Media Choices and Trust in Partially Distributed Global Teams

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Abstract

Partially distributed teams (PDTs) are increasingly common in organizations as they collaborate across distance. A PDT has at least two collocated subteams that are geographically distant and communicate by electronic media. This paper reports on a two semester quasi-experimental study of students in global PDTs in the role of software developers designing an emergency management information system. Leadership configuration and temporal distribution were varied and their effects on communication media chosen were examined, as well as the relationship of the media used with trust. Both leadership configuration and distance affect the choices made of communications media and those choices, in some cases, are significantly associated with trust.

1. Introduction

Organizations are collaborating across distance with increased frequency. The collaboration may be in fully distributed virtual teams, or in partially distributed teams (PDTs). For example, planning and response for large scale emergencies often require collaboration across organizations and countries and require working together in PDTs [1]. A PDT is a hybrid team that has at least two geographically distant collocated subteams such that they communicate primarily through electronic media [2]. Distributed global teams that are PDTs face unique challenges. The sharing of rich face-to-face communications among the co-located subteam members as compared to mediated communication with members of other subteams, who may also be in other time zones, tends to lead to “us vs. them” social dynamics and a lack of trust among subteams. Overcoming these potential divisions presents not only a challenge to global PDTs, but an opportunity for researchers.

In this paper, we describe the results of a quasi-experimental field study that investigated how leadership configuration and temporal distance between subteams of PDTs may affect choice of communication media, and how this choice, in turn, affects trust. Although it has been argued that effective performance of virtual teams can occur without trust [3], most theorists and studies support the premise that trust is important to team outcomes [4][6][7] and communication is important to the development of trust [4][8]. Therefore, for a PDT, with both collocated and distributed members, the choice of communication technologies is critical.

PDTs can have a variety of leadership configurations, including an overall team leader and no subteam leaders; subteam leaders only; and both team and subteam leaders. An unexplored question is whether leadership configuration affects the choices of communication technology.

Distance may also affect the between subteam media choices. For example, if there are few overlapping working hours, will the PDTs select mostly asynchronous technologies? Or, might one or both sub-teams work some extended hours and use synchronous media such as instant messaging and/or audio conferences to maintain awareness of availability and to coordinate activities?

This paper reports on a two semester study of student PDTs, each consisting of two subteams from different countries, working on software requirements for an Emergency Response Information System (EMIS). The paper is organized as follows: first a literature review of trust and communication is presented, then the research questions and hypotheses are described, followed by methodology, measures of constructs, reliability and validity, analysis, results and discussion, conclusions, limitations, future research, and contributions.

2. Review of the literature

Organizations and organizational groups usually select a variety of media to use for their communications needs [25]. Watson-Manheim and Belanger [25] define “a communication media repertoire as the collection of communication channels and identifiable routines of use for specific communication purposes within a defined community (p. 268).” The communications media repertoire
includes the communications media used by the members of the group as well as the rules for using the media that develop over time [25]. Thus, there are two levels of choice --- the media to include in the repertoire and the medium to use for a particular communications interchange. For PDTs, then, it is possible that different repertoires may develop for between subteam communication than for within subteam communication.

Media synchronicity theory (MST) has particular significance for media choice by PDTs that span multiple time zones [5]. MST focuses on the ability of media to support synchronicity, a shared pattern of coordinated behavior among individuals as they work together. It proposes that for conveyance of information, use of media supporting lower synchronicity should result in better communication performance, whereas for convergence (reaching agreement) processes, use of media supporting higher synchronicity should result in better communication performance. Thus, PDTs can be expected to make use of both synchronous and asynchronous media.

Media richness theory [12] suggests that media can be more or less “rich,” which affects their suitability for use to reduce equivocality and uncertainty. However, channel expansion theory [24] suggests that the perceived richness of a medium is not strictly a function of the medium's characteristics. Rather, the experience users have with a medium, as well as the experiences they have with each other and the task, will affect how they view the richness of a medium, and therefore over time media choices may change. This is important for PDTs. Also, as different subteams may have different experiences with media, their preferred choices for between subteam communications may be in conflict. It is, therefore, incumbent upon leaders of PDTs to be certain that training or other mechanisms be used to create equal comfort by subteams with those media choices made for between subteam communications.

