Acting to Know: Improving Creativity in the Design of Mobile Services by Using Performances

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ABSTRACT
The paper contrasts two views on knowing: those of the observer and the active actor in a situation. The paper suggests that there are design cases where performance can produce different knowledge. The paper reviews the use of performances in theatre and discusses a technique to use performances in the design of mobile services. The technique is illustrated by example. The session are analysed to describe creativity and knowledge of participants.

Categories & Subject Descriptors: H5.2 theory and methods.

General Terms: Design, Human Factor.

Keywords: Performances, knowledge, creativity, Human-computer interaction, design, mobile services.

INTRODUCTION

> Dr. Doubtful: "Look, we cannot start considering the layout of buttons, because we don't know the number of keys needed. We cannot start the design from the key count, because we have no idea about the logic of use. There is no point in focusing on the logic, because the features are not defined, we are not able to define the features, because we don't understand the actual purpose of the device. The purpose escapes from us, for the simple reason that we do not know who the potential users might be. And we cannot start searching for the users, because we know nothing at the gadget itself. We are not able to grasp the problem without solving it at the same time, but we don't know what to begin with. The solution may be whatsoever. The problems are so ill defined, they are so wicked." [13]

This quotation is from industrial designer Turkka Keinonen's speech – staged as a discussion between two fictional characters, Mr. Confident and Dr. Doubtful – that he gave in the event where he was nominated as the "Designer of the Year" in Finland. It shows eloquently the difficulty encountered in the design of new mobile devices and services, Keinonen knows the difficulty by heart: at the time of the speech he was leading the Usability group of Nokia Research Center.

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C&C'02, October 14–16, 2002, Loughborough, Leic, United Kingdom.
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Inventing novel applications in such technology-push situation has been found to be a very tough design problem. We have participated in a number of projects where several novel product concepts for mobile communication have been developed (see e.g. Kuutti et al. [15], Pulli et al. [16], Tuikka & Kuutti [26]) and the experiences from these projects resonate well with Dr.Doubtful's concerns in the story above.

Why, then, is it so difficult to identify realistic and interesting ways to use new communications technology? After all, we have a number of tested and tried methods to design applications. There are three main attributes of the "wickedness" why the existing approaches fail: novelty, openness, and mobility. With respect to novelty, the starting point of the best existing methods is that there is some existing practices to be improved, some problems to be solved, or some actual or at least potential users whose needs can be probed. With the 3G services we are discussing about a completely new infrastructure, which cannot be compared with anything existing, and that in principle will enable the emergence of completely novel practices – and envisioning something completely new is difficult indeed. Another problem is the openness of the design brief: at this moment the features of infrastructure and basic services are not yet fixed, as well as the application areas. Therefore there are little constraints which makes it very difficult to formulate any meaningful design alternatives. (The openness problem – the too vast scope of possibilities – is becoming even harder with the introduction of intelligent environments or ubiquitous computing, that increase the possibilities and complicate the design situations even further.) Finally, our design methods seem to work best with rather conventional, immobile work situations. Mobility brings with it a new level of situatedness that is very difficult to handle in design. Whatever brainstorming tricks we were using in design

sessions in the abovementioned projects, our ideas were hard to develop and left much wanting – something essential was missing. Certainly there was a need for some extra creativity – how to grasp that "whatsoever"?.

We believe, that this problem can be at least partially relieved by drawing from the experience of the practice in theatre as a long-practiced way to create alternative realities. We are in particular interested in what is happening in improvisational performances. We believe, that by using performances a kind of knowledge can be brought to bear in design that would be very difficult if not impossible to reach without them.

The paper elaborates this problem in the following way. Firstly, the epistemological side of the difficulty is studied to show, that there is a difference between the knowledge of an external observant and one involved in an activity, and this *involvedness* may be the key element in solving our problem. Secondly, we report about our experiences where performances are used in participatory sessions to explore scenarios for mobile services. The technique we developed to study the potential of performances in design (Situated and Participative Enactment of Scenarios -- SPES) is illustrated by the means of a couple of examples. Thirdly we analyse the sessions to show the particularity of creativity and knowledge creation in this situations. The analysis is based on literature on performance study, creativity and theatre.

