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# The "Voice Effect" in Groups

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## ABSTRACT

This study looks at how collaborative technology, proximity choices, and group size can affect voicing in groups. Results of the study, involving two experiments with 550 participants, show that collaborative technology can improve an individual's desire to voice, instrumental motives to voice, non-instrumental motives to voice, and the opportunity to voice in face-to-face groups. The results also show that the use of collaborative technology can lesson individual voice losses as groups increase in size especially in distributed environments. These findings have important implications in group interactions using technology.

### Keywords

Human Computer Interaction , voice effect, collaboration

## INTRODUCTION

For collaboration to be successful, effective communication between group members is crucial. The importance of communication increases when the exchange of information in verbal or electronic discussions is imperfect. Members must first decide to contribute the information and then have the opportunity to contribute it. Individuals' motivations to voice their opinions may greatly vary within the context of a given work situation or environment (Dennis, Hilmer, and Taylor, 1998). Although businesses have begun to use collaborative technology to improve communication, the HCI impact of collaborative technology on information sharing activities is unclear. Some studies find collaborative technology to enhance information sharing within groups (Dennis, 1996A); others find no effects (Mennecke and Valacich, 1998); others find inhibited information sharing (Hightower and Sayeed 1996).

Given these issues, several research opportunities related to HCI and collaboration emerge. Additional research is needed to study media conditions and social factors that influence how groups perceive and use technology, and the social structures created by collaborative technologies (Yoo and Alavi, 2001).

## LITERATURE

*Voice effect* is the notion that having the opportunity to provide input on a decision will enhance judgments of process fairness (Folger, 1977). Alternative explanations for the *voice effect* are grouped as *instrumental and non-instrumental explanations*.

*Instrumental explanations* claim that voice enhances procedural justice because individuals assume that expressing their views will increase the chances for favorable outcomes. The instrumental perspective explains that voice enhances perceptions of procedural justice because participants hope to influence decision makers to enhance the likelihood of favorable outcomes (Brett, 1986).

*Non-instrumental explanations* focus on informational and symbolic results of procedures (Lind, Kanfer, and Early, 1990) rather than on the ability of procedures to enhance instrumental benefits for voicing individuals. This perspective attributes the voice effect to desires by participants to express their opinions and be listened to, regardless of outcomes (Tyler, 1987). Non-instrumental motives to voice can be divided into two related constructs (Barry and Shapiro, 2000): *Non-instrumental motives to express opinions*, which is the desire to express feelings to a group to feel better, regardless of the outcome; and (2) *non-instrumental motives to vent*, which is the desire to vent opinions, regardless of the outcome.

The *desire to voice* reflects on one's motivation to participate in group processes. A large part of this desire is whether group members believe that they can potentially influence group outcomes (Barry and Shapiro, 2000). Although the impact of voicing opinions likely differs depending on a group's context, one's desire to voice opinions should not vary significantly within a given context.

*Opportunity to voice* is defined as to the degree to which a group allows group members to express their opinions before decisions are made (Barry and Shapiro, 2000).

Social presence is defined as "the degree to which [a] medium facilitates awareness of the other person and interpersonal relationships during the interaction" (Fulk et al. 1990, p. 118). Most studies have operationalized social presence from low to high (Miranda and Saunders, 2003). Electronic and paper-based communication media are generally viewed as low in social presence, while FtF communication is viewed as high in social presence (Miranda and Saunders, 2003).

Variations in social presence occur through both proximity choices and media choices—as distributed groups naturally have less presence than FtF groups.

## HYPOTHESES

FtF groups tend to have high social presence while distributed groups have low social presence (Miranda and Saunders, 2003). The results of distributed groups tend to be diminished by having less media richness and socialization than FtF groups (Burke, and Chidambaram 1999).

Although FtF work is superior to distributed work in terms of social presence, it is not necessary superior in all aspects. Several dozen potential process losses are typical in FtF groups (Nunamaker et al., 1991); however, most research has focused on evaluation apprehension, domination, and production blocking—all of which affect voice.

*Evaluation apprehension* occurs when group members withhold ideas because they fear the ideas they suggest may be criticized or ridiculed by other group members (Diehl and Strobe, 1987), and is stronger in FtF groups. *Domination* occurs when a group member forces his/her will upon other group members (Nunamaker et al., 1991), which is also stronger in FtF groups. *Production blocking* occurs when only one member can communicate at once, which causes the suppression or forgetting of group members' ideas; all of which can require one to focus on remembering a particular idea, while waiting to express it to the group, rather than creating new ideas; and may cause one to listen closely to the ideas of others, rather than creating new ideas (Diehl and Strobe, 1987). This can occur more in FtF because domination is more likely, and dominant people cause group production blocking. Although distributed groups have less social presence than FtF groups, this limitation will likely be counterbalanced by having fewer negative effects from evaluation apprehension, domination, and production blocking than FtF groups.

H1A: The *desire to voice* will be similar for group members , regardless of proximity.

H2A: *Instrumental motives* for voicing will be similar for group members, regardless of proximity

H3A: *Non-instrumental motive*s of *expressing opinions* will be similar for group members, regardless of proximity.

