Everyday Life as a Stage in Creating and Performing Scenarios for Wireless Devices

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Abstract: Scenarios in HCI are widely used and discussed as written or visual narratives. In this paper, we discuss fruitful conditions for the creation and performance of scenarios particularly for the concept design of mixed realities or wireless devices. Designers are attempting new ways of engaging people in design and experiencing ideas in early design phases. Examples range from exploring scenarios using mockups or Wizard-of-Oz techniques, to testing scenarios with prototypes. In our design projects, scenarios were created and performed with participants following them in their daily activities. Discussing these sessions, which we called SPES (Situated and Participative Enactment of Scenarios), we highlight as promising conditions to create scenarios: the everyday life as a stage and the opportunity for participants to exercise reflection-in-action.

Keywords: Concept design; Participatory design; Performance; Scenarios

1. Introduction

Scenario based design is an established and widely discussed approach in the design and HCI literature [1]. Scenarios are short stories, descriptions about use of technology contextualized in a meaningful setting [2]. Scenarios are often used in practice-based HCI design to discuss future changes in practices, but they can also be used in describing completely novel practices made possible by new technology. An issue that is not often discussed is how scenarios are generated. What are the fruitful ways to create scenarios?

In emerging design approaches, scenarios are created in concept design activities. In concept design, which precedes interaction design and prototyping, ideas of products and scenarios are created and validated within user groups.

We review some examples where designers have attempted new ways of engaging people in design and experiencing ideas in early design phases. This includes user trials with Wizard-of-Oz techniques or prototypes, improvisational theater to explore future scenarios, or staged scenarios with professional actors to collect feedback. After the related work, we describe concept design sessions from our projects where scenarios were created and performed with participants following them in their daily activities. The aim is to contribute to the

design of personal technologies discussing promising conditions for the creation of scenarios. Describing and discussing these sessions, which we called SPES (Situated and Participative Enactment of Scenarios), we highlight two promising conditions: everyday life as a stage; and the opportunity for participants to exercise reflection-in-action.

2. Approaches in Generating Scenarios

One way of generating scenarios is to gather designers in a brainstorming session (for a well known example, refer to Tognazzini [3]). More sophisticated methods include the use of material from observations as a base for generating scenarios. A well-explained and established approach is Contextual Design [4]. In these approaches, and generally in the HCI literature, scenarios feature merely as written or visual narratives, although performing and inventing scenarios is not new to design (e.g. considering participatory design or the growing influence of other design areas in HCI [5]). The interest in new types of concept design activities, where scenarios are created and performed, is motivated by the growing research in new interfaces and technologies that go beyond traditional input and output devices. As we will experience these

technologies in a more physical way, compared to interacting with a keyboard, a mouse and a screen, our actions and their context in the physical world gain importance [6].

In the following we review works that document group sessions to create and develop scenarios. In all the examples, participants are engaging in performances in addition to verbal or visual communication. In a simplistic categorization, we can consider two aspects: first, sessions may be inspired by a direct contact with the world (the context) of the recipient of the design; and secondly, the recipient of design (prospective users) may have different roles from test subjects to more participatory roles. Based on these aspects, we present the related work in four types of sessions: (1) designers in brainstorming sessions, (2) designers' sessions situated in a real setting, (3) sessions with prospective users, and (4) situated and participative sessions. The sessions we describe and discuss from our project fall into the last type of sessions.

2.1. Brainstorming and bodystorming sessions

To explore scenarios and aesthetics, in Djajadiningrat et al. [7] the designers brainstorm in a group session using interaction relabeling, in which possible interactions with a known mechanical device are mapped to the functions of an electronic device to be designed. In another group exercise, they use extreme characters as users with exaggerated emotional attitudes.

Informance Design [8] is a visualization technique where scenarios are rendered as plays and interactive environments. Designers are actors who role-play users with simple prototypes in a staged user environment. "Informances, like user testing, are enactive and evaluative. Unlike user testing, they are intended to explore design ideas in ways that are generative rather than analytic."

Bødker [9] reports scenarios as a starting point for acting in design workshops. In this example, use situations are taken from the current work to stage the future action. Bødker stresses that a lot of effort is put into selecting the right situations out of many hours of video and observation. The real situations offer richness of detail, which provide useful triggers of thoughts.

