

8-25-1995

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Brian S. Butler

*Carnegie Mellon University*, [bb26@andrew.cmu.edu](mailto:bb26@andrew.cmu.edu)

Deborah E. Gibbons

*Carnegie Mellon University*, [dg4t@andrew.cmu.edu](mailto:dg4t@andrew.cmu.edu)

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## Recommended Citation

Butler, Brian S. and Gibbons, Deborah E., "Values and Knowledge about Computer Mediated Communications: Testing a Model of Social and Broadcast Media Effects" (1995). *AMCIS 1995 Proceedings*. 192.

<http://aisel.aisnet.org/amcis1995/192>

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# Values and Knowledge about Computer Mediated Communications:

## Testing a Model of Social and Broadcast Media Effects

Brian S. Butler  
bb26@andrew.cmu.edu

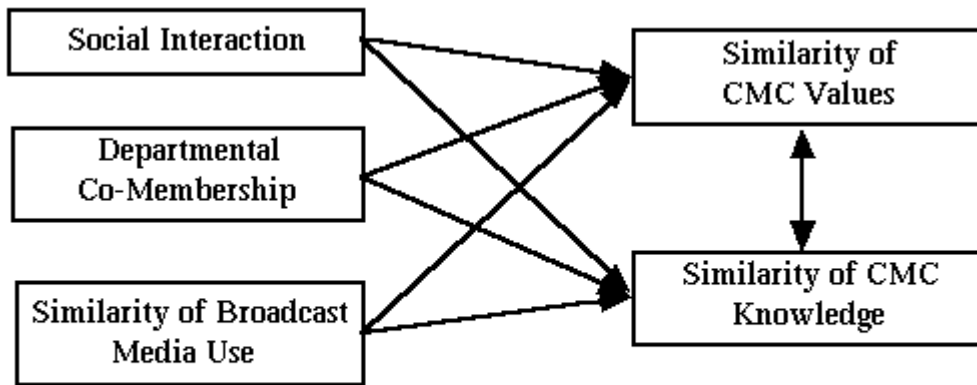
Deborah E. Gibbons  
dg4t@andrew.cmu.edu

Carnegie Mellon University  
Pittsburgh, PA

Many knowledge-intensive organizations, such as educational institutions, technology developers, or professional services firms, depend on the ability of individuals to obtain information and ideas. Use of computer mediated communication (CMC) systems, including electronic mail, commercial on-line services, and the Internet, has the potential to vastly improve information flow. Thus, for many organizations, individuals' ability to obtain knowledge about CMC technology will remain an important issue as new services become available. Attitudes and knowledge can both play a role in adoption of innovations. Therefore it is important to understand how values regarding new technologies develop within organizations. In this paper, we apply existing theories of social influence and learning to these issues. We propose and test a model of the impact of social interaction, department structures, and broadcast media on the spread of knowledge and values regarding CMC systems.

### Theory

It has been suggested that people's attitudes and values develop through social interaction (Salancik and Pfeffer, 1978), evolve within formal departments (Fulk, 1993), and are influenced by exposure to broadcast media. Knowledge regarding innovations may also diffuse through these channels, so each mechanism could contribute to the dissemination of values, of knowledge or of both. In addition, individuals' attitudes and knowledge about CMC may influence each other. The proposed model focuses on understanding which social mechanisms contribute to the spread of knowledge and values about CMC technology within an organization. (Figure 1)



**Figure 1: Model of CMC Value and CMC Knowledge Development at the Dyadic Level**

It has been found that perceptions of an innovation can depend on social interactions (Rogers, 1983). Networks of advice relations are known to support diffusion of new practices. However, it is not well understood whether this is the result of shared knowledge, attitudes, or other kinds of influence. There is some evidence that work-related social interaction impacts the development of values regarding new information technologies (Rice & Aydin, 1991). In addition, information about complex phenomena is shared through informal social contact (Brown and Duguid, 1991). Recent studies have found that advice networks can play various informational roles within organizations. Consequently, it is likely that direct social interactions play different roles in the development of knowledge and of values about CMC systems. This may cause pairs of individuals to develop similar values, similar knowledge, or both.

Many people have found that there are various social influences that operate within groups such as formal departments. Norms that develop over time often become shared among members of a work group. For example, some researchers have argued that socially constructed values regarding CMC technology develop within formal work groups (Fulk, 1993). In addition, departments often place individuals in common environments and require them to complete similar tasks. This commonality is likely to further support the development of shared values and to foster attention to similar information. If people attend to similar information, they should develop similar knowledge. Thus, it is likely that individuals who are members of the same formal departments within an organization will have similar values, knowledge or both.

Finally, broadcast media have been shown to be important in the diffusion of new ideas. Recently, CMC technologies have become more visible in both general audience and specialized broadcast media, making them potentially important sources of information about the technology. It has been recommended that non-experimental studies of social influence should consider the impacts of various media (Marsden & Friedkin, 1994). In addition to providing information about CMC, many media sources, through their editorial policies, explicitly and implicitly encourage a particular view of CMC

technology. Thus, exposure to similar sources from outside the organization may result in similarity of knowledge or values between individuals.

