Establishing Indicators for Effective Communication among Task Groups: The Case of the 'Task Force Out of Baguio' (TFOOB)

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ABSTRACT

The COVID-19 lockdown protocols enforced by the Philippine government on March 2020 forced colleges and universities in the Philippines to suspend face-to-face classes. Consequently, hundreds of enrolled students were stranded in university towns and cities and needed to return to their respective hometowns. In response to this crisis, the University of the Philippines Baguio (UPB) organized the Task Force Out of Baguio (TFOOB) to help safely transport stranded students to their homes. The task force faced the challenges of navigating the varied and changing rules on crossing the city and town borders, securing necessary permits for travel, and communicating with multiple local government units. Given the rigid health and safety protocols at that time, communication between and among the members of the TFOOB was mostly through online platforms. This article examined the online group chat exchanges of the TFOOB. Through visualizing these communication exchanges by establishing a communication network mapping, three indicators emerged as potential measures for evaluating an effective communication network for groups: 1) volume and frequency; 2) intentionality or means of showing intended recipient; and 3) types of messages – task or relational communication.

Keywords: COVID-19, communication network, group communication, online communication

INTRODUCTION

Working with a group during a pandemic was both a challenge and an opportunity to explore the dynamics of a group that was tasked to respond to an extraordinary situation with limited, and even non-existent physical interaction among its members. The challenge of working with this virtual group inspired the researcher to reflect on how the group interacted to achieve its goals and, in the process, established indicators of an effective communication network.

The COVID-19 pandemic and the subsequent lockdown protocols enforced by the Philippine government in March 2020 forced many universities in the Philippines to adopt a work-from-home arrangement for administrators, faculty, and staff and to suspend face-to-face classes. One of the universities that implemented such measures is the University of the Philippines Baguio (UPB), the Northern Luzon constituent unit of the University of the Philippines System. Many UPB students are not permanent residents of Baguio City and were stranded in the city due to travel restrictions and the suspension of operation of public transportation in Baguio City.

The UPB responded to the situation by creating the Task Force Out of Baguio (TFOOB), a group tasked to help safely transport UPB students to their homes in the provinces. The TFOOB was headed by a senior faculty member and official of the University. The task force included five faculty members who are also University officials in various capacities and one senior administrative staff, all of whom worked voluntarily.

The TFOOB advised stranded UPB students on how to avail of the transport service offered by the University and what documents to prepare. The TFOOB scheduled medical check-ups, applied for travel permits, and rented vehicles to safely transport stranded students directly to their homes. In several cases, the TFOOB coordinated with the local government units (LGU) which sponsored vehicles that fetched their stranded student constituents from Baguio City. In their coordination work with LGUs, TFOOB checked travel requirements and schedules, picked up students from their temporary residences in Baguio City, brought them to designated transport boarding areas, and later followed up to ensure their safe arrival at their destinations.

The TFOOB was a task group. Task groups are formed to address a specific concern or to achieve a specific goal. Compared to other group formations, task groups which may adopt the form of work groups, task forces, or *ad hoc* committees have a short lifespan and are disbanded upon completion of the specific task or goal (Beebe and Masterson 2015; Calefato and Lanubile 2010). Given that the group is task-oriented, communication is vital for it to coordinate efforts and to achieve its goals. Beebe and Masterson (2015) highlighted attributes crucial to the effectiveness of a task group. These include clarity and specificity of goals, clarity of specific tasks among group members, presence of operational

rules and expectations, and developed means of coordination. Group effectiveness is one aspect of group communication that has been constantly researched over the past decades, yet neither definite measures nor formula have been set. Hackman and Morris (1975) stated that "we still know very little about why some groups are more effective than others" (2) which was sustained decades later by Gonzalez, Burke, Santuzzi, and Bradley's statement that there is a need to conduct further studies on group communication because of the lack of concrete evidence in measuring effective communication (2003). Brewer and Mendelson (2003) also noted that even the term "effectiveness" has not been clearly defined in group research and despite being a common thread in research, "there has been no systematic process" and no "direct measurement of team effectiveness" (777). Calefato and Lanubile (2010) offered a broader view by explaining the somewhat complex nature of measuring effectiveness because it relies on the varied contexts faced by groups. In the continuing test for variables and appraisal of contexts in the study of groups, this research offers possible indicators for measuring effective group communication by analyzing network flows.

According to Alafriz et al. (2014), hundreds of models and frameworks related to the study of team performance or effectiveness were developed through the years. It is interesting to note from their observation that the most common approach in these studies was the Input-Process-Output (IPO) framework, a key feature of the general systems theory. The effectiveness measures, despite being varied, may then be attributed to the IPO components. Input variables, for example, may include composition, characteristics, skills and competencies, and tasks of group members. Process variables may identify the activities, interactions, and resources utilized by the group. And the output variables commonly include the outcomes related to the attainment of goals or productivity of the group (Alafriz et al. 2014; Mathieu et al. 2008). In the current study, the IPO approach is used with a focus on the process aspect where interactions or exchanges among the group members took place. McGrath noted that the "central feature, the 'essence' of a group lies in the interaction of its members" (1984, 12) which is also the focus of this study.

Communication interactions are vital in maintaining a task group which is typically depicted in a face-to-face setting. The face-to-face interactions enables a task group to meet regularly to discuss and monitor the implementation of tasks necessary for goal achievement. Aside from task-related roles, face-to-face interactions also strengthen the social nature of the group as relational roles are performed verbally and nonverbally. But with the limitations posed by the pandemic, TFOOB relied largely on online communication, making it a virtual task group.

Virtual small group communication is defined by Beebe and Masterson (2015) as consisting of "three or more people who collaborate from different physical locations, perform interdependent tasks, have shared responsibility for the outcome of the work, and rely on some form of technology to communicate with one another" (21). They also noted that virtual groups have "lower levels of initial

trust, cohesiveness, and satisfaction" (2015, 138) than face-to-face groups. One contributing factor is the type of interaction in virtual communication where feedback can be asynchronous or delayed. Harris and Sherblom (2008) likewise noted that the simultaneous and richly loaded communication in terms of "emotional, attitudinal, relational, and contextual" information found on face-to-face interactions are reduced because a "text-based communication medium ... provides less opportunity for the communication of these simultaneous cues, feedback, subtlety of inflection and emotional-relational content" (302). While some negative aspects are attributed to the virtual text-based communication such as the "laborious and time consuming" construction of a message, Harris and Sherblom (2008) further pointed out that the careful composition of messages in a virtual setting "increase[s] the clarity of the overall group discussion" (304).

The difference between face-to-face interaction and online/virtual/mediated communication has been studied by various scholars. The differences lie in the use of nonverbal cues (Calefato and Lanubile 2010; Walther 2013), collaboration effectiveness (Hatem, Kwan, and Miles 2012; Tutty and Klein 2008), time utilization in collaborative work (Sins et al. 2011), as well as cohesion, interpersonal relationship, and group decision making processes (Jonassen and Kwon 2001) to name a few. Acknowledging the major differences in communication interactions in the online space from that of face-to-face, the current study highlights how task groups communicate online to determine the affordances and potential of virtual communication as an alternative mode of communication for task groups.

