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Visual artefacts as boundary objects in participatory research paradigm

ABSTRACT
This article is based on the findings of an ethnographic field research conducted at Sudarshan Layout, an urban slum in Bangalore, India in February 2009. The research was participatory in nature and was conducted in collaboration with Ambedkar Community Computing Center (AC3), a group consisting of local youth of Sudarshan Layout. Various visual research methods such as a ‘self-documentation’ exercise, involving the creative use of a digital camera, and ‘social mapping’ exercises were employed. These methods led to the creation of various visual artefacts such as hand-drawn social maps and digital photographs. In this article, I argue that these visual artefacts (hand-drawn social maps and digital photographs) acted as boundary objects, enabled a dialogue and promoted negotiation of meaning between the participants and me. In the article, I describe how these visual artefacts facilitated the participatory research and assisted in collaboration, communication and cooperation between us.

KEYWORDS
boundary objects, participatory research, ethnographic action research, participatory rural appraisal, visual artefacts, Indian urban slums

INTRODUCTION
This article is based on findings of an ethnographic field research conducted at Sudarshan Layout, an urban slum in Bangalore, India in February 2009. The field study was part of my recently completed Master’s thesis (title: ‘Design Opportunities and Challenges in Indian Urban Slums – Community Communication and Mobile Phones’). The thesis investigated the area of mobile-based community communication for marginalized communities belonging to Indian urban slums. The study is qualitative in nature and is best defined as participatory research exploration.
Ethnographic Action Research (EAR) and Participatory Rural Appraisal (PRA) have inspired the methodology used in this research. Both EAR and PRA insist on the use of participatory methods, and suggest adaptation of the research process according to challenges faced in the field. This participatory research was conducted in collaboration with members of Ambedkar Community Computing Centre (AC3), a group consisting of local youth of Sudarshan Layout. The fieldwork presented a unique opportunity to employ visual methods such as a ‘self-documentation’ exercise, involving the creative use of a digital camera, and ‘social map-drawing’ exercises. These methods led to the creation of various visual artefacts such as hand-drawn social maps and digital photographs.

In this article, I argue that these visual artefacts (hand-drawn social maps and digital photographs) acted as boundary objects, enabled a dialogue and promoted negotiation of meaning between the participants and me. In the article, I describe how these visual artefacts facilitated the participatory research and assisted in collaboration, communication and cooperation between us. I discuss how these visual artefacts assisted in and mediated building a holistic understanding of problems that might not be obvious, such as drainage, an issue that severely affects the quality of life of the entire local community.

PARTICIPATORY RESEARCH AND METHODOLOGICAL FRAMEWORK

Participatory research emerged in the 1970s, and has focused on bottom-up research approaches, as compared to the conventional top-down research approaches. Participatory research has argued for a change in relationship between the researched and the researcher by facilitating the collaborative engagement of the participants in the research process (Lilja and Bellon 2008; Campbell 2002; Gotschi et al. 2009; Kumar 2007). Participatory research stresses the attitudinal shift in researchers’ approach to believing that local people are capable of analysing their situations or problems, and to appreciating the knowledge of people in reflecting on and developing solutions to issues in their daily lives (Kumar 2007; Campbell 2002). In this way, participatory research requires the researcher to be a facilitator in collaboration with the participants and innovate according to the local context. Participatory approaches are recommended for research that requires building a holistic understanding of the local community (Lilja and Bellon 2008).

EAR is a research approach that can be used to study the impact of Information and Communication Technology (ICT), especially with regard to poverty alleviation (Tacchi et al. 2003). PRA is a research methodology that advocates bottom-up research approaches with a flexible and innovative mix of various methods and sensitivity for the local context (Kumar 2007).

EAR combines ethnography with action research. Ethnography is a research approach that primarily deals with detailed observation of a particular set of people in a particular social setting (Silverman 2000). Action research focuses on bridging the divide between the researcher and the researched by engaging the participants in the research by ‘forming collaborative, reciprocal, trusting, and friendly relationships between researcher and subject’ (Falzone 2004: 328).

