Examining the Process of Electronic-JAD

Erran Carmel
The American University

Joey F. George
Florida State University

Jay F. Nunamaker, Jr.
University of Arizona

One of the more common approaches to involving users in the system development process is called JAD (Joint Application Development). The JAD approach is based on highly structured, facilitated meetings and, as such, has the potential to be supported by Electronic Meeting Systems (EMS). A multiple-site field study was conducted in which JAD meetings—both traditional and electronic—were observed. Some differences between traditional JAD and JAD supported by EMS were found. The quality of group member participation was more equal in supported JAD meetings. Some supported JAD meetings lacked the session discipline of traditional JAD. Conflict resolution (closure), emphasized in traditional JAD, was not achieved in several electronic sessions. Session management activities—the responsibility of the facilitator for integration of the session with other life cycle activities—was weak in some electronic sessions.

One of the leading methodologies for user involvement and user participation in the system development process is called JAD. JAD (Joint Application Development) involves users in a series of structured meetings which, traditionally, have benefitted from little explicit computer support. Yet, given the highly structured nature of JAD meetings, and the prominent role of the JAD facilitator, it appears that JAD meetings have the potential to benefit from additional computer support. Our research question is how and whether JAD can benefit from computer support in the form of Electronic Meeting Systems (EMS)(See Figures 1 and 2). The study we conducted to investigate this question can be classified as descriptive, as there is no theory of JAD and no overarching theory of EMS. Dubin (1978) argues that “...there is a fundamental place for accurate description in any science. Description...provides the input for developing units of a theory, its laws of interaction, the system states, and the boundaries of the model (p. 219).” Our findings are a starting point for the development of a theory of meetings, supported by computing and not, that includes structured processes like JAD. Our study also has practical implications — similar to those of Olson and Olson (1991) — for identifying opportunities for successful computer support.

We begin with a literature review of the intersecting methodologies and technologies, describe our field study approach, and discuss our observations of JAD sessions for four broad process-related areas of interest.

Literature Review

Our review of literature and practice encompasses several intersecting fields: JAD, Electronic Meeting Systems, and the focus of our research, Electronic-JAD.

Joint Application Development

JAD came about because of a pragmatic realization that more intense user participation would lead to better systems.

Manuscript originally submitted September 22, 1993; Revised April 13, 1994; Accepted June 8, 1994 for publication.
Figure 1: A typical JAD room  (Adapted from Wood & Silver, 1989)

Figure 2: A typical electronic meeting room
The practical operationalization of increased user involvement is to focus on meetings (sessions) in which all the “involvement” (dialogue) takes place. The JAD user meeting then becomes the event around which the rest of the system development activities revolve. The approach is participatory in that the users are queried more (and hence involved more) than users typically were before the advent of JAD. The innovation in the JAD approach, as it has developed today, is that the user meeting is structured, disciplined, and is a foundation of the Systems Development Life Cycle (SDLC). JAD is said to lead to increased quality, reduced costs, and life cycle time reduction.

JAD originated at IBM in the late 1970s and began attracting broad industry-wide attention only several years later (Rush 1985; EDP Analyzer 1986; Gill 1987). The interest in the JAD approach has remained exclusively in industry where (by extrapolating figures from various sources) we estimate that there have been well over ten thousand JAD-like meetings. The JAD approach is instilled in its practitioners through manuals (Guide 1986), books (Wood and Silver 1989; August 1991; Martin 1991), and continued exposure in the trade press (Martin 1990; Andrews 1991; Crawford 1991; Hill 1991). JAD is one of Yourdon’s “eleven silver bullets” (Yourdon 1992) and is the fundamental methodological basis for James Martin’s Rapid Application Development (Martin 1991). A summary of reported benefits can be found in Carmel, Whitaker, and George (1993).

There is no one structure or definition for JAD. Over the years JAD has evolved to become a framework for “how to run a meeting.” Users attend the meeting to define or design an information system. The JAD approach is both a technique and a methodology. It is a technique because it is a structure for conducting a design meeting with user participants. It is a methodology because when introduced into the SDLC, JAD sessions/workshops/meetings form the core around which all the activities revolve.

The JAD approach emphasizes structure and agenda. This is evident in the JAD literature that reads somewhat like cookbooks (IBM 1986; Guide 1986; Wood and Silver 1989; August 1991). Everything is explained in great detail: “to do” lists are included, as are copies of useful forms.

