Examining the Formation of Swift Trust within a Scientific Global Virtual Team

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Abstract

This study examines the development of trust within a 77 member global virtual team, "SciTeam", tasked with organizing a scientific conference. A dedicated discussion board space was created within a virtual scientific organization platform (on which team members from around the world interacted). The task included logistics, scheduling, and content components. We studied the team using a 'swift trust' framework, ideal for task-oriented geographically displaced communities in which strangers work together to complete an assigned task. A mixed methods approach allowed us to develop qualitatively-derived hypotheses which we quantitatively tested. A unique finding was that while we could discern team member's particular posting habits (social or task-oriented), a user's impact upon the forum along the axes of trust and sociability was more strongly determined by their overall activity than by a user's propensity to engage in trust or social behavior.

1. Introduction

The virtual team we studied, "SciTeam", was charged with organizing an interdisciplinary scientific conference. At the beginning of the team's project task, the only determined aspects of the conference were the location and the date. This meant that the topics, speakers, the conference format, as well as the poster design were all emergent and had to be collectively negotiated by team members. During the process, team members were able to create relationships with one another while planning the conference. A central mode of communication between team members occurred in the team's online discussion forums. The forum contained discussions (termed 'topics') which addressed a specific issue or problem pertinent to the team's task. Our study is particularly interested in how 'swift trust' [9] developed and how emergent trust relationships

affected task completion. Through regular interactions among team members, new levels of trust were developed prior to task completion. This study seeks to further understand the role of 'social'/affective forms of trust and their affect on task completion in a global virtual team. Topics which engage the team members in social conversations are examined quantitatively and qualitatively. The facilitation of diverse communicative exchanges where there were both social and explicitly task-oriented interactions are also examined.

2. Swift Trust

Swift trust was first conceptualized by Meyerson et al. [11] as a way to understand how individuals working in temporary teams develop trust around a communal task. Meyerson et al.'s conceptualization of swift trust is based on geographically co-located team members and face-to-face interaction, which maintains trust through "highly active, proactive, enthusiastic, generative style of action" [11]. These members develop swift trust because they are able to engage in social cues. Swift trust has also been successfully applied to understanding global virtual teams [8]. Swift trust shares similarities with 'situated trust' [5], "trust constructed in a specific situation with a particular audience at a given point in time" [13]. A key difference between the two is that Swift trust involves certain variables exclusive of the situation, such as a person's ability (*ex ante*) and situated trust is inherently embedded and developed within the situation. However, the two are not mutually exclusive and swift trust can be an antecedent for situated trust [14].

2.1. Swift Trust in Teams

Meyerson et al. [11] found that "[r]ole-based interaction leads to more rapid development of trust than does person-based interaction". Once individuals have been assigned tasks and have

specific tasks to fulfill, other users find it easier to trust them because members know what to expect from these individuals. By focusing on the tasks and identifying individuals with their roles, team members are better able to engage in trust since trustee and trustor share a common focus on completing their work. When this breaks down, the "'blurring' of roles will lead to a slower build of trust," [11]. Teams with clearly demarcated roles exhibit levels of reliability which are particularly conducive to building trust. If other team members depend on a teammate to deliver on a specific task and this person fails, then the trustors will hesitate to trust them in the future. Members who are dependable and consistent in their behavior tend to develop trust at a faster rate than members who fail to maintain their the impression of dependability.

Jarvenpaa and Leidner [9] argue that this type of trust predominately involves 'ability', 'integrity', and 'benevolence'. Ability refers to "the group of skills that enable a trustee to be perceived competent within some specific domain". Benevolence refers to "the extent to which a trustee is believed to feel interpersonal care and concern, and the willingness to do good to the trustor beyond an egocentric profit motive" [9]. Lastly, integrity refers to an "adherence to a set of principles (such as study/work habits) thought to make the trustee dependable and reliable, according to the trustor" [9]. These are identified as key characteristics which play a significant role in the development of swift trust; they can also be qualitatively and quantitatively measured using established instruments. Swift trust is particularly useful as it helps explain how individuals working together as a team are able to successfully trust each other without prior experiences with these individuals.

