Facilitating and structuring environmental knowledge: prototypical pre-design for a new campus setting

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ABSTRACT

This applied research combines state-of-the-art computer-supported facilitation process with a conceptually new way of structuring behavioral knowledge of the physical environment. The object is to develop a prototypical evaluation/pre-design/design process which can be used in practice. The paper reports on the first phase of an actual building project for a university campus where representatives from all client user groups have participated in GSS facilitated sessions. Large amounts of user information have been organized into a graphically enhanced data base including decisions on key programmatic issues. Proposed GSS sessions for the second phase envision a continuous flow of pre-design information through design and design evaluation processes.

1 INTRODUCTION

At the University of Arizona (U.S.), the co-authors, one from Architecture, the other from Management Information Systems, have been interested in maximizing the flow of information during pre-design, design and evaluation of built environments. In developing the prototype process described below, two critical problems with existing practice are addressed by the unique interests of the respective authors. The first concerns issues of democratic participation and decision-making based upon accurate recording of user information. Toward this end state-of-the-art electronic group support systems (GSS) capabilities are used for this pre-design, design, evaluation research. The second critical problem simultaneously addressed concerns the way we structure knowledge about the human use of the physical environment. Most programming, evaluation and even design relies heavily upon holistic “types” of spaces, using labeled rooms, buildings, sites, etc. by which to associate and store information about use. The present research relies more upon clearly behavioral categories of spatial experience: wayfinding, visual and non-visual aesthetics, task performance, social territories, cultural expression. The combined application of computer based, graphically capable GSS participation together with behavioral based,
spatial knowledge structures may enable an unusual continuity between evaluation, pre-design and design aspects processes.

The practical vehicle for this research is a building actually proposed for the S.A.L.T. (Strategic Alternative Learning Techniques) Center on The University of Arizona campus. This nationally regarded group provides services to university students with learning disabilities such as dyslexia or attention deficits. S.A.L.T.'s new director enthusiastically saw the research project not only as a way to better program for the unique needs of students and staff, but as the basis for better communication and sharing of values. S.A.L.T. presently serves about 400 students with a staff of about twenty-five not including numerous part-time tutors.

This paper describes the use of GSS for architectural processes generally and the idea of structuring of environmental knowledge using the S.A.L.T. project as an initial case example. This case study, ideally organizing information along a continuum of evaluation, pre-design and design, is about half complete. Impetus for the research grew out of a third year academic design studio which used S.A.L.T. space requirements as the basis for individual projects. The authors began evaluation and pre-design processes in the GSS lab to maintain the project's momentum and to possibly contribute to S.A.L.T fund raising activities just under way. Until funding is substantially complete, however, the university cannot enter into contractual relationships with an architectural firm. So while the research project could have been continued using "hypothetical" design input from architectural faculty and students, the goal is for the second phase of the present work to be carried out within the actual contracted professional processes for the building. Given the delay in completing the evaluation/pre-design/design cycle, we have taken the opportunity to capture our thoughts and conclusions up to this point.

2 COMPUTER ENHANCEMENT OF PARTICIPATORY PROGRAMMING

2.1 Support for the Process of Architectural Programming

Modern programming grows out of the Beaux-Arts school of architecture during the 1930s in the United States (Gordon and Stubbins, 1988) but did not become a recognized formal process until the work of William Pen a and CRS in the 1950s and 1960s (see Pena, 1977).

2.1.1. Purpose and Process of Programming
Programming is the systematic approach to evaluation and pre-design research consisting of stages where the project objectives are defined; organizational, environmental, and context information are surfaced; requirements are developed;
alternative conceptual solutions are generated and evaluated; and the results of the process are organized in a form useful to the architect/designer. While many architects believe that programming and design are tightly intertwined, for the purposes of this project we have approached programming and design as a linear process.

Current programming techniques include survey, interview, group worksession, and structured walkthrough. Surveys are used to collect data from large amount of architectural dwellers. It is inefficient to gather large quantities of quantitative information in any other manner. Interview is used to capture in depth data from a few selected key players in the programming process. It is too expensive and time consuming to conduct more that a few interviews, so representative points of view are sought. The interview technique allows the architect to probe for background information which might not emerge in survey questionnaire form. Structured walkthroughs are a combination of existing site tour and interview in one. The architect conducts an interview while visiting an existing or proxy site. The intention is that actual presence at a site will prompt interview discussion which would not occur in a non-proximate environment. The limitation of structured walkthroughs is that they can be disruptive to actual work, therefore the interview group must be kept small and the visit to any one site must be kept short. In addition, management may be hesitant to discuss real issues regarding a specific work environment in front of the users of that environment. And, as with interviews, structured walkthroughs are a time consuming and expensive process.

Group worksessions are used by many architectural programmers to gather user objectives, specifications, and information during early stages of the programming process. Several architects have evolved their own methods for undertaking group worksessions. Perhaps the most acclaimed approach is that taken by William Pena of Caudill, Rowlett Scott (Pena, 1977). While it is recognized that group worksessions provide the richest data, they are often not undertaken because of logistical constraints. Group worksessions -- or squatter sessions as they are sometimes called -- are time consuming, expensive, require considerable architectural manpower and are wrought with group behavior inefficiencies. Several of those inefficiencies are described below.

2.1.2 Client Naïveté/ Designer Expertise
The first problem is that many architects believe that all of the programming expertise resides with the architect and that most clients are too naïve to contribute to the knowledge base (Henderson and Falanga, 1989). Becker (1990) suggests that involving clients is more time consuming and more expensive than using experts with broad experience and specialized knowledge. While others might suggest merely bringing users into the process to provide information to experts to enhance the decision making process, White (1991) in his survey of 73 architects found many believe that client
involvement is not supportive as clients often do not understand why information is needed.

2.1.3 Time Required for Process
Many architects recognize the advantages of bringing broad scale community participation to the programming process, but the involvement of a significant number of client users is viewed as time consuming, expensive, frequently inconclusive, and extremely distracting. Squatting is too intense a process for many clients and of too short a duration anyway to provide in depth analysis to problems; marathoning1 on the other hand is time consuming and fatiguing as well as limits who can be involved (Gast, 1975; McLaughlin, 1976). Many architects complain that clients are too impatient to sit through an abstract programming process (White, 1991); the clients want to begin seeing design results right away. Weber and Pyratoke (1975) found that clients expect too much work to be accomplished in one participatory meeting and that programmers had to limit expectations as to what could be done in a single meeting.

2.1.4 Organizational Constraints
Many constraints to client involvement emerge in a hierarchical organization. When programming in a business organization, some managers see worker participation as a vehicle which undermines management’s authority. Many managers see the right and responsibility of making decisions for the good of the workgroup clearly part of their own mission. They see shifting control down the line as a usurpation of that authority and responsibility (Becker, 1990). And some programmers support this world view in arguing that the client is the legally bound representative of user groups and will act in their best interests (Henderson and Falanga, 1989).

In other organizations it is simply an issue of power. Clients will not permit staff to participate in the programming process as leaders may also be anxious to protect power in the status quo (McLaughlin, 1976; White, 1991). And participation in the process itself could become a source of power; information of the process becomes value; participation becomes prestige; and value and prestige evolve into power (Bayazit, 1981).

