Email Communication and Exchange Quality: An Empirical Study

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Introduction

Evidence suggests that computer mediated communication (CMC) is on the rise. Email is rapidly emerging as the key platform for knowledge creation and knowledge dissemination (Sussman & Siegal, 2003). It is also now considered as the foundational communication component of networked organizations, virtual teams and electronic communities. (Brown et al, 2004). This is in part stimulated by decreasing cost, increased accessibility of information and the rapid exchange of information.

Although current collaboration tools make communication easier and faster, questions arise whether the new media enhances or debases exchange quality. Exchange quality can be described as the quality of the relationship and interaction among employees- a set of relationships based on employment contracts (Huang, 2002). This includes the quality of coordination, the quality of shared information, level of participation and commitment, shared understanding, the reliability as well as credibility of information and the quality of social interaction in a given context-in this case a computer mediated environment. An exchange can be purely 'economical' (agreed upon by an employment contract; job or task related) or 'social' (one that goes beyond purely business or professional concerns, relationship oriented).

The purpose of this study is to examine the perceived satisfaction of employees with respect to the new media, in particular the email, on these exchange dimensions; compare media choices for information related tasks and to report trends relating to communicating in a computer mediated environment. The study explores the quality of exchanges with respect to two types of tasks-the information generation task and the information exchange tasks. The paper is organized as follows: the review of literature first examines the role of CMC in organizations with specific focus on only one configuration-email communication;

this is followed by development of the hypotheses. The article concludes with discussion of the findings and directions for future research

Literature Review

Research studies investigating the impact of computer mediated communication (CMC) on organizational communication have yielded rather contradictory results. On the one hand, CMC is viewed as providing a reduced cues environment poorly suited to emotional and self expressive communications and on the other it is seen as supporting rich information, connecting others, increasing involvement of the peripheral players, and consolidating existing connections (Rice, 1999; Wellman et al., 1996).

Given these diverse and often contradictory findings, it is somewhat difficult to assess the impact of CMC and plan for its implementation and use (Haythornthwaite, 2002). This is compounded by the fact that organizational communications is rarely confined to a single genre (Orlikowski & Yates, 1995).

To facilitate a clear understanding of the underlying issues related to electronic communication, the present study has compartmentalized the previous researches under various headings.

Exchange quality and Social Context Cues

Exchange quality is affected when there is a presence of social context cues. These are the non-verbal cues perceived by the message recipient to understand the sender's viewpoints. Kock (1998) included collocation, high degree of synchronicity, observing and conveying of verbal and non verbal signals, perception of body language and the ability to convey and listen to speech as the unique qualities that differentiate face to face or highly natural communication from asynchronous communication.

There are contradictory findings in this regard. Few researchers suggest that CMC, particularly the email, inhabits the impressions of the sender (Siegel et al, 1986) and that communication is not as personal as it is in face to face communication (Daft & Lengel, 1986). When fewer cues are available, respondents may misinterpret messages and form biased judgment about the sender. This negatively affects the exchange quality and induces antisocial behavior (Walther, Anderson & Park, 1994).

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Proponents of CMC, on the other hand, argue that absence of social context cues makes recipients equally motivated to discover more information about the sender, establish better group relations in the long run(Walther, 1992; Walther & Burgoon, 1992; Byron & Baldridge, 2007) thereby improving the quality of the exchange.

Exchange quality and Social Interaction

Field studies have repeatedly found that trust and other relational characteristics enable information sharing in organizations (Song, M., Berends H., Bij Hans, Weggeman, 2007). This enhances the quality of the exchange.

E mail communication is asynchronous in nature. By definition it restricts the amount of social interaction that can take place in a computer led communication environment. Though researchers confirm that social interaction is indeed low in email communication (Haythorthwaite, 2002; Chidambaram, 1996), yet these can be developed over a period of time regardless of the medium chosen

Research by Haythornthwaite (2002) discounts the use of a particular media in fostering an effective exchange and instead places premium on the perceived relational tie among team members. Consequently no media is completely rich (as face to face is commonly believed to be) or completely lean (such as the email). Richness is in the exchange. Haythornthwaite concludes that strongly tied individuals adapt easily to new media and work on it to improve their ties further. This is supported by Walther, et al (1994) that participants using some form of CMC eventually do build a bond over an extended period of time. On the other hand, weakly tied groups do not adapt easily and prefer to use the organizational prevalent set up to communicate. This is confirmed by Lee (1994) who concludes that email is neither a rich medium nor a lean medium and that communication richness (exchange quality) depends on the interaction between the medium and its users. The same email might be a rich medium for some but a poor one at some organizations.