2.2. Theories of Ability, Integrity, and Benevolence

Integrity, ability, and benevolence have been applied to online settings for swift trust measurement [4, 8, 9]. A key aspect revealed in the swift trust literature is the importance of 'cognition-based trust', which refers to necessary knowledge in the task as well as the integrity and ability of a user [1, 8]. In contrast to the cognition-based aspects of trust, there is 'affect-based trust', which refers to benevolent aspects, such as sharing emotions via cues or engaging in interactions which are not exclusively task-oriented [1, 8].

Integrity plays an important part in the formation of swift trust through the development of trustworthiness and shared values [1, 4, 8]. Integrity

provides the trustor with a narrative by which a trustee can be evaluated. If the trustee can convey their reputation or their work ethic, then a trustor would be more inclined to deem the trustee trustworthy. However, trustworthiness should not be conflated with trust [4]. Shared values are another aspect of the equation. Wu et al. [17] note that, "[r]esults also demonstrate strong support for the impact of shared values on member commitment [... but] do not influence individual perceptions of integrity." In our study, for example, team member commitment can be seen as a form of trust [9] because it is similar to Corritore's [4] example of initial versus mature trust in online contexts. A willingness to have positive experiences will play a role in the formation of trust.

Cognitive-based trust plays an important role in the formation of swift trust due to perceived ability and integrity and has been found to be markedly higher than affect-based trust throughout the completion of a task [11]. This reveals that an emphasis on the integrity and ability of users plays a crucial role in the formation of trust throughout a project. Additionally, high performing teams are more likely to have a higher initial cognition-based trust than low-performing teams [11]. This agrees with Jarvenpaa and Leidner's [9] conclusion that teams that took more initiative in volunteering to complete tasks as well as communicate with team members were teams that had high levels of trust at the commencement and conclusion of the project. This initiative can be translated into having integrity and ability as team members were able to complete components of the project and demonstrate these two characteristics to other team members who then displayed aspects of swift trust by engaging with the committed team member.

2.3. Utility and Shortfalls of Swift Trust Online

The formation of trust online allows for globally dispersed teams to efficiently complete tasks [1, 8, 9]. Beyond efficiency, "'swift trust' enables members to take action, and this action will help the team maintain trust and deal with uncertainty, ambiguity, and vulnerability while working on complex interdependent tasks with strangers in a situation of high time pressure" [9]. Successfully overcoming challenges as a team facilitates the development of further compounded trust [10]. Initial forms of trust set the foundation for future development into what Corritore [4] terms 'mature trust' or what Anderson terms 'multidimensional trust' [1].

Anderson [1] argues that swift trust requires "assurance or confidence built by the trustor himself that the trustee is trustworthy, and this can only be achieved through personal encounters, which are … excluded in virtual networks". Anderson [1] found that swift trust is useful as a 'safety net' but has lower utility than other forms of trust. The development of swift trust may also prevent the formation of more beneficial forms of trust (e.g. multidimensional trust). Swift trust may also not be able to replicate the effects of more desirable forms of trust [1]. Additionally, swift trust is fragile as it is dependent on the "quickly diminished influence of depersonalized categories" [15]. The fragility of swift trust is affirmed in Jarvenpaa and Leidner's [9] discussion of 'HiLo' teams which had strong trust at the beginning of a task but not at the end. Although Meyerson et al. [11] did not take into account online forms of swift trust, their reasoning for explaining the fragility of swift trust still applies. For example, they argue that the recruitment of individuals into a team matters to the formation of trust since the members interact based on the completion of a specific goal. Additionally, if the individual who assembled the team (a "contractor") is credible, then the members usually presume credibility through association. However, in many virtual communicative spaces, the lack of a contractor can have direct effects on swift trust formation. In our study, team members are voluntary participants (without a contractor or any financial incentive). Members had to develop trust based on their own understandings and expectations.

3. Methods

This study investigated the role that swift trust plays in the interactions of *SciTeam*. In order to study these online interactions, a mixed methods approach of qualitative and quantitative content analysis was chosen. In distinction to the swift trust literature [8, 9, 11] which primarily uses experimental methodologies, this study observed the virtual space of team participants. The main avenue of contribution was through the team's discussion forum.