There are four necessary building blocks for a JAD session:

1. **Facilitation.** A designated leader (or leaders) manages the meeting. Most JAD practitioners consider the meeting leader to be key to process success, even above the act of gathering the users in one place, the raison d’être of JAD. The facilitator (a member of neither the IS team nor the user group) is specifically trained to lead such meetings. The facilitator should have training in group dynamics (or an instinctive flair), and in systems development methodologies. She is responsible for all activities: the agenda, the discussion, and documentation of the session results. She carefully controls all discussions, guiding, interrupting and cutting off discussion where necessary.

2. **Agenda setting/structure.** The meeting must have a plan of action.

3. **Documentation.** A designated person (or several people) carefully documents everything in the meeting. He is often referred to as a scribe. Lists are rigorously maintained.

4. **Group Dynamics.** Group dynamics techniques such as those described in Doyle and Straus (1976) are used for inspiring creativity (e.g., brainstorming), resolving disagreements (e.g., airing facts, documenting them as “issues,” taking notes), and handling speaking protocols (e.g., enforcing “one conversation at a time”).

A typical JAD session early in the SDLC has participants compiling a list of assumptions, constraints and open issues; targeting specific people and organizations for tasks; and constructing timelines. Lists and other text are often maintained on wall charts, such that the walls end up being covered with flip-chart paper. Some facilitators encourage the users to roam around the room and fill in the wall charts (DEC 1990), while the more traditional techniques allow only the facilitator to control the marker. The use of creative visual aids is broadly recognized as helpful to assist users, many of whom are IS designers.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>“Classic” design meeting</th>
<th>JAD meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td>User involvement in meeting</td>
<td>• Low to non-existent. Usually only IS designers are involved.</td>
<td>• Intensive involvement, but problems of training and understanding exist.</td>
</tr>
<tr>
<td>User involvement in between meetings</td>
<td>• Low to non-existent</td>
<td>• Low</td>
</tr>
<tr>
<td>Meeting control technique</td>
<td>• None, democratic ethos</td>
<td>• Facilitated, <em>not</em> democratic</td>
</tr>
<tr>
<td>Process technique</td>
<td>• Usually none</td>
<td>• Regimented agenda with specialized tasks</td>
</tr>
<tr>
<td>Typical meeting size</td>
<td>• 3 to 5</td>
<td>• 5 to 15</td>
</tr>
</tbody>
</table>

Table 1: Comparison of classic design meetings to JAD meetings
novices at developing information systems, in visualizing the software (one vendor offers a $400 suitcase of custom-designed magnetic color-coded symbols). JAD vendors emphasize the facilitation skills of their professionals as the main contribution of their services. Today, many JAD sessions are conducted using CASE tools: graphic tools for depicting data flow diagrams, Entity-Relationship diagrams, state transitions and other diagramming techniques, and screen painters. Table 1 contrasts the better-known “classic” design meeting and JAD. (For related research on design meetings: at Xerox PARC, Tang and Leifer, 1988; and at MCC, Ellis, et al., 1991; and the University of Michigan’s Machine Intelligence Center, Olson and Olson, 1991).

Electronic Meeting Systems

JAD is fundamentally a meeting technique and as such may be supported by a new type of software environment: Electronic Meeting Systems (EMS) (Dennis et al. 1988). EMS combines technology, procedures and facilitation to make meetings more effective.

One of the significant research efforts in this field, and one on which the rest of this study is based, is the University of Arizona GroupSystems, referred to from hereon in as GroupSystems (Dennis et al. 1990; Nunamaker et al. 1991) (Also, see Figure 2). At this writing there are several hundred EMS globally using GroupSystems and similar EMS. GroupSystems is the result of the Plexsys project (Nunamaker et al. 1989), which in turn evolved from one of the first attempts to automate the systems development process: PSL/PSA. In the 1970’s the Plexsys researchers encountered a frustrating real-life problem: the “users” of a Navy system hired consultants to define system requirements for them instead of specifying themselves using PSL/PSA. This experience pointed to the need for computer support of the user’s requirements stage and led to the development of the now well-known computerized meeting rooms. Once this room was in place, it was discovered that it was useful for general managerial planning activities, which is the direction of much of the early research. The study described in this paper is a closing of the loop, of the original philosophy of Plexsys--a return to its roots in the domain of requirements definition and elicitation.

