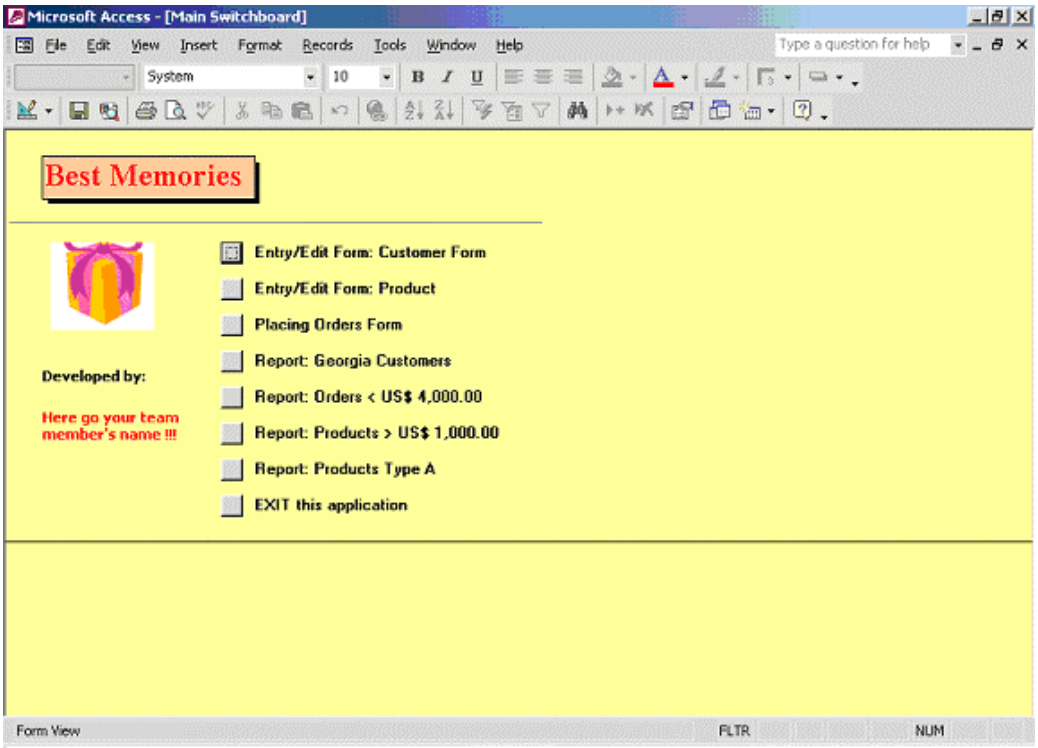
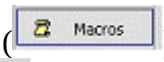


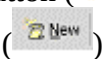
Figure 1 – Switchboard

CREATING MACROS

<u>The example below describes how to create an AUTOEXEC macro.</u>

1º) Click the MACROS button (

)in the Database window.

2º) Click the option NEW (

) to open the window to create a new macro.
3º and 4º) Enter Maximize and OpenForm actions as described in figure A.
5º) Close the window and save the macro named as AUTOEXEC.
6º) Now you are ready to send this macro to your team members and use it in the database.

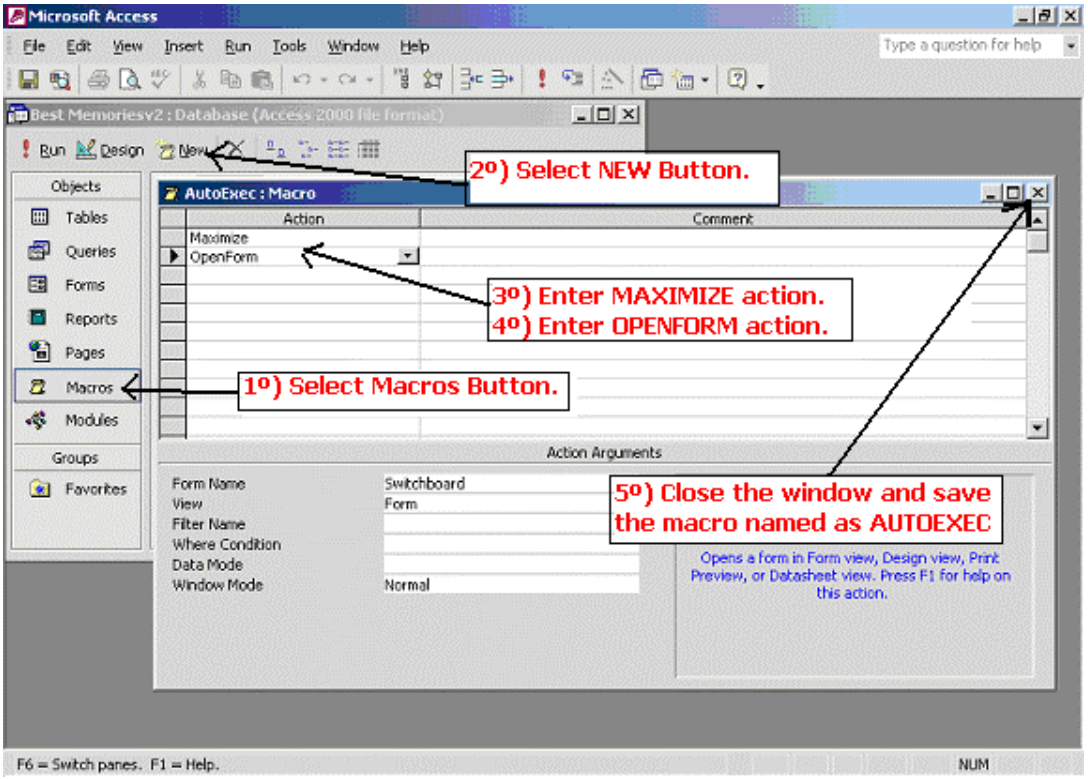
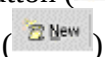