OBSERVER AND ACTOR WAYS OF KNOWING

In this section we make a short tour to epistemology and try to show that there may be a certain difference between the knowing by an external observer and an involved actor. Because most of the methods and techniques used currently in informing design are analytically oriented and use explicitly the point of view of a detached observer, perhaps that might account for the difficulties in creating novelty. In our tour to epistemology we largely follow the British-american philosopher Stephen Toulmin, who has elaborated the topic of the difference of these two ways of knowing in a number of his books.

Toulmin has during his long career been always interested in thinking as it takes place in practical world as opposed to abstract analytical philosophy and formal logic, initiated by Descartes in 17th century. He contrasts abstract "rationality" against practical "reasonableness", and his thesis (e.g. [24,25]) is that the "cartesian" thinking that has been dominating science over 300 years has been a harmful diversion that should be corrected. Toulmin describes and analyses the reasons and development of this diversion from the perspective of the history of philosophy, and by taking a long perspective from antiquity to today he is able to relate a number of 20th century philosophical and scientific debates into a more general movement that attempts to correct the diversion, "Return to Reason", as the title of his last book [25] optimistically declares. It is impossible to go through Toulmin's whole argument here, and we have just selected a few issues illustrative for our purposes.

According to Toulmin there is a long tradition in the history of human thinking that emphasises the specificity of the knowledge needed in acting in the world, knowledge that is particular, local, and timely, as contrasted to general and timeless. He traces the origins of this thread to antiquity, where Aristotele separated three kinds of knowledge: purely intellectual, theoretical knowledge (*episteme*), knowledge how something is done in practice (*techne*), and knowledge needed in dealing with concrete, actual problems as they arise (*phronesis*). (By the way, it is illustrative that the two first words are still alive: we have both epistemology and technology, but no corresponding term stemming from phronesis).

> "Aristotle shared Plato's hope that we would eventually discover truths that held generally of human beings as well as on natural things; but he saw that our change of acting wisely in a practical field depends upon our readiness, not just to calculate the timeless demands of intellectual formulae, but also to take decisions *pros ton kairon* – that is, "as the occasion requires"." (Toulmin [24], 190)

Initially and until the end of medieval time all of these types of knowledge were considered equally important, but in the beginning of the 17th century this started to change. Toulmin connects this change to the desperation after the irrationality of the 30-years war that had ruined Europe. New coherence had to be built in the society, and for that a framework of unquestionable truths was needed – but it could not be based on fallible human practices or, after a religious war, on theological doctrines either. Descartes, Leibniz and others found a sure foundation in the axiomatic system of Eucledian geometry that was made as the ideal model of rational thinking. It was detached and self-sufficient, capable to produce truths that cannot be questioned. Unfortunately, a huge part of practical life was then also excluded from any considerations. With the advance of natural sciences this logical rationalism became first dominating and finally the Only Right Model for scientific thinking. In the area of technology diversions from the ideal model were (and perhaps still are) sneered upon, but tolerated because of utility. Phronesis has instead fully lost its status and became even doubtful: a good example is the status of rhetorics, that initially has been respected as a study of practical reasoning, but which term currently has almost a flavour of systematic cheating.

Logical rationalism developed into a great system of analytical philosophy and formal logic, and during the 300 years of domination it has deeply moulded also our everyday thinking. Eventually, however, it has became more and more difficult to maintain this supremacy, and voices demanding a better correspondence with the whole sphere of practical life have been raised. Toulmin points out such philosophical challengers as Heidegger, for whom a

position of an "external" observer is impossible, because we are all similarly "thrown" in the world, or Wittgenstein, for whom thruths cannot hold outside the "lifeworlds" and "language-games" where they are originated.[1] Especially interesting for Toulmin in this respect is pragmatism by John Dewey who in his *Quest for Certainty* 1929 [8] presented one of the most systematic and destructive criticisms against the epistemological separation between *theory* and *praxis*.