During the last decade of EMS research, no overarching theory of EMS has emerged, but other theories have been used as a basis for EMS study. Two of the more prominent theories involve group process gains and losses (Nunamaker et al. 1991) and adaptive structuration theory (Poole, Holmes, and DeSanctis 1991). Both applications of theory stress that outcomes from EMS use are not deterministic. Rather, they depend on either the balance of process gains and losses resulting from EMS use (Nunamaker et al. 1991), or on the nature of the EMS and how the group chooses to use it (Poole, Holmes and DeSanctis 1991). Whatever the actual mechanism, EMS use can affect how a group behaves and performs in a meeting, and this in turn helps determine the outcomes. One of the more discussed effects is the potential for the equalization of participation (Nunamaker et al. 1991). Several other potential group outcomes mediated by EMS use include decision quality, consensus, satisfaction, and time to decision (Dennis et al. 1988; George et al. 1990).

Electronic JAD

With the proliferation of EMS in many locations and the obvious overlap between EMS and JAD, it was not long before essentially “automated JAD sessions” began taking place. IBM personnel reported conducting several such sessions in some of their electronic meeting rooms as early as 1989. Some JAD-like sessions were conducted on an experimental basis at the University of Arizona (Ram et al. 1989; Daniels et al. 1991) and at the University of Minnesota (Wanninger and Dickson 1992). Framework papers have appeared (e.g., Carmel, George and Nunamaker 1992), but the study described here is the first broad treatment of JAD use in electronic meeting rooms. In 1989, the term Electronic-JAD (E-JAD) was coined at the University of Arizona to describe EMS support for the JAD process.

Methodology

We chose to conduct a multiple-site field study (Benbasat, Goldstein and Mead 1987) because the field is where JAD is practiced and best understood, and because of the importance of studying it in its natural context. JAD sessions are thought to be effective for systems and organizations in the large, where large complex webs of issues and items exist that are represented by the people and the entities involved.

The unit of analysis is the session. Eleven sessions were studied in detail: five Traditional JAD (T-JAD from hereon) sessions and six Electronic JAD (E-JAD) sessions (Tables 2 and 3). All organization names reported here are pseudonyms. The study involves snapshots of JAD sessions that occurred during actual system development in a variety of settings and conditions.

Data collection was conducted by multiple means: Pre- and post-session interviews with key people in each session, in-session observations, document collection, post-session questionnaires, a participation table (discussed later), and a timetable of activities. Qualitative and quantitative data complement each other and serve as a form of triangulation. All data were systematically and carefully collected (See Carmel (1991) for additional information). The questionnaire data were aggregated by session and compared by JAD type (E-JAD and T-JAD). Due to small sample size Mann Whitney/Wilcoxon non-parametric tests failed on all questions.

The sample of sessions is a convenience sample. Although not perfectly representative of all JAD sessions (as no sample with six organizations can be), the organizations...
Areas of interest and findings

We examine four process areas in the study.

Equality of participation and equality of influence

The JAD group dynamics are said to foster openness to encourage greater breadth of input. This in turn is supposed to help lead to better design and greater user ownership of the system being developed. Related to equality of participation is equality of influence. If one or more participants dominate systems development meetings, the benefits from the potential for equal participation are lost. For example, Franz and Robey (1982) found, in a case study of user-led design, that one particular user came to dominate the system development process to the detriment of others. In summary, it seems that the JAD approach strives to equalize participation and influence.

As stated earlier, theory and research have pointed repeatedly to equality of participation as one of the main changes in group process in electronic meetings. This seems to stem from anonymity, which decreases the threat of critical feedback to ideas (i.e., evaluation apprehension), and from parallel work, which increases access capabilities.

Given the potential of EMS to equalize participation, we expected E-JAD groups to demonstrate more equal levels of participation. We examined the differences in rate of participation between E-JAD and T-JAD. All of the sessions — electronic and non-electronic — had an uneven contribution of users.

Using two E-JAD sessions as examples of the variance, FINANCE2 verbal participation was dominated by one user, the Chief Executive Officer, while COMPUTER1, composed of equal-rank users, had a much broader level of participation.

Table 4 summarizes session participation data for IS staff, the facilitators, the users, and the EMS. Columns 1 through 3 were gathered by noting the speaker (e.g., whether it be a user, etc.) at frequent fixed time intervals during the session.