2.1.5 Group Behavior and Communication Issues
It is difficult for groups to remain focused on the task at hand in a group worksession. Clients tend to want to accomplish too much too quickly and the programmer must work to maintain an orderly agenda and pace to the process. Groups tend to get sidetracked by negligible issues or become concerned with issues not germane to the

1Ongoing worksessions which can last several days.
problem at current stage of development [i.e. what color will the wallpaper be, when we haven’t yet decided whether to build]. Clients tend to ask "why do you need to know" to every question the programmer raises making it difficult to move a group forward. And groups tend to want to debate issues well past the point of being productive to the programming process (Thompson, 1975).

Two different types of communication issues plague group worksessions. The first is a function of differing vocabularies between the architect and the participant. White (1983) reported that architects fear trusting worksession data as clients tend to say one thing, but programmers hear another. Thompson (1975) was more blunt: designers are inclined not to pay attention to statements they do not understand. Statements are commonly made in terms of organizational slang which is either unintelligible to the programmer, or incorrectly deemed to be unimportant. This problem is exacerbated by the fact that most group worksessions use an architect/technographer. This technographer has to translate participant statements into architectural jargon. Any issue the architect/technographer fails to capture may be lost from the entire process.

The second issue is one of intergroup process within a work organization hierarchical structure. Managers have visions of endless and fruitless discussions among all of the workers with virtually no consensus emerging. Because of this, managers discourage employee participation in group worksessions. For the employees who do participate, this atmosphere contributes to a large variance in participation. The reticent tend to remain silent or agree with the status quo positions of management and the stronger individual advocates (McLaughlin, 1976; Becker, 1990). Almost inevitably differences are suppressed and contributions are lost in group worksessions.

2.1.6 Information Overload
If a group worksession is successful in pulling data from the participants, there is a danger of too much success. Pena (1977) warns of the potential of data clog by collecting too much information for the programmer to assimilate. Gast (1975) attempted keeping a planning workbook, but found that in the intensity of the session he could not keep it up to date. Too much of the work in organizing the data was done after-the-fact, defeating part of the purpose of bringing together the participants in the first place. Preiser (1994) is developing a new technique to address this problem. He is bringing a team of up to seven programing assistants onto the client's site for a marathon of squattting sessions and interviews over a period of three to five days. While the team approach to data collection solves Gast's problem of collecting and collating data on the fly, the intrusiveness of having so many outsiders involved may negatively impact other facets of data collection.
2.1.7 Group Size
Conflicting needs dictate the choice for group size. On one hand the desire exists to involve as many organizational participants as possible. Increasing involvement improves chances of hearing differing positions and viewpoints. It engenders goodwill among the eventual users of the new space increasing the likelihood of acceptance of the final design. It helps the programmer to understand better complex relationships among departments or functions of an organization (Becker, 1990). On the other hand, large groups tend to become unwieldy. There is competition for floor time, Dominance, reticence and free riding increase in larger groups. It is more difficult to achieve and maintain group focus. And it becomes very expensive for the client organization to pay for the time of a large group of participants.

Weber and Pyratok (1975), for example, found that group size limited them in brainstorming: "It was impossible to generate ideas with a single group of 16 adults. Smaller but heterogeneous work groups operating simultaneously would be more workable." Research in marketing focus groups indicates that optimal group size is seven to ten participants (Chakravarti, et al., 1992) and the same probably holds true for programming work sessions.

2.2. Using GSS to Address These Inefficiencies

Group Support Systems (GSS) are computer-supported environments designed to enhance the work process of a group. GSS are of interest to this study because they have previously been used to support architectural programming with promising outcomes. (Mittleman, 1995).

GSS includes three components. The first is a meeting room containing networked computer workstations for all participants, with one or more public projection screens upon which information can be displayed. The second is group support software that enables participants to communicate, contribute ideas, analyze options, vote on alternatives, and so forth. The third component is the facilitator who leads a structured process by chairing the meeting and helping participants use the technology.

GSS impacts group activities in four ways by providing process support, task support, process structure, and task structure (Nunamaker et al., 1991).

1. **Process Support**. Process support is the communication infrastructure provided by the tools or technology used by the group. Process support in a GSS environment includes [1] parallel communication, [2] group memory, and [3] anonymity. GSS enables parallel communication by allowing all group
members to speak at once through the computer. The electronic computer channel organizes the communications and provides all group members with a full accounting on demand of everything said during the session. Group memory is supported by GSS in that the complete record of everything said (or a summary record if that is more desirable) can be carried from session to session during a meeting – or can be carried from meeting to meeting. This provides all group members with a complete record of business transacted, statements aired, and decisions made. Anonymity is enabled by GSS in that discussion comments can be made in a manner not at all attributable to the individual speaker. It should be cautioned that anonymity is a continuous rather than discrete variable and that full anonymity is not possible in some meeting situations.

2. **Task Support.** A GSS supports the task at hand independent of the process used. That is, it makes information readily available to group members that might otherwise not be available. In this way GSS technology may enable group members to make better use of previous meeting data, may promote additional synergy of thought, and may encourage more complete task analysis. Lotus Notes is an example of a distributed GSS which provides strong task support by modeling data into useful historical information independent of any group process. Any GSS repository created or used by a group would be an additional instance of this category.

3. **Process Structure.** Group facilitators in both GSS and non-GSS environments use process structure to support effective group activities. Facilitators lead groups through structured processes designed to increase focus, accentuate creative thinking, and reduce avoidable process losses. Many participatory design games are examples of process structure in a programming environment.

4. **Task Structure.** Task structure enables the group to better understand and analyze task information. It is the common tool type of DSSs. Group task structures include fishbone diagrams, stakeholder analyses, and affinity clustering. These task structures improve group productivity by helping the group better visualize and organize its key information.

The constructs presented here provide for a theoretical basis for understanding how GSS impacts group activities. Impacts on group performance are mediated by all of the factors listed above; GSS impacts group performance via the four technological factors listed.
2.3 Supporting Current Design Programming Methods

Given these theoretical justifications for GSS, how might a GSS model to support design programming address each of the inefficiencies, bottlenecks and opportunities for design programming described above?

2.3.1 Client Naïveté/Designer Expertise
GSS can provide task structure to help participants better understand why information is needed and the complexity of tradeoffs the programmer and designer must make. A GSS might do this by organizing complex information in a form that makes tradeoffs readily apparent. In doing so, the GSS can help the participant to become a more effective member of the programming team. Both the task structuring and process structuring components of the GSS should provide mechanisms to help architects appreciate and accept input from clients.

In addition, the availability of anonymity may create new roles for architects in the group work session. Because anonymity enables a participant to provide commentary without identification, it may be possible for architects to contribute probing follow-up questions or anonymous critical responses. Both types of participation should lead to increased productivity with minimal facilitator bias (Connolly, Jessup & Valacich, 1990; Chakravarti et al., 1992).

2.3.2 Time Required for Process
Many architects report that an effective group work session takes a significant amount of time and recruiting participants for such sessions is difficult because those participants are impatient to the process, and the client is reluctant to pay wages for the participants to spend time in the session.

GSS provides support for this dilemma in a number of ways. One, the intensity and focus of a GSS session is such that time passes less noticeably than in a traditional work session. Two, more can be accomplished in less time in a GSS session. EMS support for information capture and idea generation has been very promising. Laboratory experiments have found that EMS groups can generate more information and ideas of higher quality in a given amount of time than non-EMS groups (Gallupe, et al., 1992). And three, the process structure provided by the GSS will aid the programmer to bring tasks to closure. This will enhance the perception (and maybe the reality) that work is being accomplished at an adequate pace. Whether or not a decision is reached, participants should be satisfied with the progress made over the duration of the work session.