The virtual collaboration environment in which SciTeam was incubated utilizes social networking technology to enable users to create a user profile in which they can display information about their education, publications, work history, interests, projects, affiliations, and skills. Team members utilize the forum space both professionally and socially. However, discussions are most focused on the task. This team offers insights regarding the role

of swift trust in the formation and efficiency of ad hoc global virtual teams.

3.1. Qualitative Methodology

The qualitative aspect of our project utilizes content analysis, "'a research technique for making replicable and valid inferences from texts (or other meaningful matter) to the contexts of their use'" [16]. We studied all of the team's forum-based communications, which are divided into topics (i.e. threads). Content analysis has been successfully used in other studies of online discussion forums because it allows for the researcher to gain an understanding of the interactions that take place within an asynchronous text [16]. Furthermore, content analysis lends itself to implementing a mixed methods approach as data can be exported for quantitative statistical analysis [16]. We implemented a grounded theory approach [7] which utilized emergent coding in order to understand the variety of interactions in the forum without relying on highly restrictive discursive structures. Emergent coding refers to a form of content analysis that requires the coder to read through the text and attempt to analyze the recurring themes that occur within the text in order to understand the interactions that take place.

To begin our emergent coding, three codes were used to classify the different types of interactions taking place within the team's discussion forum: 'social', 'question and answers' (Q&A), and 'task-oriented'. Social refers to comments/posts where the users take part in a social experience (there is no constructive dialogue taking place regarding the task). A complementary code is Q&A since this code refers to the sharing of information between team members. When someone poses a question to either a specific individual or to the entire thread, the interaction is coded as Q&A. The other major type of interaction that occurred was task-oriented, which refers to a constructive conversation about the task amongst team members. These 3 parent codes have a total of 12 children codes under them. Since the data is publicly searchable, we have slightly modified the actual posts and user names to protect the privacy of research participants.

The team's discussion forum is organized chronologically, which was useful in documenting the evolution of user interactions. The chronological data also helps inform hypotheses regarding the creation of an online community. We used NVivo for all content analysis coding. The successful use of NVivo for content analysis has been documented in the qualitative and mixed methods literature [2]. Following the NVivo literature [3], quantitative

analysis was conducted on the codes that were gathered from the qualitative analysis.

3.2. Quantitative Methodology

Following Chi [3], we used data from our qualitative analysis for hypothesis generation. 30 team members were randomly selected for analysis. Every post in the forum for each of these 30 users was coded. This sample (comprising 85% of all posts on the SciTeam forum) allowed us to focus on the posting styles of individual team members and on a given member's contribution to the forum. We explored the frequencies of the codes in NVivo and performed subsequent statistical analysis using R. 19 variables emerged from qualitative coding, of which three key codes were: Task-oriented, Q&A, and Social (all other codes were either subsets of these three or were too infrequent for analysis). Our quantitative analysis of SciTeam focused on four variables: total posts per user and the three key codes. Variables were analyzed both in their raw form and subsequently normalized in two ways to offer further detail. We conducted the study under three hypotheses:

H1: Q&A, Social, and Task-oriented behaviors will be expressed most often by heavy users of SciTeam. Behavior on SciTeam is purposeful and team members who are most active on the forum will also tend to have the greatest quantity of these types of posts.

H1a: The total number of posts will not correlate with the proportion of posts of each of the three types. Raw activity is not enough to predict behavior patterns. Intensity of forum use is unrelated to social or task-oriented posting style.

H2: Q&A and Task-oriented are complementary behaviors which occur in tandem. Team members who engage in high levels of Q&A posts will also engage in Task-oriented behavior. The process of trying to complete a task will bring up questions that users need to resolve and, likewise, Q&A will prompt Task-oriented attempts to implement new procedures as a result of knowledge gained.

H3: The Social variable will be positively correlated with both Task-oriented and Q&A. Team members who are more social will also tend to be more invested in the task and more willing to devote time to Task-oriented and Q&A posts.