In the literature, trust has been defined a number of ways [9]. [7] We use Mayer et al.'s definition of trust: “the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustee, irrespective of the ability to monitor or control that other party” [7] (p. 712). While trust has been studied extensively in both traditionally collocated and fully distributed virtual teams (e.g., [10]), it has not been fully explored in PDTs.

DeRosa, Hantul, Kock, and D’Arcy [11] apply their media naturalness theory as an alternative to media richness theory to explain media preferences. According to media naturalness theory, the factors influencing preferences place face-to-face interaction in the middle of a richness continuum as the most “natural” form of communication. That is, a medium can be richer (or too rich) or less rich (not rich enough). However, individual differences also influence preference and, through experience with a medium, people can learn to use and prefer it [11]. DeRosa et al. posit that without experience with remote members in a virtual environment, trust will be more difficult to achieve in non face-to-face interaction.

Communication is important for building trust [4] [8]. Therefore, media choices can affect the level of trust that develops. We posit that the two most important contextual characteristics of PDTs that will influence media choice are leadership configuration and temporal distance between subteams. In PDTs there are a variety of leadership conditions which determine the location of the leader(s). If a leader is not collocated with some of his/her members, s/he must develop “telepresence” [15] to express leadership presence and position. The need to develop telepresence may affect the choice of media. However, if a leader is collocated with the members (as is the case with a PDT subteam leader), the richness of face-to-face interactions [12] convey status, position, etc. readily. Additionally, it is expected that temporal distance affects the choice of media, since multiple time zone separation leads to coordination problems. Therefore, our overarching research questions are:

Are leadership condition and/or temporal distance associated with media choice in Partially Distributed Teams?

How are media choices related to trust?

The literature on executive support systems suggests that different technologies are best suited to support specific leader roles [26]. Since the distant leader has to develop telepresence, the behaviors (roles) exhibited by the distant leader may differ from that of the collocated leader. Therefore, since leadership configuration determines the location of the leader and that may affect the media chosen, it is hypothesized that:

3. Research questions and hypotheses
H1: Leadership configuration will have a significant association with the choice of communications media in PDTs.

Temporal distance causes delay [16] which may affect the choice of communications media (e.g., synchronous or asynchronous). Also, temporal distance is associated with cultural distance, and thus as temporal distance increases, communication challenges may also increase because of language and culture issues [11]. Thus it is hypothesized that:

H2: Temporal distance between subteams affects choice of communications media in PDTs.

Finally, as discussed above, the effectiveness of communication can influence the level of trust developed. Thus it is hypothesized that:

H3: There is a relationship between the choice of communications media and trust in PDTs.

4. Method

4.1. Participants and sites

In Semester 1, 359 undergraduate students from three universities in two countries (U.S. and the Netherlands) were placed into 39 teams of seven to 11 members each. In Semester 2, 204 undergraduate students from five universities in four countries (U.S., Spain, UK, and China) were placed into 21 teams of eight to 12 members each, and, with one exception, each of two subteams was collocated within the same class, and the other subteam was from a different university and country. In semester 1, all 39 teams were comprised of a subteam from the US and a subteam from the Netherlands. In semester 2, there were 8 US-UK teams, 3 US-Spain teams, 9 US-China teams, and 1 US-US team. English was the language of the project; all participants were reported by their instructors to have at least a working knowledge of English.