Haythornthwaite focused on relational ties as a precondition to affect qualitative exchange among members. Chidambaram (1996) on the other hand argues that relational ties can be developed in a computer led environment. He however concludes that relational tie is easier to build in groups with some form of face to face interaction as opposed to groups which are interacting solely by CMC tool.

To summarize, social interaction is expected to be lower in the email communication. To improve the quality of the exchange, participants need to have some form of social interaction. This can exist irrespective of the medium utilized. Strongly tied teams adapt better to the new media than weakly tied teams and consequently have a richer exchange. Conversely, social ties can be built up over a period of time through frequent communication. This supports the view that relational factors do have an impact on the quality of the exchange.

Exchange quality and Email frequency

Huang (2002) found that the exchange quality improves when there is greater *frequency* of email communication. When there is greater frequency, there is greater contact and a reduced chance of misunderstanding. Frequent email becomes a measure of relational development leading to an improved exchange quality.

Exchange quality and Media Satisfaction

Evidence regarding this is rather contradictory. Task satisfaction is linked to satisfaction with the media. Consequently a favorable exchange is one where participants record satisfaction with the media on the task.

Employing the theory of task technology fit, the quality of interaction across face to face and computer mediated communication has been compared. For certain tasks such as information sharing, no significant difference was found in the performance of the task by the groups using technology and groups interacting face to face (Murthy, Kerr 2004). Strauss (1996) found no significant difference in information sharing or performance between CMC groups using a chat type system and face to face groups.

Few researchers have found CMC in general and email in particular to be less satisfying on the decision making task. Studies by Dennis (1996) indicate that verbally interacting groups (read email) exchanged only a small portion of the available information and made poor decisions as a result. As more time was required to complete the task, the overall effectiveness of the medium was perceived to be low. This adversely affected the exchange quality in the long run.

Other researchers have found out that satisfaction varies with other elements in the work process such as the task process, the person's perception of his or her partner (Kiesler, et al, 1985) the task-media interactions, as well as the size of the group.

Exchange quality and Media Choice

Choice of media for a particular task can affect the quality of the exchange. Researchers on CMC have focused on media choice among managers (Markus, 1994) to examine the extent to which the media hinders or helps in the performance of work teams.

The Media Richness theory guides researchers to focus on task equivocality and the capacity of a medium to convey information. (Daft &Lengel,1984, 1986). According to this theory, exchange equality improves if media choice is segregated on the basis of tasks to be performed. In comparison to FTF, email was deemed to be lean medium as it involved tasks that were unequivocal in nature. Accordingly, face to face communication was preferred for tasks involving brainstorming, decision making and problem solving and email communication for tasks that were routine in nature such as information exchange and the like.

Researchers have questioned the validity of the Media Richness theory. Fulk, Scmitz & Steinfield (1990) consider the selection of a medium to be influenced by social norms rather than a specific fit between task and medium. In other words a manager's choice of a particular media for a certain task is governed by organizational constraints rather than the optimal fit.

In contrast, the Media Naturalness theory (Kock, 2004) merits attention on two counts-it proposes that communication in organizations can be understood by understanding biological and evolutionary factors, and, secondly, that people do manage to overcome obstacles presented by media that is *low on naturalness* (such as the email). The theory implies that people actively seek to improve the quality of exchange. Kock (1998) has compared CMC and Face to face interactions and found out that people do adapt to communicating through different technology as they become familiar with it. This is confirmed by studies conducted by Burkes (1999)

Exchange quality and Task performance

The quality of the exchange improves when participants report improved performance on various organizational tasks. Three

categories of tasks have been identified-the idea generation tasks, intellective tasks (information exchange process or sharing) and judgment tasks (Simon, 2006). Results of studies have been mixed with some reporting improved performance from CMC tools on certain tasks and others finding exactly the opposite.

