

The Impact of Cultural Diversity on Global Virtual Team Collaboration – A Social Identity Perspective

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Abstract

Global Virtual Teams (GVTs) – teams with geographically and temporally dispersed members who heavily rely on computer-mediated communications (CMC) – face significant collaboration challenges associated with cultural diversity. From the social identity perspective, we investigated the impact of GVT members' cultural individualism/collectivism (I/C) and language identities on their participation in team collaboration. A field experiment involving 33 GVTs was conducted to test our hypotheses. The results indicated that when a team's identity faultlines are strong, its members' I/C and Language identities have significant impact on their levels and forms of participation; and that communication media have significant interaction effects on these relationships.

1. Introduction

With the advances in information and communication technologies (ICT), global team collaboration across time and geographical boundaries has become a common practice for organizations. Such teams, normally termed Global Virtual Teams (GVTs), offer lower costs, improved efficiency, greater flexibility, better utilization of resources [1, 2], and an opportunity to coordinate complex business tasks across a potentially far-flung confederation of organizations.

Although enjoying these benefits, GVT members also face significant collaboration challenges due to their temporal and geographical dispersion [1, 2, 3]. Diversity in national cultural backgrounds and in languages among GVT members can greatly influence team communication and team success [2, 3]. The effectiveness of any GVT depends largely on the effective participation of its members. Proper management of cultural diversity and intercultural interaction among GVT members is therefore critical to effective member participation and team success [2, 3].

We investigated the issue of cultural diversity in GVTs from the social identity perspective. Interaction between GVT members from different social groups and with different social values [2, 4] is quite typical in GVT collaboration [3]. Although prior studies have investigated the effects of social identities such as

cultural Individualism/Collectivism (I/C) and team compositions on GVT processes (e.g. [1, 5, 6, 7, 8]), they often focus on the separate effects of each social identity. We intend to understand the intercultural interaction among GVT members by considering the impacts of multiple interacting social identities that are significant to GVT members.

As communication within GVTs is mainly mediated by ICTs, studies of GVTs should not neglect the effects of communication media on group processes. Hence, we explore the interactions of social identities, team composition, and group processes in the context of CMC. We hope to better understand and address the cultural and communicational challenges in GVT collaboration in general and GVT member participation in specific.

2. Literature Review

2.1 Social Identities and GVTs

Social identity is developed based on an “individual’s knowledge that he belongs to certain social groups” and that his membership to these groups bears “some emotional and value significance to him” [9]. It involves an identification process whereby one internalizes some form of social categorization so that it becomes a component of the self-concept [10].

The understanding of social identity is important to GVT research for the following reasons. First, social identity is found to be a significant factor in influencing group processes of small groups [11]. For instance, one’s commitment to a group is found to be dependant on how group-prototypical he/she is [11]. Studies in intercultural communications, conflict management, and team decision-making also demonstrate that social identities such as cultural I/C and self construal are critical to how individuals interact with others (e.g., [1, 5, 6, 8, 12]).

Second, implicit in the concept of diversity is the difference in social categories; and diversity issues often become salient when categorical distinctions among team members are recognized [4]. The understanding of social identities helps us grasp the impact of member diversity on GVT collaboration processes as members’ behavior in cross-functional or culturally diverse teams

is affected by the social-psychological mechanism of subgroup identification (i.e., social identity) [13].

Third, GVTs operate in a computer-mediated environment, and the influence of social identities on team interaction is expected to differ from that in a face-to-face environment. According to the social identity model of de-individuation (SIDE) theory [14, 15], communications with less nonverbal information and in physical isolation promote greater group identification and self-categorization and hence can emphasize social identities [14, 15, 16]. A recent study by Postmes, et al. [17] illustrated that when people feel anonymous in some respects of their personal selves in the presence of a highly salient social identity, they are more likely to conform to identity-congruent norms.

Social identities are critical to GVT success. Social identities associated with national cultures and languages have been recognized to be significant in culturally diverse work teams [2, 3, 4, 13, 18]. Patterns of thinking or “dimensions” of national cultures, reflecting the “collective programming of the mind which distinguishes the members of one human group from another” [19], can be considered as the *prototypes* of various social identities in Social Identity Theory [9, 10] – social groups that possess similar values. Among the five cultural dimensions identified by Hofstede [19, 20], I/C, the degree to which people in a country prefer to act as individuals rather than as members of groups [20], is the dimension that has been studied most extensively in relation to team communication and collaboration [6, 12]. Its impacts on team collaboration and small group processes are widely studied and well established. Hence, I/C is a good starting point for us to investigate a culturally related social identity in GVT collaboration.