<table>
<thead>
<tr>
<th>Session Name</th>
<th>JAD type</th>
<th>Duration in days</th>
<th>Net hours in JAD session (net of breaks)</th>
<th>No. of users</th>
<th>No. of other participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUNIC1</td>
<td>Traditional</td>
<td>0.5</td>
<td>3.3</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>MUNIC2</td>
<td>Traditional</td>
<td>0.5</td>
<td>4.25</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>FINANCE1</td>
<td>Traditional</td>
<td>0.5</td>
<td>1.75</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>SCHOOL</td>
<td>Traditional</td>
<td>1</td>
<td>8.25</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>AERO</td>
<td>Traditional</td>
<td>0.5</td>
<td>2.0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>COMPUTER1</td>
<td>Electronic</td>
<td>4</td>
<td>17.0</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>COMPUTER2</td>
<td>Electronic</td>
<td>10 half days</td>
<td>IC</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>COMPUTER3</td>
<td>Electronic</td>
<td>1</td>
<td>5.25</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>FINANCE2</td>
<td>Electronic</td>
<td>0.5</td>
<td>2.15</td>
<td>21</td>
<td>4</td>
</tr>
<tr>
<td>MILITARY1</td>
<td>Electronic</td>
<td>4.5</td>
<td>30.30</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>MILITARY2</td>
<td>Electronic</td>
<td>3</td>
<td>18.35</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

IC - Incomplete/unreliable data
The questionnaire results unanimously point to a perception, on the part of the users, of greater equality in E-JAD sessions, as indicated by two influence measures: Influence1 and Influence2. The first measure indicates that there was a higher perception of equal participation in E-JAD than T-JAD (3.08 for E-JAD; 3.38 for T-JAD; where 1 is “very equal”). The second measure is perhaps the strongest indication. In marked contrast to the JAD task-oriented approach where discipline allowing the participants to get up from their indepen-
dent session discipline as important in bringing about a successful JAD session.

The EMS literature has begun to examine closely-related notions in controlled settings vis-a-vis the contracts of structure and restrictiveness. McLeod and Liker (1992) found that groups using an EMS with a lower structure than GroupSystems showed less task focus than manually-supported groups. Wheeler and Mennecke (1992) found that high restrictiveness groups tend to have greater participation in the discussion and are more satisfied. Based on these findings, we expect structured and restrictive sessions to show positive dependent measure outcomes. However, we cannot state a priori which sessions would have greater structure or restrictiveness based on the presence or absence of technology. Thus, we do not present any expectations on this area. We chose two operationalizations of session discipline: an objective one — utilization of time, and a subjective one — session mood.

Time utilization (maximizing productive work time) was measured in two ways: as “net group work” time, and by an item in the post-session questionnaire. The time spent on work activities was recorded and compared to total session time, resulting in net work time. The average net group work for T-JAD was 83%, while net group work for E-JAD was only 60%. The questionnaire assessment supported this: the average E-JAD user response was 4.20 and the average T-JAD user score was 4.53, on a 5-point scale where 5 was the least amount of wasted time.

The more striking difference was in the session moods. In marked contrast to the JAD task-oriented approach where rules such as “everyone takes a break together” are enforced, three very different E-JAD sessions (COMPUTER1, FINANCE2, MILITARY1 were in different locations with different facilitators) bordered on the chaotic. One session could be described as a “party,” another as a “social gathering,” and the third in terms such as “warfare” and “disruptive.” One possible explanation for this observation is that the absence of the leader/facilitator removes the element of discipline allowing the participants to get up from their independent and collaborative electronic tasks and wander away to (respectively): listen to rock music, eat at the buffet, smoke and debate politics outdoors. As EMS users have pointed out, it is difficult to sit for extended periods in an electronic session.