The study at hand examined and analyzed the group chat exchanges throughout TFOOB's four-month lifespan. The message exchanges were quantified using a coding sheet that tallied the occurrence of a group member's action as an initiator or recipient of a message and categorized the message content according to three types: task-related, relational, or off-topic. Using Gephi, a visualization tool, the communication networks were mapped out using the quantified data.

LITERATURE

Group

The term "group" has been defined in various ways by scholars, but certain common features emerge from the definitions, that is, it consists of several people interacting with one another for a common objective (Adams and Galanes 2012; Beebe and Masterson 2015; Forsyth 2019; Galanes and Adams 2019; Harris and Sherblom 2008; Myers and Anderson 2008). Galanes and Adams (2019) classified groups into two major categories, namely, primary and secondary. Primary groups include highly intimate social groupings such as family and friends, while secondary groups are those created for a

specific interest or goal. Adams and Galanes (2012) viewed the two categorizations of groups as opposite nodes of a continuum and noted that there was "no group that is purely primary or secondary in its functioning" (17). Some aspects of both categories may be seen in various groups, but the TFOOB was considered a secondary group due to its task-based orientation.

A task force is one type of secondary group formed to achieve a specific goal or solve a problem (Harris and Sherblom 2008) or investigate an issue (Galanes and Adams 2019). The TFOOB was formed with a specific goal to help stranded students return home. The creation of TFOOB was in providing an avenue for unified action to resolve the issue of so many UPB students from the provinces stranded in the city. The TFOOB, acting on behalf of the students and University, helped reduce the burden and cost of individual travel at a time when travel restrictions were in place and public transport was suspended due to the lockdown.

Members as Volunteers

A group consists of at least three members who work for the realization of a goal. The TFOOB was composed of six to seven faculty and staff employees who were concurrent University officials. Membership in the TFOOB can be equated to a parallel team formation where members perform their tasks in the group in addition to their other "on-going responsibilities" (Harris and Sherblom 2008, 150). TFOOB members voluntarily did their tasks in addition to their other responsibilities. These other responsibilities in a way benefitted the TFOOB by speeding up some processes due to key University officials being members of the group. Apart from the effective utilization of the individual capacities and skills of each member, the value of volunteerism – or what Aguiling-Dalisay et al. (2004) described as "*bukas/kusang-loob na pagtulong sa kapwa na walang inaasahang kapalit* [helping someone out of absolute free will… without consideration of any remuneration or anything in exchange]" (23-24, emphasis in original) – drove the high levels of commitment and motivation of TFOOB.

Networking in Groups

The study of group dynamics has been around for over half a century. Kurt Lewin, a psychologist, pioneered its conceptualization and the understanding of the influence of an entire group on its individual members in terms of behavioral changes (Burnes 2004). Tracing the etymology of dynamic to its Greek origin "*dynamikós*, which means to be strong, powerful, energetic" (17), Forsyth (2019) provided a succinct definition of group dynamics by linking these characteristics to how forces and processes within the group "create continual motion and change" (18). Group dynamics refer to both the description and the study of the various interactions within the group. Group dynamics illustrate

the relation and engagement among members, decision-making processes, situational responses, and achievements. To summarize, the interpersonal processes are the objects of study in group dynamics. These processes provide an overview of how a group evolved, cohered, structured, functioned, performed, and handled tensions and conflicts, and was affected by its context. Similarly, in the present study, group dynamics will be analyzed and presented through a visualization of the frequency, density, and patterns of interactions among the members.

Scholars have developed various methods of analysis and means to measure group dynamics. Robert Bales (1950) for example, used the Interaction Process Analysis (IPA), a structured observation coding mechanism that yielded quantitative data. Bales focused on the task-related and relational aspects of interaction. IPA measures four categories of interactions, each with three behavioral examples or manifestations. The behavioral descriptions are then grouped according to six frames of reference that point to problems of orientation, evaluation, control, decision, tension-management, and integration. Bales later updated and expanded the coding mechanism for group interaction. The IPA became the Systematic Multiple Level Observation of Groups (SYMLOG) and added categories that showed "members' dominance–submissiveness, friendliness–unfriendliness, and accepting–opposing the task orientation of established authority" (Hare and Hare 2005 as cited in Forsyth 2019, 43). Bales' SYMLOG method required a direct observation of group behavior and a survey of individual and group behavioral perceptions.

These methods, however, were primarily premised on a face-to-face situation where one may be able to observe the group members during the study. The COVID-19 pandemic and the virtual nature of the TFOOB chat group created a limitation and posed a challenge on how to gauge group dynamics without direct observation. While recent developments in the study of group dynamics have incorporated the use of computational applications in coding and visualizing the data on group dynamics, these technologies serve to automate the process of encoding observed group behaviors. For example, Losada and Markovitch (1990) developed an app named GroupAnalyzer, a computerized system for coding and analyzing group meetings. Some features of GroupAnalyzer include "fast and accurate coding, accurate timing, fast feedback, integrated numerical and graphical representation, and comprehensive dynamic analysis" (101). Taking off from the SYMLOG's three-dimensional coding scheme, Group Analyzer focused only on the overt and nonverbal behaviors which an encoder inputs into the application. There were problems in encoding, given the dynamics of a meeting such as an immediacy, timing, name recall, and capturing the complexity of the interactions and behaviors manifested, but capturing the interactions provided an overview of interaction flows and "behavioral streams" (109) which could help in understanding and promoting collaboration within the group. Another application intended for capturing group dynamics is CoPrA2GO developed by Nowakowski et al. (2014). CoPrA2GO encodes real-time face-to-face communication and processes the data through the Collaboration Process Analysis (CoPrA). An encoder records the interactions based on a preset

codebook of actions. Both applications mentioned above, however, were still hinged on physically observing a group. The challenge now, for the study at hand, is to devise a method that will measure the group dynamics of a virtual chat group.

Measuring group dynamics also leads to measuring or judging group effectiveness. Uwe Bussmann (2013) posited that the effectiveness of a group depends on various factors that relate to the group structure and processes. Smaller groups tend to have "functional" (28) interaction and higher motivation among their members which affect the group's overall performance and the attainment of its goals. The term 'synergy' captures both the interaction and motivation of group members in working for the realization of their group's goals. While not the only factor, synergy is regarded by Bussmann as the "heart of effectiveness in a group" (28). Similarly, Sbea and Guzzo (1987) in their study of determinants of group effectiveness in a large retail corporation, identified three determinants, namely "task interdependence, outcome interdependence, and potency" (25). Task interdependence refers to the member's "degree of task-driven interaction", while outcome interdependence pertains to the effects of "task accomplishments" on the group, and potency is the group's perception and outlook of their own capabilities. These three indicators influence the overall group interaction and performance. Sbea and Guzzo concluded that communication, specifically, messages exchanged should be viewed in relation to group performance. They noted that capacity building is also an important factor in increasing interactions related to tasks and that these interactions must be recognized to form distinct patterns in the group. Lastly, they suggested the use of "multiple measures of performance" (30). In the present study, group effectiveness is premised on the volume, frequency, intentionality, and type of message exchanges that form various communication networks within the group as it strives to attain its goals.

