UNDERSTANDING GROUP PROCESSES:
CHALLENGES OF DISTANCE LEARNING IN THE COVID-19 ERA

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ABSTRACT

Two competing issues introduce additional tension for faculty teaching courses with group projects during this Covid-19 pandemic: digital or hybrid formats; however, students prefer and perform at higher levels in face-to-face (FTF) situations while intra-group trust, which leads to higher student performance, is higher in FTF than online classes. We examine the impact of digital group communication on student satisfaction. One area of concern to students is the issue of perceived injustice. This issue was underscored in student feedback on course evaluations. We developed a questionnaire to measure the intervening role of group processes in the classroom: goal sharedness, accountability, freeloading and intragroup trust. We find that satisfaction with team performance is lower in online courses. In addition, each group process studied significantly affects the relationship between type of group communication and student satisfaction, while the role of intragroup trust has the greatest impact. We also note that students perceive a significantly higher level of freeloading in digital classroom situations. Faculty can improve student satisfaction and performance by advising and training students in each of these four group processes early in each course, especially in digitally delivered classes.

Keywords: Type of Group Communication, Intragroup Processes, Student Satisfaction

INTRODUCTION

Covid-19 has a dramatic impact on many of our teaching methods and processes. For example, many university courses have been and continue to be taught mainly online or in some blended fashion. We have experienced the role that technology had to play (and probably will continue to play) in higher education. Team communication is consistently identified as a critical component of team performance (Salas, Reyes, & McDaniel, 2018). Marlow, Lacerenza, Paoletti, Burke, and Salas (2018), for example, highlight the influence of types of communication used to accomplish tasks. However, despite clear agreement on the importance of team communication, the degree to which communication is required for achieving high levels of performance under different conditions is relatively unexplored (Marlow et al., 2018). And group projects, which were being used more frequently in course assignments before the onset of this pandemic (Lee, Smith, & Sergueeva, 2016), have become a major method of providing students with opportunities to interact with classmates and learn approaches to work with different people and expand their perspectives.

The levels of team performance and members' satisfaction are affected by group processes. For instance, teams with a shared goal are more likely to feel committed to this goal and to improve their innovative performance because their efforts have focus and direction (Hülsheger, Anderson, & Salgado, 2009). Accountability has also been considered a fundamental of organizations as, without it, individuals would be able to do whatever they wanted, whenever they wanted without fear of punishment, resulting in the chaotic breakdown of organizations (Hall, Zinko, Perryman, & Ferris, 2009). Accountability improves task performance (Mero, Guidice, & Werner, 2014) and promotes coordinating behaviors (Unger-Aviram & Erez, 2016).

However, group processes are not always either effective or constructive. While distance learning has been forced by COVID-19, college students are encountering more freeloading issues among their team members (Pellot, 2021). Decreased social presence in distance learning affects student participation and willingness to contribute constructively (Molinillo, Aguilar-Illescas, Anaya-Sánchez, & Vallespín-Arán, 2018). Additional performance challenges include restricted conflict dissolution, possible increased freeloading, and restrained team synergy (Welte, 2021). Intragroup trust is critical in determining levels of performance (Choi, Zeff, & Higby, 2018). After the spring and fall semesters of 2020, our students indicated that freeloading and accountability (justice issues) were of high concern to them (personal communication, December 21, 2020). As we developed a questionnaire to measure these sentiments, we found that goal sharedness might be a partial surrogate for intragroup trust. These, then, became the four areas of focus for the present study, investigating their role in moderating the relationship between type of group communication (FTF and technology-based) and student satisfaction: goal sharedness, accountability, freeloading, intragroup trust.

The importance of student satisfaction was highlighted by our conversations with faculty when discussing new syllabi for online course presentations. We learned how most faculty emphasize the need and desirability of including student satisfaction in their goals for successful classes. In addition, there seem to be at least two types of satisfaction of concern for students, corresponding to critical outcomes desired by faculty: 1) satisfaction with class and project performance levels (the bottom line for almost any course); and, 2) satisfaction with team member interaction, often described as being critical in team performance. Studies (see, e.g., Marlow, Lacerenza, & Salas, 2017) identify the role of communication in influencing performance and satisfaction and the role of group processes as modifying this relationship. Our research model includes these relationships. See Figure 1 below.

Figure 1. Research Model

Our specific research question is: What is the impact of the type of group project communication on student satisfaction as modified by these four group processes?

LITERATURE REVIEW

Group Project Communication and Satisfaction

The literature on team/group communication identifies two basic categories, namely, face-to-face (FTF) communication and technology-based (online) communication. Previous research results indicate that FTF communication leads to both higher group performance and higher satisfaction (see Choi et al., 2018; Choi, Zeff, & Higby, 2019). These results are consistent with Downey, Obermire, and Zehms, (2020) and Lahiri (2010), while Denstadli, Julsrud, and Hjorthol (2012) found a more positive relationship between technology-based communication and performance in certain situations. Marlow et al. (2017) provide a comprehensive review of communication in virtual teams to establish a framework for future research. They note the complexity of the relationship between communication and performance in virtual teams, as moderated by intervening variables, and perhaps the best way to improve on this relationship is to initially use some FTF interaction (e.g., to increase the level of early trust). For example, swift trust, a form of trust occurring in temporary organizational structures of quick starting groups, exists in virtual teams (Jarvenpaa, Knoll, & Leidner, 1998). However, studies found that swift trust was fragile and often wildly inaccurate (Crisp & Jarvenpaa, 2013).

FTF interactions provide more complete communication (Short, Williams, & Christie, 1976), whereas digital communication limits direct personal observations that allow members to perform effective cognitive trust assessment (Robert, Denis, & Hung, 2009). Lack of awareness of who is responsible for specific outcomes (Cui, Lockee, & Meng, 2013) further reduce overall performance, while increasing frustration and dissatisfaction, and lowering participation. FTF communication not only increases performance levels of teams and team members, but it also enhances satisfaction with group outcomes and other group members (Choi et al., 2018; Zhang, 2016). The lack of appropriate social interaction puts challenges on collaborative learning in virtual environments (Akar, Öztürk, Tunçer, & Wiethoff, 2004).

Two theories, media richness and social presence, help explain differences between face-to-face and online communication. Media richness theory (Daft & Lengel, 1986) explains how face-to-face interaction enables not only the spoken language and other verbal cues, but also body language providing a better basis for understanding each other compared to purely technology-based interaction (Lantz, 2001). Both high and low media richness levels are effective when matched with appropriate tasks. For example, media with lower richness are effective when used with more routine tasks and richer media are better matched with nonroutine, complex and ambiguous tasks (Denstadli et al., 2012). Group projects for classroom assignments are examples of non-routine and complex tasks.