As a means for communication, a common language is critical to collaboration of all teams. Its role is even more salient in GVTs [2, 3] as their members often speak and are accustomed to different languages. The interaction among members from different language groups implies potential language barriers. Difficulties in applying a common language, usually English [2, 3], can greatly impair effective team communication and may in turn impact members’ attitudes towards the team as well as their participation in team collaboration [3].

Although a GVT, as a social group, can have values and norms that its members identify with and conform to, its members’ inability to resolve their differences in individual social identities may weaken their identification with the team. People who have strong identification with a group are more likely to feel close to in-group members [21] and are more willing to commit to and participate in pro-group activities [22]. If members of a GVT identify strongly with their respective culture I/C identity or language identity, the team may have difficulties in establishing a common team identity. We believe that the social identities

associated with culture I/C and language are two significant social identities in GVTs.

2.2 Team Composition and Group Faultlines

Team composition refers to the nature of the members of a team, and is often discussed in association with its levels of homogeneity and heterogeneity (e.g., [5]). Team composition has been found to have significant effects on group processes. Oetzel [5] asserts that individuals in heterogeneous teams often encounter interaction difficulties to different cultural identities. Enayati [23] observed that team composition moderates members’ identification with the team, and in turn affects their participation. Watson, et al. [8] found that although culturally homogeneous teams had more effective interaction processes and better performance initially, culturally heterogeneous teams were able to catch up and even achieve better performance when given time to develop.

Although the effects of team composition or team heterogeneity on group processes are well documented, how exactly it influences team interaction is still unclear [24]. To better understand the impact of team composition, we need to examine the degree of diversity within a team and how the level of diversity is associated with each individual’s attachment to his or her personal social identities. In the past, group diversity has been considered based on demographic variables. However, examining the impacts of group diversity based on one single demographic attribute may cause one to miss the potential impacts of other attributes and their interactions [24]. Group faultlines, a concept introduced by Lau et al. [24] to address this concern, refer to hypothetical dividing lines that may split a group into subgroups based on one or more attributes. Depending on the similarity and salience of its members’ attributes, groups have many potential faultlines, each of which may activate or increase the potential for particular subgroupings. Faultlines can also vary in strength [24] – the strength of group faultlines depends on (1) the number of individual attributes apparent to the group members, (2) the faulting alignment, and (3) the number of potentially homogenous subgroups.

In GVTs, culture I/C and languages are two significant attributes that may trigger social identity subgroups. The strength of these faultlines depends on the alignment of subgroups in I/C and proficiency in the common language. Consider I/C as one “layer” of the “crust” of group diversity and language proficiency as the second “layer” [24] and sub-groupings based on I/C and language are “cracks” in the two layers of the crust. The effects of these cracks will be most severe when they are aligned at the same place in the layers. The faultlines are weak when attributes are not aligned or cracks are in different places in the layers of the “crust”.

In a 4-member GVT that includes 1 Collectivistic (C), non-English-speaking (L) member and 3

Individualistic (I), English-speaking (H) members, the faultlines formed based on I/C and Language are strong and closely aligned, as the subgroup memberships based on I/C and Language are identical. The faultlines in a GVT with 2 Individualistic (I), English-speaking (H) members, 1 Individualistic (I), non-English-speaking (L) member, and 1 Collectivistic (C), non-English-speaking (L) member are considered weak, as the subgroup memberships based on I/C is distinct from those based on Language. The concept of group faultlines is useful for studying heterogeneous group dynamics as it pinpoints the relationships among group structure, group size, and group processes.

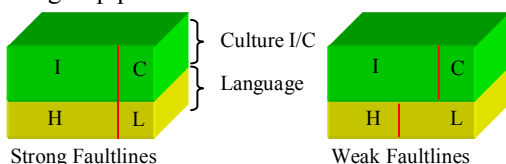


Figure 1. Strength of Group Faultlines

2.3 Member Participation in GVTs

Member participation – contribution of information, ideas, or suggestions to team decisions and actions – is a fundamental element of team interaction and is important to effective team collaboration. Studies in GVT found that due to the temporal and spatial dispersion, many problems encountered by GVTs stemmed from problematic team participation [2, 3].