In a face-to-face setting, the communication network is established by finding out "who talks to whom" (Beebe and Masterson 2015, 138). The patterns that emerge depend on the distribution of interaction among the members. Forsyth (2019) defined communication networks as "patterns of information exchange among members of a group" (182). The networks formed by every group vary in complexity and density. Barnes and Harary (1983) noted that the use of graphs in analyzing networks began in the 1950s. Since then, scholars have either focused on the highly technical, abstract, and/or mathematical aspect or on the relational dimension of the network. Freeman (1978/79) explained that "a graph consists of a set of points and a set of lines or edges connecting pairs or points" (217). The points represent the group members while the lines represent the interaction. The connections made by the combination of points and lines create various patterns. A 'wheel' or 'star' structure is formed when "all interaction is 'to' or 'from' a central position" while a 'circle' is formed when all members interact with one another (Mulder 1960, 12). When members interact on a linear relay, a 'chain' is formed (Forsyth 2019). These communication networks provide a glimpse of the structure of the group, whether a 'hub' has been created indicating centrality, or a more open-type (decentralized)

network has been formed. The notion of centrality is explained by Haythornthwaite (1996) as the measure of an "actor's connections in the network" (334). In a graph, this can be done by counting the number of lines going into or out of a particular point or node. The point or node with the most lines connected to it is the most central. The flow and direction of interaction created in these networks also establish the dynamics within the group. For Beebe and Masterson (2015), the type of network formed is related to group satisfaction, efficiency, cohesion, and attainment of goals. Open type or decentralized patterns provide an avenue for active participation of the members, thus enhancing communication satisfaction. This may, however, lead to longer decision-making processes but "lead to more accurate group judgments as well as to better goal attainment and task performance" (139). A centralized network, on the other hand, promotes efficiency and cohesion.

In online group communication, Walther (2013) noted that information sharing and processing are crucial. While recognizing that computer-mediated communication (CMC) lacked nonverbal cues, Walther explained that his Social Information Processing (SIP) theory developed in 1992 "propose[d] that when nonverbal cues are unavailable, communicators adapt their interpersonal (as well as instrumental) communication to whatever cues remain available through the channel that they are using. In text-based CMC, the theory expects individuals to adapt the encoding and decoding of social information into language and the timing of messages and focus on "language content and style characteristics as more primary cues to interpersonal information" (Walther 2013, 167). He debunked the popular Interpretation to SIP those nonverbal cues in CMC only pertain to emoticons.

Walther (2013) emphasized the importance of task-related and relational or socioemotional communication. He noted that these two types were "necessary for a productive and cohesive group" (168). He indicated time to cause the inverse relationship between task-related and socioemotional communication: "[W]hen interaction time is constrained, online groups tend to exhibit more task orientation than social orientation" (169). Another key component of the group process that he emphasized was interdependence where members rely on one another to achieve the task/goal and in the process foster trust within the group. Walther also explained that groups need to adhere to the six rules he and Bunz devised in 2005, to develop trust, namely, to "start immediately," "communicate frequently," "multitask," "overtly acknowledge having read one another's message," "be explicit about what you are thinking and doing," and "make interim deadlines and stick to them" (171). Walther's rules describe behaviors in online communication that point to message exchange leading to the achievement of the group's goal. Unlike Walther's focus on the development of trust in online group communication, this current study focuses on the frequency, volume, intentionality, and the type of messages exchanged as determinants of an effective group communication network.

METHOD

Using Facebook's feature to download data (Settings>Your Facebook Information>Download Your Information>Messages>Create File), all the exchanges contained in the group chat were retrieved and saved in a Word document format. A spreadsheet was used for coding the data. The people involved in the group were anonymized by assigning the codes TM1 - TM7 to the seven group members. The group members are heads of select offices that directly relate with the students and are among the leaders of the University. The names mentioned in the conversations were also anonymized. This study employed a quantitative text analysis of the group chat exchanges from 20 March to 18 July 2020.

A total of 14 key sample days (using the 24-hour day cut-off) as units of exchanges were taken to facilitate analysis. Three sample days per month were taken from March to June and two days in July. The sample units were chosen based on the frequency of exchanges as well as the depth and breadth of topics and activities covered by the objectives of TFOOB. The depth was based on the number of details about a certain topic exchanged in a 24-hour period. The breadth of topic, on the other hand, was based on the variety of topics related to the tasks of the task force mentioned in the exchanges throughout the day. This was used as samples to represent a sizable number of messages to be used for data analysis. A total of 1,317 chat messages were studied from the 14 sample days in the four-month lifespan of the task group. The data were categorized and analyzed according to (1) volume and frequency of message exchanges to show the communication networks formed; (2) intentionality or means of showing intended recipient; and (3) types of message exchanges, whether task or relational communication or off-topic.

Messages were categorized according to the originator of the message (the sender) and the intended recipient (the receiver). The originator of the message can be seen from the message sender that is automatically indicated in the message. The intended recipient, on the other hand, is based on markers that suggest to whom the message was addressed, such as naming the person(s), tagging the person(s), using the designation of the person(s), or contextual clues based on the previous message to indicate that the message was for a specific person or persons and the use of the collective pronoun 'we' to indicate that the message was intended for all. The number of times that a message was 'exchanged' between the originator and the recipient was tallied. This was the basis of the network formed among the members. The messages were also categorized as task or relational communication based on the content. Task-related messages pertain to content that was related to the attainment of the tasks while relational messages pertain to content that fosters camaraderie. Off-topic messages refer to content that is not within the scope of the task force.

Using Gephi version 0.9.2, a free and open-source graph visualization software, the data collated from the 14 sample days were used to produce the communication network maps. The seven task group

members (TM1-TM7) were shown as nodes while the frequencies of message exchanges were shown as links between and among the nodes. The frequencies of message exchanges between the members were derived by adding the messages intended for specific member(s) to the messages intended for all.

This study focused only on the quantitative aspect of the chat group message exchanges. The interactions by members through email exchanges, phone calls, or face-to-face discussions were not included.

FINDINGS AND RESULTS

Volume and Frequency of Message Exchanges

The message exchanges refer to the flow and direction of communication among group members. In this study, this is shown by the messages sent by TFOOB members in the chat group. The volume refers to the total number of messages posted per day in the chat group (see Table 1).

Date		Total Unique Messages Exchanged Over the Group Chat	Average/day
March	20	120	244
	21	366	
	25	247	
April	18	55	95
	27	64	
	28	167	
May	2	41	54
	3	52	
	26	69	
June	11	33	36
	12	37	
	20	38	
July	11	12	14
	18	16	

Table 1. Unique Messages Total and Average Per Day.