Social presence theory (Short et al., 1976) explains how FTF interactions provide more complete communication. Both verbal and non-verbal cues are part of the social exchange process. Digital communication can limit direct personal observations that allow members to perform effective cognitive trust assessment (Robert et al., 2009). Awareness of who is responsible for specific

outcomes (Cui et al., 2013) and issues of accountability (Reio & Crim, 2006) further reduce overall performance, while increasing frustration and dissatisfaction, and lowering participation. For instance, team members that exclusively rely on technology-based interaction will have no opportunity to see firsthand the amount of effort others are expending or participate in informal interactions with team members. When social context cues are missing, increased depersonalization, lower cohesiveness, and less social conformity often result (Lu, Fan, & Zhou, 2016).

According to the input-process-output (IPO) model (McGrath, 1964), outputs are results and by-products of team activity that are valued by one or more constituencies (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000). Broadly speaking, these may include performance (e.g., quality and quantity) and members' affective reactions (e.g., satisfaction, commitment and viability). While using group projects in the college classroom creates numerous instructional learning and social communication advantages for both students and teachers, emotion is an important element of these advantages (Barfield, 2003). Thus, it is important to examine and understand students' satisfaction with both the group grade (output) and group members (see Figure 1, above).

Higher education institutions are focusing on understanding the factors that influence student satisfaction as well as attempting to improve it (Yusoff, McLeay, & Woodruffe-Burton, 2015). Moreover, team satisfaction is a motivational component of team effectiveness and an important consideration when identifying successful team functioning (Hackman, 1987). When a new learning environment is applied, student satisfaction should be considered in evaluating the effectiveness of learning (Zhu, 2012). For instance, learners' satisfaction can have repercussions on how learners work together, and whether there is a good working atmosphere among learners (Gunawardena et al., 2001). On the other hand, satisfaction ratings with performance decrease as the level of virtuality increases due to low social presence and low richness of information in technology-based communication (Baltes, Dickson, Sherman, Bauer, & LaGanke, 2002).

Group Processes

Group processes have played a central role in most group effectiveness models (Guzzo & Shea, 1992). Processes are important because they describe how group inputs are transformed into outputs. Our model includes the major intervening variables important in the literature review, and these are discussed below.

Goal sharedness. Goal sharedness is the extent to which group members have shared perceptions of the group's goal (Haas, Sypher, & Sypher, 1992) and exists when team members agree with the objectives and find that they are clear and worthwhile (Mascareño, Rietzschel, & Wisse, 2020). Communication is one way to improve goal clarity; goals are likely to become aligned if they are communicated to team members (Beehr, Glazer, Fischer, Linton, & Hansen, 2009). Communication is a precondition for alignment, because without knowing the overall goals, team members cannot set their own (aligned) goals, and without feedback about their goal progress, they have no reason to make corrections or adjustments in their work (Baum, Locke, & Kirkpatrick, 1998).

Goals play an important role in regulating individuals' everyday behavior (Higgins, 1997) and commitment is a key contributor to the effectiveness of the group (e.g., Aubé & Rousseau, 2005). This enhances group identification and coordinates efforts to achieve collective goals (Zhang & Chiu, 2012). Empirical findings note goal alignment is an important predictor of team performance (Hülsheger et al., 2009; Stam, Lord, Van Knippenberg, & Wisse, 2014).

Accountability. Accountability has been described as "the adhesive that binds social systems together" (Frink & Klimoski, 1998, p. 3). That is, if individuals were not answerable for their behavior, there would be neither shared expectations nor a basis for social order. Thus, without accountability, it would be impossible to maintain any form of social system (Frink & Klimoski, 1998).

Attitudes of individuals (e.g., felt accountability) can be affected by the attitudes, behaviors, and communications of others through a social information processing framework (Salancik & Pfeffer, 1978). The concept of social contagion suggests that thoughts and feelings about an issue "can be communicated from one individual to another and ultimately spread and be maintained across entire networks or groups" (Degoey, 2000, p. 54). Once these attitudes have been dispersed, they can have important effects on individual attitudes, and ultimately individual behavior. This is related to the earlier social information processing perspective (Salancik & Pffefer, 1978).

Accountability has valuable outcomes, such as performance, precision, and focus. Individuals who are held accountable for their performance are more likely to be high performers, develop greater accuracy, and be more attentive to the needs of others than individuals who are not held accountable (Thoms, Dose, & Scott, 2002).

Freeloading. Advances in information technology have created new challenges for team processes. One area of concern to students is the issue of perceived injustice and this issue was underscored in student feedback on course evaluations for the Fall 2020 semester.

> . . . other members of my group received A[']s, who did not contribute the whole semester and I had to pick up the slack on their end which is very frustrating because they received good grades on all the group work, they did not help on yet received a better grade in the class overall somehow (personal communication, December 21, 2020).

Freeloading by certain group members has been highlighted as one of the challenges with group work (Bramley, 2020). Due to heavy reliance on modern communication channels in which virtual team members do not physically have to "face" each other, freeloading, as well as low commitment, are common phenomena in virtual teams (Furst, Reeves, Rosen, & Blackburn, 2004). Group size and dispersion are antecedents of freeloading in technology-supported teams (Blaskovich, 2008). A positive relationship between virtual collaboration and freeloading exists empirically (Peñarroja, Orengo, & Zornoza, 2017).

Pitfalls and obstacles occur in online collaboration, including social loafing in virtual groups (Weinel, Bannert, Zumbach, Hoppe, & Malzahn, 2011). The level of social presence influences the perception of collaboration within the team. Lower levels of social presence can diminish

communication quality and as a result influence the perception of collaboration (Roberts, Lowry, & Sweeney, 2006). Group members in virtual teams are physically not able to witness the effort that other members put into their work. Virtual team members are forced to rely on communication channels that are less rich than face-to-face conversations (Zhang, 2016). As these channels lack richness, conflict is intensified through a misunderstanding caused by the communication methods used by virtual teams (Furst et al., 2004).

If freeloaders are not held accountable for their individual contributions, frustration and negative feelings toward that individual and toward group projects, in general, are created. Group members also feel that they have no control over the situation (Hall & Buzwell, 2013). A strong and statistically significant inverse relationship between freeloading and students' satisfaction and performance exists (Aggarwal & O'Brien, 2008).