> "…all of the rivalries and connected problems grow from a single root. They stem from the assumption that the true and valid object of knowledge is that which has been prior to and independent of the operations of knowing. They spring from the doctrine that knowledge is a grasp or beholding of reality without anything been done to modify its antecedent state – the doctrine which is the source of separation of knowledge from practical activity. If we see that knowing is not the act of an outside spectator but of a participator inside the natural and social scene, then the true object of knowledge resides in the consequences of directed action." ([8] p. 157)

To Toulmin's list we would like to add another tradition sharing similar assumptions in this respect, namely Activity Theory. Activity Theory was originated in 1920s in Sovietunion by L. S. Vygotsky as a program to develop, not a psychology of an isolated mind, but a psychology of a "whole human" active in the world. Thus *praxis* was taken as the foundation of knowledge from the very beginning. One of the epistemological formulations in Activity Theory has been developed by V.V. Davydov, who separates *empirical* and *substantial* generalizations in the following way [7]. Empirical generalizations are based on external observation and they are formulated by classifying and naming observable features into groups that are similar in some respect. The significance and relations between these classes are difficult to identify and uncertain, and the generalizations themselves are static and lifeless. Substantial generalizations must be based instead on purposeful interactions with the material to be studied. Only in such interactions the hidden connections, dynamics and resistance will reveal themselves. Substantial generalizations are thus systemic and dynamic, and further actions can be based upon them.

[1] It is interesting to note that in the 1980s when theoretical discussion about HCI design was more popular some of the most influential writers like Winograd & Flores [30] and Ehn [9] used explicitly this "opposition" view to support their argument on the importance of the user perspective in the design process, and they referenced both to Heidegger and Wittgenstein. During the 1990s this sort of philosophical argumentation did disappear from the HCI design discussions, however.

Thus there is a long intellectual tradition that valuates acting in concrete situations as a valid form of producing new knowledge. That way has not been accepted as such by the formerly dominant form of epistemology, and although at philosophical level the former dominance has already largely been dismantled by the growing criticism, it is still alive in research and design practices.

The purpose of this research is to investigate if with explorative performances it is possible to some extent to access the valuable knowledge based on acting in unfolding situations also in such cases where corresponding practices and technologies do not yet exist. Before discussing knowledge and creativity in particular design sessions that we organized we briefly introduce the notion of performance and review how different performances have been utilized in design.

ON PERFORMANCES

The notion of performance has been the object of wide discussion in the social sciences (anthropology, social psychology, linguistic etc.). Beside the several definitions, performance has been considered with different focuses looking at social reality. For example performance has been considered as a display of expressive competence or virtuosity by one or more performance in presence of an audience [1,2]. Turner [27] has considered social dramas as units of aharmonic or disharmonic social processes arising in conflict situations. Another perspective considers that there is something fundamentally performative about human being in the world. The focus of performance is in this case not only in extra-daily activities but in everyday life as well [10, 20]. Performance has been considered inherent in any human activity [20], and theatrical metaphors have been applied to study social interactions (Burke's Penthad or Goffman [10]). In particular according to Goffman human intentionality, culture and social reality are fundamentally articulated in the world through performative activity.

Although perspectives on practices as proposed in PD, CSCW and HCI have not considered performance in our everyday life, it has been considered to some extent in the discussion around representing practices and in participatory design. We think that the advantages of considering more explicitly performance is not in understanding practices in general, as the HCI and design field has well establish approaches for that (activity theory, ethnomethodology, distributed cognition, etc.). The advantages are clearly more relevant for understanding and developing design practices where performative activities have a special role in the process of evolving interpretations of design artefacts and ideas.

In the following we will recall some of the discussion on representing practices to show how performance has been considered and to lay some base for the discussion. Then we will define what we mean by performances in design. We will provide some examples of performances and a couple of examples from our projects.

Performances in design

As we mentioned at the beginning of the paper performance in the social science has been considered from very different perspectives. In the same way we could choose different perspectives in looking at performance in design. In the following we restrict our focus to particular types of activities.

Even before describing new design practices based on performance, we should note that performances do already exist in traditional design practices. In fact, performative practices can be most typically found in design in every situation in which:

1. there is an observer and an observed, or

2. designers do more or less explicit performances while discussing what one should imagine/design/use, or

3. users perform usage (e.g., in usability testing, interaction testing,…).

Here we would here like to restrict the discussion to concept design activities like improvisational performance to explore future scenarios. The objectives of the activities range from focused testing of design ideas or artefacts to providing input for brainstorming about design ideas where the designers get a feeling for use (present and future) by acting out scenarios.

