Using the Stepladder Technique to Facilitate the Performance of Audioconferencing Groups

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Organizational workforces are becoming increasingly dispersed. To facilitate communications among individuals or groups of people located in a number of different locations, teleconferencing technologies, such as audioconferencing, have been developed. The authors examined whether a structural group intervention, the stepladder technique, can facilitate the task performance of 4-person groups (n = 52) when using audioconferencing. Consistent with research conducted on face-to-face groups, the stepladder technique was found to facilitate the decision-making performance of groups interacting via audioconference. The authors postulated that certain structural elements of the stepladder technique compensate for obstacles inherent in nonvisual communications. Supplementary analyses examined best member influence and the existence of order of entry effects into the stepladder process.

Organizational workforces are becoming increasingly dispersed; factors such as corporate globalization, mergers, acquisitions, satellite offices, and telecommuting have made this dispersion both possible and necessary (Kiesler & Sproull, 1992; Venkatesh & Speier, 2000). In 2001, for instance, the U.S. Labor Department reported that 19 million Americans were working either at home or at a satellite office (“Telecommuting Grows”, 2001). At the same time, escalating airfares, increasing hotel costs, tightening travel budgets, and sheer impracticality have made it difficult for employees to communicate face-to-face on a regular basis (Jenkins, 1982). Fortunately, technologies such as teleconferencing have been developed to facilitate communication across locales.

Audioconferencing

Audioconferencing is the use of electronic telecommunications to enable people to interact in spite of physical separation (e.g., Egido, 1990). Teleconferencing can take one of four general forms: video, computer, audio/graphic, and audioconferencing. Of these four general forms, audioconferencing is the most widely used and is proliferating rapidly in organizations (Burkitt, 1991; Harmon, Schnee, & Hoffman, 1995). Audioconferencing simply connects dispersed individuals via basic telephone equipment (e.g., conference call option). Communications are strictly auditory. Audioconferencing can be relatively spontaneous, is not technology intensive, is generally reliable in operation, and is cost-effective (Jenkins, 1982). Furthermore, the lack of travel associated with audioconferencing prevents travel fatigue among employees (Jenkins, 1982). Finally, although audioconferencing can serve as an alternative to face-to-face meetings, it also allows for meetings to take place that would be nearly impossible to convene in person (e.g., a meeting to address an unexpected organizational threat can occur spontaneously among globally dispersed employees). Yet despite its frequent use and important role in facilitating group interactions among dispersed members, little research has examined decision making in audioconferencing groups (Harmon et al., 1995). The present study examines whether the stepladder technique, an intervention initially designed for face-to-face groups, facilitates the problem-solving performance of audioconferencing groups.

Audioconferencing and Group Performance

Theoretically, audioconferencing group performance should be as strong or stronger than groups interacting face-to-face. Harmon et al. (1995) argued that the lack of visual cues and actual physical distance between group members interacting via audioconferencing creates a depersonalized atmosphere, which is thought to lessen members’ social or interpersonal orientation and strengthen members’ task orientation. A task-oriented focus, in turn, promotes behaviors related to team effectiveness, such as increased surfacing of issues and concerns and more meaningful discussion and evaluation of decision alternatives. Harmon et al.’s (1995) theorizing is consistent with related research showing greater task orientation and decreased social orientation in groups interacting
via a text-only modality as compared with face-to-face groups (Culnan & Markus, 1987; Kiesler, Siegel, & McGuire, 1984; Rutter, 1987; Short, Williams, & Christie, 1976). The theorizing, however, is not completely consistent with empirical data examining actual audioconferencing group performance.

To our knowledge, only two studies have examined audioconferencing group performance relative to face-to-face group decision-making performance. One study using 37 ad hoc groups doing a hidden profiles-type task, found no significant differences between audioconferencing and face-to-face groups on decision-making performance and time-on-task (Graetz et al., 1998). Harmon et al. (1995) studied two samples of established student groups working on a business simulation task. In both samples, performance of groups interacting via audioconferencing was roughly the same as groups interacting face to face.