Table 4: Participation. Percent of total in-session time

<table>
<thead>
<tr>
<th>Session Name</th>
<th>JAD Type</th>
<th>IS staff</th>
<th>facilitator(s)</th>
<th>users</th>
<th>EMS</th>
<th>(3) + (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td></td>
</tr>
<tr>
<td>MUNIC1</td>
<td>Traditional</td>
<td>9</td>
<td>66</td>
<td>25</td>
<td>NA</td>
<td>25</td>
</tr>
<tr>
<td>MUNIC2</td>
<td>Traditional</td>
<td>2</td>
<td>47</td>
<td>51</td>
<td>NA</td>
<td>51</td>
</tr>
<tr>
<td>FINANCE1</td>
<td>Traditional</td>
<td>IC</td>
<td>IC</td>
<td>IC</td>
<td>NA</td>
<td>IC</td>
</tr>
<tr>
<td>SCHOOL</td>
<td>Traditional</td>
<td>0</td>
<td>36</td>
<td>64</td>
<td>NA</td>
<td>64</td>
</tr>
<tr>
<td>AERO</td>
<td>Traditional</td>
<td>31</td>
<td>31</td>
<td>38</td>
<td>NA</td>
<td>38</td>
</tr>
<tr>
<td>COMPUTER1</td>
<td>Electronic</td>
<td>IC</td>
<td>IC</td>
<td>IC</td>
<td>46</td>
<td>46</td>
</tr>
<tr>
<td>COMPUTER3</td>
<td>Electronic</td>
<td>15</td>
<td>10</td>
<td>15</td>
<td>57</td>
<td>73</td>
</tr>
<tr>
<td>FINANCE2</td>
<td>Electronic</td>
<td>IC</td>
<td>IC</td>
<td>IC</td>
<td>47</td>
<td>47</td>
</tr>
<tr>
<td>MILITARY1</td>
<td>Electronic</td>
<td>IC</td>
<td>IC</td>
<td>IC</td>
<td>78</td>
<td>78</td>
</tr>
<tr>
<td>MILITARY2</td>
<td>Electronic</td>
<td>IC</td>
<td>IC</td>
<td>IC</td>
<td>77</td>
<td>77</td>
</tr>
<tr>
<td>Avg T-JAD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>44%</td>
</tr>
<tr>
<td>Avg E-JAD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>64%</td>
</tr>
</tbody>
</table>

IC = Data incomplete or unreliable; NA = Not applicable (EMS is not used in T-JAD)
meeting and frequent breaks are desired. Sitting for long periods of time in a JAD session can also be a problem, but computer work (e.g., typing, reading screens) adds another dimension in that the everyday user cannot do it for an extended period of time without diversions.

**Identifying conflicts and resolving conflicts**

We define conflicts to include disagreements, differences in interpretations, semantics, as well as broader political and ideological differences. Conflict can be seen as a way to generate stimuli that lead to creativity, which in turn leads to exploring issues in depth. Conflicts are therefore treated as “constructive” if managed properly, although, clearly, conflicts are often destructive, disruptive, and time consuming. One of the advantages of the JAD methodology over the traditional method is that the users—the peers—themselves are said to resolve their differences instead of leaving it to analysts or an executive third party (Guide 1986). The JAD approach has a semi-formal way of dealing with conflicts. The (typical) JAD conflict model consists of six stages: 1) Creates an atmosphere that “discovers” conflicts of viewpoints and conflicts of interest; 2) Identifies the conflicts (or “issues” in JAD parlance); 3) Documents the conflicts; 4) Discusses alternative solutions; 5) Resolves the conflict (through consensus, impasse strategies, executive fiat, or voting); 6) Documents the resolution.

The JAD conflict model has within it techniques which support both divergence (i.e. inducing conflict) and convergence (i.e., conflict resolution, for example, agreeing on the wording of a document). This is the convergence-divergence dialectic of the meeting which is very difficult to manage properly. EMS research has measured consensus (convergence) as a dependent variable and has shown that consensus is less likely with EMS (George et al. 1990; Turoff and Hiltz 1982), or there is no difference (Watson, DeSanctis and Scott-Poole 1988). Poole, Holmes and DeSanctis (1990) demonstrated that groups working with EMS surface and resolve conflict differently than groups working with more traditional meeting techniques. They attributed some of these differences to the use of the EMS. However, they also found that not all EMS groups used the technology in the same way, with some using EMS for productive conflict management, while others ended up inhibiting such outcomes. These findings support adaptive structuration theory. Therefore, we would expect E-JAD groups to handle conflict differently than T-JAD groups, but we would also expect there to be a large amount of variance across E-JAD groups in managing conflict.

We focus here on the most critical stage: Stage 5 (resolve the conflicts). While there was at least some closure in T-JAD sessions, in two E-JAD sessions (COMPUTER1 and FINANCE2) there was almost no “closure” (resolution) on issues that came up. In both sessions it was left to the principal analysts to synthesize the text, discover the differences and then resolve the differences after the session. Thus, in these E-JAD sessions, the electronic component may have diluted the powerful techniques of a JAD session by losing the conflicts in a mountain of (electronic) text. In contrast, in other E-JAD sessions (MILITARY1 and MILITARY2) specific steps were taken to document and resolve conflicts (or “issues” as they are called in JAD parlance) using the Idea Organization tool. In sum, E-JAD groups handled at least some conflict differently from T-JAD groups, and the handling of conflict varied across E-JAD groups.