Table 1: Coding Scheme

Code Name	Description	Example
Questions and Answers	Someone asks a question or gives	"Can anyone interested in
(Q&A)	an answer to a question	either scientific or blogging attend […]?"
Social	Someone engages in a social (not task-related) conversation.	"Let's include a few pubs. Leonardo paying!"
Task-Oriented	Someone engages in an interaction to accomplish a task-specific goal.	"Leonardo, we're going to create a new topic for session topics […]"

4. Qualitative Results

The majority of the team's conversations took place prior to task completion. Substantive conversations also took place immediately after task completion. The team's forum space had some topics that were task-oriented as well as socially-oriented. These topics were both open simultaneously so team members could post to one or both genres of threads. Most of the members from the study engaged in both types of topics. Our qualitative results are organized by topic because it is within the topics that the team members engage in dialogic interactions.

4.1. Conference Structure

The first topic in the team's discussion forum was "What will the format of the conference be like?" (initiated by Leonardo). This introductory topic helped set the tone for the initial interactions as it solicited opinions about how to structure the conference. The roles within this topic were categorized as: Advocate, Proposer, Moderator, Information, and Volunteer. There are no social interactions within this topic (which sets the expectation that the members will simply take part in a focused discussion about the task at hand). However, it is important to note that almost all of the individuals who took part in this topic continued to contribute regularly to the subsequent topics, with a noticeable lack of subsequent contributions by a few individuals (e.g. Dylan and Suzan). Out of twenty-five replies, ten of those were proposals, three were moderations, two were informational posts, and six were advocacies for previous statements. This reveals that the majority of team members tend to contribute to the brainstorming topic while offering some discussion. Other individuals would act as advocates for a proposed idea, which reveals that team members were able to work together to reach a conclusion about the conference format. Following the

Interaction Analysis Model (IAM) [6], the majority of the interactions fell within phase 1 (i.e. individuals offer their own opinions and information about a subject). There were instances of the users engaging in phase 2 interactions (the users deliberated amongst themselves to ensure that they addressed issues of concerns amongst themselves and clarifying the parameters of the project).

Another example of this type of topic thread within the forum occurs when Ernie announces the official schedule of the conference. Ernie ends this introductory post by asking for more information from core team members in order to build a consensus. This topic was created about two months before the conference, but the amount of activity within this topic is regular. Unlike the first post, there are more social comments between the members. Prior to this topic's inception, there were a few topics that allowed members to further engage one another at a social level. Team members demonstrated an ability to embed social comments within the realm of work, but the majority of the comments are task-oriented. Additionally, the roles within this topic are more varied since the moderators, who share information, are as likely to comment as the members who are advocates and proposers. Discussion beyond the schedule of the conference occurred (i.e. team members have a high amount of Phase 1 and Phase 2 comments in this topic). Following Jarvenpaa and Leidner [9], these topics show an example of the high levels of swift trust amongst the members of the forum in that the "team was task-oriented", had a "clear sense of task goals", and was "very aware of time constraints". One noticeable difference to Jarvenpaa and Leidner [9] is the fact that key members did not have to remind each other of the tasks at hand. This is attributable to the fact that these topics engaged in discussions over the issues themselves rather than merely assigning tasks.

4.2. Travel Posts

Travel posts refer to interactions regarding traveling to the conference, including funding and housing. The inaugural post was from Leonardo (stating his inability to gain funding since this is not an official/traditional science conference). Other team members mention some possible outside funding sources such as grants. Paulina informed team members that she and Ernie are attempting to secure funding for the speakers of the conference in order to offset travel costs. Team members include social aspects in their conversations (and they discuss their own personal limitations and difficulties). For example, Royce posts, "Why don't we have an evil

pharmaceutical company as a sponsor?" Royce's inclusion of humor in this context is combined with a potentially workable solution to the problem at hand. This discussion reveals that some key members attempted to foster a friendly, but focused atmosphere to the team's virtual discussions. Additionally, individuals who offered support to other team members facing difficulties were non-managerial members (i.e. not moderators).