In summary, individuals' knowledge and values may be influenced by many social mechanisms, including direct interactions, formal groups, and broadcast media. Although each of these channels has the potential to transfer both CMC knowledge and values, unique attributes of each may cause them to play different roles in the overall development of values and knowledge within the organization. Thus it is important, for both practical and theoretical purposes, to understand how these social mechanisms affect the development of CMC knowledge and values within organizations.

## **Methods**

The model was tested using survey data from the first phase of a longitudinal study in a twenty year old computer software firm. The survey was distributed to 90 employees using the internal e-mail system, and returned by 64 individuals for a response rate of 72%. To focus on the spread of knowledge and values, not simply individual outcomes, similarities across individuals were analyzed..

The pattern of work-related social interaction was captured using self-report from the survey. Although research suggests that people cannot accurately recall specific interactions, it has been found that they are able to report the general pattern of their social interaction (Freeman, Romney, & Freeman, 1987). The survey asked people to report how often they go to each other person in the organization to discuss work-related issues, in terms of general frequency, and how often each person comes to them. Responses were combined to represent the average level of interaction within each pair.

Department membership represents the formal grouping of employees as recorded in organizational records.

Exposure to similar broadcast media was measured by asking respondents to list which publications they read. The titles listed were matched across all respondents so that pairs of individuals who shared more publications in common received a higher similarity score.

Similarity of CMC knowledge was measured by matching responses to an open question which asked what tools, technologies, and on-line services respondents knew about. As above, the responses were matched so that pairs who shared more knowledge received a higher similarity score. CMC values were measured using a five-item, 7-point scale ( $\alpha = 0.91$ ), and similarity scores were calculated for each pair.

To analyze the model, Multiple Regression Quadratic Assignment Procedure (MRQAP) was used. This nonparametric method, which relies on fewer assumptions than ordinary least squares regression, is robust in the presence of certain systematic interdependencies among the observations that often occur in social interaction data (Krackhardt, 1988). MRQAP performs a standard multiple regression using the independent variables

(matrices) to predict a dependent variable (matrix). This procedure generates a p-value which indicates the likelihood of a computed relationship occurring by chance. For example, a p-value less than .01 indicates that fewer than one percent of correlations produced by random permutations were as extreme as the observed value.

## Results

MRQAP models were tested separately for the two outcome variables, and results are presented in Table 1.

Table 1. Results of Multiple Regression Analysis of the Hypothesized Models<sup>a</sup>

Independent Variable	Similarity of CMC Values		Similarity of CMC Knowledge	
	Hypothesized	Revised	Hypothesized	Revised
Department Co-Membership	0.241***	0.244**	0.097	
Social Interaction	-0.073†	-0.069†	-0.005	
Similarity of CMC Knowledge	0.120*	0.125*		
Similarity of Broadcast Media Use	0.098		0.397***	0.387**
Similarity of CMC Values			0.144*	0.141*

<sup>a</sup>Beta coefficients are unstandardized. Significance was determined by Multiple Regression Quadratic Assignment. \*p < 0.05 \*\*p < 0.01 \*\*\*p < 0.001, †p < 0.1, one-tailed test [All models were significant at p < 0.02]

These results show that departmental co-membership and similarity of CMC knowledge predicted similar CMC values between individuals. Exposure to similar broadcast media was not significantly related to similarity of CMC attitudes. However, social interaction was negatively associated with similarity of CMC values such that two individuals who interact are more likely to have different values about CMC technology than individuals who do not interact.

In contrast to CMC values, CMC knowledge was predicted by the CMC values and exposure to similar broadcast media. Departmental co-membership and social interaction were not significantly associated with shared CMC knowledge.

Together, these results support a model wherein knowledge regarding a new type of technology is derived primarily from sources outside the organization, and attitudes regarding the technology are developed, through various mechanisms, within the organization. Though it is not possible to determine causality with this correlational study, the implausibility of departmental assignments, work-related interaction, and publication selections occurring because of attitudes regarding new CMC technology support the hypothesized direction of influence.

## Discussion

These findings demonstrate that various communication channels can construct values and knowledge about new technologies in different ways. They also show that social interactions, which are generally believed to positively influence values and dissemination of information, can have a null or negative effect on the spread of CMC

values and knowledge. The negative relationship between social interaction and CMC values suggests especially interesting possibilities. CMC technology attitudes may be formed through different mechanisms than other job-related attitudes, which have typically been the focus of research on social influence. Alternatively, the negative relationship could result from work-related interactions with others whose opinions are not respected.

The negative relationship between direct social interaction and CMC values parallels our finding, in two other organizations, that social contact correlated negatively with adoption of e-mail technology (Gibbons & Butler, 1995). These studies, taken together, demand further investigation into the linkages between interaction patterns, values development, and actual use of new CMC technologies.

We have begun to understand some implications of social and media contact for organizational implementation of communications technologies. Future research should examine, in greater detail, the mechanisms whereby social and media influences are impacting values, knowledge, and use of CMC technologies. This study demonstrates that a uniform diffusion model for both values and knowledge can be insufficient or even misleading. Theoretical development of more discerning models, as we have begun here, promises to expand understanding of and strategies for infusion of new values, knowledge, and corresponding use of CMC technologies within organizations.

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