CoDAS, a Method for Envisioning Larger-Scaled Computational Artifacts Connecting Communities

Carlos Araujo de Aguiar
Design & Environ.Analysis
Cornell University
Ithaca, NY USA
ca449@cornell.edu

Gilly Leshed
Info Science
Cornell University
Ithaca, NY USA
gl87@cornell.edu

Alexander Bernard
Mechanical & Aerospace Eng.
Cornell University
Ithaca, NY USA
arb392@cornell.edu

John McKenzie
English
Cornell University
Ithaca, NY USA
jvm62@cornell.edu

Camille Andrews
Mann Librariy
Cornell University
Ithaca, NY USA
ca92@cornell.edu

Keith Evan Green
Design & Environ. Analysis
Cornell University
Ithaca, NY USA
keg95@cornell.edu

***Abstract*— Information Technologies are increasingly embedded into artifacts of the physical world—furniture, rooms, buildings, and urban infrastructure—making communities around-the-globe more connected and, arguably, more intelligent. However, such larger-scaled, social computing artifacts arrive with critical concerns of cost, material choice, design requirements, fabrication means, robust and safe use, power, and resistance to vandalism and the elements. Given the complexity of realizing larger-scaled, computational artifacts, conventional design methods prove inadequate and potentially costly and dangerous if researchers move too quickly to full-scale prototyping. In this paper, we present CoDAS, a hybrid methodological approach that combines elements of well-known HCI methods to effectively develop larger-scale social computing artifacts.**

Keywords*— *Intellgient communities, embedded systems, co-design methods, smart cities, outdoor HCI, quality of life.

I. INTRODUCTION

No longer confined to a one-computer, one-person paradigm, or to groups of people working with screen-based devices, information technologies are increasingly embedded into artifacts of the physical world—indoors and outdoors—making communities around-the-globe more connected and, arguably, more intelligent. Design exemplars of such large-scale, cyber-physical artifacts assume the form of furniture [1], rooms [2], kiosks [3], billboards, floors, and building facades [4], outdoor play areas [5], pavilions [6], and monuments and other forms of civic infrastructure [7]). A grand stage for human-computer interaction, the physical world offers HCI researchers the opportunity to cultivate wide-ranging, synergetic relationships between people, computing, and their surroundings—what might be defined as "universal villages."

Large-scaled cyber-physical artifacts, however, arrive with critical concerns of cost, material choice, design requirements, fabrication means, and their need for municipal permitting, robust and safe use, power, and resistance to vandalism and the elements [8]. Given the complexity of realizing larger-scaled artifacts, conventional design methods prove inadequate and potentially costly and dangerous if researchers move too quickly to full-scale prototyping of these.

In this paper, we present a hybrid methodological approach for early design exploration, CoDAS (Co-Design At Scale) that combines elements of established HCI methods—co-design [9] and user enactment [10]—to effectively develop larger-scale social computing artifacts. While others [7, 9, 10] have used these methods to design various types of physical artifacts, few have used this approach to design interactive, large-scale artifacts, particularly those situated in outdoor spaces for use by inhabitatnts of villages and cities (as our lab, for one, proposes [11]). CoDAS has three main principles: participants co-design with researchers using a small scale-model of the artifact; participants co-create with researchers use cases as opposed to encountering and enacting scenarios prescribed by the researchers; and participants engage in user enactment within the small scale model, following from the design and the use cases (i.e. scenarios) co-created.

The key virtue of CoDAS is that is affords the early design exploration of the larger-scale interactive systems enabled by the use of a physical, tangible scale model of the artifact and its surrounding physical environment. CoDAS allows researchers to (a) design attributes and affordances of a system, and (b) observe the environmental behavior and socio dynamics around the designed system. This permits researchers to think "big" (literally and figuratively) and also at a lower cost (of time, money, physical effort, etc.) when compared to conventional design methods.

978-1-5386-5197-1/18/$31.00

Our contribution in this paper is the introduction and justification of the use of CoDAS approach in designing large-scale artifacts for smart communities (universal villages). In so doing, we make references to our own lab's use of CoDAS in our design of what we call transFORM, a workspace-without-walls for an underused, outdoor, public square. Encompassing the challenges of large-scale design, the design exemplar transFORM makes evident the benefits and few shortcomings of this approach for designing large-scale interactive systems.