Findings from Walther et al (1994) suggest that less information is transmitted on the e-mail (in other words there is reduced sharing). Deemed to be face to face construct information sharing or exchange is not as automatic or evolved in a CMC led environment. Due to the textual nature of the information that is exchanged via the CMC media, (Taylor, 2006) participants have to meet face to face to solicit more information.

According to Gallupe et al (1992) asynchronous and other forms of CMC result in improved performance relative to face to face communication in idea generation tasks and tasks that are highly structured such as decision making, coordinating, problem solving tasks etc.

To summarize, exchange quality on the information exchange or intellective task is lower in asynchronous form of communication, and relatively better than face to face communication in idea generation and problem solving and judgment tasks.

Research Model and Hypothesis Development

The review of literature reveals that in reality, exchange quality is rather an abstract concept. It can be interpreted in myriad ways. For instance managers may perceive the exchange to be of high quality if they report task satisfaction with the new media. Another interpretation could be related to the task process itself. In that case the exchange is of high quality if there is frequent communication, considerable participation and commitment from team members and involves some form of social interaction. Yet another dimension could relate to the quality of the information shared and the effectiveness of task coordination. Exchange can also be a combination of these factors, which is the dimension this research would like to explore.

Accordingly, the basic premise of the present study is that the quality of the exchange in computer supported work environments involves both economic as well as social dimensions of task performance. It is a function of the media and task satisfaction fit, the quality of social interaction as well as the familiarity with and

frequent use of the email form of communication. Media in this case refers to the Email communication (See Model given below):

QUALITY
OF
EXCHANGE

Guality of Social
Interaction

Familiarity with EMail

Frequent Use of EMail

Figure: 1 Model for Hypothesis development

The following hypotheses were formulated:

H1: Exchange quality improves when there is greater satisfaction with the media on idea generation tasks and information exchange task

H2: Exchange quality improves when employees become familiar with the medium and use it frequently

H3: Exchange quality improves when there is considerable social interaction at the workplace.

Methodology

The research study is empirical in nature. The dependent variable is the quality of the exchange. The independent variables included media familiarity, media frequency, satisfaction with the task-media fit and social interaction. These variables are not directly observable; hence, a questionnaire was utilized to measure perceptions of managers related to each of the variables. The variables were studied with respect to only one configuration- the

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ubiquitous Email. The satisfaction on various parameters of task as well as social interactions at the workplace was measured using a five point item scale. The questions were developed on the basis of the secondary research.

Pretest

The questionnaire was pre-tested on 50 managers. Minor changes were made in the questionnaire such as reducing the number of questions.

Respondents

The respondents for the study were the employees working in technology enabled organizations who interacted regularly on the email. The subjects were junior, middle and senior level employees in organizations of standing. The Human Resource heads were requested to permit the research team to personally administer the questionnaire in their respective organizations. The research team assured the respondents that the data would be confidential and only the statistical inferences would be published. In few cases questionnaire sets were couriered to HR/Personnel heads. See the chart given below for details of the sample:

Table 1: Sample Profile

	Age group in years	20-25	26 -30	31-40	41-55	>55
		9.3 %	29.8%	39.3%	19.4%	2.2%
1.1.	Work experience in	1-2	3-5	6-15	16-25	>25
	years	7.9%	19.7%	50.3%	16.3%	5.9%
1.2.	Management level	Lower	Middle	Senior		
		19.9%	71.3%	8.7%		
1.3.	Gender	Male	Female	•		
T		88.5%	11.5%			
1.4.	How many hours/day	none	<5	6-10		11-15
	do you spend on	virtually				
	your computer on a	0.6%	30.9%	65.4%		3%
	typical working day					
1.5.	How many times per	None	<5	6-15	16-30	>30
	<u>day</u> do you e-mail	1.7%	29.2%	43.5%	18.3%	73%
	officially?					
1.6.	Sector	Soft	Financial	Manufa	Pharma	Educ
		ware	services	cturing/		
			35.7%	energy	3.9%	8.7%
		11.8%		39.9%		
L						

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Total number of respondents: 356

Analysis of Data

The data were analyzed using the statistical package SPSS 16.0. Descriptive statistics, Factor analysis, chi-square analysis, ANOVA and reliability estimates were utilized for the findings.