Table 1 shows that the volume of messages exchanged was highest during the first month of the group when task orientation, brainstorming, delegation, and implementation took place. An average of 244 unique messages (chat messages, emoji reactions, and memes) were posted in the chat group during that time. As the task group established its methods of task implementation, the volume of messages tended to go down. The volume may also have been directly influenced by the fulfillment of the task group's goals, that is, as the goals were achieved, the volume decreased.

The frequency of message exchanges, on the other hand, refers to the number of times a member posted a message or responded to a message. Clear identification of sender and receiver of the messages was necessary to compute the frequency of messages exchanged by each task group member. In other words, the posted messages were tallied according to who sent them to whom. The daily message exchange frequency ranged from a high of 11.4 (TM4-TM2) to low of 0.1 (TM5-TM7) (see Figure 1).

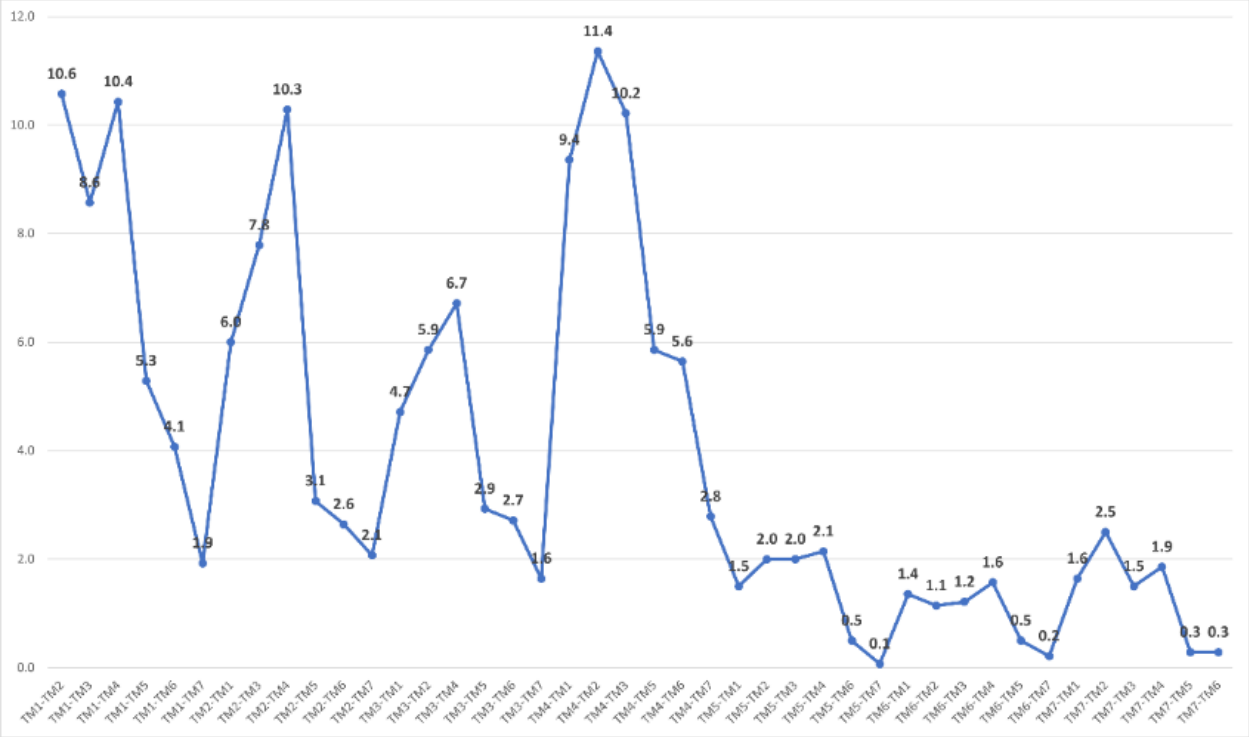

Figure 1. Average daily frequency of messages exchanged by TFOOB members (TM = TFOOB Member).

Communication Networks

Initiator	March			April			May			June			July		Total
	20	21	25	18	27	28	2	3	26	11	12	20	11	18	
TM1	44	117	51	22	7	30	1	4	25	4	11	5	2	3	326
TM2	29	88	44	14	16	36	18	12	11	5	4	3	3	1	284
TM3	33	30	45	9	13	15	3	8	7	5	3	10	0	2	183
TM4	5	72	86	7	19	18	15	16	17	6	12	5	4	3	285
TM5	4	33	20	2	1	2	1	4	4	7	3	4	1	2	88
TM6	5	26	1	1	1	4	1	3	2	3	4	2	1	4	58
TM7	0	0	0	0	7	62	2	5	3	3	0	9	1	1	93

Table 2. Total messages initiated by TFOOB Members (TM = TFOOB Members).

The message initiators are the senders of messages, the ones who posted messages in the TFOOB chat group. Table 2 shows the total number of messages sent by each initiator.

TM1 initiated the greatest number of messages followed by TM4 and TM2 while TM6 initiated the least number of messages. There is a marked disparity in the volume of messages initiated by four members, namely TM1, TM2, TM3, and TM4 compared to the other three members. The chart below (see Figure 2) shows the percentage contribution of each initiator to the overall message production.

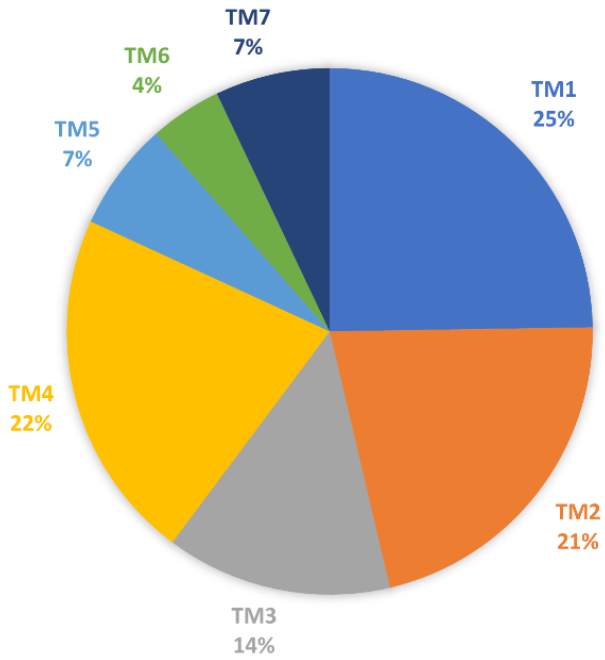

Figure 2. Percentage contribution of message initiator (TM = TFOOB Member).

The chart also shows the amount of communication engagement for each member. The uneven level of initiating a message shows that communication within the group was centered around only four initiators and that other members with a lower rate of message initiation did not always engage and became passive recipients. The nature of the virtual group where interaction can be asynchronous or delayed may have contributed to this situation. The chart, however, does not indicate nor show the latency of message posting affected by cellular network delays or other individual contexts.