Explaining the Gap Between Theory and Evidence

Given the theoretical arguments for why audioconferencing group performance should be better than face-to-face group performance, the above performance literature is curious. We speculated that the lack of visual cues thought to promote a task orientation may also lead to two decision-making impediments: communication deficits and decreased member engagement in the group’s processes (Hollingshead, 1996). These impediments, in turn, may serve to counterbalance the aforementioned gains associated with increased task orientation.

Communication Deficit

Nonverbal communication plays an important role in interpersonal interaction. Short et al. (1976) documented several functions of nonverbal communication. These functions included indication of mutual attention and feedback. For example, without eye contact, group members may find it difficult to communicate understanding and acceptance (Efran & Broughton, 1966). Furthermore, nonverbal cues facilitate the conveyance of emotions, interpersonal attitudes, and may influence how people interpret the speaker’s feelings, regardless of what he or she says (Mehrabian, 1981). Without the benefits of nonverbal cues, group communication may be less clear and rich, which ultimately may negatively impact group performance. This proposition is consistent with the literature on computer-mediated groups. Compared with face-to-face groups, computer-mediated groups (no visual cues) have reported more difficulty understanding each other (Straus & McGrath, 1994).

Member Engagement

There are many well-documented psychological differences between talking face-to-face and communicating over the phone. An extensive review by Rutter (1987) showed that the absence of visual cues inherent in telephone communication leads to increased social distance. Social distance refers to the degree of physical, social, or psychological closeness among group members (Westie, 1955). Social distance may lead to decreased member engagement in group activities, which may serve to hamper idea generation, critical decision making, and creativity (Dennis & Valacich, 1994).

Interventions to Improve Group Performance

Some researchers and practitioners may argue that the equivalence in group performance found between audioconferencing and face-to-face groups is of no concern. Namely, given the pragmatic gains (e.g., increased convenience, decreased travel costs, etc.) associated with audioconferencing, “breaking even” with regard to performance is acceptable. We take the perspective that it is possible to have both the pragmatic and theoretical performance gains discussed by Harmon et al. (1995) if audioconferencing groups use an appropriate structural intervention, an intervention that by its very nature addresses the communication deficit and decreased engagement limitations mentioned above.

Over the past 30 years, many researchers have attempted to design interventions and techniques to improve group performance. Two structural approaches most commonly discussed in books and articles are the Delphi technique (Dalkey, 1969) and the nominal group technique (Van de Ven & Delbecq, 1971). Recently, another structural intervention called the stepladder technique (Rogelberg, Barnes-Farrell, & Lowe, 1992) has been introduced. Each of these group interventions is designed to affect how group interaction is structured and organized such that the probability of productive group processes is increased and, consequently, group performance is facilitated. The present study examines the stepladder technique in audioconferencing groups. Before discussing why we chose to study the stepladder technique, we will describe the technique, itself, and extant research on the technique.

The Stepladder Technique

The stepladder technique is a group decision-making approach that structures the entry of members into a group. For instance, take the application of the stepladder process to a four-person group. First, a two-person core group is created and begins the discussion of the task by presenting their individual task ideas to each other. When this core group feels as though they understand each other’s ideas, a third member is brought into the core group and presents his or her ideas regarding the task group. The three-person group then discusses the task in a preliminary manner. Finally, the fourth member of the group enters into the discussion. The new member presents his or her individual ideas for the task to the group. Then the group works together to create a final solution. The stepladder technique has four usage requirements. First, each group member must have adequate time to think about the group’s task prior to entering into the core group. Second, upon entry, the member of the group must present his or her solutions to the core group before hearing their preliminary solutions. Third, sufficient time must be allotted to discuss the task when a member joins the core group. Fourth, the group must be completely formed before a final decision can be reached.

Performance gains associated with the stepladder technique have been documented for face-to-face groups. In Rogelberg et al.’s (1992) initial study, each member of the group proceeded through the stepladder process at an experimenter-regulated pace. Results indicated that groups who used the stepladder technique outperformed groups who used a more conventional approach. These findings were later replicated by Orpen (1997). Recently, Rogelberg and O’Connor (1998) allowed groups to self-regulate (i.e., use as much time as needed at each step). Again, stepladder groups outperformed groups employing a conventional approach.
The Stepladder Technique’s Fit With Audioconferencing

The decision to study the stepladder technique within an audioconferencing format was based on group process and “fit” reasons. With regard to process, we believed that the stepladder technique promotes group processes that directly address the communication and member engagement concerns mentioned above. First, in stepladder groups, a quasi-participation mandate exists. Members of the initial interacting dyad feel pressure to participate because only two people are in the group. Entering members are also, in some respects, mandated to participate (the entering member presents his or her ideas to the group before listening to the solutions generated by the other group members). Taken together, it is our contention that these informal participation pressures lead to increased member engagement (i.e., a group member can not help but be involved in the group meeting).