2.3.3 Organizational Constraints
Effective group process is sometimes difficult within the political decision making environs of a hierarchical organization. Power, status, and ownership of information may be important criteria of the decision making process.

GSSs provide support to move away from political decision making and towards rational decision making within a hierarchical organization by several methods. The anonymity available in a GSS session enables lower status or power individuals to speak freely when interspersed with high status or power individuals. Several lab studies have found that GSS supports more equal participation than traditional meetings (Steeb & Johnston, 1981; Dennis et al., 1988; Zigris, Poole & DeSanctis, 1988; and Pinsonneault & Kraemer, 1989).

GSS enables a larger sized group to participate in the session. A larger sized group means that more organizational representatives can have a direct say in the process. Increasing participation can contribute to increased buy in to the process and outcome on the part of the organization (Huber, Valacich & Jessup, 1993; Mittleman & Adkins, 1996).

2.3.4 Group Behavior and Communication Issues

It is difficult for groups to remain focused on the task. It is difficult to get groups to reach a decision. Strong individual personalities can dominate conversation drowning out more reticent personalities with valid viewpoints. Different participants (including the architects) may have different vocabularies for the same information; communication is impaired by lack of a common language.

GSS provides process structure in the form of facilitated tools which lead the group through a rational process. This structure can help groups which otherwise lose their way between idea generation and decision making (Easton, George, Nunamaker & Pendergast, 1990). GSS provides process support in the form of anonymity and parallel communication which enables reticent individuals and dampers dominant individuals without sidetracking the group (Zigris, Poole & DeSanctis, 1988; Jessup, Connolly & Galegher, 1990; Lim, Raman & Wei, 1990).

2.3.5 Information Overload

There are two information overload problems which occur in traditional group workshops. One is that too much information is produced for the group to comprehend and evaluate. Therefore some of the information is simply lost in the process. Two is that communication flows from the group to the repository through a single technographer. That technographer can easily be overloaded with more data than he can process at a given time. What the technographer does not capture can be lost for good. In addition, any misinterpretations or misunderstanding made by the technographer could find their way into the permanent repository in error.
GSS provide assistance for these issues in several ways. First, the *process support* of parallel communication channels and direct input of data into the repository diminish the role of the technographer and the associated risks (Gallupe, Bastianutti & Cooper, 1991; Gallupe, Cooper & Bastianutti, 1990; Dennis, 1991). Second, the parallel processing capabilities of the GSS make it possible for the entire group to see and evaluate the repository directly. This allows for corrections or additions to be made to information directly and continuously. Third, the *process structure* tools of the GSS allow the group as a whole to parse and evaluate ideas as they emerge. While even more ideas may be contributed using the GSS (Gallupe, DeSanctis & Dickson, 1988; Gallupe, Bastianutti & Cooper, 1991) the GSS tools support orderly categorization and analysis of the additional ideas through list building, keywording, and cluster analysis tools.

2.3.6 Group Size

Large groups are more representative of the organization as a whole and provide for more diverse viewpoints in group discussion, however small groups are easier to manage.

Optimal group size has been found in traditional groups to be quite small, typically 3 to 5 members (Shaw, 1981) independent of task. This is because without GSS *process support*, process losses increase rapidly with group size (Steiner, 1972). Some purely idea generation groups can function effectively with slightly more members. Marketing research literature, for example, suggests that focus groups be held to 7-10 members for optimal effectiveness (Chakravarti et al., 1994). But GSS groups engaging in idea generation tasks have functioned effectively with over 40 members (Nunamaker et al., 1995).

GSS enables effective group process with much larger groups through both *process support* and *process structuring* mechanisms. Parallel processing enables more floor time to each group member and less production blocking. Tool structure minimizes coordination and information access problems. Both productivity and satisfaction have been shown to increase. Fellers (1989) and Gallupe et al (1991) found that while small non-GSS groups were both more productive and more satisfied, large GSS groups achieved higher productivity and satisfaction scores. Several studies (Dennis et al., 1990; Valacich, 1989; and Valacich et al., 1992) suggest that in GSS idea generation settings individual participation remains constant no matter how large the group grows.

2.4 Modeling the Programming Process

Several models have been used for collecting and organizing architectural programming information. The most well known model is Peas matrix approach of gathering
information about form, function, economy and time against a process of understanding goals, facts, concepts, and needs in order to generate design problems statements for each area. (See Pena, 1977 for a full description of the model.) In this staged process, the architect assembles a client group in a meeting room with butcher board paper on the walls marked off to form the matrix described above. The architect leads the group through a structured discussion and collects on 5x7 cards key information items stated by the participants. The 5x7 cards are then pasted into the appropriate cell on the wall. The architect leads the group through all five stages of model development.

In the field of business process re-engineering a different process model is used. In this field groups are assembled to develop new functional process models for organizational workflow. A common model for these sessions is to [1] develop a model of current functional processes (the as-is model), [2] benchmark the model by researching industry best practices and seeing how other organizations undertake similar functional processes, and [3] from there develop a candidate to-be model of improved functional processes (DoD_8020.1-M, 1992; Dean et al., 1994).

Pena's approach to architectural evaluation and pre-design workshops borrows from Western cultural linear planning models. Our approach borrows closely from Pena, but more closely maps to the business process re-engineering model. We designed a three meeting intervention where the first meeting explored the as-is physical environment of the client organization in the form of investigating activities which take place in the existing setting, the second meeting benchmarked client interests and desires against design solutions applied elsewhere, and the third meeting supported client discussion and decision-making in the context of the new site.

While this intervention model may enhance the client participation process, we believe that process structure should be further facilitated by a clear organization of environmental knowledge which links closely to the behavioral experiences of the users to maximize potential gains from client participation.

3 CATEGORIES OF ENVIRONMENTAL BEHAVIOR

3.1 The Importance of Framing Knowledge to Fit Participatory Processes

When designers and behavioral consultants program and evaluate the built environment the most convenient way to organize knowledge about use most often relies upon conventional typologies of space, i.e. "lobbies", "corridors", "bathrooms", "courtyards", etc.. As mentioned above, interview and observation methodologies elicit "goals", "facts" and other information about activities and meanings associated with typologically conventional spaces presumably understood by both client and professional. Certainly one finds tendencies to secondarily organize usage according to
more purely behavioral descriptors such as "wayfinding", "socializing", "safety", "beauty", "accessibility", "privacy", "identity", "symbolic", and so on. Certainly such behavioral terms are frequently used in narratives about elicited activities and meanings of a particular space. Yet they are by no means well understood by most from any research based, social scientific perspective, nor will they be used as the primary means of structuring environmental knowledge.

Even though both client and professional use conventional typologies of space as primary organizational devices in programming and evaluation, it is now obviously true that "holistic typologies"—whether spatial or verbal, or large scale or small—are far dearer to the hearts of professionals than users. Consider the ubiquitous presence in design of the term "place", derived from phenomenology, as well as older "aesthetic" views of spatial order, coherence, and the like made manifest in historical typologies. Both characterize the typical designer's belief in the inherent interrelatedness and unity of use and meaning in rooms, buildings, urban spaces, and even larger natural landscapes. Even Christopher Alexander's, et. al., idea of "pattern languages" (1977) relied on a natural holism as smaller scaled "places" integrate to form successively larger "places". These fundamental beliefs of designers and even psychologists do of course serve well the practical necessity of conceptualizing, describing, drawing, and building environmental form. The object-like, place-like understanding of form is essential to both building and describing of the environment.

