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"In MY situation, I would dislike THAAAT!"

Role Play as Assessment Method for Tools Supporting Participatory Planning

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ABSTRACT
The transitory nature of some participatory planning settings means that traditional PD methods are not feasible during early stages of technology development. Role-play represents a promising technique for addressing this situation. We present our experiences in using role play as a participatory assessment method on two variants of a system for participatory planning. We summarize system-related assessment results and discuss limitations and potential improvements of this method.

Keywords
role play, assessment methods, PD, system design, urban planning, group support, graspable interfaces

INTRODUCTION
Tapping into the perspectives of those most affected by a new artifact or system is predicated on having users and a practice that are accessible. However, creating support for participatory design groups whose very nature is transitory represents a challenge for system designers. Such groups are virtually inseparable from the context of the specific problem they have convened to resolve. They have their own timelines and often focus on short-term goals, not on helping the research process or future groups by participating in the development of support tools. The nature of research software development has an impact on this process as well. Research prototypes are not generally ready for real situations because they "lag behind" in terms of capabilities, depth, usability, and stability–and they risk getting in the way of real tasks.

This does not mean that we cannot draw on the insights of participants. Initial knowledge about the domain and typical problem issues is needed to develop a reasonable prototype. As examples, we have profited from the observation of previous activities in participatory neighborhood development [1] and cooperation with urban-planning professionals.

USING ROLE PLAY AS AN ASSESSMENT METHOD
To assess two different prototypes of a system supporting citizen participation in urban planning, we decided to develop and use a role-play scenario. By recruiting subjects to play roles in a problem-solving situation using our support technology, we intended to test the systems under close-to-life conditions, to gather concrete ideas for further development, to collect user feedback and to evaluate the usefulness of user interface concepts (e.g., tangible/graspable interfaces, augmented environments).

The decision to use role play was motivated by the following considerations. Real situations will be ill structured and result in conflict. We wanted something that brings out these aspects along with emotions, context, and perspectives. Contextualization is important to make participants behave ***as if*** the problems were real and relevant, to avoid abstract, rational-problem-solving behavior. Because usability in group interaction is likely to differ from single-user usability, we wanted to start right away with group situations, identifying salient features and generating ideas. Role play based on concrete scenarios seemed a promising method to meet these concerns.

The Use of Role Play in PD
Dramatization is a form of experiential learning, that provides concrete and immediate feedback, while remaining in a safe environment [6]. Whereas standard role play consists of an initial scenario and given roles that can be freely enacted, other types of role play may have prescribed structure representing models of possible real situations with a "game-master" introducing events and guiding the manner in which the game unfolds. Role play needs some trust and ease of interaction in the group. It has been used in PD, often as part of Future Workshops, in the form of organizational games [7], as a participatory invention/envisioning method for future technology [9], or

as dramatic vignettes to stimulate discussions in focus groups [10].

In comparison to other uses of role play, we prescribed a scenario with given goals and used a working prototype instead of mock-ups. Our primary goal was to gain insights into usability and applicability of the technologies, making our approach close to user-centered design approaches. The role players' experience was essential for the discussion following the session, providing participants with deeper insights because they have experienced the technology first-hand in an engaging and goal-oriented situation.

THE SYSTEM STUDIED: THE EDC

The *Envisionment and Discovery Collaboratory (EDC)* is a prototype of an integrated environment for supporting heterogenous design groups and community participation. Building upon physical, game-like methods in participatory neighborhood development, the system is inspired by the game board of physical design games, but augments the tactile, physical game pieces with the dynamic capabilities of computational simulation (see [2]). The EDC can be classified as an augmented environment and, because of its focus on tactile, physical game interaction, as a tangible (or graspable) user interface (see [3,11]).

Individuals using the EDC convene around a computationally enhanced table where constructive design activities take place. Participants create and manipulate the computational simulation projected onto the surface by interacting with physical objects placed on the table. Our assessment study focused on two different implementations. One uses a horizontally mounted, touch-sensitive SmartBoard™ electronic whiteboard (Figure 1). The other uses the Participate-in-the-Action Board (PitA-Board—see Figure 1).