A second stepladder feature, input saliency, addresses the communication issues that arise because of a lack of visual cues (e.g., decreased understanding). The stepladder process requires group members to consistently clarify and re-explain ideas as the core group increases in size. All members wait to hear the entering member’s ideas prior to speaking. Furthermore, after hearing the entering member’s ideas, the other team members share their individual thoughts on the group task. Finally, the goal at each step of the stepladder process, until the final step, is understanding members’ perspectives and thoughts. Taken together, it is our contention that each of these actions works to allay miscommunications and misunderstandings.

There are also fit reasons for using the stepladder technique to facilitate audioconferencing group performance. Rogelberg and O’Connor (1998) argued that, given the structure, organization, and requirements, “the stepladder process may be very appropriate and natural for facilitating and improving teleconferencing groups’ performance” (p. 90). Specifically, the step-by-step group building requirements of the stepladder technique are readily and naturally achieved via current audioconferencing procedures. Imagine a scenario involving a small audioconferencing group. All group members schedule an hour of time for an audioconference. Next, the first two group members call into the audioconference and begin discussing the group task. When ready, they contact their third group member who is in his or her office, perhaps doing other work, but waiting for the call. After a preliminary discussion, they contact their next group member who is in his or her office. As can be seen, the stepladder process takes little coordination (e.g., where to meet). The only upfront organization required involves the scheduling of a block of time and an initial assignment of which members will enter at which steps.

The Present Study

The primary goal of this study is to determine how the stepladder technique affects the performance of audioconferencing groups. We hypothesized that audioconferencing groups who use the stepladder technique will outperform audioconferencing groups interacting in a conventional manner (i.e., all members working together at the same time). The primary justification for this hypothesis stems from the discussion above, that is, that certain characteristics of the stepladder technique appear able to overcome some of the potential limitations of not having visual cues during group interactions. Namely, the participation mandate and input saliency features of the stepladder technique should promote member engagement and communication quality (these claims will be partially examined via a post-task survey). The secondary justification for this hypothesis stems from the literature suggesting that face-to-face groups who use the stepladder technique outperform conventional face-to-face groups. It is important to point out, however, that research on face-to-face groups may have limited generalizability to the audioconferencing realm. Namely, both theoretical models of group effectiveness (input–process–output models in particular) and empirical studies support the notion that group processes have a major impact on group performance (e.g., Gladstein, 1984; Sundstrom, De Meuse, & Futrell, 1990). It seems certain that, to some extent, group processes used in audioconferencing (no visual cues) differ from the processes utilized in face-to-face groups (e.g., Rao, 1995). Because of an alteration of group processes, one cannot simply assume that interventions designed to improve face-to-face groups will improve audioconferencing groups.

In addition to the primary hypothesis, we examined best member influence on group decision quality. In any given group, it is theoretically possible to rank order each group member’s individual thoughts on the task in terms of quality. Ideally, the group member with the best ideas or the most expertise (best members) will have the greatest influence on the development of the group’s final solution. The question addressed in this study is, specifically, do best members in audioconferencing groups who use the stepladder technique exert more or less influence on decision quality than best members in conventional audioconferencing groups? The importance of this second research question stems from two sources. First, research has consistently found that it is essential for a group to be able to recognize expertise and weight member input to the group accordingly (e.g., Bottger, 1984). Second, extant stepladder research, that used face-to-face groups, has suggested that a key to stepladder success is its ability to facilitate expertise recognition. Therefore, this study will help determine whether the best member success factor generalizes to audioconferencing groups who use the stepladder technique.