Time, Interaction and Performance (TIP) theory [34] argues that groups simultaneously perform tasks to fulfill three functions: *Production* (tasks performed to complete the team assignment or project), *Group Well-being* (tasks contributing to the group itself as an intact and continuing social structure such as members assuming roles, developing behavioral norms, and scheduling and coordination), and *Member Support* (tasks associated with developing individual relationships with others such as social interaction). We believe that the value of GVT member participation come from their contributions to fulfill these group functions.

There are two main aspects of participation – quantity and quality. The *quantity* of participation refers to the amount of contributed information [32] and determines the degree to which a member is perceived as an influential communicator [32, 33]. Through extensive participation, these influential members are able to define team norms and values and shape the team's identity [11]. The *quality* of participation mainly concerns the content and the purpose of the information being contributed. The value of contributions is distinguished by the benefits that they bring to the team [31]. As the literature does not offer a sufficiently objective quality measure, we focus on the quantity of participation as measured by the number of contributions to team decisions and actions for the group functions.

In GVTs, it is difficult to identify and define a “turn of talk” (the point at which a person starts speaking to the point at which he or she stops and another starts) – a conceptual participation unit that has been extensively applied to studies of face-to-face team communications [25, 26, 27] – due to the multiple addressability and parallelism associated with many communication media [28]. We therefore define units of participation through identifying simple subject-predicate combinations (i.e., complete and meaningful sentences) [29, 30, 31, 32] as it focuses on the expression of thoughts.

Of the three group functions, the *production* function is often given the highest priority [34], especially in ad-hoc GVTs [2, 3]. When undertaking a production task, two modes of communication may be carried out including (1) conveying and gathering task-related information and ideas and (2) converging and resolving differences in meanings and interpretations to a shared understanding [28, 34, 35]. The conveyance of task-related information focuses on the dissemination of a variety of information from many sources in order to share and obtain as much relevant information as possible for understanding the situation [28]. Team members do not actively engage in disagreements or qualifications of each other's contributions [28]. Conversely, the convergence of task-related information focuses on aligning various interpretations of shared information to reach a common understanding and to mutually agree that they have done so. It often involves critical examination of messages and the resolution of disagreements [28]. Hence, we further decompose production participation into conveyance and convergence participation.

2.4 Social Identities and Member Participation

Through its embedded values, culture I/C identity can exert its influence on GVT member participation. I/C values have been shown to affect cooperation and participation [1, 5, 36, 37, 38, 39]. The Face Negotiation Theory states that people in Collectivistic cultures value the maintenance of their communicating parties' face [5, 12] and are often concerned about receiving negative evaluations by others [37]. Therefore, Collectivistic individuals tend to hold back their opinions for fear of hurting others' feelings and damaging group harmony. This suggests that GVT members identified with Collectivistic cultural values are more likely to attend to communication that promotes group harmony and team relationships. Hence, they may be more interested and involved in member support activities. In contrast, people in Individualistic cultures have greater face concerns for themselves and often use an issue-oriented approach when interacting with others [12, 37], implying that GVT members who identify with Individualistic cultural values are more likely to be interested in standing out by taking a leadership role in supporting the

group's well-being, and in effective communication acts associated with task production.

Language use is critical for effective team communication for all group functions. One's ability to use a language proficiently is associated with his or her effectiveness in message clarification, explanation, comprehension, justification, convergence of meanings, and consensus building [2, 3]. GVT members who are not comfortable with using the selected common language may not be able to effectively participate in team functions. We believe team members' identification with a common language in GVTs is associated with their perceived fluency in English, one of the most common languages used in intercultural collaboration.

2.5 Communication Media

GVT members rely heavily on various ICTs for communication and collaboration. These ICTs can greatly alter the temporal patterns of communication [40, 41]. Common media used by GVTs can be categorized based on their levels of synchronicity. *Synchronous* communication media such as closed circuit television conferencing with audio, telephone conferencing, and online computer conferencing relax the requirement of face-to-face communication that all communicators must be present at the same place but retain the constraint that all must be communicating in the same period of time. *Asynchronous* media such as asynchronous discussion forums, bulletin boards, and e-mails free both the time-synchronicity and place-sharing constraints [41].