Intragroup trust. Building trust within a team is recognized as a key ingredient for team success (e.g., De Jong & Elfring, 2010). Breuer, Hüffmeier, and Hertel (2016) suggest that trust facilitates specific risk-taking behaviors such as reducing defensive control, open discussion of conflicts and mistakes, mutual feedback, and sharing of confidential information, which in turn lead to more efficient coordination of team members' resources (time, effort, knowledge, etc.) and as a result, higher team success.

Working in a virtual team is more difficult because technology-based communication takes more cognitive effort to transfer knowledge than face-to-face communication, hence the difficulty level for virtual teams rises (Kock, 2004). Compared with face-to-face collaboration, virtual collaboration reduces "social context cues." With lower level of social control, participants exhibit a lower incidence of behaviors associated with individual trust (Cheng, Fu, Sun, Han, Shen, & Zarifis, 2016). Geographical closeness, background similarities, and interactions in person are often not present in virtual teams even though developing a collective trust is a crucial part of any team. Furst and colleagues (2004) suggest that trust develops more slowly in virtual situations than it does in natural work settings. They also indicate that restricted conflict dissolution, increased freeriding, restrained team synergy and lower performance create additional challenges that virtual teams have to overcome. A sense of trust or being part of a team will lead to more constructive processes such as not interpreting critique as a personal attack (Kreijns, Kirschner, & Jochems, 2003) and accumulated evidence has consistently confirmed a positive relationship between team trust and performance (Guinot & Chiva, 2019).

Once again, our research question derived from our research model and developed from the literature review is: what is the impact of the type of group project communication on student satisfaction as modified by these four group processes?

METHOD

Data Collection Procedure

All respondents have had direct and intensive experience with both FTF classes with group projects, and technology-based course work with team members. Students were asked to complete two separate surveys from the SurveyMonkey platform. The two surveys were separated by a one-week gap so respondents could consider their experiences with each delivery system independently

and separately. Students were initially randomly presented with either of the two surveys and then presented with the other survey a week later. Charness, Gneezy, and Kuhn (2012) indicate that data collected following this within-subject methodology, including a time-gap, provides stronger and more reliable results than between-subject approaches.

Sample

We invited 204 undergraduate and graduate students at an urban Midwestern United States university to participate in these surveys. The authors contacted several instructors to get permission to invite their students. Four instructors agreed and their students from 8 different business courses were invited. Of the participants, 71.4% completed 3 or more years of college and every respondent had no fewer than 25% of their courses in each of online and face-to-face delivery. Our response rate is 58.3% with 119 respondents completing the questionnaires corresponding to each of the two independent conditions. Of these respondents, 88.2% are between the ages of 18 and 26, while 44.2% are females.

Questionnaire Development

This study was motivated by initial responses from student end of course surveys and resultant discussions with college faculty regarding freeloading and the importance of student satisfaction for both course outcomes and class development. When these discussions were put into a framework of past research experience with team development, a new student survey was created. The questions are clustered around each of the six variables of concern for this study: four intervening variables (sharedness, accountability, freeloading and trust) and two dimensions of the dependent variable (satisfaction with the team performance and satisfaction with team members). All variables were directly measured by more than one question and the descriptive statistics are included in the results section below (see Table 1).

Data Analysis Approach

We apply ANOVA analyses to see if the students' responses to group processes are different between FTF and technology-based communication (i.e., one-way Repeated Measure ANOVA). A five-point Likert scale was used to provide a cardinal rather than an ordinal scale for data analysis and provide the basis for comparisons and results, including the following categories: (1) Strongly disagree; (2) Disagree; (3) Neither agree nor disagree; (4) Agree; (5) Strongly agree. Since four approaches of one-way Repeated Measure ANOVA (Pillai's Trace, Wilks' Lambda, Hotelling's Trace and Roy's Largest Root) reflect the same degree of significance, we report only the Wilks' Lambda in our results section below, since this is the most widely accepted measure (Todorov & Filzmoser, 2010). To capture the relative impact of each of the four intragroup processes on the dependent variables (Satisfaction with team members and Satisfaction with team performance) we also completed regression analyses, both individually and in combination, and present the results of these five different models in the results section below (see Tables 7 and 8).

Measures

Graphs comparing each of the four intervening variables and both dependent variables in each of two conditions (the two states of the independent variable) are included to show the consistency of results even when statistical significance is not present. See Figures 2-7, below. Cronbach's alphas of the variables were used to develop reliability and are all above .84 (see Table 1). This level suggests that it is well above the widely accepted level of .7 (see, e.g., Tavakol & Dennick, 2011). Multiple items are used to measure each concept and the average score of each concept is used for analysis. The scale items were developed by the authors drawing from similar items reported in the literature (Goal Sharedness – Zhang & Chiu, 2012; Freeloading – Bacon, Stewart, & Silver, 1999; Mulvey & Klein, 1998; Accountability – Bacon et al., 1999; Intragroup Trust – Costa & Anderson, 2011; Satisfaction with Team Performance – Lancellotti & Boyd, 2008; Satisfaction with Team Members – Zeitun, Abdulqader, & Alshare, 2013). These items are presented in the results section.

RESULTS

Descriptive statistics and the significance level of each of the four intervening variables and the two dependent variables are presented in Table 1, below. Satisfaction with Team Members (Figure 7, below) is the only one of the six variables that does not have a significant effect, while all six variables have the slope consistent with what we expected, based on the literature review and initial discussions with students and faculty.

Table 1. Descriptive Statistics and Multivariate Tests (Wilks' Lambda)

	Face-to-Face		Online			Wilks' Lambda	*F*	*p*
	Mean	SD	Mean	SD	N			
Goal Sharedness	3.95	0.67	3.77	0.75	119	0.94	7.38	.008**
Freeloading	2.46	0.72	2.64	0.84	119	0.94	7.17	< .001***
Accountability	3.99	0.67	3.79	0.86	118	0.93	8.59	.004**
Intragroup Trust	3.88	0.70	3.70	0.83	118	0.95	5.84	.017*
Satisfaction w. Team Performance	4.19	0.60	4.07	0.63	118	0.96	4.78	.031*
Satisfaction w. Team Members	3.60	0.83	3.50	0.94	118	0.99	1.29	.258
p < .05, ** *p* < .01, *** *p* < .001								

Intervening Variables (Group Processes)