II. CoDAS, A Hybrid Methodological Approach

CoDAS takes inspiration in the design methods and thinking of others in the HCI community: McCullough's concept of "Ambient Commons," [12] which recognizes the role of existing physical environments as the ground for the digital [13]; DiSalvo's "Civic Design" [8] and "Civic Tech," [14] which extend HCI to the wider life of the public but is focused much more on data rather than on the cyber-physical; Dourish's "embodied interaction," [15] defined by a phenomenological approach; and Forlizzi's design-focus on human interaction with robots [16] and, more broadly, interactive artifacts [17]. Within this intellectual field, ou approach fills a gap in its attention to computer-embedded, social and collaborative artifacts of larger physical scale, and the interactions they afford, which we recognize as a significant manifestation of emerging HCI and mechanical engineering inquiry.

A. *Co-design and Co-creation*

Co-design derives from the Scandinavian participatory design tradition [18] and involves the practice of collective creativity applied by designers and non-designers when working in collaboration throughout the design process. Co-design aims to include a wide range of stakeholders, including end users and those who will be directly and indirectly affected by the products, in informing, ideating, conceptualizing, and contributing to design decisions based on their collective understanding of the cultural and societal scenarios [9].

Co-design is especially appropriate for the conceptualization of the design of large-scale public systems, since involving the people who would eventually encounter and use these systems helps transform a *space* into a *place*. As Yu-Fi Tuan describes it [19, p. 6]:

> Space" is more abstract than "place." What begins as undifferentiated space becomes place as we get to know it better and endow it with value. [...] Furthermore, if we think of space as that which allows movement, then place is pause; each pause in movement makes it possible for location to be transformed into place.

B. *User Enactments*

The second HCI design method included in CoDAS is User Enactments (UE), first defined by Odom et al. [10], and later included in a design-method practitioner handbook [20]. In UEs, "designers construct both the physical form and the social context of simulated futures, and ask users to enact loosely scripted scenarios involving situations they are familiar with as well as novel technical interventions designed to address these situations" (p. 338). UEs however require considerable time, effort, and a full-scale physical site or voluminous lab to develop the physical form for the scenario enactment.

CoDAS, instead, preserves the spirit of UEs by creating a physical space for enacting a future scenario with the purpose of gaining insights into designing new interactive systems in emerging design spaces, but uses a small scale model of that space and its design elements, and small scale human figures to represent people in that space. As we will see in the case study that follows, participants enacting a scenario by moving the human figures in the scaled space were able to project their imagined behaviors (physical and even mental) onto the human figures.

C. *Combining Co-design with UEs in a Social Setting Framework*

A social setting framework [21] serves as the basis for combining co-design and user enactment activities. According to Lofland's social-setting framework [21], every social setting involves *actors* engaging in *activities* with *others* in a certain *space*. Recognize that these actors may or may not be human—that "actors" can be the physical and digital artifacts that are integral to interactive behaviors. In constructing this social setting framework, we ask the following environmental-behavior question: "*who does what with whom using what in which setting?*" [22].

The construction of such a framework requires designers to define all or at least most of these constructs (i.e. actors, activities, objects, settings) in a way that delineates the scenario under investigation. The pre-definition of such constructs will depend upon the research question. In our case study discussed below, we initially wanted to understand the activities people would mostly engage in within an urban, outdoor, public space. Given our questions, we were able to pre-define the actors, setting, and typological design elements, leaving the activities and the particular aspects of the designed artifact open for participants to select and define.

III. PROCEDURES

A. *Scale Model Fabrication*

CoDAS involves the use of scaled models as a basis for co-design, co-scenario creation, and user enactment. The elements defined in the social setting framework are fabricated in the scale model and used by participants throughout the design study ("Fig. 1"). Participants use the scaled elements to communicate their design ideas and to enact the scenarios they co-create with researchers. For the research team, the scale model is a means to capture both the physical artifact and the scenario participants envision without the need to realize a full-scale prototype and/or to be situated in its intended and actual physical surrounding (i.e. the site).

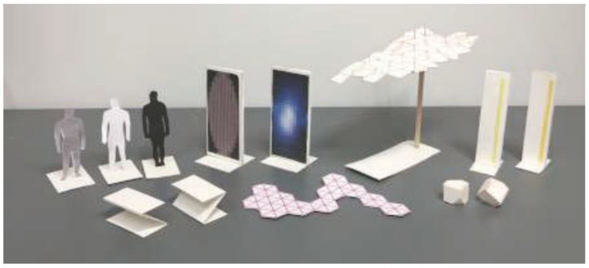

Fig. 1. An example of scaled-model elements for co-design, co-scenario and user enactment.