Tacchi et al. (2003) stress that an understanding of local context is of prime importance, and that the research process should be adapted according to the challenges
faced in the field. They recommend the use of research methods such as participant-
observation, field notes, group interviews, in-depth interviews and ‘self-documentation’
exercises. ‘Self-documentation’ exercises involve the creative use of media, such as
photography, in the research process by allowing people to document themselves and
their environment. Similar participatory research approaches involving photography have
been mentioned, such as ‘informant photography’ (Pink 2007), ‘participatory
photography’ (Gotschi et al. 2009), ‘photo-elicitation interviews’ (Clark-Ibáñez 2004),
‘auto-driven photo elicitation’ (Samuels 2004), ‘photo novella’ (Wang et al. 1996) and
‘photovoice’ (Wang et al. 1998).

PRA recommends the use of various techniques such as maps, games and activities,
followed by reflection and analysis, to build an understanding of the participant’s social
world. PRA emphasizes triangulation or cross-checking through the use of various
methods with the same participant group or the use of the same methods with different
participant groups (Kumar 2007; Campbell 2002). Kumar adds that PRA is especially
relevant in engaging illiterate or semi-literate participant groups in the research process.
One of the most popular methods of PRA is the social map. In this method, participants
are suggested to hand-draw a map depicting the social infrastructure of the locality
(Kumar 2007). Tacchi et al. (2003) acknowledge the significance of PRA, and
recommend using methods described by PRA along with EAR.

Both EAR and PRA insist on the use of participatory methods to engage participants
as fellow researchers, and suggest the adaptation of the research process according to
challenges faced in the field. The research methods employed for the research were
participant-observation, field notes, group interviews, in-depth interviews, self-
documentation exercises and social map-drawing exercises. In this article, I exclusively
concentrate on visual methods employed in the research that led to the generation of two
types of visual artefacts: hand-drawn social maps and digital photographs (described later
in this article).

VISUAL METHODS, REFLEXIVITY AND COLLABORATION

Contemporary visual research literature in visual anthropology debates the issues of
reflexivity and collaboration. The theme of reflexivity deals with the acknowledgement
of the subjectivity of a researcher in visual representations and the knowledge production
process (Banks 2001; Rose 2006; Pink 2003, 2007; Buckingham 2009). A reflexive
approach argues that visual artefacts and the knowledge produced during any
ethnographic fieldwork, by participants or researchers, is always constructed, and hence
should not be considered as an objective documentation of reality. Rather than just
focusing on the content of them, a reflexive approach aims to build a broad understanding
that includes the social context of visual artefacts produced during any ethnographic
fieldwork. The meaning of visual artefacts has to be understood not just in the context of
content or ‘internal narrative’, but should deal with ‘external narrative’, i.e. the social
context of the production of visual artefacts incorporating the discussion of intention,
relationship, identity, subjectivity, materiality and understanding of perception of
technology amongst the participants (Banks 2001; Buckingham 2009; Pink 2003, 2007).

Pink (2007) argues that the ‘ethnographicness’ of any visual artefact exists in the
‘discourse and content’, i.e. in the broad context.
‘Collaboration’ recognizes knowledge production from any fieldwork as a process of collaborative negotiation of meaning between the researchers and the participants. Pink (2003: 190) remarks that ‘Collaboration is important in any project involving people and images, both on ethical grounds and as a way of recognizing the intersubjectivity that underlines any social encounter’. Unlike the traditional methods where only the researchers handle artefact-producing devices such as cameras, a collaborative approach includes research methods that allow informants or participants to produce visual artefacts and representations of themselves. The collaborative aspect of visual artefact production makes the visual methods significant for participatory research (Buckingham 2009).

Many practitioners of visual methods acknowledge the significance of ‘photo elicitation’, where participants are interviewed on the basis of photographs and asked to interpret the photographs produced, hence enabling the researcher to understand the broad context of the photographs (Banks 2001; Buckingham 2009; Liebenberg 2009; Pink 2007). Digital technology has facilitated the elicitation process even further with the possibility of instant transfer to other devices, quick creation of multiple copies and instant replays on camera LCD screens. The visual methods are appreciated for giving access to knowledge that may have remained inaccessible to the researcher (Pink 2007), and for balancing the power dynamic between the researcher and the researched (Gotschi et al. 2009).

Following the above mentioned views on reflexivity and collaboration, I discuss two types of visual artefacts in this article. These are hand-drawn social maps and digital photographs produced by the participants as an outcome of visual methods employed for research. This article presents the broad context and negotiations entailing the production and elicitation of the visual artefacts.