Goal sharedness. The type of group communication (FTF vs. Online) has a significant effect on goal sharedness. Table 1 above indicates a Wilks' Lambda = 0.94, F (1,118) = 7.38, p = .008. The basic result, as reflected in Figure 2 below, suggests respondents indicate a significantly higher level of goal sharedness when in FTF group situations than when working on class projects in a virtual team setting. This intragroup process was measured by asking the five questions found in Table 2 below. We included two subdivisions, "Awareness" and "Commitment," to correspond to "Media Richness Theory" and "Social Presence Theory" as found in the literature review.
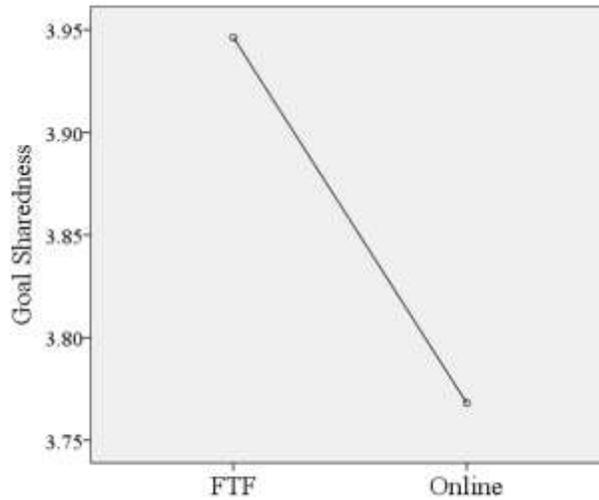
Figure 2. Goal Sharedness

Table 2. Goal Sharedness

		Question	FTF		Online		p
			M	SD	M	SD	
Goal Sharedness	Awareness	Team members had a clear understanding of role and responsibility for each member.	4.03	0.80	3.88	0.95	.122
		Team members identified clear goals and objectives.	4.01	0.75	3.86	0.84	.069
	Commitment	Our team members worked well together.	4.06	0.65	3.87	0.83	.019*
		Our team members were very cooperative.	4.03	0.75	3.91	0.79	.120
		Team members were willing to put forth a great deal of effort beyond what they'd normally do to achieve goals.	3.60	1.04	3.33	1.15	.009**

Two areas of concern with which technology-based communications have dealt when compared with FTF interactions include a reduced level of media richness and lowered social presence. Our results indicate that online group interaction may have overcome difficulties with lower media richness since there are no statistical differences between FTF and online "Awareness." We find, however, that the concept of social presence may not yet be fully integrated into technology-based communications as there are significant differences found in two questions: "Our team members worked well together" and "Team members were willing to put forth a great deal of effort beyond what they'd normally do to achieve goals." One suggestion, building on the recommendations of the Sabre Project (Kirkman, Rosen, Gibson, Tesluk, & McPherson, 2002) is to try to replicate a FTF meeting early in the semester by requiring, perhaps, a visual conference with synchronous presentation to gain an opportunity to see and "be with" other team members. This may be one way to increase social presence to gain the performance impact found in FTF meetings.

Freeloading. As Table 1 above indicates, the type of group communication has the greatest significance on freeloading than any of the group processes studied. We found a Wilks' Lambda $= 0.94$, $F(1,118) = 7.17$, $p < .001$. Respondents perceive a significantly higher level of freeloading in online group situations than in FTF group project communications (Figure 3 below). The slope seen in this graph is opposite to the slope found in Figure 2 (Goal Sharedness), as the literature review suggested. This group process variable was measured by asking the six questions found in Table 3 below as interpreted by our literature review.
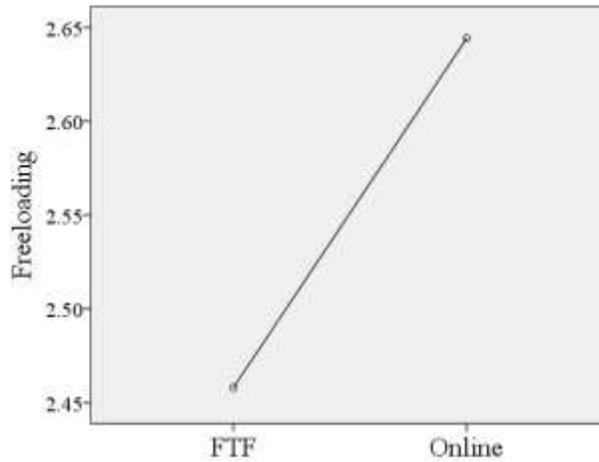
Figure 3. Freeloading

Table 3. Freeloading

	Question	FTF		Online		p
		M	SD	M	SD	
Freeloading	Team members tried as hard as they could. (r)	4.06	0.69	3.84	0.93	.022*
	Given their abilities, team members did the best they could. (r)	3.33	1.11	3.18	1.19	.173
	No one slacked off, getting others to do most of the work. (r)	3.65	0.92	3.40	1.04	.009**
	Members of my team were "free-loaders."	2.87	1.19	2.92	1.15	.649
	Team members contributed less than I anticipated.	2.82	1.07	2.92	1.11	.339
	Team members completed their work on time. (r)	3.90	0.82	3.55	1.04	< .001***

Three of the questions are viewed significantly differently between FTF and online communication interactions (#1, #3 and #6). While respondents do not identify team members as "free-loaders" (see item #4), they perceive significant differences when in online communication than in FTF interactions. Of particular note is the last item. There is the most significant difference between FTF and online communication in the perceptions of team members completing their work on time. Informal discussions with students make this an interesting item. They are unwilling to use the word "freeloading" when describing their views of team members (see item #4) although they are willing to clearly state the results of freeloading identified in item #6. While the term itself may be too toxic, the outcome is clearly perceived as undesirable.

Accountability. The type of group communication used by a group has a significant effect on accountability, as seen in Table 1 above, with a Wilks' Lambda = 0.93, $F(1, 117) = 8.59$, $p = .004$. This is also seen in Figure 4 below, and suggests participants perceive a higher level of accountability in team members when they meet in FTF sessions than they do when working together in online situations. We measured accountability with the three questions found in Table 4 below. Perceptions of accountability are much stronger in FTF meetings than in virtual group situations. As students suggested, in focus group interactions and informal discussions, accountability is much higher when they can actually see and personally interact with their partners on class projects.
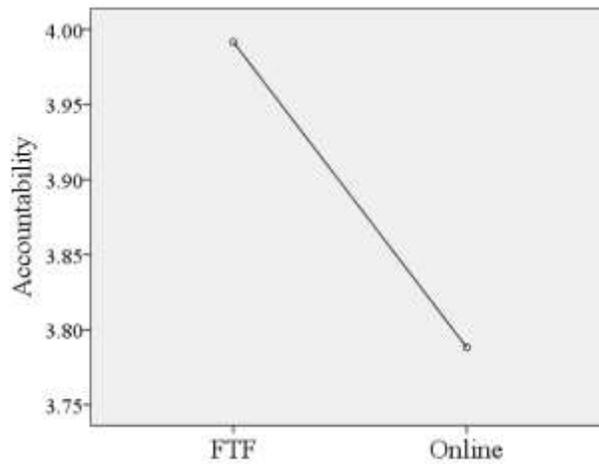
Figure 4. Accountability