In spite of some current interest in tracing the behavioral reality of building typologies (e.g. Franck & Schneekloth 1994), even the simple communicational or conventional usage of typological knowledge structures for programming and evaluation creates serious problems in any typical participatory process. Ultimately, the user will be less interested in the interrelatedness or unity of "place" than on the "affordances" which form provides behavior (a la Gibson 1979). While programmers, designers and evaluators organize participation in terms of spatial typologies, users will respond primarily in terms of only specific aspects of these spaces. useful for specific purposes, i.e. affordances.

Given the multiple behavioral dimensions or affordances of even the smallest space, particularly in settings with some depth of occupation, one significant problem with using typologies to elicit information is avoiding political attachment to particular affordances within a "place". In public meetings in the U.S., for example, if the discussions are moving from space to space, people will tend to develop advocacy for particular affordance issues vis-à-vis issues advocated by others. Because typological terminology, whether spatial or verbal, is inherently non-behavioral, participants do not sense any overall information structure to which they can predictably look to include their particular interest. Thus user information may be more closely tied to the particular politics of the participatory event than any overall politically neutral
structure of behavior/environment knowledge. The present case study involves a
certain amount of user education as to distinct categories of affordance and behavior.

3.1.1 Behavioral Strings Rather Than Settings or Places
Even from more purely behavioral perspectives, it also has been descriptively
covenient to think in terms of a locus for a particular social event. This is most
evident in ideas of "behavior settings", really as "places" as developed by Barker’s
ecological psychology (see Schoggen 1989). While some typological designation may
be necessary in programming, design and evaluation, ultimately the essential problem
for a design of any complexity is the creation of relationship not so much between
places, as in Alexander, but between different affordances within different "places".

Certainly we construct holistic images of portions of our environment, and
certainly we must always know a general locational framework to orient ourselves to all
affordances. But do human beings uniquely have an inherent or cultural need to totally
organize their environments into perceptibly ordered wholes on a series of scales? It
may be more important, behaviorally and adaptively, to know stringy relationships
between pieces of affordance than relationships between unrelated affordances within
imagable or holistic spaces. Clearly the methodology and terminology of Hillier et.
al.’s work (Hillier & Hansen 1984, journal issues Architecture & Behavior 1987,
Ekistics 1989) shows the greater information in "stringiness" compared to the
descriptions of spatially enclosed "cells" or scales of cells. Indications are that
Hillier’s space syntax methodology is becoming adaptive to particular kinds of
behavioral affordance strings, though at present most applications still deal primarily
with aspects of territoriality (though they do not prefer this term).

Beyond the conventional use of behavioral terms, one finds clearer separation of
particular kinds of behaviors in social science research. In well-developed areas like
environments for the elderly, particular kinds of behavior will be distinguished within
case studies. But while researchers will organize knowledge separately according to
wayfinding, social activities, or functional uses usually dealing with accessibility and
safety, for example (e.g. Wirdley & Scheidt 1980), we find little indication of the
theoretical difference between these kinds of knowledge structures and place-based
organization. Most significantly absent is specific emphasis on the importance of
spatial knowledge in relation to the particular kind of behavior. Often, again, one will
associate behaviors with places. Not only is perhaps the critical form of behavioral
information misrepresented, but an opportunity is missed for both structuring
participatory processes and providing designers with the all-important structural
understanding of linkage between aspects of "places".

3.1.2 Situational Shifting of Environmental Attention
We know from Goffman and others (e.g. 1974, or Meyrowitz' reference to Goffman in 1985), that humans as well as other social animals are capable of framing social encounters. We turn on a kind of social background of environmental information to answer the meta-question of "what is going on here", in Goffman's terms. From common experience as well, we are aware of a constant turning off and on of particular kinds of affordances in our surroundings, all according to our current activities or needs, i.e. the psychology of "attention". From an adaptive, information point of view, does it make sense to think of situational framing of generically different kinds of behavioral affordances? In the case of a specific wayfinding "situation" when one is clearly focusing his/her informational energies on a particular kind of knowledge (within some overall locational structure), it will be useful to turn on only particular kinds of stringy content rather than appreciate local or hierarchical places as wholes.

The following possibly psychologically real distinct categories of behavioral affordance come, however, less from hard research than from a combination of operational distinctions in social science literature and the application of such to actual processes of programming, design, and evaluation. With a small amount of initial familiarization of terminology, users easily understand analyses of environments structured according to kinds of affordances strung across settings. Not only does this approach clarify conventional terminology for behavioral activities, and more clearly structure participatory programming and evaluation according things important to users, but its emphasis on spatial relationships provides far greater continuity with actual design processes.

3.1.3. Provisional Natural Categories of Environmental Knowledge: Way-finding, Visual & Non-Visual Aesthetics, Task-Performance, Territoriality, Cultural Expression

1. **Wayfinding.** Certainly the clearest example of environmental information stringing itself across and through multiple "places" are the specific routes we use to find our way. In spite of general references to overall environmental clarity and order in Kevin Lynch and others (the need for a very general orientational or locational frame is acknowledged) Passini and others have clearly shown that some forms of wayfinding are extremely focused on one specific kind of route information to the apparent exclusion of other content (1984). In a fire one attends only to exit information. While obviously less physically threatening, we all know that other wayfinding routes can as well demand much of our attention at important times.

2. **Visual & Non-Visual Aesthetics.** In spite of much literature about aesthetics or "beauty", commonly understood definitions, not that unlike lay conventions, remain elusive in the design professions. It seems appropriate to distinguish
between "extrinsic" and "intrinsic" aesthetics which tends to separate things with clear learned and usually social meaning from things which are interesting more from the perception of form itself. The form of music or scenic natural settings are in themselves inherently interesting to people independent for the most part of social or cultural background; more arbitrary and learned meaning of environmental form are included in the last category of "cultural expression". Non-visual aspects of the environment may as well be pleasurable or unpleasurable sources of "information", e.g. the sound of water on a hot day, the sense of kineesthetics on play equipment or a roller coaster, the smell of flowers, the touch of different textures, etc. Is this kind of environmental attention most likely structured by imagable wholes or stringy links between pieces of affordance? Much of the literature on natural aesthetics at least emphasizes the spatial sequence of exploration, mystery and the like as essential (see overview in Taylor et. al. 1987), though we know that from time to time we will stop to reflect upon some picture-like view. In terms of architectural form, some attention is paid to exploration through sequences of built and natural space (e.g. Arnheim 1977).

3. **Task Performance.** When one's attention is focused on the performance of a physical task, and its facilitation by environmental form, then to what degree are other kinds of affordances turned off? While some literature obviously speaks about holistic kinds of ergonomic "work-station" activities, whether office or bathroom, much critical information exists in terms of spatially stringy adjacencies and accessibilities along routes. It may even be that the kinds of efficiency that systems engineers design, primarily systematic relationships through space, are the basis as well of behavior even in small settings as workstations. In the present research "task performance" refers to behaviors involving use of physical form essentially as a tool, usually some form of production, transportation, storage, protection, facilitation or communication of objects, information, or people.