Examples

The work that best explains possible connections between theatre and design is presented in [4], which is first of all inspired by the Forum Theatre of Boal [3]. Boal speaks about Theatre of the Oppressed and it is applied in situation of political or social oppression. The techniques proposed by Boal are aimed among other things at turning the audience from passive to active participant hence the concept of spect-actors. While using Forum Theatre Brandt and Grunnet [4] also apply some improvisational theatre techniques of Johnstone [12]. Finally they refer also to Stanislavsky who created the most influential systems of training for actors. In developing an electronic for refrigeration technician Brandt and Grunnet [4] used performances to understand work situations and build up characters of users. As a way to identify problems and getting idea the design team also dramatized scenarios generating cardboard mock-ups of tools. The users were later involved using Forum Theatre. In the Dynabook project aimed at developing concepts for electronic books, dramatized scenarios based on field studies were used in a brainstorming session. Props were used to indicate the room and the particular character. The scenarios were performed with reflective breaks where discussion occurred. In the Dynabook project designers visited users in their home environment were they were asked to perform scenarios of possible use for the electronic book. Buchenau and Suri [5] as part of they call experience prototyping investigated the needs of passengers for a new rail service. The team, taking train journeys, explored different type of travellers in several situations (entering the station, buying the ticket,...). Each scene was introduced with a card containing the scene's rules, explaining the goal, and the role of players and audience. Other examples are role-playing games with a toy mise-en-scene [11].

Situated and Participative Enactment of Scenarios (SPES)

In SPES the designer follows a member of the user group, the SPES participant, during daily activities. This participant is provided with a very simple mock-up of a future device, the mock-up is 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 product features. The designer and the 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.

Figure 1. The exchange students meet sometimes in some of the buses (20 min.) to the campus. 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.

Figure 2. Matteo wants the magic thing hooked on the bike. In the campus he can check if there are friends in the cafeteria while he is speeding past it.

Figure 3. 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.

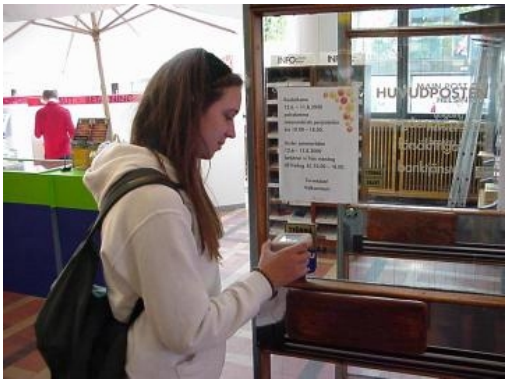

Figure 4. Diana enters in a post office and has to take a number for the cue. There are several buttons to push for the numbers according to the service. Beside each button there is an explanation in Finnish, Diana scans the words with her magic thing, which are translated into English.

SPES is applied after brief information gathering activities like a photo diary of 24 photographs maintained by the user for one week, and an interview. After this the designers have some understanding of the users 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 about 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.

DISCUSSION

There are many ways to consider knowledge and creativity in design. For the purpose of our discussion we limit the analysis to group performances as the ones in SPES (see previous section). The aim is to describe how participants (including designers among them) learn new things through a creative performative process. In this way we will point to some particularity of "knowing" and being creative for people involved in situated performances. The assumption is that some specific knowledge is acquired through the participant's experience.

In what we recognised as successful creative processes in the performance there are at least two things happening:

1)Performing and interacting with the physical reality, by which participants take actions in the physical world and change it during symbolizing activities.

2) The participants interpreting symbolizing actions in the changed environment , and aiming at a shared interpretation in a collaborative way.

It is hard to analyse this two points separately. In the following we will look more closely at the creative process during the performance and discuss similarities and differences to theatrical performance. Moreover we will point out the characterizing features of this particular creative process to respond to the issue presented in the introduction on the differences in epistemological condition between an observer and a participant in design activities.

The Creative Process

Actors and participants must be creative as we are in search for novel ideas of new artefacts and new ways of doing things. In the SPES sessions, participants are engaged in daily activities until an idea brings the spect-actors into a performance.

Diana is shopping for trousers (example in the previous section, page 3). She engaged in the activity without reflecting on what she is doing. A novel idea is introduced about the magic devices helping her to keep track of all the shop she visits. She takes the mock-up in her hand and starts showing what the device could do, thinking about her shopping and getting further ideas. The role of the other spect-actor, the designer, is crucial to the performance as supporter just as two actors of improvisational theatre or musicians in a jazz ensemble. Schön explaining the role of surprises makes the example of the jazz musicians. As they improvise together they listen to one another and to themselves, they think and feel what they are doing. "The players keep on playing while, on occasion, noting and responding to the surprises produced by other players" [22].