The messages sent by initiators were then categorized based on intended recipients. While the chat group platform is open to all the members and everyone can read the message, it is important to take note of intended recipients to show "who talks to whom" (Beebe and Masterson 2015, 138) within the group. Identification of the intended recipient was based on various markers, such as tagging the name of the recipient (i.e. in the group chat, using @ [e.g. @TM1] to directly link the name of the recipient in the message posted by the sender), naming the recipient (e.g. TM1), using the designation of the recipient (e.g. TM1a), addressing the person as Sir or Ma'am, using the second person 'you' (*mo*) in the reply, replying to a quoted message, directly reacting to a message through emojis, and context clues of the message. Messages deemed for all were mostly without designated recipients or have used terms that signify a collective, such as 'all,' 'we,' 'our' *(natin)*.

The most used marker to signify the intended recipient was replying to a quoted message, which automatically tagged and alerted the intended recipient. This sort of direct answer also indicated which message was being responded to and lessened miscommunication. Naming and using the designation of the person were the second and third most used types of markers. There were times that several types of markers were used in a message, for example, identifying both designation and name or using the quoted response and then identifying both the designation and name of the intended recipient. There were also messages with two or three intended recipients.

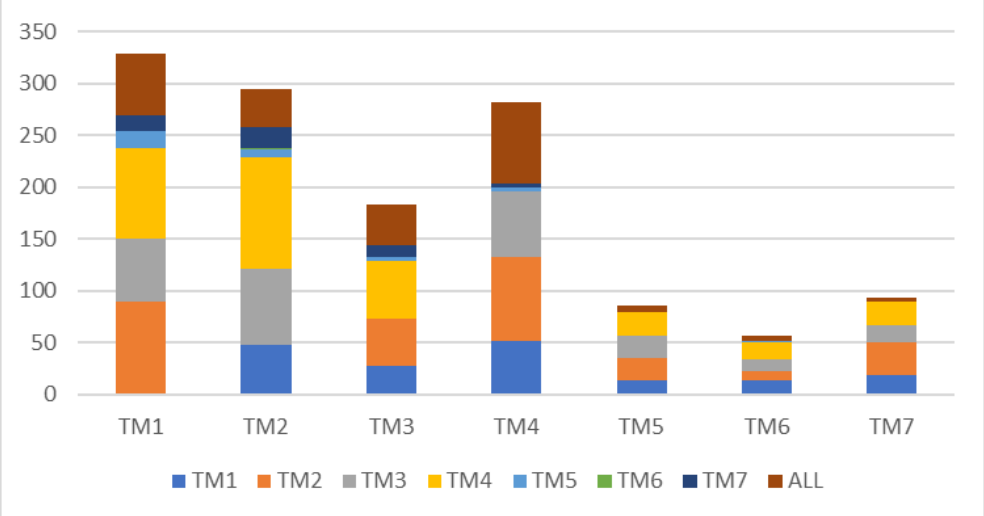

Figure 3. Total intended messages from March to July 2020 (TM = TFOOB Member).

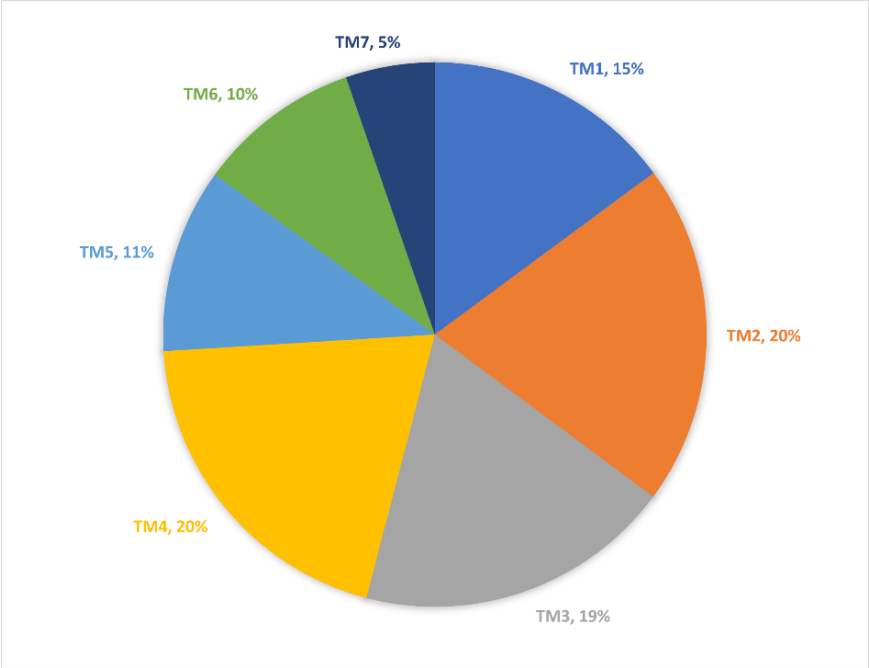

Figure 4. Message recipient percentage (TM = TFOOB Member).

Figure 3 shows the distribution of the intended messages to its recipients. The greatest number of messages was sent by TM1, TM2, TM4, and TM3, respectively. The graph also shows that TM4 sent a high volume of messages intended to all. Figure 4 shows the percentage of messages received by each member. TM2, TM3, and TM4 have received a relatively similar number of messages while TM7 received the fewest.

Comparing the percentages of being initiator and recipients of messages, Figure 5 shows that TM2 and TM4 have a relatively high occurrence of being both initiators and recipients. This can be an indication that both TM2 and TM4 have a relatively balanced communication flow. TM1 has the highest percentage of being an initiator but has received just about half the number of messages initiated. Notably, TM3, TM5, and TM6 initiated the least number of the messages.

The messages were coded based on the three types, whether these were task-related, relational related, or off-topic. Task-related messages lead to the attainment of the goals of the task force. These include brainstorming suggestions, advisories, and updates related to travel arrangements and delegation of work. Relational messages build rapport among the TFOOB members and include using pleasantries, positive reinforcements, and playful banter that promotes camaraderie. Off-topic interactions refer to messages that were not within the scope of the TFOOB.

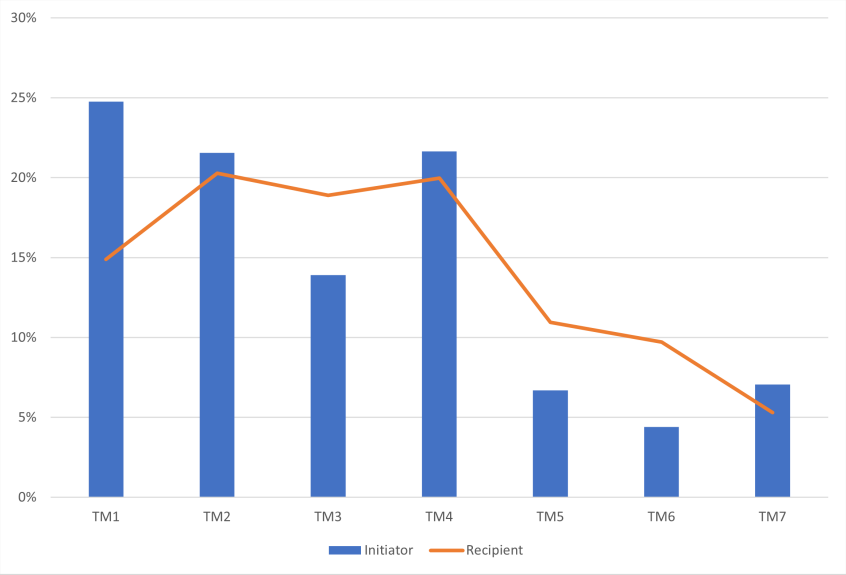

Figure 5. Percentage of being initiator and recipient of messages (TM = TFOOB Member).