This discussion led to team members forming a new topic about finding housing solutions for the conference, a discussion which illustrates the convergence of social interactions with the task-oriented nature of the team. Team members offered possible locations where individuals could stay and suggested forming a block hotel booking in order to minimize the travel costs of the conference. One moderator manages the discussion by connecting it with other discussions being held by team members about housing. Ultimately, team members attempted to create their own block booking in order to help members find affordable housing options. One team member, Jasper, offers free housing for a couple of team members. This offer reveals a level of trust developed as team members were even willing to share housing with fellow team members.

These topics share a common characteristic of inclusion of social comments (which appears to have facilitated task-oriented problem-solving). Although exceptional, Jasper's offer of free housing for team members shows a high level of benevolence amongst the members (since they do not directly gain from helping one another find housing). Jarvenpaa and Leidner [9] note that benevolence (affect-based trust) does not necessarily play an integral role in the formation of swift trust, but it does arise as a result of swift trust. Actions such as Jasper's demonstrate that trust within the team is not merely cognitive-based. Team members attempt to forge deeper relationships between one another in order ensure the success of the task and the ability of team members to attend the conference.

4.3. Social Outings

Like the conference planning itself, team members had to negotiate the logistics of social gatherings. Logistics such as selecting a date to meet and who should be included are productively resolved. One team member, Shanda, created a distinct topic to see if individuals can organize a calendar so that team members and general conference attendees will know what social events are available. The goal of this topic was to inform team members of the events as well as include

conference attendees in other general events. Team members concluded that a pub crawl and 'science walk' would be held. Interestingly, team members also organized social events which would take place after the task is completed (i.e. the conference). The science walk and pub crawl were viewed by team members as events to develop personal relationships in addition to now existing professional relationships. Team members exhibited shared values which "tend to develop mutual trust among virtual community members." [17]. Although Wu et al.'s [17] work focuses on online vendors, it is useful in that members are attempting to foster a sense of community online by creating social outings prior to task completion. As a result, the interactions that stem from the social outings seem to have a widespread impact on the rest of the discussion forum space. The discussion of the social outing is one of the first instances where social interactions seem to dominate. As such, the social outing does not occur in isolation, but creates an atmosphere that affects the types of interactions as well since team members are simultaneously engaging in conversations that are task-oriented. Moreover, the social outing topics are ultimately task-oriented in that social events are a product of the discussion.

4.4. Topic Brainstorming and Volunteering

After deciding the structure of the conference, a core team task was to decide which topics and talks would be offered at the conference. Team members during this phase were highly task-oriented. Though some social interactions do emerge, they do not distract team members from their task. Rather, it highlights intra-team rapport. Team members tended to take on roles of advocacy of proposals, but not in ways which were moderator-led. Only at the end and beginning of a task do team members tend to act as moderators. Our team also exhibited types of creative, but risky problem-solving which inherently depended upon the existence of trusting relationships.

A team task was to create a workshop for training scientists to create blogs. The main contributors to the topic were Lauretta and Alene, who both appeared willing, but hesitant to volunteer. They emphasized their ability in being able to provide a workshop about how to write content that is blog worthy, but felt ill-equipped in terms of content regarding the technical aspects of the project. Another team member, Reuben, proposed the idea of having the workshop led by two individuals, one who is knowledgeable about the technical aspects of setting up a blog and the other who is knowledgeable about content creation. Suitable team members were located and the task was completed (with Lauretta leading the task). Team members invoked shared social cues such as game shows from their childhood or being parents to inculcate a culture of personal disclosure that not only fosters trust amongst team members, but also transcends certain cultural and geographic boundaries which could otherwise limit this global virtual team. Cultural differences quickly appeared (especially in discussions of game shows), but other cultural differences were bridged (especially through anecdotes of being parents). Additionally, the volunteering for tasks by team members is important.

It is within these settings that high high levels of swift trust are particularly emergent. Jarvenpaa and Leidner [9] argue that when "members volunteered for explicit roles and engaged in independent work activities", this could be understood as the "individual [taking] a great deal of initiative with regard to managing the group process and the major content work". Jarvenpaa and Leidner [9] specifically argue that teams who exhibit these qualities have high swift trust because of the fact that the members are competent enough to work independently on their own projects while collaborating to achieve the larger end result. Additionally, the voluntary nature of the team was found to add to the shared sense of purpose amongst the team members (since team members quickly became invested in the project).