In such performances, individuals have some creative freedom, but at the same time are influenced by the situation and by each other's actions. These processes can be studied in much the similar way as 'group improvisations' as referred to by the Chicago school of the symbolic interactionists. This allows stressing the point that what we are concerned with in supporting such performances is not the psychology of creativity, or the product creativity, which is a solitary creation [19]. Instead group improvisations make salient at least two aspects of creativity: the moment-by-moment process of creative activity; the social and interactional aspects of creativity [19].

Creativity, performance and toys

As Sawyer notes [18] most of the studies on creativity tend to focus on creative activities that result in objective products. Moreover studies have focused on individual behaviour, personality and cognitive process [29, 14]. Others like Csikszentmihalyi [6] have attempted to consider also contextual and cultural factors. However when speaking about the creative surroundings Csikszentmihalyi considers "being in the right place" or inspiring environments as "comfortable" places. Interaction with materials play, and performance are not considered. Distant from the psychological perspective and from the product creativity approach, Sawyer studies "performance creativity" in the case of jazz ensembles or theatre improvisational groups. In his study material is not in the unit of analysis. In the SPES sessions, two participants engage in a group performance. In this case creativity is related to several aspects of performance.

Performing and interacting with the physical reality

Participants take actions in the physical world changing it during symbolizing activities. As in the example of Matteo Figure 2 a physical object (a mock-up) is placed on his bike. This intervention changes the physical environment and the setting where actions are interpreted. Although play is taken as the essence of creativity among some major play theorists, the role of objects in creativity has been overlooked and considered mainly in children's play. As Sutton-Smith [23] notes "because play involves the transformation of persons into agents, of objects (or toys) into agencies, of acts into representations, of places into scenes, and of time into plots, creativity is inherent to in the character of toy play."(p. 3) Sutton-Smiths seeks for "an analysis of toy characteristics from a semiotic rather than a stimulus point of view by considering toys as sign systems which evoke various alternative meanings and thus may be regarded as inherently provocative of creative response". (p. 8)

Creativity in theatrical performance

To better characterize creativity in performance for design we will now contrast it to theatrical performance. What is specific about creativity in enacting and improvising? Performances in design as theatrical performance are symbolising activities [28, 31]. In the examples we provided, participants perform future products use. As in theatre this is accomplished on one hand through symbolising actions and on the other in their 'reading' of both artefacts and other participants' produced symbols. Hence, an aspect of creativity that in our context is closely related but different to theatre is the creation of interpretations.

We should make clear that here the problem of interpretations is not related to observability, accessibility. Rather, it is related to the problem of creativity, of imagination in improvising. The improviser in theatre is somehow blind. This is her unavoidable and necessary condition. She should not be too much concerned with observing, understanding, accessing what the other one is saying or signifying, also because there will not be so much space for interactional creativity otherwise. The improviser aims for spontaneity and, most importantly, for avoiding actions that might block the partner (for example, by requesting explanations). Thus an important aspect is the continuity of performance. In the examples we showed performance is more fragmentary than a theatrical performance or are anyway very short. For examples in SPES the performance is intertwined with discussion and continuation of normal activities. For example in the example of Diana during shopping the performance interrupts her activity of choosing trousers and accompanied by a discussion between participants. After this Diana resumes her shopping and the other participant resumes following her in the background.

Some literature on theatrical performance has referred to the "suspension of disbelief". This means that the "audience awareness narrows its focus to the imagined situation presented, excluding awareness that the characters are performers and/or of itself as an audience" [20]. This is achieved in different ways according to the style of acting or theatre approaches (e.g. Theatre piece based on a script or an improvisational performance). This forgetfulness of the context, which is partly voluntary, and partly depending on the quality of the performance is not present in the same way in the examples we showed. Sometimes the reason may be that there is no clear distinction between audience and performers and sometimes because participants are also engaged in reflecting and discussing.