4.2. Task

In both semesters, the task was to determine the functional requirements and related decisions for an emergency management information system. The tasks for the two semesters were isomorphic but different in details. For Semester 1, the primary task was to prepare a written report in response to a Request for Proposal (RFP) for a Grassroots Regional Resource Repository (GRRR) which was to be an emergency preparedness information system for a specified country in South America. In Semester 2 the RFP was a proposal for a Bioterrorism Management and Planning System (BTMAPS) which was to be an emergency preparedness system for the country of Switzerland, supporting resource management and detection of bioterrorist threats to Zurich. In both semesters the subjects were to prepare the reports as if they were analysts bidding on the RFP. The final reports, due at the end of four weeks, were to specify the functional requirements of the proposed systems as well as who the users would be and what management were needed. Pilot studies indicated that four weeks was sufficient time for groups to complete their assigned tasks. Intermediate deliverables were designed to help participants work well in a PDT and guide them in the process of preparing the final report.

4.3. Communication Media

Each team was provided with private space on a custom content management system (PDT System) that permits participants to create discussion forums and participate in them, upload files to the file repository and create pages. Project specifications, deadlines, reminders and other communications from the researchers were also posted on the PDT System. However, each team was free to choose other media in addition to the “official” project system.

4.4. Leadership Conditions

Teams were assigned to one of three leadership conditions: Centralized, Hierarchical, or Decentralized. In the Centralized condition the team self-selected one overall team leader and no subteam leaders; in the Hierarchical condition, the team selected one overall team leader and one subteam leader for each of the two subteams; and in the Decentralized condition there was no overall team leader but one subteam leader was selected for each subteam. Teams selected their leaders as part of the first week’s activities to create a team contract. However, some teams selected a different leadership configuration than requested, which, in effect, put them into a different leadership condition. Analysis of the contracts indicated that there were a total of 34 teams in the Decentralized condition; 12 teams in the Centralized condition; and 14 teams in the Hierarchical condition.

4.5. Procedures

All participants worked on the task and the intermediate deliverables. Participation in the experimental instruments (i.e., surveys and personal reflections) was voluntary for U.S. students (because of IRB requirements) and required for all others, and
participants received extra credit for completing them. There was a background survey, post survey, and weekly personal reflections. Personal reflections are surveys which include open ended questions for which the participants reflected upon their experiences the previous week in a PDT.

The first week the participants engaged in activities that prepared them for working in a PDT. They completed a system tutorial, introduced themselves, and completed the first of three weekly tutorial modules. The goal was to get them off to a good start by clarifying team expectations and responsibilities, raising awareness of issues of working in PDTs, and selecting leaders. The participants read scenarios that described issues of working in PDTs with instructions that guided them to complete a team contract which included selecting and identifying leaders and agreements on how often and through which media they would communicate in their teams. During the second and third weeks, the participants worked on activities that guided them to develop their responses to the RFP and on team building activities. During the fourth week, the teams completed their final report using a proposal template provided by the researchers.

5. Quantitative measures of variables

To capture communications media choices, the post survey had a series of questions asking the frequency of use of 13 different communication media (plus “other” for which a text field was provided). Use of each medium was rated on a scale of 1 (never) to 7 (to a great extent) for both communication within and communication between subteams. Note that since participants could choose any medium or any system in addition to the asynchronous “PDT System,” it was impossible to measure actual media use. These self reports are not meant to be accurate measures of actual use, but rather reports of relative amount of use. It is likely that despite different degrees of expertise with English, all participants could understand the 1 to 7 Likert-type scale for indicating relative amounts of use of the media, and certainly, the “never” used anchor should have the same meaning for all.

Ten scale items for trust within a subteam (with the same ten items repeated for trust between subteams) were included in the post survey. The ten 7-point semantic differential scales for trust had four questions (8 in total) adapted from Jarvenpaa et al. [10] and six questions (12 total) adapted from Cummings and Bromily [17]. Responses to negatively worded items were reverse coded for analysis.

Final deliverables were graded, using a grading rubric, by a grader and two experts. Objective performance is measured by the mean of the three grades.

Initially, we hoped to examine geographic, temporal and cultural distance as separate dimensions. However, for this data set, temporal distance was perfectly correlated with both geographic distance and cultural distance, as measured by Hofstede [27]. We have used temporal distance for this paper since it is the most precise measurement of the three. Temporal distance was measured by the number of time zones between the two subteams of a team.