Table 4. Accountability

Question		FTF		Online		p
		M	SD	M	SD	
Accountability	All team members felt accountability for group success.	4.07	0.68	3.81	0.97	.005**
	Team members felt accountable for producing a certain quality of work.	3.93	0.84	3.77	0.94	.048*
	Team members felt accountable for producing a certain amount of work.	3.97	0.78	3.79	0.97	.026*

Intragroup trust. Intragroup trust is the fourth of the intragroup processes we investigated in this survey. Like the other three processes, this is impacted significantly by the type of group communication used. (See Table 1 above with a Wilks' Lambda = 0.95, $F (1, 117) = 5.84$, $p = .017$.) This impact is also seen in Figure 5 below. Our survey instrument contains the four questions in Table 5 below relating to intragroup trust. Only the first question finds a significant difference between FTF groups and teams meeting virtually, although questions two and three are marginally significant at $p < .10$. It is possible that a larger sample size might show more significant results than we found in this study.
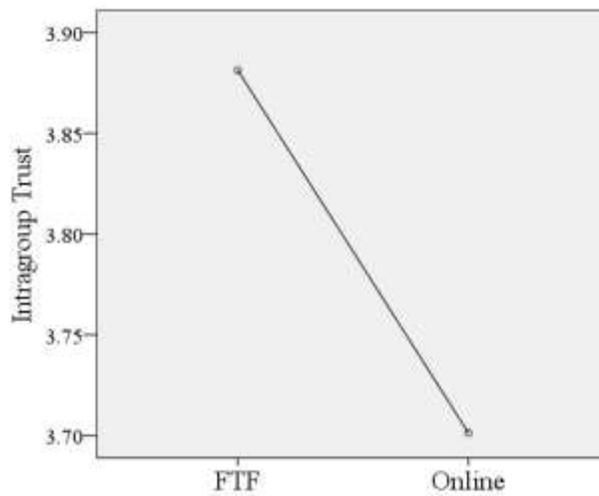
Figure 5. Intragroup Trust

Table 5. Intragroup Trust

Question		FTF		Online		p
		M	SD	M	SD	
Intragroup Trust	Team members looked for each other's interests honestly.	3.92	0.82	3.71	1.01	.018*
	We had complete confidence in each other's ability to perform tasks.	3.74	0.95	3.53	1.08	.063†
	Team members could rely on each other.	4.00	0.76	3.84	0.90	.053†
	Team members kept their word.	3.86	0.88	3.73	0.90	.138

Dependent Variables (Two Types of Satisfaction)

Our research design has four intervening variables (the four group processes included in this study) and two types of dependent variables, namely, satisfaction with team performance and satisfaction with team members (see Figure 1). We have presented our findings on the impact each type of group communication has on these four intragroup processes. We now present the results of our intervening variables on the two types of satisfaction.

As seen in the regression analyses presented in Tables 6 and 7 below, goal sharedness has a highly significant impact on both satisfaction with team performance and satisfaction with team members using each of the two types of communication (see the column labelled "Model 1" in each Table). These results, particularly the R^2 row, also suggest that goal sharedness (as is true for each of the four group processes) has a greater impact on satisfaction with team members than on satisfaction with team performance. In addition, the column of Model 5 indicates that of these four group processes, goal sharedness is the second most impactful variable on each of the two dependent variables, trailing only intragroup trust in importance.

Table 6. Satisfaction with Team Performance – FTF and Online

	Face-to-face					Online				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
Goal Sharedness	.478***				.168	.377***				.198
Freeloading		-.410***			-.084		-.260***			.146
Accountability			.477***		.140			.327***		.118
Intragroup Trust				.450***	.188†				.352***	.247*
R^2	.280	.247	.289	.313	.364	.214	.139	.211	.228	.270

† $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$

Table 7. Satisfaction with Team Members – FTF and Online

	Face-to-face					Online				
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 1	Model 2	Model 3	Model 4	Model 5
Goal Sharedness	.847***				.263*	.869***				.258*
Freeloading		-.688***			.006		-.741***			-.039
Accountability			.844***		.112			.713***		.053
Intragroup Trust				.886***	.645***				.885***	.641***
R^2	.486	.394	.498	.653	.683	.517	.492	.461	.650	.677

† $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$

The impact of freeloading on satisfaction with both team performance and team members is also significant, although negative, as seen in the Model 2 column of Tables 6 and 7. As Model 5

suggests in both Tables, however, freeloading as an intervening variable has a relatively low impact on the dependent variables.

The third intragroup process studied is accountability, which is shown to have a significant impact on both satisfaction with team performance and team members, though it is not as significant as either goal sharedness or intragroup trust (see "Model 3" column for significance and "Model 5" for relative impact). In addition, accountability has less influence on both types of satisfaction than the intragroup processes of goal sharedness and intragroup trust.

Intragroup trust, of all four group processes studied, has the highest level of impact on both satisfaction with team performance and satisfaction with team members. Model 4 indicates that intragroup trust has a highly significant impact at the .001 level, while Model 5 suggests it has the highest level of impact of all four group processes for both types of satisfaction studied. This supports previous research that first alerted us to the importance of intragroup trust. While we don't understand all group processes that influence satisfaction with performance or members, we have found in several situations that trust is a critical process to be considered in the study and development of group success.

We now look at the impact that the type of group communication has on the two types of satisfaction. Table 1 indicates the significant impact that type of group communication has on satisfaction with team performance (Wilks' Lambda = 0.96, $F (1, 117) = 4.78$, $p = .031$). Table 8 presents the three questions in our survey that directly deal with satisfaction with team performance. We note that the second question of this table suggests students in FTF teams perceive their satisfaction with team performance to be higher than they do in virtual situations, although respondents in both communication conditions statistically have the same perceptions of their satisfaction with the grade and the quality of the finished project. Figure 6 below reflects this significant influence on team performance.