**Facilitation**

There are strong sentiments about the key role of the facilitator in JAD (Martin 1990a) and other group processes. McGoff et al. (1990) found that GroupSystems facilitators feel that traditional facilitation skills are more important than technology skills. The emergence of GDSS facilitation research can be seen in Lewis and Whiteley, (1992) and in George, Dennis and Nunamaker (1992). The traditional form of facilitation for GroupSystems facilitators can best be characterized as “low-intervention” (See Table 5). Low intervention translates into low involvement in planning, infrequent follow-up, and (relatively) few interruptions during the session. In contrast, JAD facilitation responsibilities include many activities outside the meeting room and not in view of the participants: in planning and preparation.

Successful facilitation of a JAD session within the systems development process is a complex assignment that involves a combination of: management skills, social skills, systems development skills, and experience. We define session facilitation factors to include: agenda setting, goal setting, structure, handling conflict, controlling and encouraging participants, using traditional JAD techniques such as lists, and careful documentation. We define session management to include planning and preparation, as well as integration of the JAD session(s) into the overall system development process. The JAD literature argues that the facilitator is responsible for both micro and macro aspects of the session although they pragmatically acknowledge that the facilitator often has little leeway in the macro aspects.

As there has been very little academic research or theory development regarding the role of the facilitator in EMS, our observation and analysis of facilitation here is purely descriptive.

Table 6 summarizes our qualitative observations of the strengths and weaknesses of session facilitation (the micro level) and session management (the macro level). As with previous subjective assessments, these were synthesized from observations and interviews. We begin with the micro level — session facilitation. Since GroupSystems tools cannot fully support conflict discovery and conflict resolution, the (E-JAD) facilitators had a tendency to either be unaware of, or to neglect, this area somewhat. The JAD facilitator is largely responsible for enforcing the structure of the meeting through: a careful agenda; enforcing rules of conduct; enforcing a...
The facilitator...  
- has stake in process  
- has stake in outcome  
- is responsible for follow-up  
- is the focal point of the meeting  
- may spend several days preparing for session  
- intervenes in conversations  
- monitors and controls conversations  

Table 5: The JAD mode of facilitation is more activist than the GroupSystems mode

<table>
<thead>
<tr>
<th>Session</th>
<th>Type</th>
<th>Overall Session Facilitation (the micro level)</th>
<th>Overall Session Management (the macro level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MUNIC1</td>
<td>Traditional</td>
<td>Strong</td>
<td>Strong</td>
</tr>
<tr>
<td>MUNIC2</td>
<td>Traditional</td>
<td>Strong</td>
<td>Strong</td>
</tr>
<tr>
<td>SCHOOL</td>
<td>Traditional</td>
<td>Strong</td>
<td>Strong</td>
</tr>
<tr>
<td>FINANCE1</td>
<td>Traditional</td>
<td>Weak</td>
<td>Weak</td>
</tr>
<tr>
<td>AERO</td>
<td>Traditional</td>
<td>Weak</td>
<td>Strong</td>
</tr>
<tr>
<td>COMPUTER1</td>
<td>Electronic</td>
<td>Strong</td>
<td>Weak</td>
</tr>
<tr>
<td>COMPUTER2</td>
<td>Electronic</td>
<td>Strong</td>
<td>Weak</td>
</tr>
<tr>
<td>COMPUTER3</td>
<td>Electronic</td>
<td>Weak</td>
<td>Weak</td>
</tr>
<tr>
<td>FINANCE2</td>
<td>Electronic</td>
<td>Weak</td>
<td>Weak</td>
</tr>
<tr>
<td>MILITARY1</td>
<td>Electronic</td>
<td>Weak</td>
<td>Weak</td>
</tr>
<tr>
<td>MILITARY2</td>
<td>Electronic</td>
<td>Strong</td>
<td>Weak</td>
</tr>
</tbody>
</table>

Table 6: Strengths and weaknesses of session facilitation and session management

Conclusions

In this field study of E-JAD and traditional JAD sessions generalizable conclusions cannot be made because there were many uncontrolled variables, such as organization type, duration of the session, differences in topics addressed, the number of participants, and the style and personality of the facilitator. Also, the sample was too small to perform any meaningful statistical comparisons. However, even within these constraints, there are enough differences in the processes we studied to serve as the basis for formulating propositions about the role of electronic meeting systems in JAD. For example, given past research in electronic meeting systems and participation, and given the general trend toward more equal participation we observed in E-JADs, one could propose that E-JADs should foster more equal participation than in JAD groups. Our findings in the other areas are too equivocal for the derivation of any directional hypotheses.

