# Effectiveness of Six Meeting Venues to Solve Problems and Generate Unique Ideas

## *An Empirical Comparison*

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If solving problems or generating high quality ideas are among your primary meeting goals, which of the many meeting modes available in today's technological world should you choose to achieve optimal success? Face to face? Teleconference? Audio and video conference? Text messaging? Asynchronous or synchronous? With or without collaborative systems? This research brief addresses these questions.

My previous research briefs addressed the effectiveness of six meeting modes toward selected validated effectiveness factors. The comprehensive, long-term study uses mixed research methods to address the effectiveness of six different meeting venues to (1) solve problems, (2) attend to group processes, (3) address leadership factors, and (4) achieve bottom line and organizational goals. Previous research briefs (1) summarized pertinent literature, objectives and methods used in the comprehensive, long-term research study (McAlister-Kizzier November, 2009), (2) provided results of the quantitative research that addressed bottom line and organization factors (October, 2009), and (3) summarized the qualitative analysis of all major factors.

Study subjects include facilitators, participants and observers of the meetings, providing readers a 3-D perspective of the effectiveness of each meeting mode. In additional the mixed research methods enhance the insight derived from the results. The ultimate purpose of this work is to design useful models to help meeting facilitators conduct the most effective meetings based on their meeting goals. As the study progresses, additional venues and data will be reported in refereed scholarly outlets as well as in this research brief. All results shared in these research briefs have been previously published in a blind peer refereed scholarly journal or proceeding. Readers who desire to read more detail can review my work listed in the references. As in past research briefs, a brief summary of this research is linked to a longer summary that displays detailed research results. Comments from practitioners and researchers on the Facilitate Proceedings blog, is, as always, encouraged and appreciated. All comments will be responded to and taken into consideration to refine this continuing research stream.

The current research brief discusses quantitative analysis of the problem solving construct. The problem solving construct addressed how effectively each meeting mode enabled facilitators to (1) structure and solve problems and (2) to produce unique ideas of higher quality. The construct (both factors combined) and each of the two problem solving factors

were analyzed independently. Perspectives from facilitators and participants are summarized.

The following six facilitation modes are addressed:

**1 = Face to Face without CS (Collaborative systems)**
**2 = Face to Face with CS**
**3 = Audio only (speaker phone) with CS**
**4 = Audio and video (web cam) with CS**
**5 = Synchronous text web with CS**
**6 = Asynchronous text web with CS**

## *Overall Problem Solving*

First, combined data from 609 participants and facilitators related to the problem solving construct were consolidated for statistical analysis. The problem solving construct combined perceptions of facilitators and participants toward two variables: (1) to what extent they felt the meeting venue was structured and focused on problem solving and (2) to what extent they felt the meeting venue produced unique ideas of high quality.

Table 1 shows descriptive statistics by meeting mode for the problem solving construct and the two problem solving factors. As summarized in Table 1, for the problem solving construct, participants and facilitators identified face to face with CS as the most effective mode (4.3824) to achieve overall problem solving. The next most effective mode to achieve the goal of problem solving was audio and video with CS (web cam) (3.9063). The next most effective mode was face to face without CS (3.8014), followed by asynchronous text messaging with CS (3.587) and audio (speakerphone) with CS (3.4737). The least effective mode to achieve problem solving was synchronous text messaging with CS (3.4154). .

To further understand the significance of these results, ANOVA was conducted. ANOVA found significant differences at .05 (.000) among facilitation modes based on the problem solving construct, prompting post hoc tests. Tukey HSD and Bonferroni post hoc tests (see Table 2) pinpointed where significant differences in effectiveness among the six facilitation modes were discovered. Post hoc analyses found significant differences in effectiveness for the problem solving construct between face to face without CS and both face to face with CS and synchronous text messaging with CS. These results suggest that facilitators and participants perceived face to face with CS to be significantly more effective than face to face without CS for problem solving (-.581, .000). However, facilitators and participants reported face to face without CS to be more effective for problem solving than synchronous web with CS (.385, .015/.018). In addition to finding face to face with CS more effective for problem solving than face to face without CS, significant differences were reported between face to face using CS and each of the other modes studied.