5. Quantitative Results

Over the course of the task, SciTeam's 77 members created 47 topics and posted 533 replies (Table 2). Our random sample of 30 team members wrote a median of 8 posts (of which over half received both the task-oriented code and the Q&A code and roughly 30% received the social code). On an aggregate level, this reflects the task-oriented nature of this community and the multitude of planning issues that had to be resolved. Social interaction, while not infrequent, was clearly a lesser aim of the SciTeam virtual team.

Table 2. Post count by type

	Total	Median
Total Number of Posts (in SciTeam Forum)	**533**	**-**
Total Number of Posts (coded)	**454**	**8**
Task-oriented	300	5.5
Q & A	241	4.5
Social	151	2.5

After running correlations on our four variables (see Table 3), all three codes were strongly correlated with Total Posts. This suggests that the dominant users of SciTeam by post frequency also drive the greatest share of social and productivity-focused interaction on the site. This finding confirms Hypothesis H1.

Table 3. Correlations using Post Numbers

Correlations	Social	Task-Oriented	Q&A
Total Posts	0.84***	0.93***	0.94***
Social	-	0.68***	0.68***
Task-Oriented	-	-	0.91***

P-values (for all tables): * =.05; ** =.01; * =.001**

A second set of correlations was run after the data had been normalized by dividing each variable by the number of total instances of the variable (users with fewer than 5 posts were discarded so as not to skew the data). These correlations compared the proportion of codes across the whole forum. This gives us another way of looking at the data tests for the consistency of a member's contribution to the team. It has the added benefit of giving each variable equal weight when running our correlations.

Data was normalized for the relative frequency of each variable in the forum overall (see Table 4). From these correlations, we can confirm whether the 'dominant' team members in terms of posts are also the dominant actors in terms of codes. This is a forum-wide metric which measures a user's impact on SciTeam. That is to say that the same team member who is responsible for 10% of the Total posts should be responsible for 10% of the Social posts. For Task-oriented and Q&A codes, we see that this is very nearly the case. Each is highly correlated (greater than .9) with Total Posts. This offers further evidence for Hypothesis H2.

Table 4. Normalized using Variable Total

Correlations	Social	Task-oriented	Q&A
Total Posts	.807***	.945***	.936***
Social	-	.647***	.624***
Task-oriented	-	-	.925***

Social is not nearly as highly correlated with Total posts, a finding which corroborates our results from analyzing the raw data. Similarly, the correlation between Social and Task-oriented and between Social and Q&A is much lower. This suggests that the dominant 'Social' team members of SciTeam are not nearly as regular as the dominant 'task-oriented' actors. This evidence leads us to reject Hypothesis H3.

Our last analysis involved normalizing each user's data by dividing by their number of posts written (i.e. =(Social codes/Total Posts)). This yielded data which indicated the proportion of a user's posts which received particular codes. From this, we compared the propensity of a user to post Social items against their propensity to post Task-oriented ones. We left the total posts column as a separate variable to see how overall posting frequency affected the distribution of a team member's codes amongst the three categories (a post could receive more than one code). There is no significant correlation between the number of times a team member posts and their posting style (see Table 5). This confirms Hypothesis H1a. This is an important finding which suggests that user behavior on the forum varies across two axes: 'posting style' and intensity. The fact that all three normalized coded variables (Q&A, Social, and Task-oriented) have strong positive or negative correlations with each other but not with total posts suggests that there is a 'posting style' element to posting (whether a team member is more social or more task-oriented) independent of user engagement. Further, total posts does not correlate with these 'posting style' variables, which suggests that user engagement is independent from 'posting style'. These two axes appear to split a user's investment in a particular topic with a user's behavior in a particular interpersonal context. Thus, we would expect the second set of variables, those of 'posting style' to be more durable across similar types of sites and the former set of variables to be predictive of popularity.