THE CONTEXT OF THE STUDY

India, Bangalore and urban slums

India is a democratic country with a multitude of languages and cultures. The population of India amounts to 17 per cent of the global population, and includes one-third of the world’s poor (Rao 2009). According to the last Census of India (2001), India’s overall population was 1027 million, out of which 285 million (27.8 per cent) lived in urban areas. This research is based on an ethnographic field study conducted in Bangalore City. Bangalore is located in the southern part of India, and it is the capital city of state of Karnataka. Bangalore has a population of over 6.5 million and is ranked as the fifth most populous city in India (Raman 2008). Bangalore is a world-famous Information Technology (IT) centre, and is widely known as the ‘Silicon Valley of India’. The city has played a major role in the economic growth of India, and has also been test bed for a number of ICT initiatives for development (Singhal and Rogers 2001).

It is widely accepted that ‘slums’ are difficult to define, and there are multiple coexisting definitions and meanings (Sliwa 2008). According to UN-HABITAT (2003):

Slums are distinguished by poor quality of housing, poverty of inhabitants, the lack of public or private services and the poor integration of the inhabitants into the broader community and its opportunities.
Approximately 924 million people, 31.6 per cent of the world’s urban population, live in slums. The population of urban slums across the globe is estimated to increase by two billion in the next 30 years. Sixty-seven million people belonging to the urban population of India live below the poverty line. This translates into people living on less that US$2 per day (Rao 2009). Urban slums are marginalized, and represent the most disadvantaged group of urban dwellers. Much of the labour force in cities of developing countries live in slums (UN-HABITAT 2003).

Sudarshan Layout and media practices
This research is based on ethnographic fieldwork conducted in Sudarshan Layout, an urban slum in Bangalore, India. In this section I present a broad overview of the space, inhabitants and available media devices and associated practices.

Sudarshan Layout is a residential area for a (marginalized) community of construction workers, domestic help and labourers belonging to scheduled castes, as recognized by the Indian constitution. Sudarshan Layout is located in Gurappana Palya, near Bannerghatta Highway, in the city of Bangalore. Sudarshan Layout is roughly 100 metres (length) by 50 metres (width) in area. Approximately 300 families live in over 115 houses, most of which are one-room tenements. Big corporate office buildings surround the area and a large sewer line runs by one of its boundaries. The family income of inhabitants varies between Indian rupees 1500 and 10,000 (40–150 Euros) per month.

The older residents of Sudarshan Layout migrated from rural areas of Karnataka and nearby states such as Tamil Nadu, Kerala and Andhra Pradesh over a period of 30 years to settle in Bangalore. This group consists of individuals who dropped out of school to work at a very early age, and many of them are illiterate. In contrast, the younger generation of Sudarshan Layout was born in Bangalore and many of them completed basic schooling. The local population of Sudarshan Layout communicates in multiple languages, including Kannada, Tamil, Telugu and Malayalam. The youth of Sudarshan Layout are comfortable with Hindi and English as well.

The residents of Sudarshan Layout, as in the case of other urban slums in Bangalore, have been part of the labour force of the city, but have faced various types of social, economic and civic discrimination due to caste issues, poverty, lack of education and illiteracy, to name a few.

Sudarshan Layout has regular electricity supply, but persistent voltage fluctuation hampers the use of electronic equipment. Almost every household in Sudarshan Layout has a television set, and DVD players are very common as well. Financially better off families have access to satellite television, which requires dish antenna, while others receive the Indian government’s national television channel ‘Doordarshan’. Once a week someone from the locality gets a film in DVD format and then many of them watch it together. Movie-watching is not limited to a family, but is a social event where friends and other families are invited. A study carried out by Sambasivan et al. (2009) in urban slums in Bangalore showed similar findings. In Sudarshan Layout, very few families subscribe to newspapers. The most common use of media, especially amongst the male population, is to read the newspaper at the local tea stall or bakery. These shops also use newspapers as serving plates for snacks.

The mobile phone is the most pervasive communication device in Sudarshan Layout. Every household has at least one mobile phone, with a maximum of four mobile phones per family. The mobile phone is usually owned by the working member of the family. It
is a general belief amongst residents of Sudarshan Layout that anyone who has to go out of Sudarshan Layout for work deserves to keep a mobile phone. A major reason for this belief, as explained by the locals, is a sense of safety and connectedness with the community. Local residents do not have digital cameras, but it is common practice to borrow mobile phones with camera functionality to take photographs of social events. The mobile phone does not remain a private device, but is often shared amongst friends and family members. Mobile-generated digital content such as photographs remains in the mobile phone’s memory. Very few households have a landline phone connection. Residents of Sudarshan Layout have access to six telephone coin-booths. These coin-booths are installed at small multi-purpose shops. None of the families in Sudarshan Layout owns a computer, and similarly none of the households has an Internet connection. There are also a few cybercafes and mobile SIM-recharging centres in the vicinity that are visited by local youth. Please refer to table 1 for summary of key demographic and urban features of Sudarshan Layout.