B. Co-design and Co-creation

Following the fabrication of the scale model, the research team invites participants to the lab to engage in the co-design of the space and co-creation of the scenario ("Fig. 2"). The researchers ask participants to design the environment to support opportunities for different activities and experiences by positioning the scaled-elements and actors in the scaled model of the targeted environment (the site). For example, if the intended large-scale artifact is a singular body (as in a kiosk), then a reduced-sized facsimile of the kiosk is positioned in the scale-model of the environment (e.g. a corridor within a building, or a stretch of the main street with its road, sidewalk, lighting, and building facades).

Using the design and actor elements in the context of their surroundings, the participant(s) work collaboratively with the researchers, again following from the questions the researchers wish to answer in the course of the study, to design possible interactions and experiences in the space. Through this design activity, one or more scenarios take shape as well. The meaning-making process within the physical co-design and scenario co-construction can be captured via recorded audio and video and via photography throughout the activity. Alternatively, after the participant(s) complete the design and scenario co-construction activity (according to whichever parameters, as defined by the researchers), the researchers may conduct a semi-structured interview asking participants to explain their designs and scenarios.

Fig. 2. Three instances of co-design activity, using the scale-model elements.

C. User Enactments

The next step involves participants enacting the scenario(s) they formulated in the previously described activity. In the UE activity, each participant assumes (i.e. plays) the role of the actor(s) in the scenario as an enactment of how they would approach, appropriate, use, and move through and about the space. Participants use pre-fabricated, scaled human figures to stand in for themselves and others within the physical space and social setting.

Using the scaled human figures, participants then enact the scenario they co-created within the space they co-designed: its situations, how the proposed artifact(s) in their surroundings are occupied and used, which actions the participant would undertake there, and how the participant might interact with other people also present there (i.e. the additional actors represented by scaled human figures). As participants go about the user-enactment procedure, they are asked to "think aloud" in order to uncover participants' behavior and attitudes, emotions and feelings, experiences, perceptions, and understanding.

CoDAS yields qualitative data through photos, video, and audio recording as participants and designers interact with the scale model and enact the scenarios and activities they have defined in the model. This allows research teams to use their own best practices of qualitative data analysis to sort, categorize and identify important relationships [23]. These insights can later be used as resources for designing the full scale collaborative system.

IV. CASE STUDY: TRANSFORM—A WORKSPACE WITHOUT WALLS

We used CoDAS to design a workspace-without-walls, or what we call *transFORM*, a cyber-physical artifact at room-scale, situated in an underused, outdoor, public square. *transFORM* aims to augment social interaction and place attachment to an underused, urban, public space. Our objective for using our methodological approach to design transFORM was to co-construct with participants an understanding of the essential rudiments of the design—including its attributes and affordances, and of potential interactions and experiences in the designed space.

A. Social Setting Framework for transFORM

Our social setting framework consisted of four constructs: (a) actors under three conditions, (b) six distinct design components, (c) activities, and (d) the existing urban site accommodating the actors and design elements.

(a) For the (human) actors, we defined three conditions: actors alone, actors with people they know, and actors with strangers. This follows from [24] which suggest that people behave and engage differently in a space depending on whether they are alone or accompanied by others. As such, we wanted to gain insights into participants' projected behavior and experiences across the three distinct actor-conditions.

(b) We defined six design elements—canopy, floor, screen, bench, table, and light. We deliberately created typological elements that represent the essential building blocks of an artifact that we envision will be a melding of these elements. We don't expect that the design we actualize and implement in the physical site will necessarily look like a collection of these components; instead, we envision designing an artifact that contains the functionality of these components, manifested in some other form.

(c) For activities, we created a list of fourteen activities we envisioned people might engage in within an outdoor space, including, for instance, reading, studying, playing, talking, listening to music, working, etc. In order to narrow down the initial list of activities, we conducted a survey with 41 participants (28 university students, 3 university faculty members, 2 university staff; and 7 others from outside the university, ages 16-68, 19 males, 22 females). Participants were recruited through our social networks (a convenience sample). We showed participants generic images of different public spaces and asked them to select the activities they would prefer doing under the three different actor-conditions in each space.

(d) The physical site for our case study, as mentioned earlier, is an outdoor urban public space that is currently underused; our original purpose was to design an intervention that would cultivate the kinds of activities that could enliven this underused space.