The final goal concerns order of entry effects. First, we want to gain insight into whether the order in which members are brought into the stepladder process (members in the interacting dyad up to the last entering member) has an affect upon member influence on the final group decision. If order of entry does impact member influence, the ability of the best member to influence the group may be compromised and dependent on when he or she enters the group. Second, does order of entry into the stepladder process impact member perceptions of the group experience? For example, do latter entering members feel less engaged with the group effort than do members in the initial core group? Differential perceptions of the group experience on the basis of order of entry could compromise some members’ willingness to endorse the group decision as well as compromise their willingness to use the stepladder technique for future group deliberations (if relevant).

Method

Participants and Design

Two hundred eight students (50 men) enrolled in an undergraduate sociology class at a large state university participated in the study. Students were randomly assigned to a four-person group, and each group was
randomly assigned to either the stepladder condition \((n = 26 \text{ groups})\) or the conventional condition \((n = 26 \text{ groups})\). Groups completed a problem-solving task and then a post-task survey. Groups in the two conditions did not differ \((p > .05)\) on gender and racial composition or on the proportion of members possessing pre-existing relationships with one another.

**Materials and Measures**

**Problem-solving task.** The problem-solving task used was Johnson and Johnson’s winter survival exercise (1987, p. 110). Participants read a vignette that had them imagine that an airplane in which they were traveling crashed in a remote northern area during the winter. There are 12 items that remain from the crash. Participants rank-ordered the items in terms of their importance for survival. Performance was defined as the sum of the absolute differences between the ranks assigned for each item and those advocated by three wilderness experts. The computed score was subtracted from 100 so that higher scores reflected better quality decisions.

**Post-task survey.** The post-task survey (see Table 1) was designed to assess the extent to which members felt engaged in the group, perceptions of communications, and group cohesion. Member engagement was assessed by using a nine-item index developed by Wicker, Kirmeyer, Hanson, and Alexander (1976). Perceptions of communications were assessed with three general items found on a communications scale developed by Knapp, Ellis, and Williams (1980). Cohesiveness was assessed by using a four-item index developed by Seashore (1954).

**Member influence.** An influence score was calculated for each member in each respective group. Influence was defined as the deviation of the individual rank-ordering of items (prior to group interaction) from his or her group’s final rank ordering of items, summed over the 12 items. Complete individual influence would be reflected by a score of zero \((i.e., \text{a member's item rankings were identical to the group's final solution})\). Past research showed this influence index to be positively related to perceptions of influence, rates of participation, and the content of communications (Botter, 1984; Littlepage & Mueller, 1997).

**Procedure**

When a four-person group arrived at the experimental location, the numbers 1–4 (without replacement) were randomly assigned to participants. In the stepladder groups, these numbers served as the order of entry for participants.

**Stepladder technique.** The experimental procedure that was used was very similar to the procedure used by Rogelberg and O’Connor (1998). Participants proceeded through the stepladder technique at a self-regulated pace. First, the stepladder process, requirements, and the audioconferencing procedure were explained to the participants. Each participant was then given 7 min to complete the experimental task individually. On completion, each participant was escorted to separate rooms (there was a phone in each of these rooms). After each group member was ready, the experimenter called the operator and had Participants 1 and 2 connected to the audioconference. While Participants 1 and 2 were presenting their ideas to each other, Participants 3 and 4 were reading magazines provided to them by the experimenter. When Participants 1 and 2 had finished presenting their ideas to each other, one of the participants informed the experimenter that they were ready for the next member. Participants 1 and 2 were instructed to hang up their phones and wait in their rooms for Participant 3. Participant 3 then received a copy of his or her initial task solution and was given 30 s to review it (it was initially collected to prevent the individual from engaging in further task work while waiting to enter the group). The experimenter then called the operator and had the three group members connected to the audioconference. After connection, Participants 1 and 2 listened to the ideas of Participant 3; Participant 3 then listened to the ideas of Participants 1 and 2. When these group members had completed their preliminary discussion, a participant informed the experimenter that they were ready for the final member. The aforementioned process for Participant 3 was repeated for Participant 4, after which, the group worked together to develop the best solution for the task. So as not to give the impression that any one member was the assigned leader, each member had a blank solution sheet in which to write the final group decision.