H4A: *Non-instrumental motives* of *venting* will be similar for group members, regardless of proximity.

More social presence in FtF groups should directly translate into more opportunity to voice, because there are more opportunities for interactivity and greater communication bandwidth.

H5A: The *Opportunity* to voice will be greater for F-t-F group members than for dispersed group members.

Collaborative software can have more social presence due to media richness improvements that include support for parallelism, anonymity, group memory (Zigurs and Buckland, 1998), and group awareness (Lowry and Nunamaker Jr. 2003).

*Parallelism* is the ability of group members to contribute information simultaneously without waiting for other group members (Dennis, Wixom, Vandenberg, 2001). *Parallelism* mitigates *production blocking* (Gallupe et al., 1994) by creating more equal participation (Dennis and Garfield, 2003).

*Anonymity* enables group members to contribute to group discussions and collaborations without being identified, and often increases motivation of individual group members to participate (Dennis, Wixom, Vandenberg, 2001). Without anonymity, participants may withhold ideas or comments due to *evaluation apprehension* (Diehl and Strobe, 1987) or may conform to the group majority or leaders' views (Hackman and Kaplan, 1974). *Anonymity* may alleviate conformance by shielding a contributor from a group's reactions (Hayne and Rice, 1997). *Anonymity* can reduce the reluctance of group members to challenge the views of others (Nunamaker et al. 1991).

Collaborative software has been shown to increase group participation. Teams are more participative when those in power choose to listen to and act on a team's interactions, and collaborative software generally increases participation (Dennis and Garfield, 2003). This occurs because of equality provided by anonymity (Dennis and Garfield, 2003) and being able to work in parallel (Dennis et al., 1999).

H1B: The *desire* to voice will be greater in groups using collaborative tools than in non-collaborative tool groups.

H2B: *Instrumental motives* for voicing will be greater in groups using collaborative tools than in non-collaborative tool groups.

H3B: *Non-instrumental motives* of *expressing opinions* will be greater in groups using collaborative tools than in non-collaborative tool groups

H4B: *Non-instrumental motives* of *venting* will be greater in groups using collaborative tools than in non-collaborative tool groups.

H5B: The *opportunity* to voice will be greater in groups using collaborative tools than in non-collaborative tool groups.

Small groups tend to have more social presence than large groups. Increased group size has been shown to increase process losses in verbally interacting groups, either exponentially (Steiner, 1972) or linearly (Bouchard and Hare, 1970). The number of ideas contributed per person decreases sharply as group size increases (Steiner, 1972). Group research involving heuristic evaluation performed with non-collaborative software concludes the optimal

team size for HE is three to five people (Nielsen and Landauer 1993). In this scenario, teams larger than three to five members often report too many duplicate usability issues, have difficulties coordinating, and fail to find enough additional usability issues to justify size increases (Nielsen and Landauer 1993).

Much of the losses that occur as groups increase in size can be attributed to process losses such as *evaluation apprehension* and *production blocking* (Nunamaker et al., 1991). These phenomena should decrease instrumental motives to voice and opportunity to voice. Likewise, a similar decrease should be seen in non-instrumental motives to voice opinions and to vent.

H1C: The *desire* to voice will be greater in groups of three than similar groups of six.

H2C: *Instrumental motives* for voicing will be greater in groups of three than similar groups of six.

H3C: The non-instrumental motive of *expressing opinions* will be greater in groups of three than similar groups of six.

H4C: The non-instrumental motive of *venting* will be greater in groups of three than similar groups of six.

H5C: *Opportunity to voice* will be greater in groups of three than similar groups of six.

## METHOD

### Task / Tools

Participants were asked to perform a heuristic evaluation (HE) task. HE is a group-oriented usability evaluation technique and was chosen because it is efficient, economical, easy for non-experts to understand and perform, and is most effective when performed in group settings (Nielsen and Molich, 1990). The purpose of HE is to evaluate quickly the usability of a system's interfaces during software development, using heuristics for software usability. The evaluation task included evaluating a website and categorizing software bugs. Word™ was chosen as the non-collaborative tool for the control groups. Collaboratus was chosen for conditions B and C because it supports both FtF and distributed group work.

### Treatments

The design of the experiment involved a three-way ANOVA with a 2x2x2 design. The three manipulated conditions include *proximity* (FtF vs. distributed), *tool use* (non-collaborative software, Word™, vs. collaborative software, Collaboratus), and *group size* (three people versus six people).

The control groups performed HE FtF using traditional processes; conducting step one of HE in parallel without awareness of other group member's work. Instead, they recorded individually their bugs using Word™ without knowledge of what bugs other group members were submitting. In step two, control groups discussed FtF the bugs they found and combined them into one document in Word™.

The first treatment performed HE FtF in step one using Collaboratus. This tool allowed participants to see the contributions of others, but did not allow for any direct communication. In step two, the first treatment groups discussed their bugs FtF and combined them into one document in Collaboratus.

The second experimental treatment performed HE in step one in a distributed-synchronous work mode using Collaboratus. Just like the FtF Collaboratus treatment, these groups had no explicit communication capabilities in step one. In step two, these distributed treatment groups had to discuss their bugs and consolidation using the chat features of NetMeeting™.