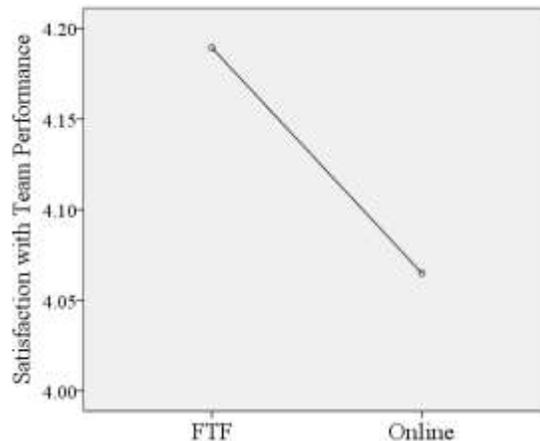Figure 6. Satisfaction with Team Performance

Table 8. Satisfaction with Team Performance

Question		FTF		Online		p
		M	SD	M	SD	
Satisfaction with Team Performance	I am satisfied with the quality of the finished project.	4.08	0.75	3.96	0.82	.132
	We produced a good paper and/or presentation.	4.24	0.62	4.07	0.72	.012*
	We received a good grade on this project.	4.25	0.65	4.17	0.62	.181

Table 9 below presents the four questions in our survey relating communication to satisfaction with team members. None of these questions were found to be significant, and this is reflected in the flatter slope seen in Figure 7. This is the only relationship in our study not found to be significant.
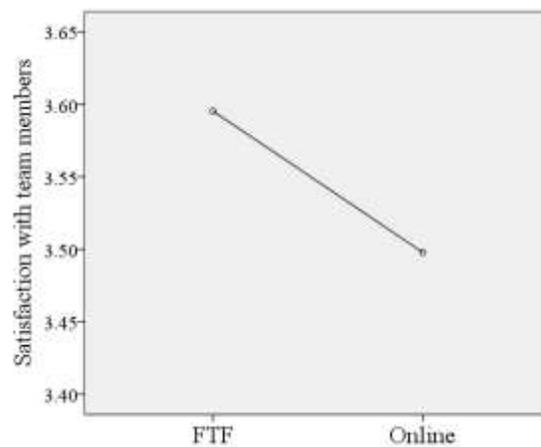
Figure 7. Satisfaction with Team Members

Table 9. Satisfaction with Team Members

Question		FTF		Online		p
		M	SD	M	SD	
Satisfaction with Team Members	I enjoyed working with my team members.	3.92	0.82	3.73	1.00	.061†
	Our team members had low stress.	3.47	0.94	3.44	1.03	.794
	I would like to work with the same team in the future.	3.63	1.09	3.47	1.19	.186
	I consider this team among the best.	3.36	1.11	3.34	1.16	.816

SUMMARY AND CONCLUSION

We present Figure 8 below to help us summarize the results of this study and relate them all back to our research model presented above (See Figure 1). We present two examples to apply study results: freeloading on satisfaction with team members; intragroup trust (our major finding) on satisfaction with team members.

Figure 8. Application of Results to Research Model
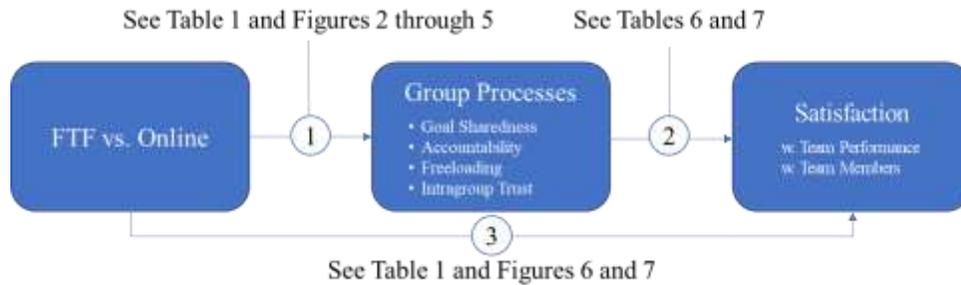
Freeloading was brought to our attention by student comments and became the motivator for undertaking this study. An interesting observation with this data suggests that the differences between the two types of communication are most significant with freeloading of any of the group processes studied (link ①). At the same time, freeloading has a relatively minimal impact on each type of satisfaction (link ②).

Looking at Tables 6 and 7, R^2 values reflect a relatively high level of explanation of variances found in the satisfaction levels in this study. In particular, the impact of intragroup trust is very high, higher than any of the group processes studied. Looking at Model 5 of these two Tables, the relative role of intragroup trust is the highest of these four variables. Our research suggests that this is a crucial variable to consider when identifying factors that improve student satisfaction.

Overall results indicate the type of group communication has a significantly different impact on each of the four group processes. Moreover, each of the four group processes studied has a significant effect on both satisfaction with team performance and team members. While the type of group communication significantly affects satisfaction with team performance, it is not significantly related to satisfaction with team members. Our data suggests this is the only relationship between variables that does not reach the level of statistical significance, as seen in link ③. While the slope in Figure 7 is what we anticipated, we expected it to be significant. Perhaps a larger sample size would bring out this relationship more clearly. Perhaps we do not have clear questions that would better reflect this relationship for respondents. For example, the second question about the stress level of team members requires participants to make judgements about which they are not likely to be qualified.

These results suggest that student satisfaction with team performance and team members are heavily influenced and affected by the four group processes included in this study. Business school faculty might want to consider including information of the role of these and other group processes, and how to "train" students in group behavior to increase student satisfaction with their group projects, teammates and courses. For example, Kirkman and colleagues (2002) indicate how performance at Sabre, Inc., was dramatically improved when they established trust based on performance consistency rather than the typical tie to social bonds. This is a major way to overcome basic concerns regarding virtual team challenges and getting performance closer to levels gained in FTF group interactions. Future research needs to explore additional group processes and their impact on satisfaction.

REFERENCES

Aggarwal, P., & O'Brien, C. L. (2008). Social loafing on group projects: Structural antecedents and effect on student satisfaction. *Journal of Marketing Education*, *30*(3), 255-264.

Akar, E., Ozturk, E., Tuncer, B., & Wiethoff, M. (2004). Evaluation of a collaborative virtual learning environment. *Education & Training, 46*(6), 343-352.

Aubé, C., & Rousseau, V. (2005). Team goal commitment and team effectiveness: the role of task interdependence and supportive behaviors. *Group Dynamics: Theory, Research, and Practice*, *9*(3), 189.

Bacon, D. R., Stewart, K. A., & Silver, W. S. (1999). Lessons from the best and worst student team experiences: How a teacher can make the difference. *Journal of Management Education, 23*(5), 467-488.

Baltes, B. B., Dickson, M. W., Sherman, M. P., Bauer, C. C., & LaGanke, J. S. (2002). Computer-mediated communication and group decision making: A meta-analysis. *Organizational Behavior and Human Decision Processes*, *87*(1), 156-179.

Barfield, R. L. (2003). Students' perceptions of and satisfaction with group grades and the group experience in the college classroom. *Assessment & Evaluation in Higher Education*, *28*(4), 355-370.