As a consequence, the problem of creativity in improvisational theatre may clash with the aims of the reflective role that spect-actor are taking for example in the SPES sessions. In fact, theatre improvisers are not required to understand what's going on, but to carry on, and be imaginative. Now, a question one may ask is: who should exercise critical thinking then? Maybe there is no generalised answer. However, this question can be associated with another one: when to exercise critical thinking? The reason for this is that improvisations have a life of their own. There are stages in improvised

performances, in which the lights of understanding and criticism should be switched off: maybe there are moments for a reflective spect-actor and inquiring designers, and moments for an imaginative participant and invisible designers. An underlying objective that should drive this switch is the same that drives performers in 'offering and blocking' in theatrical improvisations [12] That is, providing good inspiring offers to partners, but, at the same time, avoiding to act imaginatively in a way that can block partners' offers. This view can provide a description also of the particular collaborative endeavour of knowing that involves designers and practitioners in designing through performing.

Creativity as symbolising and interpreting

What we need to make clear is that such interpretations are not only the product of the imaginative activity of a single participant. Rather, what makes them valuable in-group improvisations is their interactional character or, as Sawyer calls it, the collective emergence. An actor reacts to the offer of a newly created symbol or breach of an actor by imagining an interpretation and thereby creating a new offer. The SPES sessions are an example of this where the very simple mock-up turns into symbolizing sometimes different in different situations according to the ideas proposed by participants. Creative activities of participants and designers involve both creating new signs and interpreting them. In the performance design sessions mentioned in this paper, participants are influenced by other participants in cycles of offering and responding. Such responses require to be interpreted, and used to carry on activities.

Performance and design practices

As now, engaging in theatre performances for design has not been developed as a proper *design methodology,* nor it has been clearly founded upon specific theatre genres or styles of dramatic activities. Insights for design from such activities are not easily obtainable just by applying any techniques or by step-by-step procedures or assignments of roles to actors and designers. Rather, we can recognize and report on some types of performative activities, which under certain circumstances can inform design in a number of ways. The intention is to contribute to outlining the relevant features of this highly contextualised emergent artful activity in design. In particular, we aimed at addressing the following questions: Are there good and bad performances? Can we describe good and bad circumstances for them? How can we better be informed, enlightened, inspired by them?

CONCLUSIONS

We described the creative process in group performances for design as a collaborative process involving: 1)Performing and interacting with the physical reality, by which participants take actions in the physical world and change it during symbolizing activities. 2) The participants interpreting symbolizing actions in the changed environment, and aiming at a shared interpretation in a collaborative way.

The particularity of this process is that the knowing happens in a collaborative process interacting with the physical environment. Participants, and designers among them, share space, time and an interpreting experience. When performances are successful they are influencing each other, hence they are reacting more than acting.

Is the different creative process of participant useful for the challenges posed to design of new technology? We can here return to the opening discussion between Mr. Confident and Dr. Doubtful:

> Mr. Confident: "Whatsoever is so slimy that it escapes from criticism. It is often given aliases such as application, system, service, etc. The benefit of whatsoever is that it provides a chance. You need to pick up one and make it special. Nobody knows which of the chances will grow up to be a product, but picking one creates circumstances for evaluating the possibilities. It can be named and characterised. You can start to like it or hate it. Whatsoever has been tamed so that it dares to come forth." [13]

We agree with Keinonen: "whatsoever" can be tamed and the "new" created in inquiring actions, through making it momentarily (almost) real – bound to a certain moment in time and space and context. We believe that performances seem to offer promising capabilities for that.

AKNOWLEDGEMENTS

The authors would like to thank Anu Mäkelä and the Maypole Project for providing some of the mock-ups. Thanks to Matteo, Diana and all the other participants of the SPES sessions.

REFERENCES

1. Bauman, R., Story, performance, event, Cambridge University Press, 1986.
2. Barba, E., Savarese, N., A Dictionary of Theatre Anthropology: The Secret Art of the Performer, London: Routledge 1991.
3. Boal, A., Games for Actors and Non-Actors, Routledge Press, 1992.
4. Brandt, E., Grunnet, C., Evoking the Future: Drama and Props in user Centred Design, In: the proceedings of the Participatory Design Conference, Cherkasky, T., Greenbaum, J., Mambrey, P. (eds), New York, November 28-1 December 2000, CPSR, pp 11-20.
5. Buchenau, M. Fulton Suri, J., Experience Prototyping, In the Proceeding of the DIS2000, Designing Interactive Systems, NYC, USA, ACM Press, pp. 424-433.
6. Csikszentmihalyi, M., (1997) Creativity : Flow and the Psychology of Discovery and Invention, Harper Collins.
7. Davydov, V.V. (1984) Substantial generalization and the dialectical-materialist theory of thinking. In M.