### Participants

The participants were all members of a 200-level IS class at a large Midwestern university. 300 students were enrolled in the course over two semesters. 550 students volunteered for the two experiment sessions. The first session was conducted with three-member teams. The second session was conducted using six-member teams. In total, 512 students participated, however, 97 of these participants' data was subsequently dropped. 415 students provided demographic data: age (M=20.2, SD=1.9); GPA (M=3.3, SD=.46), years of education (M=13.7, SD=1.2.); gender (57.5 % male, 42.5% female).

### Procedures / Measures

All students were given training on HE in class. Next, students attended their assigned laboratory sessions, where their assigned conditions were executed. A given lab session was dedicated to only one condition. None of the participants were allowed to talk during Step One, and only the control groups and FtF Collaboratus groups were allowed to communicate orally during Step Two. The same facilitator and assistants oversaw each session. All aspects of the session were scripted, timed, and read carefully by the facilitator. Table 1 shows the measures used to evaluate voice.

| Study Measurements | Alpha |
|---|---|
| Desire to Voice | .6341 |
| Instrumental Motives Voice | .7996 |
| Expressing Opinions | n/a. |
| Venting | n/a. |
| Opportunity | n/a. |

**Table 1. Measures and Alphas**

All are from (Barry and Shapiro, 2000), except opportunity from (Tyler, 1994)

## ANALYSIS

The method of analysis was three-way ANOVA on each DV, with proximity, tool, and size as the IV's with alpha=.05. Multiple comparisons were conducted using a Tukey's procedure.

## DISCUSSION OF RESULTS

No significant differences were measured between FtF groups and distributed groups in terms of desire to voice, instrumental motives, expressing, and venting. These results suggest that proximity has no real bearing on desire and motives related to voice. The results also show that FtF groups provide greater opportunity to voice than distributed groups. Yet, large distributed groups have greater voice opportunity than traditional large FtF groups; and even greater opportunity is given to FtF groups using collaborative tools than traditional FtF groups at both sizes. This supports the claim that negative processes losses that often occur in FtF groups may be alleviated by collaborative tools.

No significant differences were shown between non-collaborative-tool groups collaborative-tool groups, in terms of desire and instrumental motives. However, predictions were confirmed that collaborative software would increase expressing, venting, and opportunity. This suggests that participants' desire to voice is too ingrained in one's self-concept to be affected by tool choices, and that participants did not believe that collaborative software would give them more power to influence their groups. However, participants did feel that collaborative software empowered them to express themselves; even though they did not believe they would greatly influence outcomes. Collaborative software also allowed participants more voice opportunity; likely because of parallel work, group awareness, and anonymity.

Participants in large groups had less desire to voice, less expressing, less venting, and fewer opportunities to voice. These results indicate that increases in group size are detrimental to these voice constructs. Finally, there were no significant differences between large and small groups in terms of instrumental motives.

The contribution of this research is to show how variations in social presence in groups (manipulated through proximity, tools, and group size) affect desire to voice, instrumental motives, non-instrumental motives, and opportunity. We showed that distributed work does not negatively affect desire to voice, instrumental- and non-instrumental motives, and that large distributed groups using Collaborative tools had more opportunity to voice than large FtF groups not using Collaborative tools. This provides evidence that distributed work may be more viable than previously believed, when conducted with collaborative software.

Our results also clarify the relationship between desire to voice, instrumental- and non-instrumental-motives. The results of comparing collaborative software teams with traditional software teams suggest that, since desire and instrumental motives remained constant while non-instrumental motives increased, there are additional factors that affect an individual's desire to voice. It appears these additional factors decreased the effect of the increase in non-instrumental motives to voice, so that overall desire remained the same.

Our results show that collaborative tool use is directly related to increased non-instrumental motives, venting, and expressing. This provides a unique understanding and new set of benefits to collaborative software use. Collaborative software may therefore provide distributed groups with the tools and structures needed to provide practical alternatives to FtF interaction, especially in activities which require high levels of participation among group members. The key to collaborative software effectiveness is a well-designed interface. The interface provides the means under which group awareness, parallelism, anonymity, and group memory are provided so that social presence can be increased.

## FUTURE RESEARCH

Given the limited generalizability of these findings, several streams of research should be conducted. Research could explore the applicability of the results in real business settings through field research or through controlled laboratory studies with usability experts working on systems that have specific business purposes. Replication of this experiment with varying levels of expertise and different screens and tasks would also be helpful. It could also be useful to explore the social presence, and subsequent effects on voice, of asynchronous-distributed (AD) settings.

## CONCLUSION

As work with collaborative technology becomes more prevalent, there is an increased need for understanding how such technology can affect team interactions. This study has demonstrated that appropriate choices on technology, proximity, and group size significantly increase the social presence among group members which positively affects the motivations and opportunity of members to voice their opinions. Increased voice helps members feel more satisfied with the group outcome and is associated with increased productivity. Future research should continue to explore ways to improve social presence and voice effects in HCI environments.

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