B. Constructing the Scale Model

Following the definition of the social setting framework, we physically fabricated the actors, the design components, and the physical site as a scale model using a combination of manual and digital fabrication tools.

C. Study Procedure using CoDAS

We invited seven participants (a convenience sample of university students, ages 18-30, 5 males, 2 females) to our lab to engage individually with the researcher team in our approach. We described each of the six design components, presenting on a large computer display a photo of each modeled component as well as a video of its potential interactive features. For instance, a photo of the modeled canopy was displayed along with a short video that communicated the kinds of interactive features. ("Fig. 3").

Fig. 3. A model of the canopy component (left) and two stills from a video showing a physically shape-shifting canopy, to show the intended behavior of the canopy component.

Using the components and the human figures described above, a participant and a single research team member co-designed three different environments and drafted scenarios of actor-interactions for each of these environments. For each co-design, co-designers started the design process by picking one activity corresponding to the actor conditions; the co-designers then positioned, in the physical site model, the scale-modeled actors and design components to yield a design and an interaction scenario defined by this action.

The co-design sessions, which included the co-designers' "talk aloud," were audio-recorded, the resulting designs photographed, and the scenarios saved as a text document. Following the construction of the design and scenario, we asked each participant to engage in enacting the scenarios within the spaces they defined using the human figures. We asked participants to think out loud while enacting the scenarios. During the user enactment activity, the co-designer from our research team would sometimes prompt the participant-co-designer with questions such as, *What are the actors doing at this instance in the scenario?,* to help focus the participant co-designer on the impacts the designs and scenarios have on their actors' behaviors, experiences, and emotions, and how these actors are negotiating this place and any other actors.

The research team used the qualitative software program to organize, analyze, and generate insights out of the data gathered. The analysis of the data was then used to generate insights toward advancing the development of *transFORM*. "Fig. 4" shows renderings of our latest design iteration at three instances of a given 24-hour period; "Fig. 5" shows the bottom-half of the first full-scale working prototype that the team is currently fabricating, mostly to suggest the size, bulk, and many complications of implementing the full-scale, working prototype in its intended urban site. Additionally, we also used numerical computing program (MATLAB) to analyze the gravitational forces in action in our developing prototype, as in "Fig. 6".

Fig. 4. Our current design of transFORM at three instances in a 24-hour period

Fig. 5. A full-scale, early, fulls-cale prototype of the bottom-half of transFORM, currently under construction, as informed partly by CoDAS.

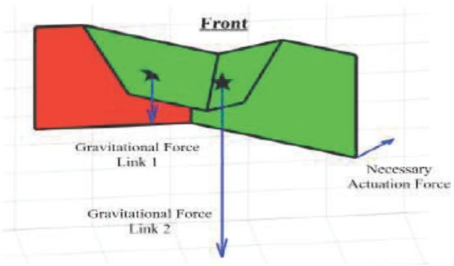

Fig. 6. Geometrical Analysis of transFORM using MATLAB

V. CoDAS Validation

The transcribed audio we collected during the CoDAS study offers some evidence by which to validate CoDAS as an effective methodological approach for use in early design development of large-scale social computing artifacts. From the transcribed audio of the case-study, it was clear that participants were able to project their imagined behavior to the scaled human figure (an actor). When referring to the human figure they were embodying, participants frequently uttered descriptions of the scene that began with reference to "I," as for example:

> *I would first approach this* [aspect of the design] *and look at the screen or floor and, if I found something interesting* [there] *I would stay; if not, then I would move to this other* [aspect of the design].

The use of the first-person here suggests that the participant personified the scaled human figure and transferred her or himself to the role they associated with the human figures when engaging in the user-enactment. Similarly, participants use of the impersonal "you" refering to "anyone" suggests a personification of the scaled human figures—the imagining of real people engaging in interactive behavior, as in:

> *space allows you to do things that you don't know yet.*

Participants could also transfer *social agency* to the scaled human figures, as suggested by another transcribed fragment:

> *I would observe these people as I move, but not get close to the spot occupied by them.*

Here, the participant explores an emotional response accessed through the positioning of the enacted actor relative to a grouping of other scaled figures the participant placed in the scale model. There is, moreover, evidence of embodying the scaled figure *and physically moving through* the designed environment:

> *You continuously move to the center. The periphery creates a path… It's like climbing a mountain: the fun moment is not directly given by the story-- you explore it by yourself.*

Here, the participant offers, by way of an analogy, the mental leap from scale model to what they could imagine doing in the full-scale design, in the world, using their own will and body.