Media synchronicity has been shown to influence teams' communication and collaboration. McGrath [41] suggested that the media synchronicity can affect the stages and functions of group work, specifically its attention to different functions. Media Synchronicity Theory [28] proposed that media with low synchronicity are more effective for conveyance communications while those with high synchronicity are better for convergence communications. Individuals with different culture backgrounds seem to have different preferences in using media with different levels of synchronicity. Massey, et al. [1] observed that Collectivistic individuals prefer asynchronous media for convergence communication while Individualistic individuals prefer synchronous media for the same communication task.

3. Research Hypotheses

3.1 GVTs with Weak Faultlines

According to Lau et al. [24], the strength of a group faultline is determined by how the attributes are "aligned" and by how many subgroups are created by the alignments. When group faultlines are weak, the resulting subgroups are less stable. The identification with each subgroup is likely to be weaker and subgroup polarization becomes less possible [24]. Therefore, members are more likely to conform to the group norm

and are more likely to identify with the team as a whole rather than with any of its subgroups [24]. Social identity theory also suggests that social identification may not be initiated when the different social groups are not apparent (i.e., weak group faultlines) [10, 11]. In teams with weak faultlines, GVT members will have weaker social identification with culture I/C and with language than they will with the team. Hence, their participation will be less likely to be influenced by group diversity associated with culture I/C and language identities. Since we are more interested in understanding the impact of cultural diversity on team participation, we focus our investigation on teams with strong faultlines.

3.2 GVTs with Strong Faultlines

When group faultlines are strong and group diversity is significant, the resulting subgroups are more apparent to the team; hence, differences in social identities are more likely to initiate the social categorization or category accentuation process and interfere with the conformity of GVT members to team norms [11, 24]. Conflicting subgroups are more likely to form. We are interested in GVT group faultlines determined by). The culture I/C identity (I or C) and the language identity associated with self-perceived English proficiency (High/H – comfortable communicating in English or Low/L – finding it difficult to communicate in English) can result in four possible subgroups (IH, CH, IL, and CL). Since the order of the pairing of subgroups in the alignment is irrelevant (IH-CL is considered identical to CL-IH), two alignments (IH-CL and IL-CH) are hypothesized and examined regarding their influence on member participation.

3.2.1 The IH-CL Alignment. Individualists are concerned with self face, implying that they frequently look for a sense of freedom, individual autonomy, personal reserves, and rights to non-distraction [12]. Hence, IH members are more outcome-oriented and as they are proficient in English and confident with their skills in communicating all group functions, they are less likely to lose face through group participation. It is expected that when using synchronous media, they would focus more on production conveyance participation than CL members, who may hesitate to express opinions using a language with which they do not feel proficient. Therefore:

H1 *When the IH-CL group faultlines are strong, IH members will participate more in conveyance production communications than do CL members in a synchronous communication environment.*

In an asynchronous communication environment, with its rehearseability and less pressure to provide immediate responses, CL members may feel more comfortable in production conveyance communications. Hence, we do not expect to see differences in

asynchronous production conveyance communications between CL members and IH members.

Synchronous media facilitate direct confrontation, supporting IH members' accustomed direct style in production convergence communication. Hence, using a synchronous medium, IH members are more likely to participate in production convergence communication than CL members. CL members, who are more reluctant to approach conflicts directly and lack confidence in their English, may hesitate to participating in production convergence, even in a less pressured asynchronous communication environment, while IH members can still effectively using asynchronous media to support their direct style of convergence communication. Therefore:

H2 *When the IH-CL group faultlines are strong, IH members will participate more in production convergence communications than do CL members, regardless of the synchronicity of the communication environments.*

Regardless of the synchronicity of communication media, IH members are more likely to extend their impacts on the team by striving for leadership roles and hence, may participate more in group well-being communication than CL members. Therefore:

H3 *When the IH-CL group faultlines are strong, IH members will participate more in group well-being communications than do CL members, regardless of the synchronicity of the communication environments.*