6. Reliability and validity of trust measures

Factor analysis was performed for the two trust scales (trust for the local “my” subteam and trust for the distant “other” subteam). Communals indicated that questions 5 and 10 with communalities of less than 4.5 should be removed. Therefore, factor analysis was then run again with questions 5 and 10 removed. The two-factor results with communalities are shown in Tables 1 and 2.

The first factor (Questions 3, 4, 6, 7) can be termed “Personal Trust” which is the trust that is based on the interactions the participants have had with each other. The second factor (Questions 1, 2, and 9) is termed “Process Trust” as it is trust that is based upon inferences made from the process of the team working together.

Reliability was assessed for each dimension of trust for both “my” subteam and the “other” subteam. Cronbach’s alphas were inadequate in many cases. However, as noted in Cortina [18], Hair et al. [19], and

<table>
<thead>
<tr>
<th>Questions</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I would have preferred if some members had less influence over important aspects of the project in my subteam.</td>
<td>.20</td>
<td>.77</td>
<td>.63</td>
</tr>
<tr>
<td>2. I wanted to more closely monitor the work of members in my subteam.</td>
<td>.29</td>
<td>.75</td>
<td>.65</td>
</tr>
<tr>
<td>3. I was comfortable when other members worked on a critical task or problem in my subteam.</td>
<td>.76</td>
<td>.19</td>
<td>.61</td>
</tr>
<tr>
<td>4. Even if I could not monitor them, I was comfortable giving a</td>
<td>.80</td>
<td>.21</td>
<td>.69</td>
</tr>
</tbody>
</table>
critical task or problem to other members in my subteam.

5. I felt that members tried to get out of their commitments in my subteam.

6. I felt that members kept their word in my subteam.

7. I felt that members were honest with me in my subteam.

8. I felt that members negotiated joint expectations fairly in my subteam.

9. I felt that members tried to get the upper hand in my subteam.

10. I felt confident that members would not exploit me in my subteam.

Table 2. Factor analysis results for trust for the remote “other” subteam

<table>
<thead>
<tr>
<th></th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Communality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I would have preferred if some members had less influence over important aspects of the project in the other subteam.</td>
<td></td>
<td>.19</td>
<td>.62</td>
</tr>
<tr>
<td>2. I wanted to more closely monitor the work of members in the other subteam.</td>
<td></td>
<td>.27</td>
<td>.54</td>
</tr>
<tr>
<td>3. I was comfortable when other members worked on a critical task or problem in the other subteam.</td>
<td></td>
<td>.78</td>
<td>.65</td>
</tr>
<tr>
<td>4. Even if I could not monitor them, I was comfortable giving a critical task or problem to other members in the other subteam.</td>
<td></td>
<td>.81</td>
<td>.70</td>
</tr>
<tr>
<td>5. I felt that members tried to get out of their commitments in the other subteam.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I felt that members kept their word in the other subteam.</td>
<td></td>
<td>.76</td>
<td>.64</td>
</tr>
<tr>
<td>7. I felt that members were honest with me in the other subteam.</td>
<td></td>
<td>.81</td>
<td>.69</td>
</tr>
<tr>
<td>8. I felt that members negotiated joint expectations fairly in the other subteam.</td>
<td></td>
<td>.82</td>
<td>.68</td>
</tr>
<tr>
<td>9. I felt that members tried to get the upper hand in the other subteam.</td>
<td></td>
<td>.06</td>
<td>.51</td>
</tr>
<tr>
<td>10. I felt confident that members would not exploit me in the other subteam.</td>
<td></td>
<td></td>
<td></td>
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</table>

Ocker et al. [20], Cronbach’s is sensitive to the number of scale items and the dimensions of trust have few items. However, composite reliability is not sensitive to the number of items in the scale [20] and so PLS was used to find the composite reliability.