Reliability Estimates of the Measurements

The questions were new; hence there was no record of their reliability. The Cronbach alpha was used to measure the internal consistency of the variables. The resulting index is .850 for 63 items. ANOVA with Friedman's test is significant (.000). Cronbach alpha for satisfaction scores with CMC on various dimensions is .885 (14 items). Cronbach alpha for choice of media for various tasks is approximately .700 for 16 items. This is consistent with the history of the instrument as a reliable instrument.

Findings

As there was a three way interaction between tasks, interaction and satisfaction, I conducted a one way ANOVA using the scores from satisfaction, choice of medium for that particular task and dimensions of task performance. I identified differences in satisfaction with the electronic medium for the economic as well as social dimensions relating to the two tasks under study-information gathering process and information exchange process. The purpose was to identify satisfaction differences between media conditions. The findings section discusses the exchange quality with respect to each of the two tasks followed by the ANOVA results

Information Generation Task and Exchange Quality

Majority of the participants (225) preferred the face to face medium for tasks that involved generating ideas and discovering information. Online brainstorming was preferred by 118 respondents only

The group that preferred the CMC was more satisfied with the email media on various social as well as economic exchanges of this task than the FTF group. The difference between the responses of the two groups was statistically significant. The FTF group recorded much lower satisfaction on the social interaction

dimension of task performance than the CMC group. The results of the ANOVA suggest that though respondents may not prefer a particular medium yet express satisfaction with the media on certain dimensions. The standard deviation for satisfaction on some of the dimensions appears to be high

Table: 2 Media Choice for Information Generation Task and Satisfaction with CMC on the economic and social dimensions of task performance

	Economic and social dimensions of task performance	Mean and SD of CMC (118)	Mean and SD of FTF (225)	ANOVA F-stat
1	Sharing job information with group	3.55 1.13	3.14 1.21	.007 R
2	Quick response	3.98 .99	3.98 .99	.000 R
3	Task coordination	3.92 92	3.92 1.03	.000 R
4	Group coordination	3.72 1.05	3.05 1.01	.000 R
5	Quality of judgment and analysis	3.52 1.05	3.52 1.01	.000 R
6	Information generated	3.95 .88	3.55 .96	.000 R
7	High participation And commitment	3.66 1.00	3.27	.002 R
8	Reliable	3.79 .98	3.17 .91	.000 R
9	Credibility of information	3.90 .94	3.53 .93	.001 R
10	Sharing personal views on official matters	3.20 1.22	3.01 1.11	.218 A
11	Quality of social interaction	3.25 1.13	2.77 1.00	.001 R
12	Original meaning Conveyed as intended	3.55 1.02	3.12 .97	.002 R

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13	Shared	3.41	3.09	.012 R
	understanding	.95	1.00	
	of situation	.93	1.00	

Null Hypothesis R-Rejected (there is a difference in responses) A-Accepted (there is no significant difference in the responses) at .05 level of significance

Information Sharing and Exchange Quality

A large majority of the respondents preferred the CMC media (282) for this task; those preferring the FTF were only 74 in number. On most of the issues there was a significant difference in satisfaction levels between both the groups-CMC and FTF. Predictably the CMC group was more satisfied with the CMC media than their FTF counterparts. The difference was more profound in the dimension relating to social interaction. The standard deviation for satisfaction on some of the dimensions appears to be high

Table: 2: Media Choice for Information Exchange Task and Satisfaction with CMC on the economic and social dimensions of task performance