Compared to IH members who tend to focus less on social communications, CL members may try to make up for their apprehension in production and group well-being participation by focusing on member support functions as member support functions are often less complex and do not require high English proficiency. Therefore, we expect that:

H4 *When the IH-CL group faultlines are strong, CL members will participate more in member support communications than do IH members, regardless of the synchronicity of the communication environments.*

3.2.2 The IL-CH Alignment. IL members with greater concerns for self face may hesitate to contribute opinions and ideas as they may loss face when not being able to fluently communicate using English. CH members, on the other hand, are expected to be more active in production conveyance communications as they are more fluent in English and are better as articulating their ideas and opinions. This difference may be apparent in a synchronous communication environment where there is higher pressure for immediate and clear explanations or arguments. In an asynchronous communication environment, although its rehearseability may assist IL members express ideas and opinions, their ability to clearly convey information may still be restricted by their English proficiency. Hence, we hypothesize that:

H5 *When the IL-CH group faultlines are strong, CH members will participate more in production conveyance communications than do IL members, regardless of the synchronicity of the communication environments.*

The sender-oriented communication and the rehearseability associated with features of asynchronous media may help alleviate the anxiety IL members have when communicating using English. Eager to resolve conflicts and less apprehensive about direct confrontation, they are expected to argue for their positions in an asynchronous environment. CH members, due to their conflict-avoiding tendency, may not be as active in production convergence communications as IL members. Therefore:

H6 *When the IL-CH group faultlines are strong, IL members will participate more in convergence production communications than do CH members in an asynchronous communication environment.*

In synchronous communication environments, as IL members may not feel confident about convergence communication using English and CH members may try to avoid direct conflict confrontation, it is difficult to make predictions. Hence, we do not offer any hypothesis for this relationship in this setting.

Group well-being communication often does not require such strong language skills as does production communication, suggesting that IL members who want to shine but who may not be able to in other sorts of communication will do so here. CH members, with less interest in striving for individual distinction, may not particularly focus on this type of communication.

H7 *When the IL-CH group faultlines are strong, IL members will participate more in group well-being communications than do CH members in an asynchronous communication environment.*

IL members may participate less in member support communication as they are less concerned with relationship-building and are less fluent in English. We expect to observe this trend both in synchronous and in asynchronous communication environments.

H8 *When the IL-CH group faultlines are strong, CH members will participate more in member support communications than do IL members, regardless of the synchronicity of the communication environments.*

4. Research Methodology

4.1 Participants

A field experiment involving 33 4-member GVTs of undergraduate students from a major Asian university and from a private university in Eastern United States was conducted to test the hypotheses. Students participated in this experiment as a two-week long group project that accounted for 15% of their course grades. Each team consisted of members majoring in

Information Systems and in Management. Located on two continents and 12 hours apart, members of these teams were geographically and temporally dispersed. Participants were given pseudonyms and were allowed to interact with others only using these names and only through the assigned communication media. Inspection of their communication logs did not reveal violation of these rules. 44.8% of the participants were female.

A pre-experimental survey was conducted to assess each participant's culture I/C and English language identities. Items assessing culture I/C orientations were adopted from prior studies [6, 36, 42] including those for Individualistic Orientation, Collectivistic Orientation, Independent Self-construal, and Interdependent Self-construal. These items had good divergent validity and high reliabilities (.785, .912, .869, and .867, respectively). These four constructs were used to determine each participant's culture I/C orientation: one is considered individualistic if he or she scored higher on independent self-constructs and/or scored higher on individualistic orientation. For those who scored equally on these constructs, the cultural values of their countries of origin were used. The participants' nationalities and countries of origin were first used to determine their levels of English proficiency (high for English-speaking countries and low for non-English-speaking countries). In the case that a participant originated from a non-English speaking country but had an English-speaking country nationality, or vice versa, his or her ratings on perceived English language fluency items were used to indicate his or her levels of proficiency.

43 IH, 45 CL, 22 CH and 22 IL individuals were identified based on the results of the pre-experimental survey. These results were then used to assign participants to teams so that each team would have a strong faultline based on the IH-CL or IL-CH alignments – 22 IH-CL teams and 11 IL-CH teams. Based on surveys taken after the first and the second week of the project, participants indicated that they perceived the differences in culture I/C and English language identities among their fellow team members.