The results of PLS also provide average variance explained (AVE) which Chin [21] indicates can be interpreted as a measure of reliability and should be over .5 for good reliability. The results are shown in Table 3 and demonstrate adequate reliability as measured by both composite reliability and AVE for all dimensions of trust measured.

Table 3. Reliability measures for trust

<table>
<thead>
<tr>
<th>Data Set</th>
<th>Dimension</th>
<th>Composite Reliability</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>“My” Subteam</td>
<td>Personal</td>
<td>.90</td>
<td>.65</td>
</tr>
<tr>
<td></td>
<td>Process</td>
<td>.80</td>
<td>.58</td>
</tr>
<tr>
<td>The “Other” Subteam</td>
<td>Personal</td>
<td>.91</td>
<td>.67</td>
</tr>
<tr>
<td></td>
<td>Process</td>
<td>.78</td>
<td>.54</td>
</tr>
</tbody>
</table>

7. Analysis

Trust and the various media used were not normally distributed and transformations failed to achieve normality. Kutner et al. [22] note that when normality cannot be achieved, nonparametric Spearman rank correlation coefficient is commonly used for making inferences about associations. Therefore, Spearman’s r was calculated to test the associations hypothesized. In the cases where the effect of a categorical variable is to be tested (e.g., the effect of leadership configuration on media used), nonparametric Kruskal-Wallis tests are performed. However, because ANOVA is robust when it comes to the requirement for normality, Tukey’s tests were also performed to further explore the relationships.

For the purposes of description, media use ratings of 2-3.9 are considered to be “low” frequency; 4-5.9
“moderate frequency; and 6-7 “high” frequency. Ratings of between 1 (never) and 2 are “nearly never.” An examination of the data showed that some responses were erroneous. For example, with the exception of the one zero-distance team, communication between subteams by face-to-face meetings or course management systems, which were used within the classes, not between classes, was with high certainty not possible for the teams. Therefore, respondents who answered media use questions by indicating at least some face-to-face meetings or course management systems between subteams were assumed to have erred in their answers unless they were in the zero-distance team. The responses from those 108 (77 from Semester 1, 31 from Semester 2) participants were not used in the data analysis. We note that after the experience of Semester 1, definitions of what “my subteam” and “other subteam” meant were clarified to help avoid this problem in Semester 2.

8. Results and discussion

The frequency of use of the media over all conditions is shown in Table 4. Overall for within subteam communications, Facebook, Internet phone, FAX, video conferencing, teleconferencing, bulletin board, and “other” were nearly-never used. The PDT System, text messaging, phone, and course management system were used with low frequency. Instant messaging, email, and face-to-face meetings were used with moderate frequency. No medium was used either never or with high frequency. Although face-to-face meetings were used most, it is a surprise that they were not used more as the subteams were collocated. However, this may be because there was limited time in class to meet face-to-face and student schedules differ so that other communications media were used as well. However, it is noteworthy that the most used media were a mix of asynchronous (email) and synchronous (instant messaging and face-to-face).

For between subteam communications, members relied mostly on the PDT System, instant messaging, and email. The remainder of the media was “nearly-never” used. This is a pattern of usage similar to that of within subteam communication except that the PDT System was used more for between subteam communications and face-to-face was used more for within subteam communications. Recall that for between subteam communications, only the zero distance team could hold face-to-face meetings so that result is not surprising. It is possible that the choices of communication media were influenced both by what was deemed appropriate and also by the experiences of the members and leaders which made some media more “natural” [11] than others.