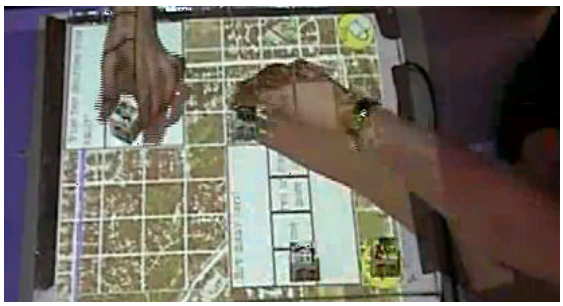

Figure 1: Interaction with the PitA-Board

Figure 2: EDC-SmartBoard Version

The SmartBoard provides an interface similar in large part to a high-resolution touch screen with a single cursor along with sketching pens and a sketching mechanism. However, the touch-sensitive surface does not support true parallel interaction. The PitA-Board [4] was developed by the EDC team at L^3D as an alternative interface to overcome these limitations. The underlying technology consists of an 8-by-8 grid of 2-inch squares that can sense the location and identity of 15 distinct transducers. These transducers can then be imbedded in physical objects, allowing for multiple cursors and simultaneous interaction. The PitA-Board ability to track tokens complies with the definition of graspable interfaces [11]. In the assessed version, two grids were assembled in tandem to form a larger board.

APPLICATION OF ROLE PLAY TO THE EDC

To understand many of the issues faced in the design of the systems, our assessment was targeted on insights at several levels: usefulness, usability, interaction design, group interaction, and applicability to realistic tasks and group interaction. We decided against locating a specific neighborhood group and an actual problem and elected to engage subjects in role-play. The research team adapted a transportation scenario previously used in our research and fleshed it out with details appropriate to the capabilities of the two systems. A set of roles was developed for the participants.

Subject Selection

We recruited two sets of subjects (one for each system). We succeeded in finding participants who were not well versed in the computing, public-transportation, or urban-planning domains, including people from outside the university. The SmartBoard group, two men and three women, was well distributed in age (from early 20s to late 40s), and represented diverse life experiences, including a mother of teens. The PitA-Board group consisted of: two female and one male undergraduate students and one 50-year-old local single mother.

We held two sessions during the first week of November 2001, staged as neighborhood meetings, with the research team playing the roles of technical and process facilitators. At the end of the sessions, we engaged the groups in discussions aimed at gathering their impressions, responses, and suggestions. Each session (including the follow-up discussion) was videotaped for later analysis with the consent of subjects. The researchers shared initial impressions and watched the videos individually and together during subsequent days.

Scenario

The scenario was the following: Transportation planners have decided to redesign an under-used bus route through a local neighborhood to better serve the needs of the residents. The bus route may be expanded or re-routed. Planners determined about 5 minutes slack in the bus schedule and identified appropriate streets. Interested neighbors are called together to propose an improved route and bus stop locations.

Subjects convened around the boards, which showed a map of Gunbarrel, an outlying neighborhood in Boulder, with major streets highlighted. The subjects were allowed to choose from role cards describing personae that spanned population groups with different needs such as: a college student, a young working mom, a couple in their fifties with teenage children, and 75-year-old grandparents. The session was patterned into different phases.

Phase 0 introduced participants to the system and gave them a chance to get familiar with the task, the map, the system, and the interaction methods.
Phase 1 allowed participants to place their house tokens onto the map and fill out surveys about their personae while introducing themselves to each other.
Phase 2 was a deliberately open-ended discussion, giving group process a chance to evolve. All facilities could be used. Both groups started to discuss options.
Phase 3 asked how far participants would be willing to walk to a bust stop under ideal conditions. The chosen distance was immediately displayed as a translucent colored circle around houses. The intersection of circles was highlighted.
Phase 4 asked about less ideal conditions that might change the preferred walking distance.
Phase 5 consisted of the final discussion about the bus route and placement of bus stops (maximum 8 stops).

OBSERVATIONS, PROBLEMS AND EXPERIENCE

Our observations were exploratory and open to emerging themes from repeated video viewing. The results span multiple issues, including underlying technology; physical, interaction, and task design; facilitation; and role-play.

Group interaction and session length differed greatly. The SmartBoard group interacted successfully with the system, cooperating intensely while arguing opposing opinions, even though they experienced several technical breakdowns. The group using the PitA-Board, however, did not get into role-play; their interaction was slow and full of pauses. Nevertheless the assessment sessions provided us with a wealth of observations and lessons to learn. For example, we found that in the PitA-Board variant, the reduced size of the game board, the small number of interaction objects, and the missing sketching facility did not invite enough interaction or foster a creative and exploratory mode of problem solving.