4. **Territoriality.** At the simpler end of a probable spectrum of social space running to the very symbolic, here included in the final category, personal and social territories have immediate "holistic" implications in their boundedness. In any larger human environment, however, whether city or large building, relationships between kinds of territories will create perhaps a more vital and essentially stringy map of social potentialities (as evident again in the "space syntax" work of Hillier and others). Beyond simple spacing or exclusionary mechanisms of personal space, crowding, or privacy, the hierarchies, power
corners, neutral spaces of established human social space are highly significant for their positional information (e.g. in Steel 1986).

5. **Cultural Expression.** As territorial structure becomes more conventionalized, both in terms of attached sign systems and spatial definition, the more learned, "cultural", or "expressive" it becomes, as distinct from more immediately understandable physical, economic and legal authority of most positional territoriality. The rhetorical discourse of a teenager's bedroom or image of a corporate headquarters still appears to rely upon essentially territorial preconditions in addition to the persuasiveness of their "message" from particular social groups (which requires some background learning). Such thematic displays may as well be integrated into a positional territorial structure of family home or city.

In the thematic domains of more associationally deep historical or sacred space, however, formalized spatial maps may be seen less as occupied territories than ritual devices for the expressive manipulation or structuring of symbolism. While ritual symbolism does of course support social organization, both its symbolic content and spatial structure are more independent of specific individual or group occupants. Few contemporary environments go beyond a kind of discursive territoriality where thematic content is most useful in distinctions between "us" and "them" rather than for a more ritual-like integration of dissonant aspects within the organization (see Doxtater 1990, 1994 for a fuller discussion).

3.1.4. A McHarg-Like Layering of Environment

Thus while some holistic, typological information about the environment will be inevitable and perhaps desirable, much highly significant knowledge will take the form of "affordance strings" or maps less interested in "place" association per se, than linkages of usable aspects of places strung across the built and natural landscape. Beyond the present speculation of strings as actual cognitive phenomena, are two very practical issues. First is the mentioned education and depoliticizing of participatory processes in pre-design and evaluation processes. Secondly, not unlike actual McHarg-derived planning processes where distinct environmental "systems" are layered to determine best uses (1969), "situational" design can as well be conceptualized as the superimposition of different kinds of behavioral "systems" or affordances. The distinction is with conventional processes of attempting to put together systems of wholes. In a truly post-modern, post-structuralist, and deconstructive approach to design, categories of behavioral information might finally become fundamental to
solving design's most difficult problem, the creation of a single integrative, spatial prototype accommodating affordance aspects of multiple "places" or "settings".

4 A NEW SETTING FOR S.A.L.T. ON THE UNIVERSITY CAMPUS

The programming work sessions were held in a collaborative meeting facility designed specifically to support the GSS environment. Participants represented as many different kinds of student and staff users as possible. The facility (pictured below) seats twenty-nine meeting participants behind PCs with twenty-one inch monitors. Actual participation for the three sessions ranged between twenty and twenty-five individuals of mixed age and gender. The facility has three ten-foot diagonal public screens and the ability to broadcast any combination of PC, camera stand, 35mm slides, video tape, or closed circuit television onto them. All of this technology -- and room lighting -- is managed through a matrix control unit at the front of the room.

The programming sessions used GroupSystems GSS software which was developed at The University of Arizona and is now marketed commercially. This software consists of five collaborative programs which embody structured GSS processes. They are:

- **Electronic Brainstorming:** supports open-ended collaborative brainstorming processes;
- **Topic Commenter:** supports multiple parallel discussions;
- **Categorizer:** supports multiple parallel discussions and organization of information;
- **Group Outliner:** supports collaborative list and tree building;
- **Vote:** supports polling and ranking ordering of ideas.
The software requires minimal if any learning curve for the meeting participant, although the learning curve is rather steep for the architect/facilitator. As one of the researchers on this project had been a GSS facilitator for six years at the time of the study, facilitator learning curve was not a barrier for this study.

4.1 Strategies and Contents of three GSS sessions

4.1.1 Session One: Activities In and Discussion About Existing Setting, by Category
The goals of the first session were the introduction of meanings of the five environment/behavior categories and the evaluation of S.A.L.T.'s existing settings. The two and a half hour session was divided into two distinct components. First, views of the existing setting provided background for listing of activities according to category: wayfinding, visual & non-visual aesthetics, task-performance, territoriality and cultural expression. Activity listing was confined to a particular category as the group was facilitated through all five kinds of environmental behavior. A short verbal and slide discussion together with hardcopy definitions of each category preceded each of the five separate activities listing exercises. Group Outliner was used showing the participants only the name of the category at hand to which associate activities.
Participants generated 716 activity descriptions across the five categories in about an hour of work.

Second, following the listing of activities by category, participants engaged in an on-line parallel discussion which generated 286 comments about their activities and behaviors in their existing space. Photographs of the existing space were made available as an on-line reference during the discussions. While such photographs fell short of being a structured walkthrough for both listing of activities and discussion, they did serve to trigger participant recollections while sitting in the worksession. The session ended with an on-line evaluation of the meeting process.

4.1.2. Session Two: Discussion of Other Settings According to Categories of Use
The second session extended the understanding and potentialities of category layers to examples of environmental affordances built elsewhere. Again, we broke this session into five components spending about 20 minutes per distinct kind of environmental behavior. Each category contained six to ten discussion questions, each associated with specifically related captured photographs and graphics from external sources. Discussion questions grew out of literature reviews and analysis of participant responses from the first session. During each twenty minute category session participants were allowed to freely choose which of the questions they wished to respond to. Software allows the participant not only to freely choose questions but to scan all the questions to see where the most active discussion is occurring (among simultaneous conversations).

For the two wayfinding questions there were thirty-seven comments; for nine visual & non-visual questions, 143 comments; for sixteen task performance issues, 336 responses; for ten territorial questions, 163 comments; and for nine aspects of cultural expression, 181 contributions.

4.1.3. Session Three: Discussing and Deciding Emerging Issues in Context with the Site
The third session now focused on potential decisions about the new S.A.L.T. environment. GSS discussion was accompanied by computer generated views of the proposed site projected on the lab overhead screens. No on-line images were used in this session. After analysis of the discussion immediately after the session, a hardcopy questionnaire was distributed to obtain quantified responses to those issues most clearly defined.

In the lab session the group first attempted to refine issues in visual & non-visual aesthetics, territories, and cultural expression. Multiple issues and prompt questions were posed for each category. In this session participants were allowed to freely select interesting topics and conversations in all three categories, generating 183 comments in total. For the second half of the lab session, the focus was on task performance and wayfinding. About half of the task performance issues were
associated with particular job descriptions for the staff. Participants were asked to be certain to discuss their appropriate set of questions, while again being able to scan and contribute to all simultaneous discussion in the two categories. 191 comments were added in this half of the session.

The hardcopy questionnaire distributed three days after this session asked participants to rank agreement or disagreement to a specific question on a scale of one to seven. Each behavioral category had from fifteen to twenty-five questions.

4.2 Examples of ongoing data files according to category

4.2.1. Wayfinding

Our first session generated a list of 115 wayfinding activities, most of which identified specific users and destinations in the existing building. Scales ranged from finding the exterior entrance from points on campus to locating public functions, bathrooms, copiers, etc.. The following prompts were given in hard copy form to the participants prior to this session.

- Where is the building?
- Where is the entrance?
- How do certain people find their destinations in the building?
  - a. Different kinds of offices?
  - b. Classrooms/Labs?
  - c. Storerooms?
  - d. Restrooms?
  - e. Emergency exits?
  - f. Accessible routes?
  - g. Food?
  - h. Social spaces?
  - i. Tutoring spaces?