In each case, as illustrated in Table 2, face to face with CS was found significantly more effective than the other modes for problem solving. Significance was reported for audio only speakerphone with CS at .20333, .000, audio and video web cam with CS at .12444, .002, synchronous text messaging with CS at .96697, .000, and asynchronous text messaging

with CS at .79540, .000. A significant difference (.49087, .012/.014) was found between audio and video web cam with CS and synchronous text messaging with CS. That is, problem solving was more effective in meetings conducted with the web cam enabled by CS than with synchronous text messaging using CS.

**Table 1**
**Problem Solving Construct and Factors**
**Participant and facilitator factors mean comparison by facilitation mode (N=609)**

**Highly effective = 5**
**Least effective = 1**

| **Facilitation Mode** | | **1- Face to Face without CS** | **2- Face to Face with CS** | **3 Audio only (speaker phone) with CS** | **4 Audio and video (web cam) with CS** | **5- Synchro-nous text messaging with CS** | **6- Asynch-ronous text messaging with CS** |
|---|---|---|---|---|---|---|---|
| **Problem Solving Construct** | **Mean**<br>**SD**<br>**N** | 3.8014<br>.84562<br>214 | 4.3824<br>.53115<br>153 | 3.4737<br>.73548<br>19 | 3.9063<br>.88585<br>64 | 3.4154<br>1.06275<br>65 | 3.5870<br>1.01258<br>92 |
| To what extent do you feel this medium . . . | | | | | | | |
| is structured and focused on problem solving? PSFOCUS<br>N = 607 | **Mean**<br>**SD**<br>**N** | 3.9159<br>.86259<br>214 | 4.3203<br>.60321<br>153 | 3.5263<br>.84119<br>19 | 3.9531<br>.88065<br>64 | 3.4000<br>1.14291<br>65 | 3.4239<br>1.10178<br>92 |
| Has the ability to produce unique ideas of higher quality? PSUNIQID<br>N= 609 | **Mean**<br>**SD**<br>**N** | 3.6869<br>1.03467<br>214 | 4.4444<br>.65784<br>153 | 3.4211<br>.76853<br>19 | 3.8594<br>1.02147<br>64 | 3.4545<br>1.13926<br>66 | 3.7634<br>1.11704<br>93 |

**Table 2**
**ANOVA Posthoc Tukey HSD and Bonferroni facilitation mode comparisons*****
**Problem Solving Construct N=609**

**1 = Face to Face without CS**
**2 = Face to Face with CS**
**3 = Audio only (speaker phone) with CS**
**4 = Audio and video (web cam) with CS**
**5 = Synchronous text messaging with CS**
**6 = Asynchronous text messaging with CS**

| Facilitation Mode | Mean Difference | Std. Error | Tukey HSD/ Bonferroni<br><br>Sig. (.05) |
|---|---|---|---|
| 1–2 | -.58095(*) | .08850 | .000/.000 |
| 1–3 | .32772 | .20011 | .574/1.000 |
| 1-4 | -.10485 | .11909 | .951/1.000 |
| 1-5 | .38602(*) | .11839 | .015/.018 |
| 1-6 | .21445 | .10421 | .311/.601 |
| 2-3 | .90867(*) | .20333 | .000/.000 |
| 2-4 | .47610(*) | .12444 | .002/.002 |
| 2-5 | .96697(*) | .12376 | .000/.000 |
| 2-6 | .79540(*) | .11028 | .000/.000 |
| 3-4 | -.43257 | .21839 | .355/.721 |
| 3-5 | .05830 | .21801 | 1.000/1.000 |
| 3-6 | -.11327 | .21065 | .995/1.000 |
| 4-5 | .49087(*) | .14720 | .012/.014 |
| 4-6 | .31929 | .13606 | .177/.289 |
| 5-6 | -.17157 | .13545 | .803/1.000 |

*The mean difference is significant at the .05 level

**The table displays only one set of statistics for each possible relationship among the modes, thereby eliminating the redundancy of inverse identical relationships

Subset clusters are useful to understand significant difference among the meeting modes. As illustrated in Table 3, Tukey HSD reported face to face using CS clustered in a subset by

itself, with a significantly more positive score for the problem solving construct. Table 3 also reports synchronous text messaging using CS was less effective in solving problems than the other five facilitation modes, to the point of being an outlier.