Table 5. Normalized using User's Post Total

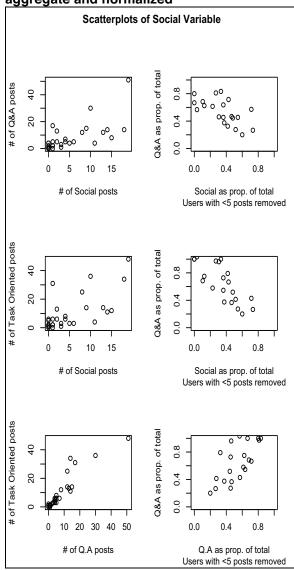| Correlations	Social	Task-Oriented	Q&A
Total Posts	-0.08	0.06	-0.02
Social	-	-0.78***	-0.62***
Task-oriented	-	-	0.68***

A further finding comes from the correlations amongst the three normalized codes themselves. All three possible pairs of the variables are positively correlated before they are normalized, but once they are normalized, the social variable is negatively correlated with both Q&A and Task-Oriented. Users with high proportions of social posts tended to have low rates of task-oriented and Q&A activity and vice versa. Q&A and Task-oriented remain positively correlated after they are normalized. This further confirms Hypothesis H2. This also indicates that the secondary mode of interaction, social behavior, was

not merely less frequently expressed, but that it was associated with reduced frequencies of the two key conference planning behaviors - task-oriented and Q&A. This offers a further lack of support for Hypothesis H3. The antagonism between sociability and productivity is well documented in the swift trust literature and this finding suggests that a swift trust model for online interactions is valid for SciTeam.

Table 6: Best fit slopes for two regressions

Regression	Linear Reg. Slope	(P-value)
Q&A~Social	-.533	.01
Task O.~Social	-1.004	.001

Figure 1. Scatterplots of key variables, in aggregate and normalized

Best fit lines were examined for the task-oriented/social and the Q&A/social scatter plots (the slope and p-values are reported in Table 6). For Q&A and Social, a user who has one percent fewer Q&A posts than the other is likely to have two percent more social posts. Thus, the hybrid model in some contexts may drive greater engagement overall. For Task-Oriented, the best fit line, to a high degree of confidence, suggests a one to one tradeoff of Task-Oriented behavior for Social behavior.

Team members who post the most tend to have the greatest influence on all categories (as is seen from the statistically significant positive correlation between our three codes in both raw numbers and normalized by share of the overall expression of a variable). Once the data is normalized to report the proportion of a user's posts that are social compared with the proportion of a user's posts that are focused on arranging the conference, not only is there no statistically significant correlation between number of posts and posting style, but the normalized Social variable correlates negatively with the proportion of either Task-oriented or Q&A posts. This behavior - as seen in Figure 1 - supports the swift trust literature on a per user basis, but contradicts the literature on an aggregate basis - because the heaviest users are so much more engaged than the lightest.

Our overall results (see Figure 1) indicate no significant correlation between a user's influence and posting style. It is engagement which drives expression of the codes rather than 'posting style'. Asymmetric levels of engagement mean that interactions are more strongly determined by post frequency than by post style.

6. Limitations

Our methodology has limitations both quantitatively and qualitatively. In terms of the former, our study does not account for differences in the impact of different users' posts. For example, one user may be just as effective in communicating socially in one post where another user may extend a similar interaction in two. This should not skew our results in the case that a user is generally more wordy, but will distort our findings if a user requires more posts relative to the norm to communicate socially than to communicate when working on tasks. We could not study team members who participated in other ways (e.g. via email and instant messenger). Our results for all of the normalized variables do not generalize to the lowest levels of forum activity; in order to have 1/1=100% not distort our data, users with fewer than 5 posts across all of the 47 topics were discarded. Our findings can only indicate how

behavior changes from a relatively low level 4<x<10 up to the greatest values. Low posting users were discarded for normalized variables. Conclusions can only be drawn starting at a minimum threshold of activity (5 posts amongst 47 topics).

Our qualitative work focused on posts between team members and observing relationships between team members. A limitation of this approach is that there is a bias towards users with clearer conversational styles. Different cultural backgrounds and levels of English proficiency can have differential impact on the perception of user posts by researchers coding this data. Additionally, our team is volunteer-based. Lastly, their task was to organize an event, a task which is not entirely comparable to more commonly occurring virtual team tasks.