4.2 The Communication Environment

All teams were provided with a communication environment that included both synchronous and asynchronous communication tools: a synchronous instant messaging service, a web-based asynchronous e-mail service, and an asynchronous group discussion forum and file repository. Each participant was given a unique user ID and a password for accessing his or her individual e-mail account, IM services, and the group forum and file repository. Use of sound and images transmissions that may reveal true individual identities were prohibited. Participants were also instructed to log all their e-mail messages and IM communications. Examination of the archived e-mails and IM logs did not reveal any use of sound or image transmissions.

4.3 Task Assignment and Team Deliverables

The teams were required to analyze a system implementation case and submit an interim report at the end of the first week and a final business proposal at the end of the second week. To be able to respond to the discussion questions, team members with IS and Management majors had to contribute their subject-area expertise. To accomplish the task, team members had to carry out both conveyance and convergence communications. Results from the post-experimental survey showed that participants indicated that they had carried out both conveyance and convergence communications to complete the project. In addition to the interim report and the final business proposal, each team also had to submit their communication logs, archives, discussion minutes and shared documents.

5. Analysis and Results

5.1 Content Coding

Member participation was measured based on coding of team communication logs including team forum discussions, emails, and IM messages. The process involved first parsing communication logs into participation units and then coding of the participation content. Based on the suggestions of Burke [29] and Bonito [30, 31, 32], each complete subject-predicate combination was parsed as a communication unit. Due to the nature of text-based synchronous communication, an IM message that had incomplete sentences but conveyed a complete idea was also parsed as a unit. Content of participation was coded and categorized into: Production Conveyance (CY), Production Convergence (CV), Group Well-being (GW), and Member Support (MS). The number of contributions in each participation category was recorded for each participant.

The communication logs were independently coded by two coders, who were blind to the experimental conditions and hypotheses. The process resulted in an average of 424.8 parsed and coded units for each team. Inter-rater reliability, the percentage agreement of coded results between the two coders, was found to be high (90.1% per message for unit parsing; 85.2% per message for CY, 88.3% per message for CV, 86.4% per message for MS, and 89.7% per message for GW).

5.2 Hypothesis Testing

For each alignment (IH-CL and IL-CH), a two-way ANOVA analysis was carried out to test the effects of identity and media synchronicity on member participation for production conveyance (CY), production convergence (CV), group well-being (GW), and member support (MS). The participation scores were standardized for each team before analyzed.

Hypotheses 1, 2, 3, and 4 concern teams with strong IH-CL group faultlines. H1 suggests that in synchronous

communication environments, IH members will participate more in CY communication than will CL members. A significant interaction effect was found at the .1 level ($F=2.924$, $Sig.=.089$), indicating that in synchronous communication environments, IH members participated more in CY communication than did CL members, while in asynchronous communication environments, CL members participated more than did IH members. Post-hoc t-tests showed that the difference was significant for asynchronous environments at the .05 level ($t=-2.105$, $Sig. =.038$) but not for synchronous environments. H1 is not supported.

H2 predicts that IH members will participate more in CV communications than will CL members, regardless of the synchronicity of the communication environments. A significant interaction effect was found at the .01 level ($F=26.156$, $Sig. =.000$). Post-hoc t-tests indicated that the difference is significant for synchronous environments ($t=6.502$, $Sig. =.000$) but not for asynchronous environments. H2 is partially supported.

H3 hypothesizes that IH members will participate in GW functions more than will CL members, regardless of the synchronicity of the communication environments. A significant main effect on identities was observed at the .01 level ($F=27.704$, $Sig. =.000$), indicating that CL members participated significantly more in group well-being communications than did IH members, the opposite of what we predicted. No interaction effect was found. H3 is not supported.

H4 predicts that CL members will participate more in MS functions than will IH members, regardless of the synchronicity of the communication environments. A main effect on identities was observed at the .01 level ($F=28.215$, $Sig. =.000$). CL members participated significantly more on member support than did IH members, supporting H4. No significant interaction effect was found.