The work that best explains possible connections between theater and design is presented in

Brandt and Grunnet [10], which is first inspired by the Forum Theatre of Boal [11]. Boal speaks about 'Theatre of the Oppressed', and it is applied in situations of political or social oppression. The techniques proposed by Boal are aimed at, among other things, turning the audience from passive to active participants, hence the concept of spect-actors. While using Forum Theatre, Brandt and Grunnet [10] also apply some improvisational theatre principles of Johnstone [12] as the importance of restrictions while improvising. Finally, they also refer to Stanislavskij, who created the most influential systems of training for actors. In developing electronic services for refrigeration technicians of supermarkets [10], they used performances to understand work situations and build up the characters of users. As a way of identifying problems and getting ideas, the design team also dramatized scenarios by generating cardboard mock-ups of tools. In another project, called Dynabook, aimed at developing concepts for electronic books, dramatized scenarios based on field studies were used in a brainstorming session. The scenarios were performed with reflective breaks where discussion occurred.

2.2. Situated Sessions

In Buchenau et al. [8], in an approach they call experience prototyping, the design team is investigating needs of passengers for a new rail service. The team, taking train journeys, explored different types of travelers in several situations (entering the station, buying the ticket, etc.). Each scene was introduced with a card containing the scene's rules, explaining the goal, and the role of players and audience.

Particularly interesting is the work of Steve Mann in the design of wearable computing applications [13]. Using performance art in public spaces, wearable computing is presented "in a deliberately unusual manner where it is left up to the people interacting with the device wearer to imagine the intent of the device". Designers interpret the reactions and comments of the public when they interact with the device and the wearer.

2.3. Sessions with prospective users

In these sessions, prospective users may have the role of audience (test subject) or they may have an active role (participatory). An example for

the former case is Focus Troupe [14], where dramatic vignettes are presented to an audience of potential customers. The product concept is featured like a prop or dramatic element in a familiar situation adapted to the new invention. After the play, the audience of potential customers forms small groups engaging in several conversations about the concept.

There are also several examples of sessions, where the prospective users have an active role (participatory). Using role-playing and games is well established, in particular in the Participatory Design tradition [15,16]. In Brandt and Grunnet [10], the users are involved using Forum Theatre to validate and develop scenarios for refrigeration technicians in a supermarket. In Kyng [17], mock-ups as representations of the future system, work situation descriptions, and future use scenarios are used in exploratory workshops for the simulation of future use (cooperative prototyping in the Utopia project). Another example is Role Playing Games [18], where participants play on a *mise-en-scene* of toys and maps, with designers playing the game master or side roles.

2.4. Situated and participative performances

While designing mobile devices for plant operators Buur et al. [19] report of operators improvising video scenarios using mock-ups at the plant. The operators shot videos on how they would use the device. In the Dynabook project [10], the designers visited users in their home environment, where they were asked to perform scenarios of possible use for the electronic book.

The type of sessions we discuss from our project, SPES, falls into this category, as it is situated in the everyday life of people with their participation. However, there is one difference to the other work in this category. All the sessions are situated in the workplace [19] (or at home, as in the Dynabook project [10]), and are participatory. However, while the improvised video scenarios [19] and the examples in Dynabook are organized as a separate activity, SPES unfolds during people's activity. In our sessions, we do not merely visit the participant – we engage literally in shadowing [20].

3. Situated and Participative Enactment of Scenarios

In SPES the designer follows a member of the user group, the SPES participant, during daily activities. The participant is provided with a very simple mock-up of a future device, called the 'magic thing', to help the imagination and not restrict the mind of people to current electronic devices. The magic thing is used to envision ideas of services and gadget features. The designer and participant in the SPES session act out use scenarios as interesting situations arise. In this way, the designer and participant in SPES are at the same time actors and spectators: spect-actors.

SPES is applied after brief information gathering activities like a photo diary and an interview. After this the designers have some understanding of the participant, and are able to organize the SPES sessions. According to the activities of the participant, the designer prepares some future scenarios and ideas as well as a mock-up. Each session can last several hours, and can extend over more than one day. The session unfolds during the ordinary activities of the participant. By particularly interesting situations or incidents, the spect-actors invent and act out scenarios of future services.

The designer is equipped with a digital camera, a diary to record user activities and take drawings of the user mobility. The participant is equipped, in addition to his/her things, with a simple mock-up, the magic thing, that represents a future device, and is invited to carry it around everywhere.

With SPES we aim at:

1. *Trying out* (testing) the emerging ideas and discerning important contextual information. The designer after having experienced the scenario and the situation is able to discern relevant contextual information and create realistic scenarios.

2. *Exploring*: collecting creative contributions from participants.

3. Collecting realistic and authentic scenarios. Participant should be able to *communicate* the ideas to the other participants performing the scenario.