As suggested by these various excerpts drawn from the audio transcriptions of the case-study, there is an equation the participants construct between themselves and the scaled human figure, where they project their imagined behavior to the human figure as they engaged in the user-enactment activity. Finally, our approach identified different spatial arrangements that the research team will consider in advancing the design. Using some number of the six design components, participants created "micro-spaces" within the larger public space as defined by the buildings, where each micro-space exhibited its own attributes, affordances, ambiance, levels of permeability and privacy, and activities.

Together, these micro-spaces connected to one another through "interstitial spaces." Interestingly, the participants' overall organization of the space, constituted by micro-spaces and interstitial spaces, tended to be organized in two different ways: a more rigid, compact, centralized organization, and a more informal, looser one comprised of two micro-spaces ("Fig. 7").

Collectively, the analysis of the transcribed audio from the case-study suggests that the methodological approach is valid as a design procedure that makes apparent the types of human-human and human-environment interactions that might occur, at least in part, as a result of the design of this place.

Fig. 7. Looking down on the scale model from directly above it: two organizational strategies from the transFORM study: (left) a compact and centralized organization, and (right) an informal organization of two "micro-spaces."

A. Practical advantages of our approach

In more practical ways, our approach offers distinct advantages as compared to other HCI methods that might be used in the early stages of the design of larger-scale social computing artifacts. Permission from municipal authorities to conduct early-stage in-situ study of full-scale prototypes is extremely difficult to secure. The same can be said of securing approval for the same research involving human participants by IRB boards. Full-scale components are meanwhile costly and difficult to manually manipulate by co-designing participants due to their size and weight, very likely limiting the exploratory design space of the investigation. The smaller scale, meanwhile, permits the design team and its participants to have an overall understanding of the many components involved, as well as more comprehensive understanding of the physical site, at low cost, and with a very low hurdle for IRB approval.

B. Shortcomings and Limitations

The key limitation in using the CoDAS method is that participants are projecting their own behavior on scaled figures, artifacts, and environments, rather than experiencing and responding to the many qualities unfolding in time that define real space—not only qualities seen, but also those heard, touched, and smelled. CoDAS demands a leap of imagination by study participants that researchers cannot fully capture and interpret; arguably, the participant cannot as precisely communicate perceptions of the places designed and the interactions these places afford as one could in a real-world environment.

VI. CONCLUSION

In designing large-scale social computing artifacts—key components of what might comprise universal villages of the future—CoDAS allows designers to advance conceptual and interaction design as imagined by participants through the vehicle of scale-model actors, design components, and physical surroundings. In our case study, the accounts of participants in our onw implementation of CoDAS suggest that a participant's engagement and exploratory behavior with the scale model can offer an understanding of: (a) the attributes and affordances of design components, (b) the ambiance and spatial organization of the design, and (c) the interactive behaviors across actors.

In our case study implementation of CoDAS, we also learned that investigation and discovery by participants by way of CoDAS was frequently followed by a triangulation of interaction involving at least one design component and two actors. This permitted us to begin investigating the key objective of our own *transFORM* project: to augment social interaction in and place attachment to an underused, urban, public space by way of a larger-scale, social computing artifact. As social computing systems become embedded into larger-scale artifacts, CoDAS offers a promising methodological approach to exploring this emerging research space and making its outcomes especially meaningful to the cultivation of universal villages.

VII. REFERENCES

[1] E. Grönvall, S. Kinch, M. G. Petersen, and M. K. Rasmussen. 2014. Causing commotion with a shape-changing bench: experiencing shape-changing interfaces in use. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '14). ACM, New York, NY, USA, 2559-2568. DOI=http://dx.doi.org/10.1145/2556288.2557360

[2] Keith Evan Green. 2016. *Architectural Robotics: Ecosystems of Bits, Byte, and Biology.* The MIT Press, Cambridge, MA, Chapter 4.