Figure A – Creating an AUTOEXEC macro

The example below describes how to create a PROTOTYPE macro.

1º) Click the MACROS button (

)in the Database window.

2º) Click the option NEW (

) to open the window to create a new macro.
3º) Enter MsgBox action as described in figure B.
4º) Close the window and save the macro named as PROTOTYPE.
5º) Now you are ready to send this macro to your team members and use it in the database.

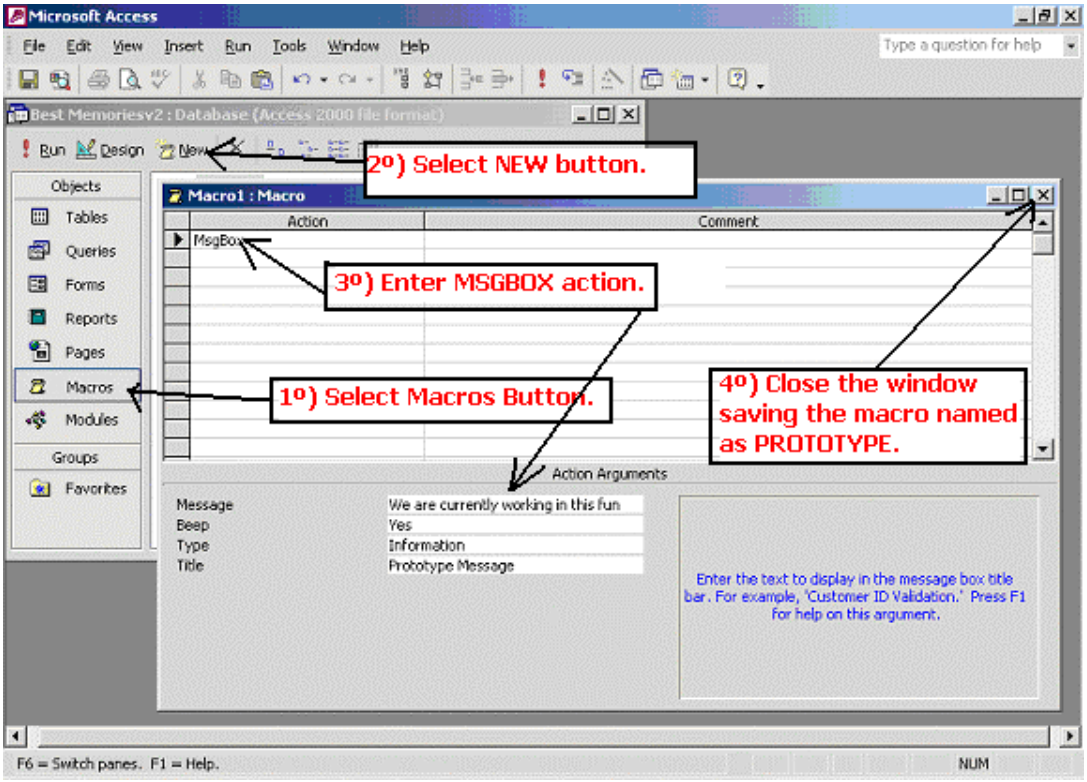
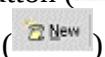


Figure B – Creating a PROTOTYPE macro

The example below describes how to create a BACKUP macro.