Hypotheses 5, 6, 7, and 8 concern teams with strong IL-CH group faultlines. H5 posits that CH members will participate more in CY communications than will IL members, regardless of the synchronicity of the communication environments. A significant interaction effect was found at the .01 level ($F=158.141$, $Sig. =.000$). CH members participated significantly more in CY than did IL members in asynchronous environments ($t=-17.464$, $Sig. =.000$), and participated significantly less than did IL members in synchronous environments ($t=5.858$, $Sig. =.000$). H5 is partially supported. H6 predicts that in an asynchronous communication environment, IL members will participate more in CV than will CH members. No significant main or interaction effect was found. H6 is not supported.

H7 suggests that in asynchronous communication environments, IL members will be more participative in GW than will CH members. A significant main effect on identities was observed at the .01 level ($F=147.732$, $Sig.=.000$), supporting H7. IL members participated

significantly more in GW than did CH members, regardless of the communication media. H8 states that CH members will participate more in MS than will IL members, regardless of the media. No significant main or interaction effect was observed. H8 is not supported.

6. Discussion and Implications

6.1 Discussion of Results

6.1.1 The IH-CL Alignment. In a synchronous communication environment, IH members were expected to participate more than CL members in production conveyance. However, though this difference was observed in asynchronous communications, it was not observed in synchronous communications. The only synchronous communication medium available to our GVT members was IM, which is not conducive to the use of proper English. IH members may have had difficulties using their greater English proficiency to advantage in this medium, possibly frustrating them. CL members, by contrast, may have found the grammar-flexible nature of IM to be friendly toward their weaker grasp of the language. Hence, the difference due to lack of English proficiency may not be significant in this case. In addition, due to the 12-hour temporal dispersion, online IM meetings were difficult to arrange. This may also further contributed to the insignificant results. Being unable to effectively convey information through synchronous communications, IH members may have to resort to the use of asynchronous tools. Also, in asynchronous communications, as all members had the luxury to rehearse their messages, their advantage in English proficiency may have a larger impact on their conveyance participation.

Production convergence communications often involves conflict resolution and consensus building. IH members, with their more direct and confrontational styles of communication were expected to participate more than CL members in production convergence. This difference was observed in synchronous communications but not in asynchronous communications. The lack of direct face-to-face interaction in asynchronous communication may have relaxed CL members' apprehension toward direct confrontation, letting them better rehearse their messages to smooth out confrontations. In addition, CL members may want to contribute more using asynchronous tools as they were hesitant about contributing in the synchronous environments. IH members, on the other hand, may decrease their asynchronous convergence communication as they had the opportunities to do so through synchronous communications. This would explain the lack of difference in asynchronous environments. This result is in line with the findings of a recent study [1] that Collectivistic GVT members preferred asynchronous media for convergence

communications while Individualistic members preferred synchronous media.

Although we expected to see more group well-being participation by IH members, we observed that CL members were more active in these activities. One plausible explanation is that members of Collectivistic cultures are often high uncertainty avoidance [19, 20]. Being more anxious and intolerant about ambiguous situations such as unfamiliar tasks, team members, and communication environments, they may feel the need to impose structures and formal rules to the interaction, which would result in more group well-being participation. Individualistic members, who tend to be less apprehensive about uncertainties and ambiguity [19, 20] may be less motivated to participate in group well-being functions.

As expected, due to their tendency to attend to relationships and their motivation to contribute in an effort to make up for less participation in other functions, CL members participated more in member support communications than did IH members, regardless of the synchronicity of the communication environments.

6.1.2 The IL-CH Alignment. We expected to see more participation by CH members in production conveyance as they are better at articulating ideas and explanations using English, regardless of the synchronicity of the communication environments. We observed this difference in our sample only in asynchronous communications. Surprising, IL members participated significantly more in production conveyance than CH members when using synchronous communication tools. One possible explanation is that the individualistic drive to take a leadership role in production conveyance is strong enough to overcome a language handicap, with the self-confident ILs believing that the substance of their contributions will outweigh any negative face their English mistakes might cost them. This seems particularly likely given the low rehearsability and grammar-tolerant nature of the synchronous medium used in this study. CH members, as they had the opportunities to express their ideas through asynchronous communications, may be less motivated to do so in a synchronous environment.

We expected to see more production convergence communications by IL members in an asynchronous environment as they are able to preserve self face about English communications in such an environment. However, we did not observe any significant differences. This may be because it takes a higher level of English proficiency for one to argue and justify his or her positions. As individualists are highly concerned with preserving self face, they may still feel anxious about their adequacy in using English to communicate.