In this study, there is an inverse proportionality between task-related and relational messages, meaning, as the task-related messages increase, the relational messages decrease; likewise, as the task-related messages decrease, the relational messages increase. Off-topic messages generally comprise less than 10% of the total messages exchanged except for one day when the off-topic messages doubled and reached a high of more than 20%. It is interesting to note that on the same day, both task-related and relational messages were on a downward trend (see Figure 6).

To better visualize the dynamics within the group, the researcher utilized an option in Gephi that highlights the flow of interactions. Replacing the numeric value of the messages exchanged with a color gradient, the figures below show the changes in dynamics within the group. The concentration of communication among select individuals shows that the group chat functioned, for the most part, as having an inner core or hub as shown by the darker links that indicate who among the members drove the group toward its goal. In some instances, the group chat seemed to function as a sounding board only. Generally, the task-related and relational roles performed by the members shown in exchanges contributed to the formation of the various links. It is interesting to note that there was shifting centrality throughout the lifespan of the task group. The shifting centrality illustrates the fluidity of the leadership role within the task group. The density of the links was also dependent on the environmental contexts within the group for each period.

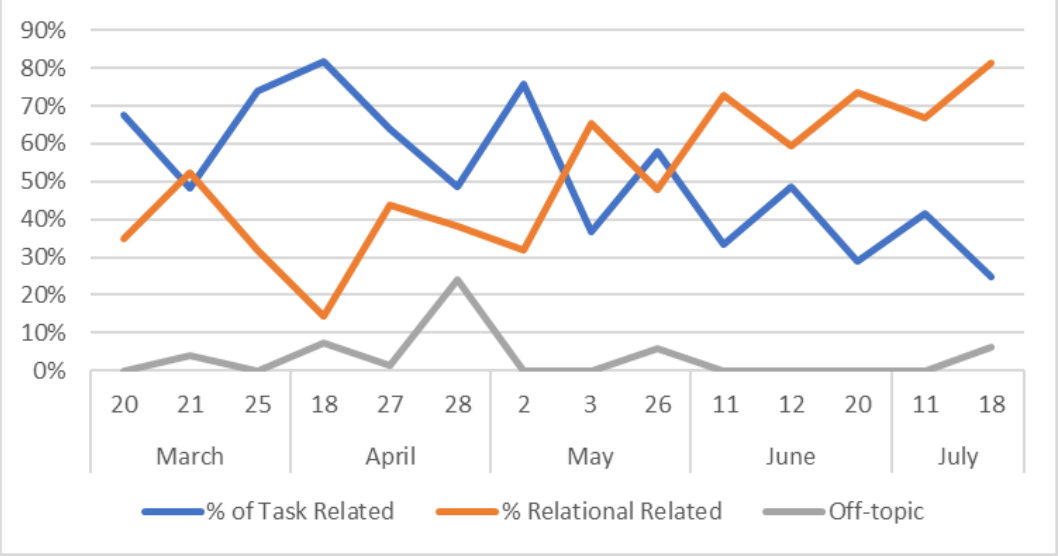

Figure 6. Types of Messages from March to July 2020 (TM = TFOOB Member).

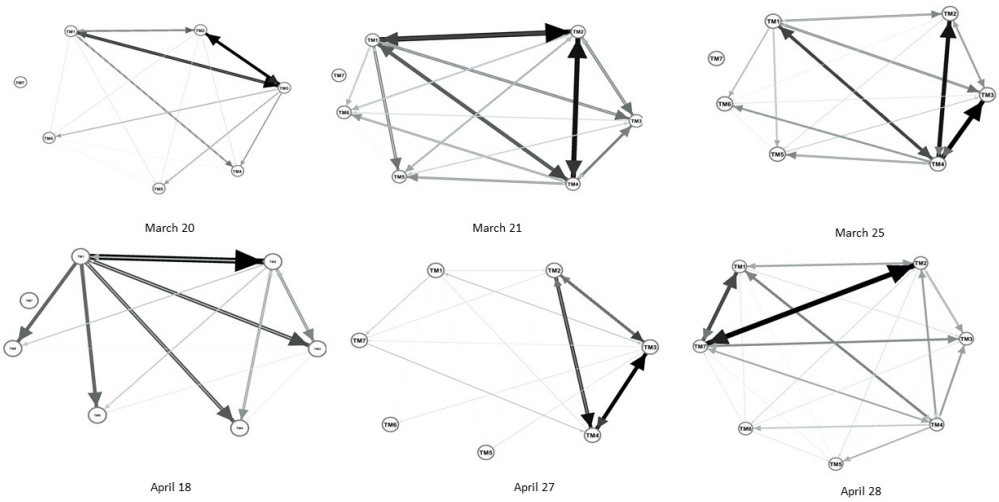

Figure 7. Communication network from March to April 2020 (TM = TFOOB Member).

The first image in Figure 7 about the communication network from March to April 2020 shows that the network triangle was most prominent between and among TM1, TM2, and TM3. There was a shift in the network triangle on the second image with TM1, TM2, and TM4 gaining prominence in communication. The third and fourth images show a fan-type of interaction where a hub or concentration of communication emanated from one node, TM4 and TM1, respectively. The last two images in Figure 7 return to a prominent triangular network between and among TM2, TM3, and TM4; and among TM1, TM2, and TM7. It is important to point out that from March 20 to April 26, TM7 was not yet part of the group so that the first four images indicate that the node TM7 was out of the loop.