<table>
<thead>
<tr>
<th>Category</th>
<th>Resource</th>
<th>Number</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human population</td>
<td>Families</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td>Houses</td>
<td>150</td>
<td>Most are one-room tenements</td>
</tr>
<tr>
<td></td>
<td>Streets</td>
<td>4</td>
<td>Each street is approximately 50 metres long and five metres wide</td>
</tr>
<tr>
<td>Water and Food Supply</td>
<td>Small multi-purpose shops</td>
<td>3</td>
<td>These small shops sell snacks, chocolates, and items for regular use.</td>
</tr>
<tr>
<td></td>
<td>Bakery</td>
<td>1</td>
<td>Sells ready-to-eat food, tea, coffee, soft drinks and other eatables.</td>
</tr>
<tr>
<td></td>
<td>Roadside tea Shop</td>
<td>1</td>
<td>Sells tea, biscuits and some snacks</td>
</tr>
<tr>
<td></td>
<td>Ration shop</td>
<td></td>
<td>Government’s Ration shop provides food and items of regular use at subsidized rates. Nearest Ration Shop is 15-20 min. of walking distance from Sudarshan Layout.</td>
</tr>
<tr>
<td></td>
<td>Clean water supply taps</td>
<td>3</td>
<td>Each street, except for Fourth Street, has one tap.</td>
</tr>
<tr>
<td>Communication</td>
<td>Telephone coin booth</td>
<td>6</td>
<td>Installed at the multi-purpose shops</td>
</tr>
<tr>
<td></td>
<td>Mobile phones</td>
<td></td>
<td>Almost every household has a mobile phone.</td>
</tr>
<tr>
<td>Health and Hygiene</td>
<td>Medical facility</td>
<td>A private clinic available in nearby area. A multi-facility hospital is 500 metres away.</td>
<td></td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bathrooms</td>
<td>Most of the houses in Sudarshan Layout do not have bathrooms. Residents use a public bathroom that has eight toilets. Four are for men while the other four are for women.</td>
<td></td>
</tr>
</tbody>
</table>

| School             | Government and Private Schools | Not in Sudarshan Layout but in nearby area. |

**Ambedkar Community Computing Center (AC3) members**

The participants in this research were the AC3 members. The Association for Planning and Social Action (APSA), a Non-Governmental Organization (NGO) based in Bangalore City, introduced me to the AC3 members. All of the AC3 members were in the age group of seventeen to nineteen and were studying in schools, and they could communicate in English. During the initial meeting, I updated them about this research and all of them expressed interest in participating in the study.

The residents of Sudarshan Layout describe AC3 as an informal computer education centre for children of slums. AC3 is based in Sudarshan Layout and is a bottom-up initiative owned by the local community. AC3 was created and is sustained by the joint efforts of various groups of people. Some of the groups belong to Sudarshan Layout while others are from outside. The idea of AC3 was conceived during a meeting of local youth of Sudarshan Layout with Stree Jagurati Samiti (SJS), an NGO based in Bangalore, and Ambedkar Youth Association (AYA), a local youth association of Sudarshan Layout. The local youth aspired to computer education, and during the meeting they expressed these desires. AYA agreed to provide space to start a computer centre while SJS contacted Association for India’s Development (AID) with a request for teachers. AID is a group of volunteers, primarily software professionals, working in the IT industry of Bangalore. Local youth volunteered to take the responsibility of the computer centre and other residents of Sudarshan Layout helped in building the necessary infrastructure. Finally, AC3 was formally inaugurated on 6 July 2008.

The members of AC3 are the social group that participated in this research. AC3 is a self-organized group consisting of members of local youth of Sudarshan Layout. It is an open group and anyone can be part of it. The members of AC3 are young and enthusiastic with regard to learning about technology. AC3 has two donated laptops that have Ubuntu (a Linux-based operating system) installed. They also have a few donated desktop computers, but these do not work because of recurring power fluctuations.