In SPES the pairing of designers and users is crucial, and has thus far been tried only between peers. The designer followed students and

employees of both sexes and the age ranged between 19 and 30 years old. SPES requires several skills from the designer: sensibility and understanding are necessary not to put the users in uncomfortable situations, and social and dramaturgical skills are important to encourage the participant's performance. Although we are trying to observe authentic situations and reactions, the presence of the designer procures a disturbance, which alters the context at a physical, social and organizational level. In the following, we present examples of SPES sessions from two different projects.

3.1. Mobile services on handheld devices

In this project we carried out concept design for mobile services on handheld devices. Seven participants were involved in ten different SPES sessions. This work resulted in nineteen scenarios out of around forty-six hours of shadowing.

3.1.1. Getting together on the bus
As the designer arrives at Thomas's apartment it is 7:45, and he just got out of bed. Before sitting at the table for breakfast Thomas was given a magic thing (a mock-up of a future wireless device), which he placed in front of him while having cornflakes. As there was no TV or Internet connection he first envisioned to check the business news updates through the devices though complaining about the small screen (see Fig. 1). The exchange students meet sometimes in the bus to the campus. Just seldom they contact each other to coordinate the trip to the campus and agree to take one of the busses.

Thomas says that it is probably intrusive and takes too much effort to call early in the morning during the breakfast to agree on a time for the bus. On the other hand, meeting on the bus going to the campus is felt as an important moment in the day. During breakfast Thomas envisioned a system that would allow him to notify through the magic device his preference for the bus and check the preferences of the rest of the group.

3.1.2. Biking around the campus
Matteo is an exchange student completing his master thesis. Over one semester he has made several friends, whom he meets during the day. Otherwise, his work is mostly individual. The SPES session begins in the morning. The designer follows Matteo by bike around the campus. A magic thing (a mock-up of a future wireless device) is attached to his bike (see Fig. 2). Matteo does not have breakfast at his apartment he prefers to drink a coffee in one of the cafeterias to meet his friends. Biking by the main building he envisions to check through the magic thing if there are friends in that cafeteria.

3.1.3. Other examples
Sergey takes the mock-up in his hand between the two reading points in the experiments. He remembers that in the Australian Open there was probably a tennis game going on that he was interested in (Fig. 3(a)).

Diana is visiting Helsinki as a tourist. She uses the magic thing as a shopping assistant to keep track of type and price of trousers in different shops. The shopping assistant also remembers the location of the shops (Fig. 3(b)).

Diana enters in a post office and has to take a

Fig. 1. Thomas during breakfast with the mock-up in his hand.

Fig. 2. Matteo biking around the campus with the mock-up.

number for the queue. There are several buttons to push for the numbers according to the service. Beside each button there is an explanation in Finnish, Diana scans the words with her magic thing, which are translated into English (Fig. 3(c)).

3.1.4. The ScreenTray in the Café

Doing concept design for mixed realities in the Café, one of the concepts that resulted out of several user-centered design activities is the ScreenTray [12]. The ScreenTray is used to carry food and beverage from the counter to the tables and is augmented by an integrated touch screen and an "orientation-aware" pointing device. In Fig. 4, Claudia is visiting Helsinki to meet Petri. In the Café they decide what to do next. They use the ScreenTray to look around. Using it, Claudia imagines that the ScreenTray is aware of its orientation and city-maps are shown with the right orientation.

3.2. Lesson learned

Based on our case studies, we identified two conditions that made possible the creation of useful scenarios for the design: first, performing scenarios in the stage of every day life with all its constraints; secondly, the opportunity for participants to exercise reflection-in-action during the performance.

3.2.1. Everyday life as a stage

Let us take the example from the previous section where Matteo bikes around the campus and attaches a magic thing to his bike. Matteo is acting out an interaction with the magic thing. Aspects like the way he rides the bike or the condition of the roads and traffic might be relevant to the interaction design work, and are

Fig. 3. Other examples. (a) Sergey, (b), (c) Diana.

Fig. 4. A session of SPES with the mock-up of the ScreenTray.

influencing him in the unfolding of the performance. Questions like how much attention he can give to the device, or what are the best output and input modes, are helping discern important details of the situation. How do we deal with the complexity of context when designing for mobile services? Dahlbom and Ljungberg [21] suggest a great deal of ethnographic work for development projects in mobile informatics. However, they recognize that these projects are uninterested in too careful descriptions. Goodwin and Duranti [22] study context from a language perspective, and recognize that the task of capturing the context of activities is very complex: "not only the internal structure of context, but the prior question of what is to count as context at a particular moment, is capable of dynamic reformulation as local frames of relevance change".