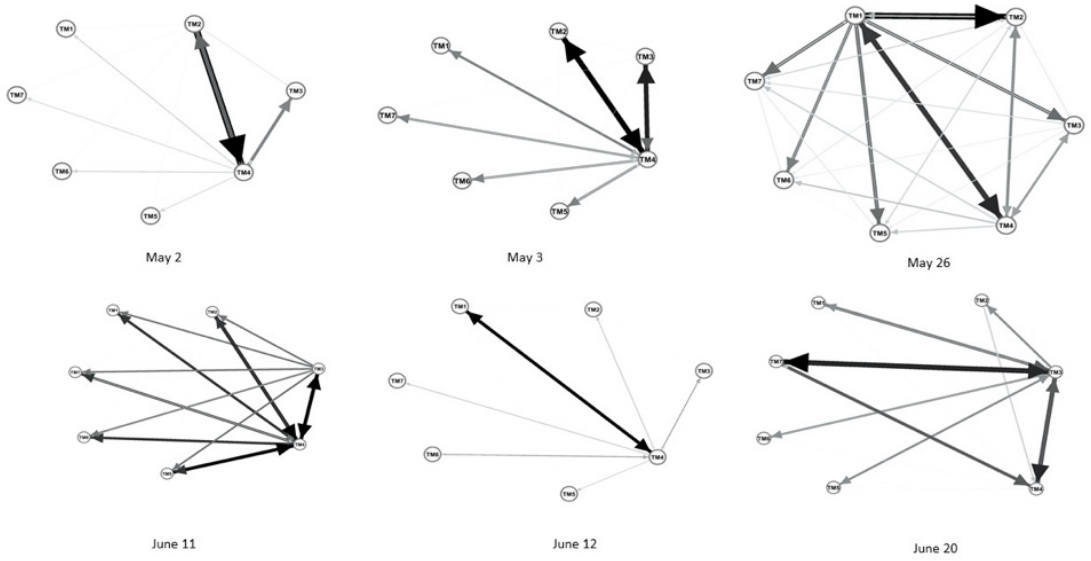

Figure 8. Communication network from May to June 2020 (TM = TFOOB Member).

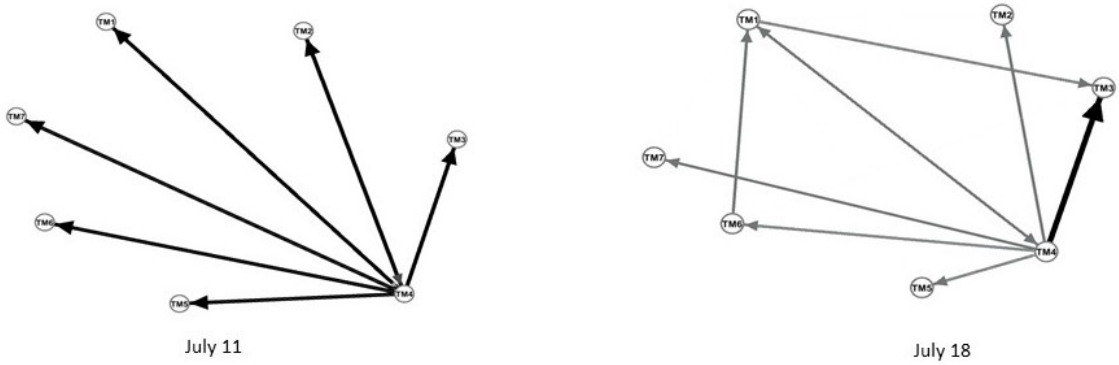

Figure 9. Communication network for July 2020 (TM = TFOOB Member).

In Figures 8 and 9, the fan-like networks illustrate a more prominent hub or closed network where one node becomes the main initiator and recipient of the interaction. The hubs were located for the most part in the TM4 node. On two instances, March 26 and June 20, the node was on TM1 and TM3, respectively. Overall, the communication networks formed were diverse. From March to July, four members, TM1, TM2, TM3, and TM4, emerged as the pyramid core of the group (see Figure 10). The other members had a lesser density of messages exchanged. There was no link between TM6 and TM7 because they did not communicate with each other.

Figure 10 manifests the overall network formed in the span of four months. Dense message exchanges between the nodes TM1, TM2, TM3, and TM4 throughout the duration of the TFOOB indicate their greater participation and communication within the group compared to the remaining members. The

volume and frequency of message exchanges by TM1, TM2, TM3, and TM4 may also indicate the level of motivation of these group members in attaining the goal.

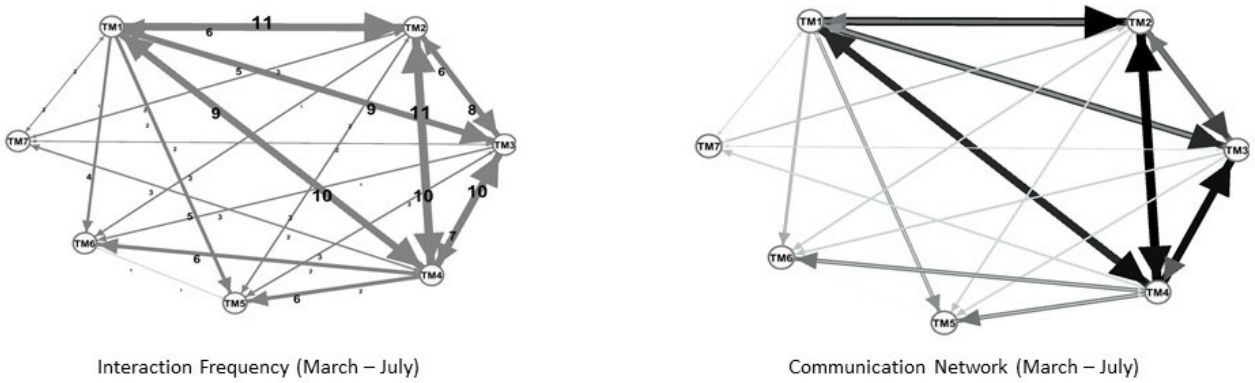

Figure 10. Message exchange frequency and communication network from March to July 2020 (TM = TFOOB Member).

Task-Related and Relational Communication Network

It is interesting to see how individual members communicated with one another based on the type of messages (see Table 3).

Initiator	Type of Message	
	Task-Related	Relational
TM1	142	188
TM2	210	108
TM3	136	58
TM4	223	69
TM5	18	69
TM6	1	53
TM7	28	50

Table 3. Types of messages initiated by TFOOB (TM = TFOOB Members).

The greatest number of task-related message exchanges was initiated by TM4 followed by TM2 while the greatest number of relational message exchanges was initiated by TM1. The lowest number of task related message exchange was from TM6 while the lowest number of relational message exchange was from TM7. TM2, TM3, and TM4 initiated more task-related messages than relational messages while TM5, TM6, and TM7 had a higher number of relational messages than task-related messages. TM1 has a relatively balanced task-related and relational message exchanges. Curiously, the messages

exchanged by TM5, TM6 and TM7 focused on the relational aspect, even as generally they had lower rates of communication with the group. Figure 11 shows that task-related messages emanated mostly from TM4. These task-related messages include suggestions, queries, updates, and advisories.

Relational messages used pleasantries, such as "hello," "good job," "thank you," and "good night" and positive reinforcements and affirmations, such as commendations for tasks fulfilled. Figure 12 above demonstrates the two nodes, TM4 and TM1, as primarily responsible for initiating task-related (left image) and relational messages (right image) respectively. The relational messages exchanged were primarily among TM1, TM2, and TM4. It is also important to note that the relational message exchange was also dense between TM1 and TM3, while no relational message exchange occurred between TM5 and TM7, and TM6 and TM7.