As expected, in asynchronous communication environments IL members participated significantly more in group well-being functions than did CH members as they may feel more comfortable striving for

leadership roles in such an environment. Surprising, the same difference was also observed in synchronous environments. This may be due to the fact that group well-being communications often do not require strong language skills. IL members may feel less threatened by losing face in synchronous environments (or perhaps just in this one) and hence, were willing to participate more in group well-being functions. For CH members, their fluency in English may have offset some anxiety about the unstructured collaboration situation, such that they did not feel the need to impose as much structure as did the CL members.

We did not observe the expected difference in member support communications between IL and CH members. One potential explanation is that while Collectivistic members may want to attend to relationship-building communications and Low English proficiency members may want to make up their less contribution in other functions by participating more in member support functions, they were also occupied with the production communications. With the short project time span to work on a quite complex task, their motivation to contribute to social communications may be offset by the need for CH members to focus on production functions as they are better at English and for IL members to concentrate on group well-being functions.

6.2 Limitations and Implications

The use of student participants posed limitations to our study and our findings. As course projects, this collaboration had a very short time frame. Hence, the results may not be typical for long-term GVTs. Not all students were as motivated to participate in the project as would be individuals who work in a corporation. The students from the United States had just started their quarter and were not as well prepared for the project as were the South-eastern Asian students who were participating in the project at the end of their semester. This artificial scheduling constraint may have caused absenteeism and miscommunication at the beginning of the project. However, participants did experience typical GVT collaboration challenges such as imbalanced team commitments among team members, conflicting schedules, multiple project commitments of team members, and the difficulties in scheduling online synchronous meetings due to time zone differences. Hence, a certain level of realism was created in this field experiment. Another limitation is associated with unexpected glitches in Yahoo! Mail that may have caused the loss of some messages. However, technical instability has been widely noted in GVT collaborations [3]. Hence, we believe that this limitation should not significantly bias our results.

This study is one of a few studies to investigate the impact of cultural diversity by applying the concept of group faultlines. Our results indicate that cultural

diversity can significantly impact member participation when the group faultlines are strong. Depending on the attributes contributing to the faultlines, cultural diversity may exert different effects on GVT collaboration. It is evident in our results that these social attributes interact with each other; hence, when understanding the influence of cultural diversity on team collaboration, it will be more fruitful to consider these attributes in combination. To effectively manage a GVT, team leaders have to consider multiple cultural attributes of the team members, rather than just their nationalities. Future research can include other cultural attributes such as uncertainty avoidance and time perception.

Our results also imply that the influence of cultural diversity, conceptualized as differences in social identities, can interact with the communication environment. Synchronous communication tools provide support for GVT members who are more outcome-oriented and are less apprehensive about direct confrontation and using English. Asynchronous communication tools, on the other hand, often provide a more relaxed environment for GVT members who are more anxious about direct conflict confrontation or the use of an unfamiliar language. For each participation function, the use of one may influence the extent of use of the other. Further research can look into how the use of synchronous tools influences the use of asynchronous tools, and vice versa, and the impact on GVT collaboration of that relationship.

We also observed that GVT members with different social identities showed preferences in their contributions. They seemed to strive to contribute more to one function to compensate for contributing less to other functions. As all group functions are critical to a team's functioning, they are all able to make contributions one way or the other. However, as GVTs are often very task-oriented, understanding how members perceive the significance of each type of contribution and how those perceptions may influence team collaboration can shed light on how preferences should be managed or manipulated to enhance the effectiveness of team collaboration.

According to Lau, et al. [24], group faultlines are not always stable. The strength of these faultlines can be weakened by increasing interactions and familiarity among team members as well as their commitment to the team. Future research should further investigate the temporal patterns of group faultlines and their impacts on team collaboration over time.

7. Conclusion

As communication technologies advance, GVTs spanning across national and organizational boundaries are becoming more important to organizations. However, the benefits of boundary-spanning are often offset by the challenges associated with member diversity. We attempted to understand the impact of cultural diversity

on member participation in GVTs from the social identity perspective. By adopting the concept of group faultlines, we were able to understand these effects better. However, further studies are necessary to better comprehend the complexity of these relationships and to provide improved insights as to how to better manage cultural diversity in GVTs.

8. References

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