Sn.	Economic and social Dimensions of task performance	Mean SD for CMC (282)	Mean SD for FTF (74)	ANOVA F stat
1	Sharing job information with group	3.68 1.18	3.36 1.13	.007 R
2	Quick response	4.14 1.01	3.74 1.10	.000 R
3	Task coordination	4.04 .93	3.63 .99	.000 R
4	Group coordination	3.77 1.02	3.48 1.10	.000 R
5	Quality of judgment and analysis	3.77 1.04	3.22 1.02	.000 R
6	Information generated	4.16 .86	3.72 .90	.000 R
7	High participation And commitment	3.83 .93	3.45 1.02	.002 R
8	Reliable	3.85 .93	3.57 1.01	.000 R
9	Credibility of information	3.95 .93	3.74 .96	.001 R

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10	Sharing personal views on official matters	3.38 1.18	2.95 1.15	.218 A
11	Quality of social	3.33	3.06	.001 R
	interaction	1.09	1.12	
12	Original meaning	3.47	2.99	.002 R
	Conveyed as intended	1.14	1.04	
13	Shared	3.56	3.24	.012 R
	understanding	.96	.94	
	of situation	.70	·/T	

Null Hypothesis R-Rejected (there is a difference in responses)

A-Accepted (there is no significant difference in the responses) at .05 level of significance

Frequency and familiarity with the Email and Exchange Quality

Results of Table 3 indicate that there is a positive and significant association between frequent email communication and exchange quality on Idea generation and Information sharing tasks. Familiarity of the medium is also positively associated with the exchange quality (satisfaction with the media on the idea generation and information sharing tasks). Though frequent email communication helps to improve the quality of social interaction (association is significant at (10%confidence interval), yet there is no reason to suggest that as employees get familiar with communicating regularly on email the quality of social interaction would increase.

Table 3: Frequency and Familiarity with CMC modes and Task Satisfaction

Sn.	Parameters	Pearson's Chi Square on Task 1- Idea generation	Pearson's Chi Square on Task 2- Information sharing	Pearson's Chi Square on Quality of Social Interaction
1	Frequency of Email Communication	.080 R	.043 R	.080 R
4	Familiarity with Email	.014 R.	. 093 R	.242 A

Hypothesis R-Rejected A-Accepted at .10 level of significance

Discussion

Exchange quality in a computer mediated environment is an amorphous concept as it depends upon the three way interaction between the media, task and satisfaction.

In this research the exchange process among employees was analyzed with respect to two communication tasks-the idea generation task and the information sharing (exchange) task in a computer mediated communication environment. These were assessed on the basis of satisfaction scores on the economic as well as social dimensions of task performance.

The results support the Media Naturalness Theory and the Media Richness theory. The media naturalness theory allows for the circumstance that individuals can compensate for a less natural medium and produce a competent work product while expressing displeasure with the medium. A considerable majority of the respondents opted for face to face communication for the idea generation task where the need for personal exchange, social interaction and discussion is felt in far greater measure; however the results show a moderate to high level of satisfaction with the CMC on these tasks by the 'FTF group'.

The study indicates that respondents prefer a medium that is high on naturalness for most information gathering or idea generation tasks as opposed to a medium that was low in naturalness for tasks routine in nature (such as information sharing)

The data collected shows that the media richness theory proposed by Daft and Lengel (1986) is valid. This research demonstrates that media satisfaction scores vary on the basis of the mode of communication. For instance, the asynchronous, text-based email system has been considered as the optimal mode of communication for knowledge sharing and group coordination tasks. Users used email as a rich medium to exchange task related information, for analytical and judgmental tasks and as a lean medium for building relationships. Our study provides evidence that for knowledge sharing tasks, intellective tasks and judgment tasks, CMC (in particular the email) is significantly more efficient. The synchronous face to face communication has been considered optimal for idea-generation tasks.

The quality of social interaction on both the idea generating as well as information sharing tasks was lower for the FTF group. This can be attributed to many factors such as lower 'psychological arousal'

when communication is not face to face, computer anxiety, the ease of use of a system as well as familiarity with the media.