Baum, J. R., Locke, E. A., & Kirkpatrick, S. A. (1998). A longitudinal study of the relation of vision and vision communication to venture growth in entrepreneurial firms. *Journal of Applied Psychology*, *83*(1), 43.

Beehr, T. A., Glazer, S., Fischer, R., Linton, L. L., & Hansen, C. P. (2009). Antecedents for achievement of alignment in organizations. *Journal of Occupational and Organizational Psychology*, *82*(1), 1-20.

Blaskovich, J. L. (2008). Exploring the effect of distance: An experimental investigation of virtual collaboration, social loafing, and group decisions. *Journal of Information Systems*, *22*(1), 27-46.

Bramley, G. (2020). There is no "I" in "a team of lawyers": an evaluation of student perceptions of group assessment within legal higher education. *The Law Teacher*, *54*(1), 55-68.

Breuer, C., Hüffmeier, J., & Hertel, G. (2016). Does trust matter more in virtual teams? A meta-analysis of trust and team effectiveness considering virtuality and documentation as moderators. *Journal of Applied Psychology*, *101*(8), 1151.

Charness, G., Gneezy, U., & Kuhn, M. A. (2012). Experimental methods: Between-subject and within-subject design. *Journal of Economic Behavior & Organization*, *81*(1), 1-8.

Cheng, X., Fu, S., Sun, J., Han, Y., Shen, J., & Zarifis, A. (2016). Investigating individual trust in semi-virtual collaboration of multicultural and unicultural teams. *Computers in Human Behavior*, *62*, 267-276.

Choi, W., Zeff, L. E., & Higby, M. A. (2018). Designing A Group Assignment in a Digital Era. *Quarterly Review of Business Disciplines*, *5*(1), 21-37.

Choi, W., Zeff, L. E., & Higby, M. A. (2019). Digital natives in China and the United States: Is technology effective in building trust? *Quarterly Review of Business Disciplines*, *6*(2), 133-150.

Costa, A. C., & Anderson, N. (2011). Measuring trust in teams: Development and validation of a multifaceted measure of formative and reflective indicators of team trust. *European Journal of Work and Organizational Psychology*, *20*(1), 119-154.

Crisp, C. B., & Jarvenpaa, S. L. (2013). Swift trust in global virtual teams. *Journal of Personnel Psychology*, *12*(1), 45-56.

Cui, G., Lockee, B., & Meng, C. (2013). Building modern online social presence: A review of social presence theory and its instructional design implications for future trends. *Education and information technologies*, *18*(4), 661-685.

Daft, R. L., & Lengel, R. H. (1986). Organizational information requirements, media richness and structural design. *Management Science*, *32*(5), 554-571.

De Jong, B. A., & Elfring, T. (2010). How does trust affect the performance of ongoing teams? The mediating role of reflexivity, monitoring, and effort. *Academy of Management Journal*, *53*(3), 535-549.

Degoey, P. (2000). Contagious justice: Exploring the social construction of justice in organizations. *Research in Organizational Behavior*, *22*, 51-102.

Denstadli, J. M., Julsrud, T. E., & Hjorthol, R. J. (2012). Videoconferencing as a mode of communication: A comparative study of the use of videoconferencing and face-to-face meetings. *Journal of Business and Technical Communication*, *26*(1), 65-91.

Downey, D. H., Obermire, K. M., & Zehms, K. M. (2020). Toward an understanding of audit team distribution and performance quality. *Auditing: A Journal of Practice & Theory*, *39*(4), 87-112.

Frink, D. D., & Klimoski, R. J. (1998). Toward a theory of accountability in organizations and human resource management. In G. R. Ferris (Ed.), *Research in personnel and human resource management* (Vol. 16: 1-51). Stamford, CT: JAI Press.

Furst, S. A., Reeves, M., Rosen, B., & Blackburn, R. S. (2004). Managing the life cycle of virtual teams. *Academy of Management Perspectives*, *18*(2), 6-20.

Guinot, J., & Chiva, R. (2019). Vertical trust within organizations and performance: A systematic review. *Human Resource Development Review*, *18*(2), 196-227.

Gunawardena, C. N., Nolla, A. C., Wilson, P. L., Lopez-Islas, J. R., Ramirez-Angel, N., & Megchun-Alpizar, R. M. (2001). A cross-cultural study of group process and development in online conferences. *Distance Education*, *22*(1), 85-121.

Guzzo, R. A., & Shea, G. P. (1992). Group performance and intergroup relations in organizations. In M. A. Dunnette, & L. M. Hough (Eds.), *Handbook of industrial and organizational Psychology* (pp. 269–313). Palo Alto, CA: Consulting Psychologist Press.

Haas, J. W., Sypher, B. D., & Sypher, H. E. (1992). Do shared goals really make a difference? *Management Communication Quarterly*, *6*(2), 166-179.

Hackman, J. R. (1987). The design of work teams. In *Handbook of organizational behavior* (pp. 315—342). Englewood Cliffs, NJ: Prentice Hall.

Hall, A. T., Zinko, R., Perryman, A. A., & Ferris, G. R. (2009). Organizational citizenship behavior and reputation: Mediators in the relationships between accountability and job performance and satisfaction. *Journal of Leadership & Organizational Studies*, *15*(4), 381-392.

Hall, D., & Buzwell, S. (2013). The problem of free-riding in group projects: Looking beyond social loafing as reason for non-contribution. *Active Learning in Higher Education*, *14*(1), 37-49.

Higgins, E. T. (1997). Beyond pleasure and pain. *American Psychologist*, *52*(12), 1280.

Hülsheger, U. R., Anderson, N., & Salgado, J. F. (2009). Team-level predictors of innovation at work: a comprehensive meta-analysis spanning three decades of research. *Journal of Applied psychology*, *94*(5), 1128.

Jarvenpaa, S. L., Knoll, K., & Leidner, D. E. (1998). Is anybody out there? Antecedents of trust in global virtual teams. *Journal of Management Information Systems*, *14*(4), 29-64.

Kirkman, B. L., Rosen, B., Gibson, C. B., Tesluk, P. E., & McPherson, S. O. (2002). Five challenges to virtual team success: Lessons from Sabre, Inc. *Academy of Management Perspectives*, *16*(3), 67-79.

Kock, N. (2004). The psychobiological model: Towards a new theory of computer-mediated communication based on Darwinian evolution. *Organization Science*, *15*(3), 327-348.

Kreijns, K., Kirschner, P. A., & Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: a review of the research. *Computers in Human Behavior*, *19*(3), 335-353.