The findings on participation and conflict management, though not statistically significant, met our expectations, which were based on existing empirical research and theory
development in the EMS literature. We had no a priori expectations in the other two areas, as there is little empirical or theory building research that is relevant. Our findings in all four areas can serve as a basis for developing theories relevant to computer support of JAD and other highly structured tasks. Our findings in two of the areas, session discipline and facilitation, may be affected by the degree of structure and by technology restrictiveness. Both constructs merit more attention.

**Acknowledgment:** This research was supported by a grant from the IBM Corporation.

**Note:** An earlier version of this paper was published in the Proceedings of ICIS, December 1992.

**Endnotes**

1 This discussion uses the term JAD in the sense of Joint Application Development, not Design. Such a definition seems closest to a broader and truly generic one.

2 GroupSystems is now a commercial product marketed by Ventana Corporation of Tucson, AZ., and by IBM Corporation.

**References**


EDP Analyzer. Developing high quality systems faster, Volume 24, Number 6, June 1986.


Kerr, J.D. Systems design: users in the hot seat. *Computerworld*, Volume 23, Number 8; February 27, 1989, pp. 87-96.


Olson, G.M. and Olson, J.S., User-centered design of collaborative technology, *Organizational Computing*, Volume 1, Number 1, 1991, pp. 61-84


Erran Carmel is assistant professor at The American University in Washington D.C. He has researched use of electronic JAD as a systems development technique. Currently, his research focuses on software development in the domain of packaged software—examining time-to-market, quality, and process models. Dr. Carmel has published in such journals as Communications of the ACM, Journal of MIS, IEEE Software and Journal of Product Information Management.

Joey F. George is an associate professor in the Department of Information and Management Sciences in the College of Business at Florida State University. He has published in such journals as Information Systems Research, Communications of the ACM, MIS Quarterly, Journal of MIS, and Communication Research. His research interests focus on the use of information systems in the workplace, including computer-based monitoring, desktop computing, and group support systems. His current work investigates deceptive communication in group support systems.

Jay F. Nunamaker is professor of Management Information Systems and Computer Science at the University of Arizona. In 1994 he was named University Regents Professor. At Arizona he established the MIS department and developed its BS, MS, and Ph.D. programs. As an internationally renowned authority on groupware, he is considered the father of electronic meeting systems now being used on a daily basis in over 500 sites worldwide. Coverage of his innovative research has appeared in Fortune, Business Week, The Wall Street Journal, The New York Times, CNN, and BBC.
Related Content

Expert and Novice End-User Spreadsheet Debugging: A Comparative Study of Performance and Behaviour
[www.irma-international.org/chapter/expert-novice-end-user-spreadsheet/69613/](www.irma-international.org/chapter/expert-novice-end-user-spreadsheet/69613/)

Running with the Pack: The Impact of Middle-Status Conformity on the Post-Adoption Organizational Use of Twitter
[www.irma-international.org/article/running-with-the-pack/191294/](www.irma-international.org/article/running-with-the-pack/191294/)

Asynchronous Learning Using a Hybrid Learning Package: A Teacher Development Strategy in Geography
[www.irma-international.org/chapter/asynchronous-learning-using-hybrid-learning/18210/](www.irma-international.org/chapter/asynchronous-learning-using-hybrid-learning/18210/)

Gestural Interaction with Mobile Devices Based on Magnetic Field
[www.irma-international.org/chapter/gestural-interaction-with-mobile-devices-based-on-magnetic-field/80371/](www.irma-international.org/chapter/gestural-interaction-with-mobile-devices-based-on-magnetic-field/80371/)

Perception of Journalistic Content Printed on Paper and on an iPad Case Study: La Voz de Galicia
[www.irma-international.org/chapter/perception-of-journalistic-content-printed-on-paper-and-on-an-ipad-case-study/80366/](www.irma-international.org/chapter/perception-of-journalistic-content-printed-on-paper-and-on-an-ipad-case-study/80366/)