**Table 3**
**Problem Solving Construct by facilitation mode**
**Mean summary by facilitation mode, giving subsets**
**Tukey HSD (a, b)**
**N = 609**

| Facilitation Mode Description | Mode Code | N | Subset 1 | Subset 2 | Subset 3 |
|---|---|---|---|---|---|
| Synchronous text web with CS | 5 | 65 | 3.4154 | | |
| Audio with CS | 3 | 19 | 3.4737 | 3.4737 | |
| Asynchronous text web with CS | 6 | 92 | 3.5870 | 3.5870 | |
| Face to Face without CS | 1 | 214 | 3.8014 | 3.8014 | |
| Audio and Video with CSS | 4 | 64 | | *3.9063 | |
| Face to Face with CS | 2 | 153 | | | *4.3824 |
| | Sig. | | .138 | .066 | 1.000 |

Subset for alpha .05

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 56.754.

b The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

To summarize findings related to the problem solving construct, ***when the goal of the meeting is to achieve effective problem solving, face to face with CS was significantly more effective than any other meeting venue and synchronous text with CS was significantly less effective than all other meeting modes.***

Results of analysis for the first problem solving factor, focus on problem solving, are discussed next.

## Focus on Problem Solving

Descriptive statistics in Table 1 indicate the most effective mode for structuring and focusing upon problem solving was face to face with CS (4.32), followed by audio and video with CS (3.95) and face to face without CS (3.92). Less effective modes for this factor were audio only with CS (3.53) and asynchronous text messaging with CS (3.42). The least effective mode was synchronous text messaging with CS (3.40). Participants and facilitators scored all modes above average in effectiveness for this problem-solving factor.

To further investigate the significant differences among facilitation venues, ANOVA with post hoc Tukey HSD and Bonferroni analyses were conducted for the problem solving focus factor. ANOVA discovered a significant difference among facilitation venues for this factor at .05 (.000); therefore post hoc analyses were conducted. These analyses, reported in Table 4 found significant differences (.05) in effectiveness exist between face to face without CS and three facilitation modes: face to face with CS (-.40437, .000), synchronous text messaging with CS (.51589, .001), and asynchronous text messaging with CS (.49197, .000). This means that face to face without CS is significantly less effective than face to face with CS and significantly more effective than either of the text messaging modes for achieving focus in problem solving. Significance was likewise found between face to face with CS and audio only with CS (.79395, .003/.004). Post hoc analysis also suggested statistical significance between face to face with CS and each text messaging venue (synchronous at .92026, .000; and asynchronous at .89635, .000). Table 5 illustrates the significant clusters discovered in this analysis.

These results suggest that if the goal is to focus problem solving, audio with CS and both text messaging venues are not as effective as face to face with CS. Significance was furthermore reported between audio and video with CS and both text messaging venues at .55313, .005/.006 for synchronous and .52932, .003/004 for asynchronous. These results indicate that, when compared with audio and video with CS, both text messaging approaches are significantly less effective to achieve problem solving focus.