**Conventional group approach.** First, the conventional approach \((e.g., \text{work together to derive a solution})\) and audioconferencing procedure was explained to the group members. Each member of the group was then given 7 min to complete the task individually. Next, each member of the group was escorted to separate rooms that contained a phone. Each participant was given a copy of his or her individual solution. So as not to give the impression that any one member was the leader, each member was also given a blank solution sheet to record the group’s final decision. The experimenter called the operator and had all four members of the group connected to the audioconference. Group members were instructed to present their ideas to each other and work together to develop the best solution for the task.

It should be noted that to increase motivation, participants were told that they would be given feedback regarding how their group solution compared with peer and expert solutions. Related to motivation, it is noteworthy that for most participants, this was their first time participating in an audioconference. Participants in both conditions reported anecdotally that

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**Table 1**

**Post-Task Survey Content and Internal Consistency**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Sample items</th>
<th>Response scale</th>
<th>Coefficient alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Member engagement</td>
<td>1. Indicate the extent to which you felt that you worked hard.</td>
<td>5-point extent scale. A value of 5 indicating &quot;to a great extent.&quot;</td>
<td>.92</td>
</tr>
<tr>
<td></td>
<td>2. Indicate the extent to which you were involved with the group task.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3. Indicate the extent to which you contributed to the group.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Communication quality</td>
<td>1. The group had communication breakdowns.</td>
<td>5-point agreement scale. A value of 5 indicating &quot;strongly agree.&quot;</td>
<td>.66</td>
</tr>
<tr>
<td></td>
<td>2. The group had trouble understanding each other.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cohesion</td>
<td>1. Indicate the extent to which the group members felt that they were a part of the group.</td>
<td>5-point extent scale. A value of 5 indicating &quot;to a great extent.&quot;</td>
<td>.80</td>
</tr>
<tr>
<td></td>
<td>2. Indicate the extent to which the group members got along with each other.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
this experience was quite novel and interesting (“Did not feel like an experiment”).

Results

Group Performance

Stepladder groups’ decisions were of higher quality than the conventional groups’ decisions, t(50) = −2.36, p < .05, R² = .10. Furthermore, the decision quality of stepladder groups surpassed the quality of their best member’s individual solution (the individual who had the best individual task performance in each group) 34.6% of the time, whereas this occurred in 19.2% of conventional groups. It is also worth mentioning that before the aforementioned analyses were conducted, an index of group resources of the conventional groups, did not significantly differ from the aggregate group resources of stepladder groups. The aggregate group resources for stepladder groups was created. The aggregate group resources for stepladder groups sources (the average of the four individual solutions to the task) was compared to the average best member decision quality score across conventional groups, t(50) = .50. p > .05. In addition, the average best member decision quality score across stepladder groups did not differ from the average best member decision quality score across conventional groups, t(50) = .51, p > .05. Taken together, this evidence suggests that the groups in the two experimental conditions were equivalent with regard to individual member resources. One area in which the groups were not equivalent concerned time-on-task. Time-on-task was calculated for each group. To compare times across conditions, the index was calculated in people minutes (the aggregate amount of time each individual spent working in the group). Stepladder groups worked longer than conventional groups, t(50) = −5.63, p < .05, R² = .40. Note, because time was measured in people minutes, the time gap appears more substantial (and may be misleading) than we would like the reader to believe. For example, if conventional groups worked an additional 7 min on average (this would equal 28 more people minutes), then time-on-task across conditions would be nearly identical. See Table 2 for a summary of these results.

Post-Task Survey Perceptions by Group Condition

To avoid violation of the independence assumption in subsequent analyses, individual survey perceptions within a group were aggregated to form one group score on each survey construct, respectively. Stepladder group members felt more engaged, t(50) = −1.98, p = .05, ω² = .07, in the group and in their task than did conventional group members. With regard to communication quality, t(50) = −.45, p > .05, and cohesion, t(50) = −.91, p > .05, the perceptions of stepladder group members did not significantly differ from the perceptions of the conventional group members. See Table 2 for a summary of the above results.