7. Conclusion

Our study examined *SciTeam,* a scientific global virtual team. Team members volunteered to undertake a reasonably complex organizational task, the creation and execution of an interdisciplinary scientific conference. Our study qualitatively and quantitatively explored the formation of swift trust amongst team members and discussed how different types of interactions between the users affected swift trust. By examining a variety of social and task-oriented interactions, our analyses examined the ways in which swift trust was created and sustained amongst the members. Given that swift trust relies on the completion of assignments within the larger goal of the virtual team, we studied the Task-Oriented code (which was the most used code) in relation to the other variables. It is through the combination of different forms of interactions that swift trust was able to flourish (since it allowed team members to complete tasks in their own way and form bonds with other team members). As can be expected, the task-oriented variable held a prominent role in all of the interactions. Since team members were able to consistently work on their task-based projects, task completion was paramount and most frequently demonstrated by SciTeam's most involved users.

Though the team initially formed out of the task of organizing a conference, a community ethos emerged. The first few virtual interactions concentrated on basic logistics. From this, a team grew wherein interactions were not restricted to the task, but also extended to social engagement amongst team members. Team members also volunteered to execute tasks beyond the remit of the project as they became further committed to achieving the highest level of success rather than merely executing the task. Team members successfully interacted on task-related matters in one discussion while simultaneously having informal social conversations in another topic thread. The concurrent diversity of topics allowed team members to build multidimensional virtual personas. Interactions in these different spaces at first seemed disjointed, but, as the task progressed, these interactions became more consistent. Team members were able to remain effective in task execution while establishing a pleasant and collegial virtual atmosphere. The global distribution of the team also helped provide diversity in terms of social cues. *SciTeam* reveals high levels of swift trust, affirmed through the manner in which tasks are divided amongst team members, the overall cohesiveness of the team, and the level of multidimensional trust that the members developed.

The swift trust literature finds that teams that had a high level of motivation for completing tasks while engaging in small amounts of social interactions usually had high levels of swift trust. Though *SciTeam members* engaged in significant social interactions, this was done to aid task completion and overcome cultural and geographic boundaries. Team members also rotated leadership so that different members were able to assume a role of organizing a specific task within the larger project (depending on skills and abilities). Jarvenpaa and Leidner [9] argue that teams that distribute equal responsibility amongst themselves help ensure that all members have a stake within the group. Within *SciTeam*, members chose their assignments collectively and were not passively assigned tasks. Within topical interactions, members helped regulate the conversation and decided what should be discussed next.

The average example of team interactions is one where the social component is present, but is complementary and subordinate to the prevailing task objective team members are responsible for. Social interactions are neither antithetical to the development of trust nor unambiguously supportive. We fail to reject the continued importance of social interactions in building trust. As with other global virtual teams of volunteers such as open-source software development [12], a core group of individuals were instrumental when major sub tasks emerged. These members completed a disproportionate number of tasks, but their contributions did not discourage other team members from contributing. Core members jointly facilitated strategies to encourage non-core team members to volunteer for tasks and complete them. Even though core members might have a more significant presence within the team, non-core members also had a significant impact on the task. A key finding of this

study is that virtual social interactions amongst team members of global virtual teams did not deter swift trust development [9]. Our findings indicate that there is a trade off between sociability and task-oriented behavior. However, the voluntary nature of this global virtual team and the great disparity in user involvement that occurred as a result meant that user activity rather than user 'posting style' spoke more to the development of trust building activity.

Our findings offer important contributions to the literature on voluntary and constructed virtual teams. In virtual teams where a member is free to determine their own level of overall engagement, this has the potential to be a more significant variable in the development of trust than any of the specific swift trust variables. Because engagement can vary so widely across team members, even members who have relatively adverse 'posting styles' which would predict low development of swift trust can offer far more significant contributions to community trust than those who are positively disposed to trust, but relatively disengaged. Future work in this area could contribute to questions such as whether there is a hidden correlation between posting style and engagement and how the voluntariness of a virtual team affects factors significant to trust formation.

8. Acknowledgments

9. References

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