**Table 4**
**Comparison of the Effectiveness of Six Facilitation Venues**
**Focus Factor in the Problem Solving Construct**
**ANOVA with Posthoc Tukey HDS and Bonferroni**
**PSFOCUS**
**N= 606**

**1 = Face to Face without EMS**
**2 = Face to Face with EMS**
**3 = Audio only (speaker phone) with EMS**
**4 = Audio and video (web cam) with EMS**
**5 = Synchronous text messaging with EMS**
**6 = Asynchronous text messaging with EMS**

| Facilitation Mode | Mean Difference | Std. Error | Sig. (.05)<br><br>Tukey HSD /Bonferroni |
|---|---|---|---|
| 1–2 | -.40437(*) | .09357 | .000/.000 |
| 1–3 | .38957 | .21157 | .440/.991 |
| 1-4 | -.03724 | .12592 | 1.000/1.000 |
| 1-5 | .51589(*) | .12517 | .001/.001 |
| 1-6 | .49197(*) | .11018 | .000/.000 |
| 2-3 | .79395(*) | .21498 | .003/.004 |
| 2-4 | .36714 | .13157 | .060/.081 |

**Table5**
**Tukey HSD (a,b)**
**Means for groups in Homogeneous subsets based on facilitation mode by** Focus Factor in the Problem Solving Construct
**N = 609**

**1 = Face to Face without CS**
**2 = Face to Face with CS**
**3 = Audio only (speaker phone) with CS**
**4 = Audio and video (web cam) with CS**
**5 = Synchronous text messaging with CS**
**6 = Asynchronous text messaging with CS**

| Facilitation Mode | N | Subset for alpha = .05 | | |
|---|---|---|---|---|
| | | 1 | 2 | 3 |
| 5 | 65 | 3.4000 | | |
| 6 | 92 | 3.4239 | | |
| 3 | 19 | 3.5263 | 3.5263 | |
| 1 | 214 | | 3.9159 | 3.9159 |
| 4 | 64 | | 3.9531 | 3.9531 |
| 2 | 153 | | | 4.3203 |
| Sig. | | .974 | .106 | .145 |

a Uses Harmonic Mean Sample Size = 56.754

b The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

In summary, participants and facilitators reported that the most effective meeting venue when focus on problem solving is important is face to face with CS. The second choice to achieve this goal is audio and video with CS. Although all modes studied were reported to be above average in effectiveness for this variable, the text messaging with CS modes were reported to be the least desirable to achieve the focus factor in problem solving.

Results for the second problem solving factor (ability to produce quality unique ideas) are discussed next.

## *Generation of Unique Ideas*

As illustrated in Table 1, the most effective mode to produce unique ideas of higher quality was face to face with CS (4.44), followed by audio and video with CS (3.86), asynchronous text messaging with CS (3.76), and face to face without CS (3.69). The least effective modes for this problem solving factors were synchronous text messaging with CS (3.45) and audio only with CS (3.42). Participants and facilitators scored all facilitation modes as above average for this problem solving factor.

ANOVA revealed a significant difference at the .05 level (.000) among the meeting facilitation venues prompting post hoc analysis to determine where the differences lie. Post hoc Tukey HDS and Bonferroni analyses are reported in Table 6. When analyzed for the ability to produce unique ideas of higher quality, face to face with CS was significantly more effective than face to face without CS (.75753, .000). Significant differences for this factor were also found between face to face with CS (the most effective mode for this factor) and every other facilitation venue studied, as follows: audio with CS (1.02339, .000), audio and video with CS (.58507, .001), and both synchronous (.98990, .000) and asynchronous text messaging with CS (.68100, .000). Table 7 displays the results of homogeneous mean scores, illustrating face to face with CS emerged in a cluster by itself in post hoc analysis.

**Table 6**
**Participant and Facilitator**
**Has the ability to produce unique ideas of higher quality?**
**PSUNIQID**
**N=608**

**1 = Face to Face without CS**
**2 = Face to Face with CS**
**3 = Audio only (speaker phone) with CS**
**4 = Audio and video (web cam) with CS**
**5 = Synchronous text messaging with CSS**
**6 = Asynchronous text messaging with CS**