Best Member Analyses

The average influence scores of the best members were compared to the average influence scores of the other three members of the group. Across the 26 groups, best members in stepladder groups exerted greater influence (M = 25.54, SD = 10.07) on the group than the other three stepladder group members (M = 33.28, SD = 9.57), t(50) = −3.52, p < .05, ω² = .18. Conversely, the best members in conventional groups did not exert more influence (M = 31.76, SD = 13.24) on the group than the other three members (M = 29.09, SD = 11.07), t(50) = .93, p > .05. Finally, the most influential individual in each of the 52 groups studied was identified (the individual with the lowest influence score for each group). In stepladder groups, of the 26 most influential members, 17 were also the best individual members. In conventional groups, of the 26 most influential members, 7 were also the best individual members.

Order of Entry Analyses

The following analyses focused exclusively on members of stepladder groups. Influence scores of the individuals in the initial core group, group members entering the process at Step 2, and group members entering at Step 3 were not different from each other, F(2, 101) = 1.08, p > .05. Furthermore, order of entry was unrelated to members feeling of engagement, F(2, 101) = 2.11, p > .05, perceptions of communication quality, F(2, 101) = .07, p > .05, and cohesion, F(2, 101) = 1.26, p > .05. See Table 3 for a summary of these results.

Discussion

The present study sought to make two contributions to the literature. First, we hoped to improve audioconferencing practice. Given the rising use of audioconferencing as a practical and effective way of bringing together dispersed employees, we need to know how to facilitate and optimize audioconferencing group performance. Second, we hoped to increase understanding of the stepladder technique (i.e., order of entry effects) and determine its applicability to an audioconferencing modality—a modality that appears well suited to the technique from both a theoretical and practical perspective.

Group Performance

As hypothesized, the stepladder technique was found to facilitate the decision-making performance of groups interacting via audioconference. Furthermore, the effect sizes found in this study were very similar to those identified in face-to-face stepladder groups. Performance gains, however, appeared to come at a cost. Namely, stepladder groups worked significantly longer than conventional groups. The question then becomes, is it time-on-task
that leads to group performance gains? We argue that stepladder groups, by nature, take longer than do conventional groups (Rogelberg & O’Connor, 1998). However, time itself cannot be credited solely for the success of the stepladder groups. If time were a confound, then conventional groups who worked longer on the task should outperform those conventional groups who spent little time on the task. This was not the case. Despite a large amount of variability (see Table 2), time-on-task was unrelated to group performance in the conventional condition, \( r(24) = .09, p > .05 \), total time-on-task was also not related to decision quality in stepladder groups, \( r(24) = .08, p > .05 \). Furthermore, in an additional analysis, we isolated those stepladder groups working below the median amount of time that stepladder groups typically worked together \( (n = 12) \), and we isolated those conventional groups working above the median amount of time that conventional groups typically worked together \( (n = 12) \). After doing so, the groups were nearly identical on time spent on task. Although the reduced sample size prevents a meaningful inferential test, stepladder group performance scores \( (M = 56.67) \) were descriptively higher than conventional group decision scores \( (M = 52.58) \) by nearly the same margin as what was found in the overall sample. Taken together, it does not appear that time-on-task confounds the stepladder success findings. Instead, it raises the pragmatic issue of whether the performance gains associated with the use of the stepladder technique are worth the extra time. The answer to this question must be made in reference to a specific situation. For example, groups under extreme time pressures should probably not use the stepladder technique. However, in other cases, we would argue that the extra time spent using the stepladder technique \( (7 \text{ min on average in this study}) \) is worthy of the nearly 1 standard deviation gain in performance quality.

Questions About the Stepladder Technique

Three pressing questions emerge for future research. Why does the technique work? Will our findings using ad hoc student groups generalize to the world of work? Will employees want to use the stepladder technique if given the choice?