In the second session it was difficult to find specific wayfinding diagrams for similar organizations in the literature. A couple of images of corporate reception desks evoked some discussion. Unfortunately such holistic concepts of "place" do little to inform us of patterns of fundamental spatial sequences of wayfinding in comparable kinds of settings. While a certain amount of wayfinding research exists, it tends to be focused on specific aspects of this behavior rather than mapping the entire range of routes outlined in the applied approaches of Passini.

With images of the proposed campus site as visual background, the third session was able to expose a few important wayfinding issues, though more about finding
important public entrances from the campus than specific locations within the building. To a large extent these latter will be tested during the design process itself by reviewing the initial list of destinations (and other new ones) against an actual architectural prototype. The questionnaire portion of the third session provided very little solid direction for the six questions posed. The following discussion was more interesting in its development of a good background for the distinction between reception area as a wayfinding necessity and as social "greeter" or "gatekeeper" for the organization, i.e. between wayfinding and territoriality. These issues can now be discussed independently and in relation to linked affordances in the rest of the environment. The notion of "reception" as place has been "deconstructed" as it were.

4.2.2. Visual and Non-Visual Aesthetics
A certain amount of education about distinctions between affordance layers took place during the listing of activities and open discussion of the first session. This was both true and intentional for all categories of behavior. While the far greater number of responses of the activities list clearly identified "aesthetic" issues (as presently defined), the odd territorial, task and expressive meaning comment can be found among the total of 152. Our prompt hardcopy prior to this portion of the first session:

**Visual Aesthetics:**
Is walking to or around the "building" visually interesting?
When should I have the opportunity to see visually stimulating things?
   a. when entering the "building"?
   b. when generally walking through the interior spaces?
   c. when using the restrooms?
   d. when using the copy machines?
   e. when sitting at my desk?
   f. when sitting in a classroom?
   g. when using the computers in the lab?
   h. when participating in a tutoring session?
   i. when socializing with a group?
   g. when riding an elevator?
   h. when eating lunch by myself.
How will natural and architectural aesthetics be important to the above activities?

**Non-Visual Aesthetics:**
Do I want to open my office window to smell a fresh rain, or other positive fragrances?
What negative smells do we want to avoid?
How important are textures of materials as a source of tactile interest? Are there important positive sounds—e.g. water, music— which should be considered? What are the negative noises we want to avoid? When and where will it be pleasurable to feel the effects of cool or warm climate? Unpleasurable?

There was no shortage of visual images to choose from for the second session, even for eliciting discussion about sound, smell, touch, or temperature. In the open discussion session, participants were asked to discuss the following meanings, each associated with a graphic image or images:

1. Views of nature from working spaces
2. Contact with climate change
3. Access to natural sounds
4. The pleasure of outdoor courtyards
5. Building exteriors which reflect nature
6. Shaded and sunlit spaces
7. Interesting forms from the architecture itself
8. Interesting interior volumes and the role of plants inside
9. Roof structuring and skylights as source of interesting patterns

Thus in addition to many of the negative issues raised in the first session, the process begins to detail the positive aesthetic character of the new setting. Nevertheless, participants were far less interested in the strong architectural images of issue number seven. The fact that most positive issues involved natural form and phenomena, contrasted to stark architectural form, however interesting from the designer’s point of view, reflects research results about human preferences for the natural. This may be simply because most architectural form will have too much meaning in other dimensions of behavior, especially task performance or the social (territorial and expressive). While the designers can quickly read general positive or negative sentiments associated with discussion issues, the comments are very rich and to a large extent defy any quick evaluation of multiple side issues. Yet these are real verbatim comments by real users and will at the very least provoke the designers to consider some greater complexity of information within a particular affordance layer.

The questionnaire decisions and discussion of session three were able to develop quite conclusive information around several major themes which included: the kinds of landscape on the exterior (native desert), the orientation of windows away from direct sun, the retention of an existing courtyard of a close campus neighbor
(education building), the importance of interior landscape, the importance of window views of natural and urban scenes, and the restriction of smoking to designated exterior areas. Whether the designed environment will be interesting to explore, or the way interesting aspects can be accessed in relation to all other affordances, is still at this point in the process difficult to address. Like the ultimate test for wayfinding, with aesthetics as well one might further evaluate the first designed prototype by simulating movement through the spaces. Almost all published images of aesthetics are of course, still, pictorial, place-like views. We know from landscape research, however, that mystery and exploration through the environment can command considerable or even greater attention as well.

4.2.3. Task Performance

Most American office workers, whether staff, professional or executive, think of work environments almost exclusively as settings for the performance of work. Wayfinding is part of getting the job done, as is usually top-down supervision and territoriality. Usually the only legitimate aspects of aesthetics or symbolic expression are used to present the organization's "front" or "public" image. The list of activities, discussion and other information for task-performance in the present research nevertheless is about the same as other categories. This is probably because of relatively equal time allocated to each kind of affordance. Activities of the first session task-performance list can be very detailed, yet often without clear indication of how the activity is or is not supported by the physical environment. Aspects of the discussion of session one begin to focus on issues at the organizational scale, leaving perhaps unanswered questions about individual workstations or more unique work patterns. The hardcopy prompts asked for responses for both workstations and spatial adjacency relationships:

(all issues have an "accessible" and "expandable" consideration):
What are all the different kinds of workstations (activities)?
   a. individual "desk" activities (various)
   b. conferencing in groups larger than two or three
   c. tutoring in different size groups
   d. using a computer individually and with others
   e. participating in a class
   f. storing goods and equipment
   g. copying
   h. using the restroom
   i. cleaning up after physical exercise
   j. preparing food
   k. waiting for an appointment
   l. delivery/garbage pick-up areas
What are the critical adjacencies between workstations?
Do supervisors require visual control of employees in order to supervise tasks?
General building-wide activities
  a. entering and exiting under critical conditions (doors, elevators, stairs, etc.)
  b. moving goods
  c. cleaning and servicing the building
  d. avoiding accidents caused by the physical form of the building

The issue topics of the second session were derived from both the larger issues of the first and from evaluation literature, particularly the BOSTI studies (1984). Participants were asked to discuss the following work process issues, each of which had accompanying plan and photo graphics of other existing or hypothetical environments:

1. Independent workflow
2. Sequential workflow
3. Team workflow
4. Open landscape vs. individual offices
5. Recent concepts from Europe and elsewhere
6. Variations of individual offices (workstations)
7. Group conference and break areas

The decision questionnaire of the third session established multiple issues, again without really addressing small scale or ergonomic aspects of specific workstations. The group clearly preferred, for example: clustering rather than distributing tutoring throughout the facility, the need for conversational privacy in office workstations, common amenities for staff and professionals alike, natural light for workstations (offices), a waiting area for students to be tutored, no day care space, no need for showers or changing rooms, etc. Beyond some thirty-three task issues on the hardcopy questionnaire, the lab discussions were organized according to specific functions, e.g. tutoring, using the computer lab, administering, admitting, counseling, coordinating tutoring, computer support and general building activities. Participants responded primarily to their particular role or activity. Several prompt questions were given for each major activity. In the case of tutoring, for example, participants were asked about: using systems furniture or private rooms for tutoring, characteristics of group tutoring, the use of undesignated common spaces for tutoring, visual supervision of tutoring by supervisors, control of tutoring areas, linkage to tutoring coordination,
etc.. This extensive discussion, while not definitive, is extremely rich as an ethnographic slice of office organization.