[3] K. Heimerl, B. Gawalt, K. Chen, T. Parikh, and B. Hartmann. 2012. CommunitySourcing: engaging local crowds to perform expert work via physical kiosks. In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '12). ACM, New York, NY, USA, 1539-1548. DOI: http://dx.doi.org/10.1145/2207676.2208619

[4] B. Mutlu and J. Forlizzi. 2008. Robots in organizations: the role of workflow, social, and environmental factors in human-robot interaction. In *Proceedings of the 3rd ACM/IEEE international conference on Human robot interaction* (HRI '08). ACM, New York, NY, USA, 287-294. DOI=http://dx.doi.org/10.1145/1349822.1349860

[5] O. Zuckerman, N. Pares, S.e Benford, and H. H. Lund. 2006. Designing interactive environments for outdoors gaming and play. In CHI '06 Extended Abstracts on Human Factors in Computing Systems (CHI EA '06). ACM, New York, NY, USA, 419-422. DOI=http://dx.doi.org/10.1145/1125451.1125542

[6] K. Boehner and C. DiSalvo. 2016. Data, Design and Civics: An Exploratory Study of Civic Tech. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (CHI '16). ACM, New York, NY, USA, 2970-2981. DOI: https://doi.org/10.1145/2858036.2858326

[7] T. H. Mokhtar, K. E. Green, I. D. Walker, T. Threatt, V. N. Murali, A. Apte, and S. K. Mohan. 2010. Embedding robotics in civic monuments for an information world. In CHI '10 Extended Abstracts on Human Factors in Computing Systems (CHI EA '10). ACM, New York, NY, USA, 3859-3864. DOI: https://doi.org/10.1145/1753846.1754069

[8] C. DiSalvo and Christopher A. Le Dantec. 2017. Civic design. *interactions* 24, 6 (October 2017), 66-69. DOI: https://doi.org/10.1145/3137097

[9] E. B.-N. Sanders and P. J. Stappers. 2008. Co-creation and the new landscapes of design. *CoDesign*, Vol. 4, No. 1 (March 2008), 5–18.

[10] W. Odom, J. Zimmerman, S. Davidoff, J. Forlizzi, A. K. Dey, and M. K. Lee. 2012. A fieldwork of the future with user enactments. In *Proceedings of the Designing Interactive Systems Conference* (DIS '12). ACM, New York, NY, USA, 338-347. DOI: https://doi.org/10.1145/2317956.2318008

[11] de Aguiar, C. H., Green, K. 2018. transFORM - A Cyber-Physical Environment Increasing Social Interaction and Place Attachment in Underused, Public Spaces. DIS 2018 PWiP, Hong Kong.

[12] Malcolm McCullough. 2013. Ambient Commons: Attention in the Age of Embodied Information. The MIT Press, Cambridge, MA.

[13] Malcolm McCullough. 2004. Digital Ground: Architecture, Pervasive Computing, and Environmental Knowing. The MIT Press, Cambridge, MA.

[14] S. Carr, M. Francis, L. G. Rivlin, and A. M. Stone. 1992. *Public space.* Cambridge University Press, Cambridge, UK.

[15] Paul Dourish. 2001. Where the Action Is: The Foundations of Embodied Interaction. The MIT Press, Cambridge, MA

[16] Lucy Bullivant. Media House Project: the House is the Computer, the Structure is the Network. Special Issue: 4Dspace: Interactive Architecture. *Architectural Design* 75, 1 (January/February 2005), 51-53. DOI: https://doi.org/10.1002/ad.13

[17] J. Forlizzi, C. DiSalvo, J. Zimmerman, B. Mutlu, and A. Hurst. 2005. The SenseChair: the lounge chair as an intelligent assistive device for elders. In *Proceedings of the 2005 conference on Designing for User eXperience* (DUX '05).

[18] F. Kensing & J. Blomberb. 1998. Participatory Design: Issues and Concerns. *Computer Supported Cooperative Work 7* (1998), 167–185.

[19] Yu-Fi Tuan. 1977. Space and Place: The Perspective of Experience. *Minneapolis: University of Minnesota Press.*

[20] B. Harrington and B. Martin (Ed.s). 2012. Universal Methods of Design: 100 Ways to Research Complex Problems, Develop Innovative Ideas, and Design Effective Solutions. Rockport Publishers, Beverly, MA, 164-165.

[21] J. Lofland et al. 2006. Analyzing social settings a guide to qualitative observation and analysis. Wadsworth/Thomson Learning, Belmont, CA.

[22] J. Zeisel. 1984. Inquiry by design tools for environment-behavior research. Cambridge University Press, Cambridge, UK.

[23] H. E. Walcott. 1990. Making a Study 'More Ethnographic.' *Journal of Contemporary Ethnography 19*: 44-72.

[24] Erving Goffman. 1963. Behaviour in Public Places, Notes on the Social Organization of Gatherings. The Free Press., Florence, MA