The issue of considering body and physical space has been present for examples in the CSCW literature [23]. Luff and Heath [24] consider how the field has had a tendency to overlook important aspects of mobility even within a room. Heath et al. [25], show examples of how observations of bodily action in the physical space can be useful to the design of new technology.

In the cases presented, we showed how the physical world and everyday life were a stage to invent the scenarios. As we mentioned, related work [10] argues for the importance of restriction in improvising. Restrictions as constraints have a mysterious and symbiotic relation to creativity [26]. Through SPES, designers and participants are able to experience the scenario in the *physical* world of everyday life with all its *constraints*. The fact that the constraints are part of the *Lebenswelt* (world of mundane event [27]) is the clue to understanding why creating scenarios following people in their daily activities is so fruitful.

3.2.2. Unfolding reflection-in-action
Current HCI design approaches are evolutionary, iterating phases of observation, implementation and testing. We consider SPES as a moment in design where observation and the generation of ideas are intertwined and analysis is left out. We maintain that what makes our session work is the possibility for participants to exercise reflection-in-action. As in Schön's examples of the cycle of seeing-drawing-seeing, we are able to

discern contextually relevant details and let them further influence our action [28]. What Schön calls 'reflection-in-action' is distinguished from everyday action that we carry out without thinking. It is closely related to the experience of surprise. "Sometimes we think about what we are doing in the midst of performing an act. When performance leads to surprise – pleasant or unpleasant – the designer may respond by reflection-in-action: by thinking about what she is doing while doing it, in such a way as to influence further doing" [28]. Creativity is therefore necessary for spect-actors immersed in daily activities to exercise reflection-in-action.

The clue to understanding why we engage in this type of reflection is performance. Barba [21], in what he calls 'theatre anthropology', discusses the difference in the way we use our body in everyday life and in performance, noting that we are not conscious of our daily practices', and that in the practices we follow the principle of less-effort, i.e. obtaining the maximum result with the minimum expenditure of energy. During the performance, besides investing energy in successfully accomplishing actions on the practical or expressive side, we must invest energy in thinking.

In one of the examples reported in the previous section, Diana is followed during her shopping. Considering the difference between her usual shopping and the shopping during SPES, we note that during the performance she is not doing things unthinkingly, but is more conscious of her actions.

The literature on scenarios [1] has referred to the work of Schön [28], in particular for the role scenarios have between action and reflection. As Carroll puts it, scenarios evoke reflection in the *context of doing design*. There seems to be a great difference in the context when using scenarios in an office or when performing a scenario in the everyday world of the participants. In the cases we presented, as participants are engaging in daily activities, performances can be said to evoke reflection in the *context of practices*.

3.2.3. Limitations and problems
A problem is how to capture or later access the performances which took place. While Brandt and Grunnet [10] argue that a bodily approach can help in making tacit knowledge explicit, we maintain that experience is not immediately explicable, so that part of what we learned

remains inaccessible. Verbal results from an analytical interpretation of ethnographical data, for example, can be more useful.

No video camera was used, and it would have caused an additional disturbance in the unfolding of the daily activities. The main disturbance is caused by the presence of the designer, which perturbs and disturbs the everyday life of the participants changing organization of the practices and social conditions. In addition, in social situations in particular, the participants may feel uncomfortable or embarrassed while acting with a toy in their hands. As Brandt and Grunnet [10] note, this type of session demands courage from participants. We add that it may require competencies from performing arts, for example warm-up exercises to overcome embarrassment as in theatre.

There are open issues, like the fact that the participant is also taking an additional role: the role of the person being studied by a designer. Another problem discussed widely in the drama literature is the fact that for people, it is much easier to act a role other than themselves, while we are more uncomfortable acting ourselves.

One of the aims of design is to deliver systems that can be appropriated by people in real life. The process of appropriation through which things effortlessly mingle with our everyday life [29] is an open-ended and complex process. We therefore need to be conscious of the limitations when trying to anticipate aspects of future practices. In particular, we need to be conscious that the relevancy of performances and scenarios is tied to the moment at which they are created.