4.2.4. Territoriality
In most American organizations issues of social hierarchy, equality and identity hide behind an ideological veil of "function". The size of individual offices, location, views of workers and the like all will commonly be explained in terms of their task performance utility. In reality, American offices in particular are extremely territorial with a constant play for more and better positioned space. The negative aspects of what is essentially a social order in constant evolution is recognized by management consultants and researchers (Stone & Luchetti 1985). Currently the ideal office of the future eliminates plays for territoriality either through the diminution and standardization of size and increase of mobility in workstations, or the preference for virtual work space over the real. As we will see below, when participants are allowed to decide these issues themselves, the choice is clear. To elicit these purely social issues, the following prompts were provided, again as part of the first session:

How much is the setting controlled (daytime, nighttime security)?
   a. public areas?, private areas?
   b. areas where potential for theft exists?
   c. exterior spaces?
Do territories signal relative power between individuals or groups?
   a. do locations, space allocations, furniture or windows indicate status?
   b. does the location or massing of the building suggest importance or status?
   c. do supervisors require visual control over employees to express authority?
Should there be spaces, at different scales and locations, which encourage free, spontaneous and primarily social interaction among users?
   a. Who participates in which spaces?
   b. Inside and outside, above and below?

The list of activities of session one reveals, not surprisingly, an extensive set of occasions commonly understood as have primarily social as distinct from task performance significance. Eating lunch with workmates, making small talk with students, conversing in the bathrooms, dropping by the "front desk" or water cooler, and most of the 120 listed social "situations" clearly referred to the separate affordance layer of private, hierarchical or neutral territories. Discussions during the first session were immediately interesting.
The graphic images of other places which formed the basis of discussion in the second session were labeled as follows: gain, participants were free to jump to whichever discussion interested them most:

1. Territories in the open landscape
2. Power corners
3. Little rooms (individual offices) and big rooms (shared)
4. Socializing in the office pool, in conference rooms
5. Special spaces for socializing
6. Eating together
7. Socializing and eating outside
8. Parties at work
9. Dining together as a special occasion
10. Annual or special celebrations
11. Reception as welcoming activity

By the third session a number of socially important issues could be decided upon in the questionnaire: there should be a reception person, everybody should have an exterior window (not used as status sign), the size of one's office should not correspond to social status, no lounges are necessary in the restrooms, it would be good to distinguish between conference spaces for work and other spaces for social activities, etc.

Discussion themes for the third session focused on "waiting", "eating/drinking/smoking", "social status", territorial separation between departments, restrooms and lounges, conference and social spaces, and openness to people outside of the organization. Sub-questions were posed for each. In "waiting", for example, the experience of visiting parents and students to admissions is queried, together with the possibility of tutoring waiting being close to major student social space. Another waiting issue discussed involved the possibility of a special, separate or more formal entrance for visitors, distinct from an "everyday" student and staff entrance.

4.2.5. Cultural Expression

Not unlike architecture students and practitioners, users as well need to develop an understanding between intrinsic (visual and non-visual) and extrinsic "aesthetics". During the first session the most common misrepresentation of "cultural expression" was the inclusion of intentional decorative aspects such as color coordination, plant materials, furniture form--things with clear visual aesthetics but without any symbolic or social meaning. Still, the majority of the activities listed and the related discussion of the first session corresponded to the hardcopy prompt:
What is the relationship between the history and overall "belief system" of S.A.L.T. to other social groups (benefactors, campus neighbors, community, country); how should this be expressed architecturally (special entrances or event spaces, facades, historical association)? Will it be possible to associate different beliefs or values with different areas within the new building; will common spaces express special unifying S.A.L.T. values? What kinds of group activities (parties, ceremonies, rituals) express important beliefs? Where do or might these occur? Should a distinct architectural "style" exist to communicate a particular philosophy or discourse? Should architectural metaphors attempt to associate certain meanings to aspects of the S.A.L.T. setting.

Most of the images used to elicit discussion in the second session once again were of "objects", this time cultural or symbolic. Certainly some are clearly associated with territorial locations and position within some larger built and natural landscape, and perhaps a few with ritual sequence. In very traditional environments, we recall, in spite of the clear threshold demarcation of symbolic "domains", it is the formalized relationship between domains which achieves the greatest expressive effect, i.e. during ritual movement. These sequential meanings of traditional space are seldom represented in the literature on historic and prehistoric form, not unlike territorial structuring or positioning. Much of our discourse on history relies upon the description of built objects rather than of specific human use of environment as symbolic information. In spite of the obvious "object" and "place" characteristics of the following issues of session two, one goal of future sessions is to develop a cognitive awareness in the participants of possible sequential meanings in the expressive layer:

1. Places to commemorate or express group values
2. Using art and design to express taste
3. Special areas to receive special visitors
4. Environmental art as metaphor
5. Attached images
6. A high-tech image?
7. Post-Modern philosophy?
8. Reflections of nature or the Southwest
9. Images of the University of Arizona campus and education

It is probably true that many U.S. organizations—recent literature about "corporate culture" notwithstanding—really do not have well developed, specifically evolved
subcultures. Thus the discussion in session two didn’t clearly define shared values, or the expression of such. While administrators may have wished there was a greater cultural cohesiveness, other participants clearly stated the lack of such, without any negative connotation. Even though the conventional beliefs about U.S. work as "work" rather than "social" or "cultural" seems less evident in the S.A.L.T. organization, other more indigenous beliefs do not seem to be developing. For one thing the organization is recent, and people haven’t really had the opportunity to express themselves in their own environment. Somewhat paradoxically, given the admitted absence of unique organizational values, they emphatically did not look kindly on the use of form for the promotion of larger national or international philosophies by architects.

To a large extent the questionnaire of session three established as much of what the group didn’t want as what it did. The building should express the unique primarily natural aspects of the Southwest, with some reference to University of Arizona tradition and S.A.L.T.’s existing setting in the most historic building on campus. It shouldn’t be high-tech or postmodern. In terms of indigenous S.A.L.T. culture the only aspect present was the desire for some location to display donor plaques, student and staff recognition, SALT history, etc. Discussion here was focused on major themes with again two or three sub-themes associated with each:

- Vestiges of Old Main and relationship to the Southwest
- What are the values that SALT wants to convey or showcase?
- Bringing guests into SALT

As an organization, it appears from the discussion of cultural expression that for this fairly recently formed group, SALT is a locus for work first and foremost, even though "task-performance" itself really isn’t a strongly conventionalized belief. Most use of symbolic expression has to do with the organization’s presentation of itself to the campus or special visitors. It is clear that participants do not see any extensive amount of formalized socio-symbolic activity as necessary to the maintenance and continuity of internal aspects of what they do. They are in fact a service organization, where skilled professionals work primarily with individuals or small groups of students passing through the university system. Thus the primary relationships, between tutor, counselor, administrator and student, are more transient and really external to the longer term relationships among staff. Because permanent staff really don’t produce a "product" as a group or team, relying more facilitating relationships with students, there may be less need for cultural expression to support long term relationships among work groups.