Why does the technique work? This study was undertaken with the belief that it is essential to know if the stepladder technique works in a particular modality before thoroughly probing why the technique is effective. Therefore, whereas this study succeeded in meeting its goal of identifying an intervention to improve the performance of audioconferencing groups, it did not systematically identify reasons for its success. We do postulate that certain structural elements of the stepladder technique are able to compensate for obstacles inherent in nonvisual communications \( (i.e., \text{ misunderstandings and decreased member engagement}) \). Namely, we believe that the participation pressures inherent in the stepladder process make it difficult for members not to be engaged in the group and its task \( (\text{the survey data provide some evidence for this contention}) \). Further, the stepladder process requires group members to consistently clarify and re-explain ideas as the core group increases in size, thus addressing the communication clarity concerns to some extent \( (\text{the survey data did not provide evidence for this contention}) \). However, to really understand the determinants of stepladder success, research needs to move beyond a survey assessment of group processes and instead use a video-based process-coding methodology. This approach would also be useful in determining whether the keys to stepladder success are modality specific or overarching \( (\text{despite the obvious process differences between modalities}) \). It is certainly noteworthy that the best member influence explanation forwarded in previous face-to-face stepladder research \( (\text{stepladder technique facilitates expertise recognition}) \) received additional support in this study.

Will it generalize to the world of work? A common critique of most lab-based group research is whether it will generalize to the world of work where real employees are doing real tasks. Given some research suggesting that the same results cannot be expected to occur across student groups in simulated meetings and in already established groups in organizations \( (\text{Harmon et al., 1995}) \), this is obviously an important empirical question. We would argue, however, that the student groups studied here are perhaps analogous to many temporary ad hoc groups \( (e.g., \text{project teams}) \) found in industry. Furthermore, we believe that data collected from student audioconferencing groups will generalize more readily to the workplace than will data collected from student face-to-face groups. Namely, a common external validity critique levied against student group data is that participants lack history together. Although a valid concern, we believe that naturally occurring audioconferencing groups often lack history together as well. Namely, audioconferencing typically occurs when employees are not in the same proximity of one another \( (e.g., \text{different work sites}) \). As a result, like student groups, an established history may be the exception rather than the rule in ad hoc audioconferencing groups \( (\text{this would probably not be the case for face-to-face groups}) \). Therefore, although additional research is needed to establish the external validity of our findings, we are hopeful that our data will generalize.

Will employees want to use the technique? Research should systematically examine member reactions and willingness to use the stepladder technique. Regardless of the supportive research, if employees do not want to use the technique or are unwilling to continue to use it over time, a pragmatic problem exists. It is certainly encouraging that the order of entry into the stepladder process did not appear to be related to member influence, perceptions of the group, and perceptions of cohesion. Namely, it would be extremely problematic from a technique buy-in perspective if either the early, middle, or latter entering members felt like second-class group members or did not perceive the group experience favorably.

Table 3
Order of Entry Analyses for Stepladder Groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Members in initial core group</th>
<th>Members entering at Step 2</th>
<th>Members entering at Step 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( M )</td>
<td>( SD )</td>
<td>( M )</td>
</tr>
<tr>
<td>Influence scores ( a )</td>
<td>32.02</td>
<td>7.31</td>
<td>28.77</td>
</tr>
<tr>
<td>Member engagement ( b )</td>
<td>4.29</td>
<td>0.51</td>
<td>4.06</td>
</tr>
<tr>
<td>Communication quality ( b )</td>
<td>4.45</td>
<td>0.61</td>
<td>4.42</td>
</tr>
<tr>
<td>Cohesion ( b )</td>
<td>4.60</td>
<td>0.44</td>
<td>4.45</td>
</tr>
</tbody>
</table>

\( a \) Lower scores reflect greater influence. \( b \) Scores ranged from 1 to 5, with 5 indicating the highest level of endorsement.
Conclusion

Given that organizations establish groups to address key issues and problems and that these groups can, and do, interact via audioconference at times, it is essential that these groups make the best possible decisions regardless of the modality in which their meeting takes place. Without good decisions, individual, team, and organizational effectiveness can be compromised. The findings from this study support the use of the stepladder technique as a mechanism for facilitating and enabling audioconferencing groups to achieve success. At the same time, the stepladder technique seems to fit naturally and easily with an audioconferencing format; the implementation of the stepladder intervention to an audioconferencing format is seamless and relatively unobtrusive. Despite stepladder success, we do not interpret our data to mean that the success of groups may be substantively improved to the extent that a mindset of choosing the right tool for the situation is adopted as opposed to the mindset that the conventional approach to group decision making is the one and only tool at a group’s disposal.

References


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