The findings suggest that the frequency of email communication and its familiarity is a significant factor in the exchange quality in a CMC led environment. Impersonal communication is not only beneficial for completion of the task but if used frequently can also improve the quality of group exchange on interpersonal dimensions as well. This supports the media naturalness theory that adaptability, usefulness and satisfaction from a media is more when people start using it more frequently. This is because higher frequency of communication may lead to higher volume of information exchanged. Frequent communication allows the group members to stay in touch with each other leading to clarification of thoughts and ideas. CMC -particularly the email configuration offers a reduced cues environment, therefore the recipients are motivated to know more about the sender and establish better group relations by using a number of non-verbal cues to analyze the message and form judgments about the sender. In other words frequent communication facilitates task clarity, task coordination and group coordination. Frequent use of email may lead to devise newer ways to stay in touch (as a social networking tool), thereby improving the quality of the exchange in the long run.

Frequent email communication leads to media familiarity (although the reverse is also true) which in turn improves social interaction. In this study, familiarity with email appears to have a positive impact on satisfaction with the media.

Conclusion

Issues relating to both computers and communication simultaneously impact on the group's effectiveness in a CMC environment. The interaction of computer technology and communication medium may create complications not envisaged by the company.

The research concludes that to facilitate efficient and effective exchange processes modern collaborative technology tools must coexist —and be interspersed—with frequent face to face communication.

This is because most of the services sector organizations and even other sectors now have matrix led structures where group ties are liable to be weak. Groups with weak work relationships are likely to engage in fewer social exchanges, decreased self disclosure and

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less emotional reciprocity in exchanges. This erodes the quality of the exchange process resulting in poorer information exchange, decreased sharing of ideas and ineffective decision making in the long run.

Organizations need to make suitable provision of a suitable collaborative workplace where the CMC helps rather than hinders the communication process. Dimensions such as the nature of the tasks and its related dimensions (e.g., economic and social) and the communication environment (familiarity and frequency of the channel) are important factors to consider when examining CMC use.

The research concludes that managers still prefer the face to face mode for brainstorming and information gathering tasks and seek its benefits even in a CMC led environment. If CMC is to be introduced it must also be supplemented by face to face interaction at regular intervals. Where teams are interacting solely through the CMC, video-conferencing, bulletin boards and in-house electronic newsletters must be initiated to address the emotional as well as self expressive needs of the employees. Frequent communication by email must be encouraged within teams to foster feelings of trust and spirit of sharing.

One way to achieve this is would be to suitably train managers to use the new media, the other would be to introduce CMC with caution.

Directions for Future Research

This research is limited to email communication only as such it would be worthwhile to explore other facets of CMC such as the impact of Instant Messaging, bulletin boards and blogs on task performance. Also, a sector wise analysis to measure the impact of CMC on task performance and satisfaction can be attempted.

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Biography

PAYAL MEHRA (MBA, PhD) has 13 years of teaching experience. She is currently Assistant Professor in the Communications Group at the Indian Institute of Management, Lucknow. Her research interests include themes on managerial communication, specifically, the impact of technology on communication, as well as the aspects relating to the teaching-learning methodologies in higher education.

APPENDIX

Factor analysis: Type of tasks

Table 1:

KMO and Bartlett's Test					
Kaiser-Meyer-Olkin Measure	.719				
Bartlett's Test of Sphericity	Approx. Chi-Square	875.687			
	df	120			
	Sig.	.000			

KMO and Bartlett **Test**

Factor Analysis Table 2: Rotated Component Matrix

Rotated Component Matrix					
Communication	Component				
Tasks	1	2	3	4	5
Official info	.163	.012	.023	.555	.124
Time sensitive information	089	111	.068	.584	.291
Confidential information	.082	.218	.005	.751	061
Asking questions	.615	.139	.060	.376	098
Exchanging opinions	.854	041	041	.085	.133
Generating ideas	.685	.131	.296	020	.047
Decision making	401	247	397	.189	050
Staying in touch	.122	132	.726	020	.144
Getting to know someone	.099	.367	.733	.097	113
Resolving conflicts	.093	.534	.455	.228	106
Selling something	.092	.783	.055	.039	.156
Persuading others	.067	.761	.036	.018	.178
Meetings	027	.162	.047	.181	.592

Interviewing	.094	.078	018	069	.749
Coordinating tasks	.052	.037	.092	.185	.652
Expressing/ perceiving emotions	.004	.067	.438	.382	.249

Rotation Method:

Varimax with Kaiser Normalization

converged in 6 iterations;

54 percent variation accounted for.