Acknowledgements

References

1. Carroll, J. (2000) Making Use: Scenario-Based Design of Human-Computer Interactions. MIT Press
2. Kuutti, K. (1995) Work processes: scenario as a preliminary vocabulary. In: Carroll, J.M. (Editor), Scenario Based Design: Envisioning Work and Technology in System Development. Wiley
3. Tognazzini, B. (1995) Tog on Software Design. Addison-Wesley
4. Beyer, H., Holzblatt, K. (1998) Contextual Design: Defining Customer-Centered Systems. Morgan Kaufmann
5. Winograd, T. (1996) Bringing Design to Software, Addison-Wesley
6. Iacucci, G., Kuutti, K. (2001) We are back on stage! Promoting participation and drama in the design of emerging technologies for collaboration. Proceedings IRIS 2001, Scandinavian Research Seminar on Information Systems
7. Djajadiningrat, J.P., Gaver, W.W., Frens, J.W. (2000) Interaction relabelling and extreme characters: methods for exploring aesthetic interactions. Proceeding DIS2000, Designing Interactive Systems, New York City, USA, ACM Press
8. Buchenau, M. Fulton Suri, J. (2000) Experience prototyping. Proceedings DIS2000, Designing Interactive Systems, New York City, USA, ACM Press, 424–433
9. Bødker, S. (1999) Scenarios – setting the stage for reflection and action in user-centered design. Proceedings Hawaii International Conference on System Science
10. Brandt, E., Grunnet, C. (2000) Evoking the future: drama and props in user centred design, In: Cherkasky, T., Greenbaum, J., Mambrey, P. (Editors), Proceedings Participatory Design Conference, New York, CPSR, 11–20
11. Boal, A. (1992) Games for Actors and Non-Actors. Routledge
12. Iacucci, G., Jäntti, K., Lindberg, T., Lukander, K., Vizcaya, J., Vuorenmaa, M. (2001) The ScreenTray as augmented physical object in the Café: Concept design through Observations, mocking-it-up and Performing Scenarios with People. Proceedings Conference on Communication of Art, Science and Technology, Bonn, Germany, 305–310
13. Garabet, A., Mann, S., Fung, J. (2002) Exploring Design through Wearable Computing Art(ifacts). Extended Abstracts CHI 2002, Minneapolis, Minnesota, ACM Press, 634–635
14. Salvador, T., Sato, S. (1999) Playacting and focus troupe: theater techniques for creating quick, intense, immersive, and engaging focus group sessions. Interactions ACM, 35–41
15. Ehn, P., Sjögren, D. (1999) From system description to scripts for action. In: Greenbaum, J., Kyng, M. (Editors), Design at Work: Cooperative Design of Computer System. Lawrence Erlbaum, 241–269
16. Muller, M., Tudor, G., Wildman, D., White, E., Root, R., Dayton T., Carr., R., Diekmann, B., Dykdtra-Erickson, E. (1995) Bifocal tools for scenarios and representations in participative activities with users. In: Carroll, J.M. (Editor), Scenario Based Design: Envisioning Work and Technology in System Development. Wiley
17. Kyng, M. (1995) Making representation work. Commun. ACM, 38(9)
18. Iacucci, G., Mäkelä, A., Ranta, M., Mäntylä, M. (2000) Visualizing context, mobility and group interaction: role games to design product concepts for mobile communication. Proceedings COOP'2000, Designing Cooperative Systems Conference, IOS Press, 53–65
19. Buur, J., Binder, T., Brandt, E. (2000) Taking video beyond 'Hard Data' in user centred design. Proceedings Participatory Design Conference, New York, CPSR
20. Sachs, P. (1993) Shadows in the soup: conceptions of work and the nature of evidence. Quart. Newsletter Lab. Comparative Human Cognition, 15(4), 125–132
21. Barba, E., Savarese, N. (1991) A Dictionary of Theatre Anthropology: The Secret Art of the Performer. Routledge London

22. Goodwin, C., Duranti, A. (1992) Rethinking context: an introduction. In: Goodwin, C., Duranti, A. (Editors), Rethinking Context: Language as an interactive phenomenon. Cambridge University Press, 1–43

23. Robertson, T. (1997) Cooperative work and lived cognition: a taxonomy of embodied actions. Proceedings 5th European Conference on Computer-Supported Cooperative Work, 205–220

24. Luff, P., Heath, C. (1998) Mobility in collaboration. Proceedings 7th Conference on Computer Supported Cooperative Work, CSCW 98, Seattle, WA, ACM Press

25. Heath, C., Luff, P., Kuzuoka, H., Yamazaki, K. (2001) Creating coherent environments for collaboration. Proceedings Seventh European Conference on Computer Supported Cooperative Work, Bonn, germany, Kluwer Academic

26. Laurel, B. (1991) Computers as Theater. Addison-Wesley

27. Husserl, E. (1970) The Crisis of European Sciences and Trascendental Phenomenology: An Introduction to Phenomenological Philosophy. Evanston Northwestern University Press

28. Schön, D. (1991) The Reflective Practitioner – how professionals think in action. Ashgate Arena

29. Ciborra, C.U. (1996) Groupware & Teamwork Invisible Aid or Technical Hindrance? Wiley

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