Lahiri, N. (2010). Geographic distribution of R&D activity: how does it affect innovation quality? *Academy of Management Journal*, *53*(5), 1194-1209.

Lancellotti, M. P., & Boyd, T. (2008). The effects of team personality awareness exercises on team satisfaction and performance: The context of marketing course projects. *Journal of Marketing Education*, *30*(3), 244-254.

Lantz, A., (2001). Meetings in a distributed group of experts: comparing face-to-face, chat and collaborative virtual environments. *Behaviour and Information Technology*, *20*(2), 111-117.

Lee, S. H., Smith, D., & Sergueeva, K. (2016). What do students think about group work in business education? An investigation into the benefits, challenges, and student-suggested solutions. *Journal of Education for Business*, *91*(7), 380-386.

Lu, B., Fan, W., & Zhou, M. (2016). Social presence, trust, and social commerce purchase intention: An empirical research. *Computers in Human Behavior*, *56*, 225-237.

Marlow, S. L., Lacerenza, C. N., & Salas, E. (2017). Communication in virtual teams: A conceptual framework and research agenda. *Human Resource Management Review*, *27*(4), 575-589.

Marlow, S. L., Lacerenza, C. N., Paoletti, J., Burke, C. S., & Salas, E. (2018). Does team communication represent a one-size-fits-all approach?: A meta-analysis of team communication and performance. *Organizational Behavior and Human Decision Processes*, *144*, 145-170.

Mascareño, J., Rietzschel, E., & Wisse, B. (2020). Envisioning innovation: Does visionary leadership engender team innovative performance through goal alignment? *Creativity and Innovation Management*, *29*(1), 33-48.

Mathieu, J. E., Heffner, T. S., Goodwin, G. F., Salas, E., & Cannon-Bowers, J. A. (2000). The influence of shared mental models on team process and performance. *Journal of applied psychology*, *85*(2), 273.

McGrath, J.E. (1964). *Social psychology: A brief introduction*. New York: Holt, Rinehart, & Winston.

Mero, N. P., Guidice, R. M., & Werner, S. (2014). A field study of the antecedents and performance consequences of perceived accountability. *Journal of Management*, *40*(6), 1627-1652.

Molinillo, S., Aguilar-Illescas, R., Anaya-Sánchez, R., & Vallespín-Arán, M. (2018). Exploring the impacts of interactions, social presence and emotional engagement on active collaborative learning in a social web-based environment. *Computers & Education*, *123*, 41-52.

Mulvey, P. W., & Klein, H. J. (1998). The impact of perceived loafing and collective efficacy on group goal processes and group performance. *Organizational behavior and human decision processes*, *74*(1), 62-87.

Pellot, E. (2021, February 23). *College student slams classmate over 'irresponsible' in-class behavior: 'Let your professor know'*. In The Know. https://www.intheknow.com/post/college-student-slams-classmate-over-irresponsible-in-class-behavior-let-your-professor-know/.

Peñarroja, V., Orengo, V., & Zornoza, A. (2017). Reducing perceived social loafing in virtual teams: The effect of team feedback with guided reflexivity. *Journal of Applied Social Psychology*, *47*(8), 424-435.

Reio Jr, T. G., & Crim, S. J. (2006). *The Emergence of Social Presence as an Overlooked Factor in Asynchronous Online Learning*. Retrieved from ERIC database. (ED492785)

Robert, L. P., Denis, A. R., & Hung, Y. T. C. (2009). Individual swift trust and knowledge-based trust in face-to-face and virtual team members. *Journal of Management Information Systems*, *26*(2), 241-279.

Roberts, T. L., Lowry, P. B., & Sweeney, P. D. (2006). An evaluation of the impact of social presence through group size and the use of collaborative software on group member "voice" in face-to-face and computer-mediated task groups. *IEEE Transactions on Professional Communication*, *49*(1), 28-43.

Salancik, G. R., & Pfeffer, J. (1978). A social information processing approach to job attitudes and task design. *Administrative Science Quarterly*, *23*, 224-253.

Salas, E., Reyes, D. L., & McDaniel, S. H. (2018). The science of teamwork: Progress, reflections, and the road ahead. *American Psychologist*, *73*(4), 593.

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. Toronto; London; New York: Wiley.

Stam, D., Lord, R. G., Knippenberg, D. V., & Wisse, B. (2014). An image of who we might become: Vision communication, possible selves, and vision pursuit. *Organization Science*, *25*(4), 1172-1194.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Education*, *2*, 53-55.

Thoms, P., Dose, J. J., & Scott, K. S. (2002). Relationships between accountability, job satisfaction, and trust. *Human Resource Development Quarterly*, *13*(3), 307-323.

Todorov, V., & Filzmoser, P. (2010). Robust Statistic for the One-way ANOVA. *Computational Statistics & Data Analysis*, *54*(1), 37-48.
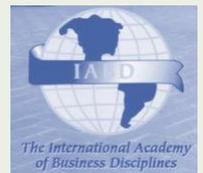
Unger-Aviram, E., & Erez, M. (2016). The effects of situational goal orientation and cultural learning values on team performance and adaptation to change. *European Journal of Work and Organizational Psychology*, *25*(2), 239-253.

Weinel, M., Bannert, M., Zumbach, J., Hoppe, H. U., & Malzahn, N. (2011). A closer look on social presence as a causing factor in computer-mediated collaboration. *Computers in Human Behavior*, *27*(1), 513-521.

Welte, H. (2021). *Virtual teams and group development a comparison between group development in traditional face-to-face teams and virtual teams* (Unpublished doctoral dissertation). Leopold-Franzens-Universität Innsbruck, Austria

Yusoff, M., McLeay, F., and Woodruffe-Burton, H. (2015). Dimensions driving business student satisfaction in high education. *Quality Assurance in Education*, *23*(1), 86-104.

Zeitun, R. M., Abdulqader, K. S., & Alshare, K. A. (2013). Team satisfaction and student group performance: A cross-cultural study. *Journal of Education for Business*, *88*(5), 286-293.

Zhang, J. (2016). The dark side of virtual office and job satisfaction. *International journal of business and management*, *11*(2), 40-46.

Zhang, Y., & Chiu, C. Y. (2012). Goal commitment and alignment of personal goals predict group identification only when the goals are shared. *Group Processes & Intergroup Relations*, 15(3), 425-437.

Zhu, C. (2012). Student satisfaction, performance, and knowledge construction in online collaborative learning. *Journal of Educational Technology & Society*, *15*(1), 127-136.

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QUARTERLY REVIEW OF BUSINESS DISCIPLINES

August 2022

Volume 9
Number 2