AC3 members learn computer skills from AID volunteers who visit AC3 five days a week. At the time of this research, the AC3 members were using the laptops for basic computer functionalities like word processing, games, movie watching, image editing and digital drawing. AC3 members access Internet from cybercafes or from AID volunteers’ homes to send e-mails and browse the Internet. Most of them own mobile phones and use various functionalities like SMS, contact book, loudspeaker, camera, etc. At the time of
the field study, the AC3 members did not have access to digital cameras, but they borrowed camera-mobile phones from their friends to take photographs of social events and family functions.

In December 2008, two months before this ethnographic field study, Richard Stallman, founder of the Free Software Foundation, and Eben Moglen, Chairman of Software Freedom Law Center, visited AC3. Both Richard Stallman and Eben Moglen praised AC3 and acknowledged the efforts of the AC3 members. Local print and online media covered these visits. Photographs of the AC3 members appeared in newspapers, on blogs and in online magazines. The news also spread to slums in the vicinity and many people started visiting Sudarshan Layout to meet the AC3 members. All these events instilled confidence in the AC3 members, and they discussed documenting and presenting the work of AC3 and life in Sudarshan Layout to the world at large. They wanted to present the views and voices of local residents that have been largely ignored by the progressive section of Indian society and governmental organizations. They decided that they would use a digital camera to make visual presentations to be put on the Internet. (The AC3 members had requested and supposedly received a digital camera from Eben Moglen and Richard Stallman, but it was stolen before it could reach them.)

BEGINNING THE FIELDWORK
During the first meeting with the AC3 members, I had a point-and-shoot Canon A450 digital camera. The presence of the digital camera started a conversation about the desire to document the work of AC3 and life in Sudarshan Layout. The AC3 members expressed a keen interest in learning about and using the digital camera. Therefore, I offered to teach them basic camera functionalities and to share the point-and-shoot Canon A450 digital camera with them. Subsequently, I held informal teaching sessions dealing with the operation of the camera. I also taught them how to use Bluetooth technology to transfer images from a mobile phone to another mobile phone and from a digital camera to a laptop. They were very enthusiastic about and comfortable learning about these digital technologies. Seeing this enthusiasm, I decided to include visual methods, such as ‘self-documentation’, utilizing a digital camera.

The digital camera proved crucial in forming a bond with the AC3 members, and facilitated in building a relationship of trust. The role that a camera can play in establishing a trusting relationship with research participants has been documented by Pink (2007). Sime (2008) has argued that visual methods allow young adults and children from low-income groups to express themselves better in a participatory research context. There has also been other recent work arguing for consideration of young adults and children as competent and engaging them as co-participants in research (Sinclair 2004; Pain and Francis 2003). The significance of the digital camera for the youngsters, the bottom-up ideology of AC3, the political significance of being able to incorporate lost voices and the desire for empowerment amongst the AC3 members made the environment conducive to incorporating visual research methods.

VISUAL ARTEFACTS AS BOUNDARY OBJECTS
I define a ‘Visual Artefact’ as a human-created visual representational object or entity. For example, paintings, sketches, maps, doodles, photographs, video and film are visual
artefacts. ‘Boundary object’ is a concept introduced by Susan L. Star and James R. Griesemer (1989: 393) as:

> Boundary objects are objects that are plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use. These objects may be abstract or concrete. They have different meanings in different social worlds, but their structure is common enough to more than one world to make them recognizable as a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds.

In the context of participatory research, I define a ‘boundary object’ as an entity whose meaning and use is negotiated, as it mediates and facilitates collaboration amongst various stakeholders of the research. The visual artefacts discussed in this article are hand-drawn social maps and digital photographs. In this section, I argue that these visual artefacts acted as boundary objects and brought forth a constant negotiation of meaning between the participants and the researcher. I further discuss how these visual artefacts facilitated this participatory research and assisted in building a holistic understanding of the Sudarshan Layout that otherwise would not have been possible.

The AC3 members’ desire to document their lives and showcase them to the world through the use of digital media provided this research the means to build a broad understanding of community communications. We (the AC3 members and I) came to share the goal of representing life in Sudarshan Layout. This required cooperation, communication, coordination and collaboration between myself as a researcher and outsider to Sudarshan Layout and the AC3 members. The boundary objects acted as an ‘interface between two different social worlds’ (Vik and Villa 2010: 159) The informal teaching sessions and discussion on visual methods were the start of negotiation of meaning between us.