5 NOTES ABOUT PROCESSES AND RESULTS OF THE FIRST PHASE
5.1 Successful and Problematic Aspects

5.1.1 Debriefing From the Three Sessions
In session one, the listing of activities relative to the existing setting was very successful. While all participants were stimulated by the open-ended discussion which followed, some felt the need for greater structure. To a degree the first session replicates a pattern not unlike the “walk-through” in conventional architectural programming. In addition to actual content collected, the greater participatory aspects of the GSS process allowed individuals: to reference behavioral definitions during the “walk-through” much like a “help” menu, to have greater choice in the scanning and selection of aspects of the setting of interest to them, and to experience greater opportunity to freely contribute information to a simultaneous data base (whether activities list or open discussion).

Debriefing after this first session was uniformly positive in tone. Photos of their existing might have been graphically larger or more detailed, and more comprehensive (ultimately it would be ideal to have a video of all settings which could be scanned by participants; they could associate comments in the data base with any position in the film). Not unlike subsequent sessions, a number of participants felt frequently rushed when trying to adequately respond to all the issues in a limited amount of time. This problem appears to increase in following sessions where the refinement of relevant issues, the number of which keeps growing nonetheless, creates a demand for more specific responses. Certainly one the corollaries of participatory work is the increased demand for quantity and quality of information.

the second session debriefing clearly showed happy but increasingly tired “campers”. While most were stimulated with the photos of affordances in other existing settings, a few felt some contents were too idealistic or unrealistic in terms of S.A.L.T.’s probable future environment. The definitions of categories seemed to be quite well understood through the second session, though a couple of participants wished to arrive at the questions or issues within each category by group brainstorming (rather than having them predetermined by the researchers). Since the discussion choices in the second session were more tightly organized than the discussion portion of the first, few if any debriefing comments spoke of inefficiencies of process.

Because of the hardcopy questionnaire which followed the third session, no on-line debriefing took place here. Several verbal comments after the session, however, expressed a somewhat decreased level of interest because of the lack of graphic information associated with the issue discussions (only constant bird’s eye views of the proposed site on campus were displayed on the large screens in front of the room, not on-line). This would appear to have less to do with interest in visual images per se, than the expectations which participants brought with them to the third session. Having
moved from existing to other settings in the two preceding sessions, one would logically expect to see more visual complement of issues now clearly addressing the design of the future S.A.L.T. "building". A few constant views of the site context alone was neither sufficiently interactive nor specific enough relative to many of the now well focused issues. In spite of these problems, the overall verbal responses were again quite positive, and the number of good decisions made with the follow-up questionnaire seems very productive at this stage of the process.

5.1.2 Size of the Group and Software Limitations
Small group literature suggests that effective group size for activities such as programming is less than twelve people. We were able to work with groups as large as twenty on this project and anticipate that the number could have gone as high as our room capacity (twenty-nine) without losing any effectiveness. We did learn, however, that the amount of information stimuli put in front of the participants would impact the amount and quality of interaction the participants would experience. That is, both the number of parallel questions asked and the presence or absence of visual stimulation would moderate whether the participants would simply answer the on-line questions posed or would engage in conversation with other participants. Other research (Mittleman, 95) suggests that group size moderates this relationship as well.

Additional software development is needed. The GSS tools used are multi-purpose tools used for all sorts of collaborative groups. We uncovered specific design programming needs which beg the development of additional software. We had a desire to automatically map visual images with text discussions. The software did not do this mapping so we had to teach the participants to manually make the mapping. We had a desire to create a matrix structure of discussion topics with a separate discussion folder for each cell of the matrix. While the software supported discussions folders on nodes of trees and lists, it did not support folders in nodes of matrices.

5.2. Logical next steps of the second phase

The very large amount of information produced by only three sessions (and hardcopy questionnaire) has particular significance for the continuation of the process into design and after. much data remains still in a "discursive" form without clear programmatic definition or resolution. Yet the number of concrete issues still probably equals or exceeds those of conventional processes, with of course the added confidence of having been arrived at through much more participatory means. the rest of the really non-quantifiable data of the one hundred plus pages of discussion probably best exemplifies the true "complexity and contradictions" of multi-layered environments. its usefulness remains to be developed in the second phase. Again, the reason for the two phases of
the project is due real world contingencies rather than conventional distinctions between "programming" and "design".

Returning to earlier discussion about holistic vs. stringy structures of behavioral knowledge, it seems probable that in addition to the mentioned hindrances of "typological" thinking about environments, conceptual professional distinctions between programming and design may as well be caused by the same. If typical programmatic information exhibits primarily "place" association—begging the question of theoretical or historical typologies—then the lack of sequential spatial patterns so essential to the development of design prototypes appears to cause designers to be less interested, less convinced about programmatic content. They may return to test design prototypes against place associated affordances, but program will not lead directly or smoothly into design, and ultimately much significant behavioral knowledge. In an ideal world, the kind of spatially based participatory process we have been experimenting with would continue largely uninterrupted through design and even eventually into some evaluation. Users will be there at every step of the way.

5.2.1. Testing architect generated schemes for affordance "layers"
We can think of the computer based cyberscape of the future SALT facility as an evolving series of spatially based affordance maps. Then in addition to deciding about discrete quantifiable issues, this cyberscape can logically integrate with the creation and evaluation of design prototypes. The sessions of the second phase will depend heavily upon the participation of some actual design team. It is possible, as evident in previous academic studio experimentation, to design actual prototypes where the emphasis is on only one level of situational content. While the importance of any particular affordance will vary with the kind of project, in many cases the inherent spatial basis of each kind of information can be relatively easily translated into five different schemes for the same project. The probable goal of the next session (beginning the second phase) will be to evaluate five different spatial designs for the site, one for each category of behavior.

This session will additionally begin to build a truly spatial understanding of site potential in the minds of the participants. Moving now into the most clearly spatial aspect of the process, graphic communication of space becomes one of the most problematic of concerns. These necessities themselves will undoubtedly demand independent research consideration. When one is convinced that the participant is really cognizing the spatial reality of a particular volume variation of the actual site (modeled in 3-D applications), then it will be possible to pose a series of questions in GSS context.

5.2.2. Testing composite design schemes
After what is essentially a pre-testing or evaluation of categorically different site schemes, the design team would be charged with creating a single composite design which again would be 3-D modeled and evaluated in a GSS session. The composite would of course be tested according to the affordance layers: wayfinding routes to known destinations by different users, opportunities for aesthetic experience or exploration, task-performance adjacency and accessibility, territorial control and positioning, and the sequences of formal or expressive events.

At this point one can only speculate about the need for additional sessions in the lab. Certainly the initial composite prototype would require design development and probably additional discussion. Many smaller scaled "workstation" issues would have to be addressed, perhaps just as easily with hardcopy "memos" and replies. Ideally the information platform for the entire process would allow immediate networking between client and professional at all times. Thus in addition to the formalized sessions, the affordance structured data base could be added to or amended at any time.

It is also not unreasonable to assume that such a continuous process would more naturally encourage post occupancy feedback. It is essentially the clients who would own and continue to maintain the database. Such could be more easily added to by the now well educated users themselves rather than relying upon new and expensive contractual relationships with another set of professionals. If such data bases could become available in the public domain, the opportunities for immediate integration into other design processes, as well as more specific research would be greatly enhanced. We would have much better content for "second sessions" (of our first phase), particularly in our ability to show examples of affordance strings rather than just images in other built settings. Given the conception of designer as creator rather than facilitator, at least in the U.S., the professional sharing of affordance content may not be immediately embraced by the majority.

6 REFERENCES