Hedegaard, P. Hakkarainen, & Y. Engeström (Eds.) *Learning and teaching on a scientific basis*. Aarhus University, Institute of Psychology, Aarhus.

8. Dewey, J. (1988) The Later Works, 1925-1953, Vol. 4. 1929. (ed. J. A. Boydston). Southern Illinois Univ. Press, Carbondale & Edwardsville
9. Ehn, P. (1988). *Work-Oriented Design of Computer Artifacts*. Stockholm, Arbetslivscentrum.
10. Goffman, E., The presentation of self in everyday life, Garden City, NY, Doubleday, 1969.
11. Iacucci, G., Kuutti, K., Ranta, M., On the Move with a Magic Thing: Role Playing in the Design of Mobile Services and Devices, In the Proceeding of the DIS2000, Designing Interactive Systems, New York City, USA, ACM Press, pp. 193-202.
12. Johnstone, K., Impro : Improvisation and the Theatre, Theatre Arts Books, 1989.
13. Keinonen, T. Anything but Whatsoever. Speech given in the "Designer of the year in Finland 2001" – seminar, Museum of Modern Art Kiasma, Helsinki 21.11.2000
14. Koestler, Arthur. (1964, 1990). The Act of Creation . NY: Macmillan, Paperback.
15. Kuutti, K., Tuikka, T., Kerttula, M., Pulli, P.(1997) VIRPI-project: Virtual Prototyping Services for Electronics and Telecommunication Industry. Rossignac (ed) *Proceedings of the TeamCAD Conference*, Georgia Tech University
16. Pulli, P., Pyssysalo, T., Kuutti, K., Similä, J. Metsävainio, J-P., Komulainen, O. (1998) CyPhone - Future Personal Telecooperation Device. In Traunmüller, R. & Cshuháj-Varjú, E. (eds.) *Proceedings of the XV. IFIP World Computer Congress 31* Vienna/Budapest, Österr. Computer Ges., pp. 529-540.
17. Salvador, T., Sato, S., Playacting and Focus Troupe: Theater techniques for creating quick, intense, immersive, and engaging focus group sessions. Interactions of the ACM, Sept. + Oct. 1999, Pp. 35-41.
18. Sawyer, R., K., (1998) The interdisciplinary study of creativity in Performance, Creativity Research Journal, Vol. 11, No. 1, 11-19.
19. Sawyer, K., The emergence of creativity, Philosophical Psychology, Vol. 12, No. 4, 1999.
20. Schieffelin,E. Problematizing Performance. In Ritual, Performance, Media. Hughes-Freeland, F., Editor. 1997; 194-207.
21. Schön, D., The Reflective Practitioner - how professionals think in action, Ashgate Arena, 1991.
22. Schön, D, Bennet, J., Reflective Conversation with Materials, An interview with Donald Schön by John Bennett, In: Terry Winograd (ed.) Bringing Design to Software, Addison-Wesley. 1996
23. Sutton-Smith, B., The role of toys in the instigation of playful creativity, Creativity Research Journal, Vol 5 (1), 3-11, 1992.
24. Toulmin, S. (1990) Cosmopolis. The hidden agenda of modernity. Chigago, The University of Chigago Press.
25. Toulmin, S. (2001) Return to Reason. Harvard Univ. Press, Cambridge, Mass.
26. Tuikka, T. & Kuutti, K., Thinking Together in Concept Design for Future Products — Emergent Features for Computer Support. *Proceedings of the Cognitive Technology 2001 conference*
27. Turner, V., Drama Fields and metaphors. Ithaca: Cornel University Press, 1974.
28. Turner V., From Ritual to Theatre, the human Seriousness of Play, PAJ Publications 1982.
29. Ward, T. B., Finke, R. A., and Smith, S. M. (1995) *Creativity And The Mind*. NY: Plenum.
30. Winograd, T. and F. Flores (1987). Understanding Computers and Cognition. A New Foundation for Design. New Jersey, Ablex.
31. Eco, U., Semiotics of Theatrical performance, Drama Review 21/1, Mar 1977, 107-117.