<table>
<thead>
<tr>
<th>Table 4. Media use frequency means and standard deviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=384</td>
</tr>
<tr>
<td>Email</td>
</tr>
<tr>
<td>Instant Messaging</td>
</tr>
<tr>
<td>PDT System</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Media WITHIN</th>
<th>Centralized Mean (SD) N=66</th>
<th>Decentralized Mean (SD) N=225</th>
<th>Hierarchical Mean (SD) N=93</th>
<th>Chi-Square</th>
<th>Pr&gt;Chi-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>PDT System</td>
<td>4.15 (2.21)</td>
<td>3.36 (2.23)</td>
<td>3.68 (2.17)</td>
<td>7.65</td>
<td>.0218*</td>
</tr>
<tr>
<td>Facebook</td>
<td>2.24 (1.81)</td>
<td>1.57 (1.23)</td>
<td>1.71 (1.31)</td>
<td>11.04</td>
<td>.0040*</td>
</tr>
</tbody>
</table>
8.1. Results of testing Hypothesis 1

Hypothesis 1 states, “Leadership condition will have a significant association with the choice of communications media in PDTs.” Kruskal-Wallis tests were performed to test the effects of leadership configuration on each communications medium choice. Table 5 above shows the significant results.

For communication media use within a subteam, significant results at the .05 level were found only for the PDT System and Facebook. For communication between subteams, the only significant results were for the PDT System, Facebook, and face-to-face meetings. It should be noted that Facebook was used in both cases either nearly-never or with low frequency. Face-to-face meetings were used between subteams only by the zero distance team, which accounts for the finding that there is a difference by leadership configuration. What is of interest, then, is the effect of leadership condition on the use of the PDT System for both within and between subteam communications. Although the measures of the use of the PDT System were not normally distributed, ANOVA is robust with respect to the requirements of normality. Therefore, Tukey’s tests were performed to explore which leadership conditions were significantly different from which other leadership conditions.

For use of the PDT System within a subteam, the Centralized condition was significantly greater than the use within Decentralized subteams. For use of the PDT System between subteams, the use in the Centralized condition was significantly greater than the use in both the Decentralized and Hierarchical conditions. It may be that for between subteam communications, in the Hierarchical and Decentralized conditions, local subteam leaders would communicate with each other through other means. But for the Centralized condition, the easiest way for the team leader to reach all the remote members was through the PDT System. That is, with centralized leadership, a centralized communication platform is used.

Thus, Hypothesis 1 is supported.

8.2. Results of testing Hypothesis 2

Hypothesis 2 states, “There is a significant association between temporal distance between subteams and the choice of communications media in PDTs.” Spearman’s r correlations were performed between temporal distance (measured by time zone difference between the subteams) and each communications medium. The significant results are shown in Table 6 below.

Table 6. Significant correlations of temporal distance with media use

<table>
<thead>
<tr>
<th>Media Use</th>
<th>Temporal Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>N=384</td>
<td>Media Use WITHIN</td>
</tr>
<tr>
<td>PDT System</td>
<td>-.17 (.0007*)</td>
</tr>
<tr>
<td>Instant Messaging</td>
<td>.14 (.0053*)</td>
</tr>
<tr>
<td>Email</td>
<td>-.17 (.0007*)</td>
</tr>
<tr>
<td>Facebook</td>
<td>-.24 (&lt;.0001*)</td>
</tr>
<tr>
<td>Phone</td>
<td>----------</td>
</tr>
</tbody>
</table>

It is surprising that temporal distance is negatively and significantly associated with use of the PDT System, email, and Facebook within subteams. This is a result that needs to be further explored. It is possible, however, that communication issues between subteams were more disruptive to the team as a whole when the distance was greater which affected the communications and media choices even within the subteams.
The results of the correlations of temporal distance with media choices between subteams indicated that the associations were significant (and negative) only for the PDT System, instant messaging, email, and phone. It is plausible that the greater the temporal distance, the less those media choices were used because of the greater delay caused by the greater distance. It is not surprising that distance affected both synchronous and asynchronous media. The time difference may be too great to effectively use synchronous media. In addition, the delay caused by time difference could make communication by asynchronous media frustrating and difficult. That all significant associations were negative suggests that the greater the distance, the less communication takes place in general. This has implications for PDTs in that special efforts may be needed to promote communication when there is temporal distance.

Thus, Hypothesis 2 is supported.