1º) Click the MACROS button (

)in the Database window.

2º) Click the option NEW (

) to open the window to create a new macro.
3º and 4º) Enter MsgBox and CLOSE actions as described in figure C.
5º) Close the window and save the macro named as BACKUP.
6º) Now you are ready to send this macro to your team members and use it in the database.

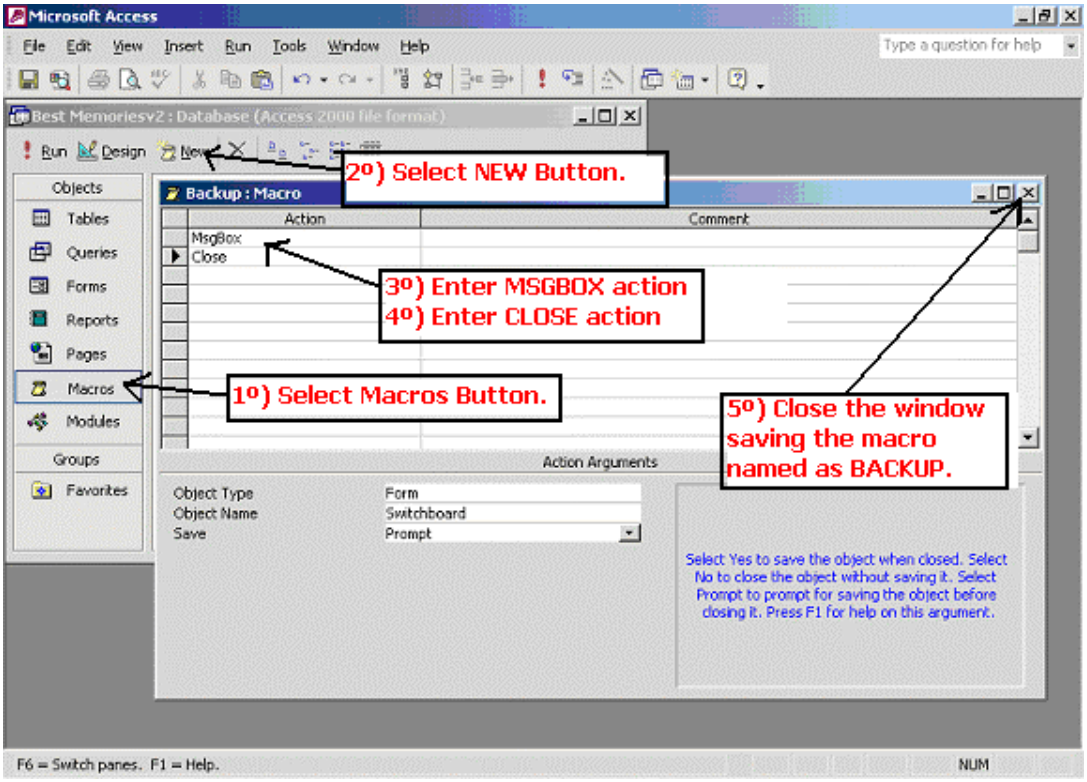


Figure C – Creating a BACKUP macro

MEETING 5 – MACROS

TASK A

Task	Possible Points	Received Points
Macro AUTOEXEC Created	1	
Macro AUTOEXEC Working	1	
Total	2	

TASK B

Task	Possible Points	Received Points
Macro PROTOTYPE Created	1	
Macro PROTOTYPE Working	1	
Total	2	

TASK C

Task	Possible Points	Received Points
Macro BACKUP Created	1	
Macro BACKUP Working	1	
Total	2	

TASK D

Task	Possible Points	Received Points
Macro UNAVAILABLE Created	1	
Macro UNAVAILABLE Working	1	
Total	2	

TASK E– ORDERS CUSTOMER 905

Task	Possible Points	Received Points
Insert Clipart into the Switchboard	1	
Insert Macros into the Switchboard	1	
Total	2	

FINAL GRADING

Task	**Possible Points**	**Received Points**
Task A	2	
Task B	2	
Task C	2	
Task D	2	
Task E	2	
Total	10	

APPENDIX E – IRB APPROVAL

The University of Oklahoma

OFFICE OF HUMAN RESEARCH PARTICIPANT PROTECTION

September 4, 2003

Mr. Andre L. Araujo
307E Adams Hall
CAMPUS MAIL

Dear Mr. Araujo:

The Institutional Review Board-Norman Campus has reviewed your proposal, "Towards an Integrative Theory of Trust in Virtual Teams: The Role of Task Perception, Virtual Setting, Technology, and Time," under the University's expedited review procedures. The Board found that this research would not constitute a risk to participants beyond those of normal, everyday life, except in the area of privacy, which is adequately protected by the confidentiality procedures. Therefore, the Board has approved the use of human subjects in this research.