| Facilitation | Mean | Std. Error | Sig. (.05) |
|---|---|---|---|

| Mode | Difference | | Tukey HSD/ Bonferonni |
|---|---|---|---|
| 1–2 | -.75753(*) | .10287 | .000/.000 |
| 1–3 | .26586 | .23260 | .863/1.000 |
| 1-4 | -.17246 | .13844 | .814/1.000 |
| 1-5 | .23237 | .13681 | .533/1.000 |
| 1-6 | -.07652 | .12068 | .988/1.000 |
| 2-3 | 1.02339(*) | .23635 | .000/.000 |
| 2-4 | .58507(*) | .14465 | .001/.001 |
| 2-5 | .98990(*) | .14310 | .000/.000 |
| 2-6 | .68100(*) | .12776 | .000/.000 |
| 3-4 | -.43832 | .25386 | .515/1.000 |
| 3-5 | -.03349 | .25298 | 1.000/1.000 |
| 3-6 | -.34239 | .24463 | .727/1.000 |
| 4-3 | .43832 | .25386 | .515/1.000 |
| 4-5 | .40483 | .17046 | .167/.268 |
| 4-6 | .09593 | .15781 | .990/1.000 |
| 5-6 | -.30890 | .15639 | .358/.731 |

- The mean difference is significant at the .05 level

**Table 7**
**Tukey HSD (a,b)**
**Means for groups in Homogeneous subsets based on facilitation mode by "has the ability to produce unique ideas of higher quality?"**
**(PSUNIQID) in the Problem Solving Construct**
**N = 609**

**1 = Face to Face without EMS**
**2 = Face to Face with EMS**
**3 = Audio only (speaker phone) with EMS**
**4 = Audio and video (web cam) with EMS**
**5 = Synchronous text messaging with EMS**
**6 = Asynchronous text messaging with EMS**

| Facilitation Mode | N | | |
|---|---|---|---|
| | | 1 | 2 |
| 3 | 19 | 3.4211 | |
| 5 | 66 | 3.4545 | |
| 1 | 214 | 3.6869 | |
| 6 | 93 | 3.7634 | |
| 4 | 64 | 3.8594 | |
| 2 | 153 | | 4.4444 |
| Sig. | | .155 | 1.000 |

a Uses Harmonic Mean Sample Size = 56.942

b The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

These results concluded that although all meeting modes were perceived as above average to generate unique ideas of high quality, the mode that outshines the others, according to the participants and facilitators in this study, is face to face using collaborative systems.

## Summary

*Any of the six meeting venues studied can achieve above-average results when the goal of your meeting is to focus on solving problems and/or to produce unique ideas of high quality. However, significantly higher quality meeting results can be achieved for (1) overall problem solving, (2) focusing on problem solving and (3) producing unique ideas of high quality when a collaborative system (CS), such as Facilitate.com, is used in a face to face setting. If a face to face meeting with CS is not cost feasible, the next highest quality can be achieved using audio and video (web cam) with CS. The audio and video with CS method can achieve economic benefits across geographic areas and time zones; however, the effectiveness of the problem solving goal will be significantly lower than that achieved with face to face with CS. These results furthermore suggest that audio only with CS, text messaging (asynchronous and synchronous) with CS and face to face without CS are significantly less effective and are not recommended when the goal of the meeting is to achieve quality problem solving.*

More detail can be found in previous and forthcoming submissions by this author to the Facilitate.com research briefs and by reviewing the author's published work listed in the references. To retain research integrity, the researcher is conducting these studies without sponsorship/support from Facilitate.com or any organization that markets collaborative meeting systems. After the research was analyzed and a viable data set was reached, suggesting strong benefits to the adoption of collaborative systems, the researcher chose this Facilitate.com publication outlet to not only share the research results with the practitioners but to also foster continued frequent dialogue with practitioners who are best equipped to inform continued refinement of this work. Morehead State University (MSU)

and the MSU College of Business & Public Affairs (CB&PA) has supported this research through funded summer grants, research sabbaticals, continued approval through the institutional review board, and funding for Facilitate.com software and support. CB&PA selected FacilitatePro as its preferred collaborative system.

Upcoming research briefs will address the effectiveness of the meeting venues to achieve optimal group and leadership processes. In addition, in future research briefs, additional venues and data sets will be analyzed quantitatively, qualitatively and triangulating the results using mixed methods. Of particular interest in this research stream is learning how to most effectively conduct meetings globally, across time and space, using the latest technological tools.

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