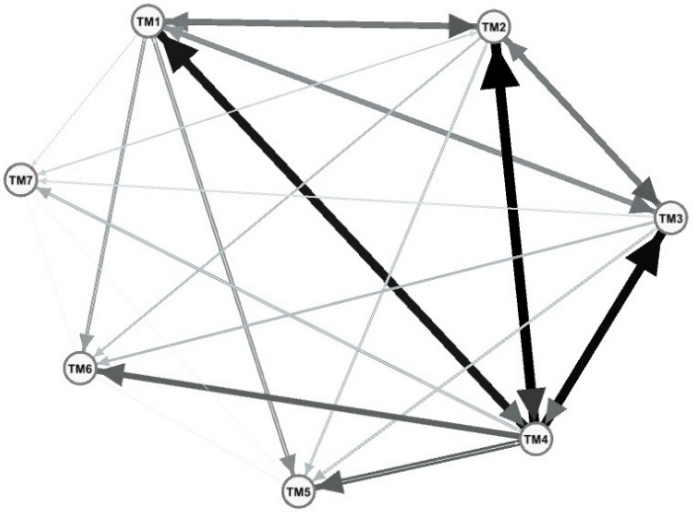

Figure 11. Task-related messages (TM = TFOOB Member).

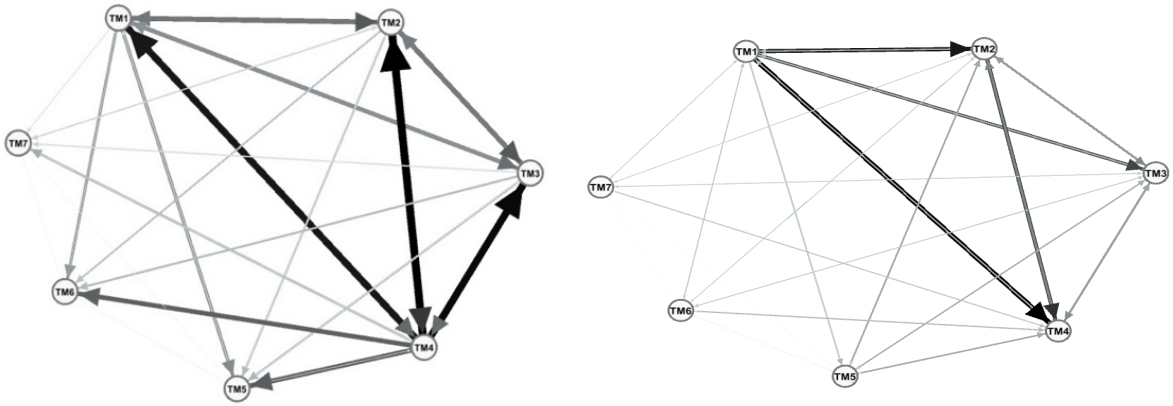

Figure 12. Comparative figures for task-related message exchange (left) and relational interactions exchanges (right) (TM = TFOOB Member).

The TFOOB worked within the context of a pandemic where the health risk was high and stringent quarantine protocols were imposed. This situation led to the utilization of online communication, specifically the group chat, to plan and implement the tasks related to the goals of the group. The volume and frequency of messages exchanged showed the necessity of sending messages to discuss the tasks and maintain good interpersonal relationships.

CONCLUSION

While acknowledging that the TFOOB was limited to online communication, this study sought to establish indicators for an effective task group communication network in the online space by examining the content and frequency of message exchanges and looking into the following: 1) networking of tasks; and 2) networking for motivation and non-motivation. Deriving networking for tasks and networking for motivation and non-motivation included determining the message initiators and recipients. Three indicators were used to assess a group communication network in an online setting: 1) volume and frequency of messages exchanged to show the communication networks formed; 2) intentionality or means of showing the intended recipient; and 3) types of messages exchanged, whether task-related, relational, or off-topic. The volume and frequency of messages are proportional to the number and level of tasks that the group has accomplished. The volume and frequency of interactions were the highest during the early part of the task group's lifespan. There was an active exchange for brainstorming of tasks and laying grounds for task processes and implementation. As work progressed and goals were achieved, the message exchanges dwindled until the group eventually stopped posting messages and was disbanded. This shows that there is a negative correlation between goal attainment and volume/frequency of message exchanges in a task group. This also means that in a task group formed for the attainment of a specific goal, the frequency and volume of exchanges can be used as indicators of group performance in relation to the output of the group. It should be noted that the various means of indicating the intended recipient of a message post provided immediate context and reduced the uncertainty and inaction of TFOOB members. A combination of the two main types of messages, task-related and relational communication, guided the group toward accomplishing its goals and enhanced the group motivation.

This study showed an inverse proportionality between task-related and relational messages. As the task-related messages increased, relational interactions decreased. Similarly, as the task-related messages decreased, relational messages increased. The main factors influencing this phenomenon are the levels of task performance and goal fulfillment which both affect the volume and frequency of the relational messages. Therefore, aside from the volume and frequency of messages exchanged, the content of the messages being exchanged can also be an indicator of the stage where the group is at

in relation to the attainment of its goal. As the type of messages in a task group transition from a predominantly task-related to a relational mode, there is a high probability that the group is nearing the attainment of its goal. Both types of messages are crucial in the interactions of group members for instructing, guiding, clarifying, and deciding the activities related to the goal and for maintaining camaraderie and a positive group atmosphere.

Motivation is the "internal drive to achieve a goal" (Beebe and Masterson 2015, 28). In a group, motivation can be manifested through active participation. In a virtual environment, motivation can be linked to the volume and frequency of messages exchanged by the members. However, communication among online group members can be impacted or reduced by challenges, such as the pandemic situation, Internet connectivity issues, the presence of parallel tasks, and other individual contexts. Group communication networks formed by the volume and frequency of message exchanges are characterized by fluidity and shifting centrality. While lack of motivation may affect the overall performance of the group (Forsyth 2019), the study showed that the presence of a core in the group communication network ensured that the tasks of the group were accomplished.

In the same way, the presence of a central point, core triangle or node hub helped to ensure connectivity and to direct or move the group towards its goal. A communication network is thus a vital aspect of a task group as it bridges the input (group members with all their characteristics and tasks) and the output (goals set to be attained by the group). As communication networks are an outcome of the exchanges between and among the group members, it is important to highlight the aspects of the exchanges, the volume, frequency, intentionality, and type of messages. Group effectivity can be measured in a variety of ways. It may be based on either the composition of the group (input), the activities and interactions pursued by the group (process), or the attainment of set goals. This study chose to focus on highlighting communication, so the measures used to gauge effectivity are the exchanges (volume, frequency, intentionality, and type) which created communication networks. There were some limitations in this study which may affect the generalizability of the outcomes. The case studied performed as a task group during a pandemic. The situation may be different in another crisis or a more stable and normal situation. The size and the gender composition of the group may influence the exchanges and the networks that may be formed. It is thus recommended that a replication of the study be conducted in various contexts of a task group and other variables within the input and process aspects be explored in future studies.

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