Sketching had been a very important feature of the SmartBoard version. Redoing sketches helped participants build a shared understanding, visible in fluent interaction and shared drawing. Missing, however, was the ability to save and recover sketches. In contrast, the PitA-Board group could not sketch, and relied on talk, gestures, and the map. Drawing the final bus route demonstrated a weakly shared mental image, with long pauses in-between. All participants liked the visualization of walking distances. They said, in the subsequent discussion: “that was a nice little feature, you see the hot spots.” Other simulation facilities (e.g., animation of a bus) did not offer much support. Nevertheless, we were inspired with ideas on additional features, for example, answering some recurrent “what if” questions such as: How much time does the new bus route take? How much time does each bus stop add?

The SmartBoard induced cooperation simply due to its size, because participants needed to help each other in order to complete tasks. On the smaller PitA-Board, everything was within easy reach. In addition, the projection extended a bit over the edges of the board. This appeared to inhibit people from intruding into this space. While the SmartBoard was *inside* people’s personal space, touching the PitA-Board became a more explicit action.

The assessment indicated that the inability of the Smartboard to handle parallel manipulations produced serious disruptions. But parallel action by itself does not guarantee cooperation. Indeed, system characteristics (e.g., size, distribution of resources) that compel people to help each other or to coordinate actions may contribute to the evolution of group awareness and feeling. The sessions provided us with intricate insights concerning interaction design for graspable tokens. We had to realize that these tokens were superfluous and tedious in the case of the SmartBoard. Yet the sensor-equipped graspable tokens of the PitA-Board made interaction very intuitive and enjoyable. We developed many ideas for how to improve interaction design, in order to heighten the amount of interaction with tokens, to improve their representational value, and to better exploit their graspability (for details: [5,8]). Our observations inspired us with many ideas, which have in part already been realized. Results confirmed our decision to search for alternative basic technology, but also taught us that it is the details that make the difference.

Results in Terms of Methodic Issues

Facilitation and Task Design

In our design of the session, we decided to act as technical facilitators, as needed, to make participants aware of system features. However, this approach might have several effects: intervention of a facilitator could disrupt ongoing conversation, using more system features might

slow-down the process, or the process might get driven by what the system supports rather than the task at hand. Indeed, some differences in observed group behavior can be traced to facilitation. When the SmartBoard facilitator demonstrated filling in the survey, he said: "I am XXX and own a car." Most people in this group imitated this. The other facilitator did not talk much and emphasized being able to work in parallel. People in that group immediately did as told, acting in parallel and not talking. During phase 0, we missed opportunities to make participants experiment with the technology. The facilitator showed how to use several tokens, but only once encouraged the participants to try them out. More actions could have been explicitly delegated to participants instead of demonstrating them. Our lesson from this is that we must think in greater detail about our facilitation approach and opportunities for involving people early. One way to do this is to simulate the session within our design team, tape it, reflect on it, and collect ideas about alternative actions. This would train facilitator behavior and sensibility, plus making facilitator behavior across sessions more consistent.

Our goal had been to create a task that would be difficult and ill-structured enough to generate some conflict. Yet we needed a manageable, narrow slice of such a task. Earlier cooperation with the transportation department gave us an idea of such typical decision situations and influencing factors. However, both sessions experienced few conflicts or trade-offs, and a general idea was developed quickly. This idea was only slightly different in each case because only a few minor variations were possible based on the map given. For further studies, we need scenarios that offer more alternatives, trade-offs, and conflict.

Role Play

The SmartBoard group became very involved during the session. They quickly started appropriating roles in lively ways: "Well, being a single mom [points at her house] and getting my kid to the bus stop is not THAAAT easy" or from another person who objected to a proposal: "In MY situation, I would dislike THAAAT [points at her house]. I would need to go into the bus, go up AAALLL the way up here [points along road]." This group invested a lot of effort to evaluating consequences and exploring alternatives. This is very different from the other group which rarely talked in the voice of the persona they had chosen to play and did not become engaged. Some remarks indicate that they interpreted the situation as requiring rational problem solving. For example, they asked at the end: "Are there any more phases?" and often: "Are we allowed to XXX?", which we interpret as a desire to find *correct* solutions. But even as rational problem solving, the design process lacked depth. There was little weighing of advantages and disadvantages, and final bus route drawing revealed uncertainty whether the solution idea was shared. Participants seemed to be evaluating ideas silently; ideas were not publicly criticized and scrutinized.

The age of the participants may have contributed to this behavior. The ability to role play effectively (beyond fantasy role play) may be linked to maturity because it requires the ability to take perspectives and shift between different roles and personae. Since most participants in the PitA-Board group were young, they may have been unfamiliar with role play and lacked life experience for the roles of older personae. In addition, undergraduates are accustomed to school-like situations that require producing "the right answer." As a result, and furthered by the videotaping of the session, they might have felt observed and evaluated. In fact, it was often the only older person in this group who broke the silence.