8.4. Association of Media Choices and Performance

Spearman’s correlations were performed between objective performance and the most frequently used media choices for between subteam communications (PDT System, email, Facebook, and phone). Only the association between email and objective performance was significant ($r=.1371$, $p=.0057$). This suggests that for objective performance, some media choices do “matter.”

9. Conclusions and implications

The results of this study suggest that given a variety of communications media from which to choose, PDTs will choose to use some for communications within subteams and those choices may be different from those chosen for communications between subteams. Both leadership configuration and temporal distance can affect which choices are made. Results also suggest that a subset of those choices may be significantly associated with trust, both for members of the collocated subteam and for members of the remote subteam. The implications are that PDTs should be given a suite of communications technology, asynchronous and synchronous, to choose from, and that decision-makers should take into account the structure of the team (leadership configuration and distance) and the potential effects the choices may have on developing and maintaining trust.

Emergencies are complex and often unexpected, requiring collaboration of professionals who have no experience with or trust of each other. Trust has been shown to be important for team functioning [23] and users and developers of EMISs are likely to need to share sensitive information which requires trust. Thus, emergency PDTs must make every effort to promote the development and maintenance of trust, including the appropriate selection of communications media. But, for emergency PDTs, if the team is in the midst of or after a crisis, it may be that not all channels of communication are available. Thus, it is particularly important that the team leadership have an understanding of which media are best suited for their teams so they can choose from the available media those that will best promote trust. Channel expansion theory [24] and media naturalness theory [11] both suggest that with training so that all subteams have experience both with each other and with the repertoire
of media choices, the number of suitable media choices will be increased, which can be important when not all media are available.

10. Limits and generalizability

Although English was the common working language, we did not control for proficiency in this analysis. It may be that communications media choices are also affected by comfort in the language used. For example, if proficiency is low, then asynchronous communication may be preferred as it gives more time to frame thoughts to the communicator. This is worthwhile to examine in future research.

There are weak to moderate correlations, as measured by Spearman’s Rho, between temporal distance and measures of trust. They range from -.07 (between temporal distance and longer term trust for the remote subteam, not significant) to a high of -.36 (between temporal distance and early process trust for the local subteam, p<.0001). Ideally, one would run a multiple regression among variables to untangle causal patterns, but because the variables are not normally distributed, we cannot employ that approach.

Though having students as subjects is always a concern for generalizability, the tasks performed by the subjects in this study were similar to those performed by software professionals in the field and, since the project counted for a significant portion of their grade (about 20%), the students were highly motivated to do well. Also, in the field there may be more than two subteams in a team. Another limitation is that we studied reported media use, rather than being able to measure actual use.

In terms of generalizing to “real” software development in PDTs, generally there is an “official” software system for project management, perhaps similar to our PDT System, but it is likely that besides this official platform they will need and use other communication media too, particularly for between subteam dyadic work and “full team” scheduled meetings. Thus, the communication media choices made in this study should reflect “real life” communications technology choices.

This study was of only medium length (4 weeks). It is probable that if the groups worked over a longer period of time, both communications mode use and trust would continue to evolve.

Finally, the task may not be representative of all practical cases in terms of goals, targets, benchmarks, constraints, and solutions for trust issues.

11. Future research

We intend to conduct field studies with software development professionals in PDTs with a variety of configurations. Additionally, future analysis will look to see if there are interaction effects between temporal distance and leadership configuration. It would also be interesting to examine if cultural distance and/or language fluency affect the choices of communication technologies. In this research, only direct effects were tested; future research should also look for interaction effects. In addition, though we could study only retrospectively reported media choices, future field studies might be able to capture measures of actual amounts of media use.

12. Contributions

This research contributes to the literature by identifying different types of trust that can occur in PDTs. It also contributes by findings that temporal distance and leadership configuration are significantly associated with the selection of communications media for some media, and that the media choice is associated with the development of trust in PDTs. Thus, it informs both researchers and practitioners of the importance of considering leadership configuration, temporal distance, and trust when choosing communications media in PDTs.

13. Acknowledgments

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14. References