This approval is for a period of twelve months from September 4, 2003, provided that the research procedures are not changed from those described in your approved protocol and attachments. Should you wish to deviate from the described subject protocol, you must notify this office, in writing, noting any changes or revisions in the protocol and/or informed consent document and obtain prior approval from the Board for the changes. A copy of the approved informed consent document(s) is attached for your use.

At the end of the research, you must submit a short report describing your use of human subjects in the research and the results obtained. Should the research extend beyond 12 months, a progress report must be submitted with the request for continuation, and a final report must be submitted at the end of the research.

If data are still being collected after five years, resubmission of the protocol is required.

Should you have any questions, please contact me at 325-8110 or irb@ou.edu.

Sincerely,

Steven O'Geary

Steven O'Geary, Ph.D.
Director, Human Research Participant Protection
Administrative Officer
Institutional Review Board-Norman Campus (FWA #00003191)

JSO
FY2004-5

Cc: Dr. E. Laurette Taylor, Chair, Institutional Review Board
Dr. Laku Chidambaram, Business Administration

INFORMED CONSENT FORM FOR RESEARCH BEING CONDUCTED UNDER THE AUSPICES OF THE UNIVERSITY OF OKLAHOMA-NORMAN CAMPUS

INTRODUCTION: This study is entitled, "Towards an Integrative Theory of Trust in Virtual Teams: The Role of Task Perception, Virtual Setting, Technology, and Time." The person(s) directing the project is Mr. Andre L. Araujo under the direction of Dr. Laku Chidambaram, Price College of Business, University of Oklahoma. This document defines the terms and conditions for consenting to participate in this study.

DESCRIPTION OF THE STUDY: During the semester you will be asked to complete a survey six times. 1) a pre-meeting questionnaire, 2) survey 1, 3) survey 2, 4) survey 3, 5) survey 4, 6) survey 5. Each time, the survey should take less than 10 minutes; over the course of the semester completing the survey should take no more than 60 minutes of your time.

At the end of the semester students of each section who filled out the survey forms will have a chance to win a free $10.00 OU Bookstore gift certificate that will be randomly drawn at the end of the last meeting. This drawing procedure will be in class and will occur in the following way: First, the user ids of all students who participated in the survey will be in a plastic bag. Second, the researcher will ask one of the students present in the class to pick one paper from the plastic bag. Third, the gift certificate will be given to the student who has the user id drawn from the plastic bag.

In order to know what students will compete for the free $10.00 OU Bookstore gift certificate, at the end of each survey form students are asked to provide their OU 4x4 code. After the drawing procedure has occurred and the gift certificate has been given to the winner student, the researcher will destroy these codes so that there will be no way to connect students' code and/or name with the survey responses.

RISKS AND BENEFITS: The key benefit to you will be the chance to win a free $10.00 OU Bookstore gift certificate. No risks beyond those experienced in routine daily life are anticipated with this research project.

CONDITIONS OF PARTICIPATION: Participation in the study is voluntary. Refusal to complete survey instruments will involve no penalty or loss of benefits to which you are otherwise entitled. Furthermore, you may discontinue participation at any time without penalty of loss of benefits to which you are otherwise entitled.

CONFIDENTIALITY: The findings from this research will be presented in aggregate form with no information specifically identifying you or any other participant in order to ensure confidentiality.

CONTACT FOR QUESTION ABOUT THE STUDY: If you have questions about the study, you may contact:

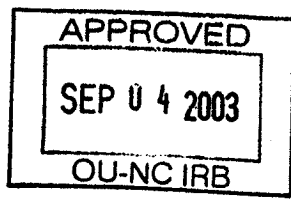
Name: Andre L. Araujo
Email: altaraujo@ou.edu
Daytime Phone: (405) 325.1659
College/Department: Price College of Business Administration/MIS Division
Campus Mailing Address: 307E Adams Hall

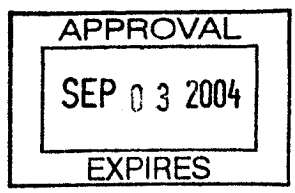
Name: Dr. Laku Chidambaram
Email: laku@ou.edu
Daytime Phone: (405) 325.8013
College/Department: Price College of Business Administration/MIS Division
Campus Mailing Address: 305C Adams Hall

For inquires about your rights as a research participant, contact the University of Oklahoma-Norman Campus Institutional Review Board (OU-NC IRB) at (405) 325.8110 or irb@ou.edu.