The literature on role play has often noted, that role play can make participants feel uncomfortable, because it may trigger previous, unpleasant experiences [6]; it needs an intital amount of trust; and it may be unfamiliar as a method. This points to the need to invest more energy into making participants feel comfortable. It also seems reasonable to avoid using undergraduates as subjects.

Role of Subsequent Group Discussion

After the role-play session we initiated a discussion. For some aspects, especially the role of graspable tokens, we had to ask explicitly, but managed to initiate lively discussion. We also asked for feedback on some ideas for improvement. Participants suggested improvements as well. Most of the major insights we gained from the videos had already been hinted at in these discussions. Whereas subjects' impressions and ideas were very important and in fact focused our subsequent video analysis, this feedback was not taken as a definitive indication that particular features should be added or modified. Rather, both feedback and observations were used to plan the next design steps, which might take the form of new features or experiments aimed at testing hypotheses to clarify design choices.

Not taking participants feedback as definitive evidence may at first sight contradict our intention of participatory design. But subjects' impressions reflected their specific experience, including design flaws, the particular group process, and individual backgrounds. Subjects judged our ideas based on this experience and could only partially imagine how a different system design might have changed the process and interaction experience. In particular, participants seemed to refer to prior experience of WIMP interfaces and GUIs, which implies interaction concepts that we deliberately want to avoid.

LIMITATIONS, LESSONS, AND FUTURE OPPORTUNITIES

Although differences between the groups do not allow strict comparison of group interaction across different

media, the assessment sessions and discussions provided us with a wealth of observations and lessons learned. The use of role play, although still a considerable distance from the desired user communities, provided us with insights that allow our systems to improve. Some of these insights can be translated into system improvements right away, other issues ask for detailed, systematic evaluation. The study shows that role play is a fruitful method for early stages of system development.

Improvements to the Method

We feel that role play can play a valuable part in a larger participatory design process. This can consist of a range of assessment types, which address issues of different scope: (a) Some issues can be assessed with standard usability tests in isolation. (b) Testing in 'local' (lab) groups is appropriate to train and improve facilitation, and to test the role play scenario and parts of interaction design. (c) The next step, role play with external subjects, has been described here. (d) Another intermediate step may be useful before proceeding to completely authentic settings: to involve authentic groups (e.g., actual people from a neighborhood), while still using carefully chosen model tasks. (e) Finally, application should be extended to authentic groups and situations.

Issues of appropriate technology and design of individual interaction with representations can be addressed at the earlier stages. Group interaction with physical and virtual models, facilitation, and the role-play scenario should be tested within the local (lab) group. As we progress towards authentic situations, it becomes more important to support and model social interaction, realistic scenarios, (model) tasks and problem domain and finally the authentic tasks and problems. No specific order for applying these assessments will be the most productive in all situations.

Our facilitation skills and group process might have been improved by simulating the session within our design team first. However, given the limited time available, it was better to make progress than to spend more time perfecting the process. It may be advantageous to assess a system at an intermediate level. Thereafter, the design process can focus on the most relevant interaction aspects (in isolation) and identify specific issues for subsequent studies. Had we studied single-user interaction, neither the issues of sharing space, nor the effects of cooperative drawing, nor the importance of sketching for building shared understanding would have surfaced. In single-user situations, the size of the SmartBoard might have been seen as a problem, rather than as a potential advantage. Which simulation features might be useful become salient only after experiencing concrete group processes and specific needs. Some aspects of interaction, such as changing and drawing bus routes, can be tested in isolation. Whereas such issues might be visible in isolation, other facets will turn up only when evaluating role play sessions, thus demanding iteration.

CONCLUSION

Whereas an ideal design situation would work with participants, the challenges for involving transitory groups make this difficult. Therefore, we need to find ways to approximate this input to the design process. We found that role play provided a great deal of such useful feedback. These insights were better than an ad hoc approach or a standard usability approach focusing on low-level, isolated interaction techniques. By creating a context, our insights allow us to develop more appropriate interactions, which can then be tested and improved as needed. This allows us to focus on specific issues in future studies (see [5]).

We do not see that role playing is the end of the process. With continued work on interaction, facilitation, simulation, and other support, we plan to move to authentic participants engaged in model tasks and situations and refine our system to the point that it can be applied in truly authentic settings.

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