PARTICIPANT ASSURANCE: I have read and understand the terms and conditions of this study and I hereby agree to participate in the above-described research study. I understand my participation is voluntary and that I may withdraw at any time without penalty.

Signature of Participant	Date
Printed Name of Participant	Researcher Signature





The University of Oklahoma

OFFICE OF HUMAN RESEARCH PARTICIPANT PROTECTION

October 30, 2003

Mr. Andre L. Araujo
307E Adams Hall
CAMPUS MAIL

SUBJECT: "Towards an Integrative Theory of Trust in Virtual Teams: The Role of Task Perception, Virtual Setting, Technology, and Time"

Dear Mr. Araujo:

The Institutional Review Board has reviewed and approved the requested revision(s) to the subject protocol. This revision is as follows:

- Addition of 6 questions to survey instrument.

Please note that this approval is for the protocol and informed consent form initially approved by the Board on September 4, 2003, and the revision(s) included in your request dated October 23, 2003. If you wish to make other changes, you will need to submit a request for revision to this office for review.

If you have any questions, please contact me at 325-8110.

Sincerely yours,

Steven O'Geary

Steven O'Geary, Ph.D.
Director, Human Research Participant Protection
Administrative Officer
Institutional Review Board - Norman Campus (FWA #00003191)

JSO
FY2004-5

cc: Dr. E. Laurette Taylor, Chair, IRB
Dr. Laku Chidambaram, Business Administration

The University of Oklahoma

OFFICE OF HUMAN RESEARCH PARTICIPANT PROTECTION

March 25, 2004

Mr. Andre L. Araujo
307E Adams Hall
CAMPUS MAIL

SUBJECT: "Towards an Integrative Theory of Trust in Virtual Teams: The Role of Task Perception, Virtual Setting, Technology, and Time"

Dear Mr. Araujo:

The Institutional Review Board has reviewed and approved the following requested revision to the subject protocol:

- Addition of questions to survey document

Please note that this approval is for the protocol and informed consent form initially approved by the Board on September 4, 2003, and the revision(s) included in your request dated March 23, 2004. If you wish to make other changes, you will need to submit a request for revision to this office for review.

If you have any questions, please contact me at 325-8110.

Cordially,

E. Laurette Taylor, Ph.D.
Chair
Institutional Review Board - Norman Campus (FWA #00003191)

FY2004-5

cc: ,
Dr. Laku Chidambaram, Business Administration

The University of Oklahoma

OFFICE OF HUMAN RESEARCH PARTICIPANT PROTECTION

Title: Towards an Integrative Theory of Trust in Virtual Teams: The Role of Task Perception, Virtual Setting, Technology, and Time
Log Number: FY2004-5

June 29, 2004

Mr. Andre L. Araujo
307E Adams Hall
CAMPUS MAIL

Dear Mr. Araujo:

Our Institutional Assurance with the U.S. Department of Health and Human Services (DHHS) for the protection of human subjects requires continuing review by the Institutional Review Board (IRB) of all studies involving human subjects at risk. The procedures for review require the principal investigator to submit a progress report to the IRB. If your study will continue, and you will continue to enroll subjects, we must also review versions of each consent document currently being used in the study. **Please revise each approved consent document, before submitting it to us. Via the consent document(s), please direct questions about participants' rights to the University of Oklahoma-Norman campus Institutional Review Board rather than the Office of Research Services. Our telephone number is 405-325-8110 rather than 405-325-4757. These changes are necessary because of our recent move to Evans Hall, Suite 316.**

Via the progress report form, please indicate if the study will continue by checking the appropriate box marked "ACTIVE." You may receive up to four annual extensions of your approval in this manner. At the end of the fifth year, you will need to complete a new application for review and approval by the IRB before continuing with your study.

We must receive the fully completed progress report by the first working day of September, 2004. If your research is continuing and your progress report is not received by the first of the month, you will have to submit new application materials to the IRB for review and approval before continuing with your study. The Office for Human Research Protections (OHRP) guidelines prohibit approval of extensions outside the approved project time period. Failure to provide adequate information will delay approval and authorization to continue.

Please complete the enclosed form **thoroughly by responding to each item**, attach a copy of each current version of the consent document(s), if appropriate, and return the complete packet to the Office of Human Research Participant Protection, 660 Parrington Oval, Suite 316 (Evans Hall). If you have questions or concerns about these procedures, please contact us at (405) 325-8110.

Cordially,

E. Laurette Taylor, Ph.D.
Chair
Institutional Review Board – Norman Campus (FWA #00003191)

Enclosure
cc: [redacted] Administration