Two types of visual artefacts were produced during the research. These were hand-drawn social maps and digital photographs. The AC3 members participated in the social map-drawing exercise to visually illustrate the urban landscape of the neighbourhood. They were provided with pencils, coloured pens, erasers and paper (A3 and A4 sizes). The participants themselves decided on the colour scheme, labels, and pictographic and schematic elements used in the maps. It was communicated that the maps need not be drawn to scale. The whole process of map-drawing and discussion was documented on video. A total of three maps were created. All the social map-drawing exercises were conducted and discussed separately with the creators. The creators of each map were not aware of what the others had drawn. In this article I present two of the maps.

In order to create digital photographs showcasing their lives, the AC3 members used the point-and-shoot Canon A450 digital camera to document elements from their environment, and participated in a self-documentation exercise. Two camera exercises were conducted, and both were introduced with the same set of instructions: Take photographs of anything you like or anything you do not like in Sudarshan Layout. It was explained that ‘anything’ could be an object, a space or a human. After both the
exercises, the photographs were transferred to a laptop belonging to AC3 and a discussion was conducted on the basis of the photographs where participants were asked to reflect on them. The discussion was attended by other AC3 members as well.

Pink (2007: 76) argues in the context of photography that ‘when photographs are produced collaboratively, they combine the intentions of both ethnographer/photographer and informant and represent the outcome of their negotiations’. Similarly, in this research, the requested tasks, to visually illustrate Sudarshan Layout and photograph elements from the space, represent the further negotiation and collaboration between the researcher and the participants in the production of the visual artefacts (hand-drawn social maps and digital photographs). The instructions I gave the participants, that is, *take photographs of anything you like or anything you do not like in Sudarshan Layout*, provided a frame that had to be negotiated by the participants for the production of digital photographs.

These visual artefacts (hand-drawn social maps and digital photographs) formed the basis for discussion, and knowledge was created as an outcome of negotiation between the participants and me. Here I present a discussion on the problem of drainage and how
it severely affects the quality of life and life cycle of the entire Sudarshan Layout. The visual artefacts assisted me in forming a broad understanding of the problem and assessing its severity. Please refer to Figure 1, Figure 2 and Figure 3 for hand-drawn social maps and digital photographs.

Figure 2. Caption: Social Map 1 (Back-Side) indicating labels used by the participants.

Figure 3. Caption: Social Map 2. The reader can appreciate labels A, B, and C stand for drainage chamber. Label D indicates the big sewer line.
FIELDWORK RESULTS

One of the social maps contained ten black circular figures representing drainage chambers and a big sewer line (labelled ‘Drainage Water’) running across one of the boundaries of Sudarshan Layout. Please refer to Figure 1 (labels: C, D and H). During the discussion on the social map it emerged that drainage is one the biggest problems for the residents of Sudarshan layout. But the problem results in many other problems that affect the quality of life of the local residents. As the discussion on the map progressed, it emerged that the problem of overflowing drains is especially severe during the monsoon period, that is, between July and August every year, when a big sewer line gets flooded and most of the drainage chambers overflow, flooding the streets of the locality. The stagnant water on the street leads to the problem of mosquitoes, which affects health and quality of sleep. A particular group of local residents who are affected by the stagnant water are very young children. These young children play at the entrance of the third cross that is indicated on the map as a ‘play place’, with their bare feet and hands touching the ground. This location has two drainage chambers in close proximity. Please refer to Figure 1 (labels: C, D and E).

The significance of the problem could also be ascertained through the multiple representations and discussions in other exercises. It emerged that the local residents were aware of the exact location of drainage chambers in the space. This was reflected in all the three social maps, since all the drawers represented these chambers and referred to them during the discussion. For instance, in another map the drainage chambers are visually represented with a circle with a cross sign. Please refer to Figure 3 (labels: A, B and C). The discussion about this map revealed the drainage chamber at the entrance of Second Street to be the most problematic, since this particular drain overflows most of the year. The problem is due to an internal blockage. Please refer to Figure 3 (label: B). The severity of this particular drainage chamber is high because it is located at a place that most people need to traverse to move in or out of Sudarshan Layout. The discussion also touched on how, during the monsoon, water-logging on streets results in the flooding of many houses, and local residents suffer from lack of sleep because they have to spend time clearing out the water. This negligence reflects and associates the drainage problem with a larger issue attached to life in the urban slums of India, that is, the government’s non-recognition and ignorance of the well-being of citizens who dwell in slums. As an AC3 member who participated in the discussion added, ‘There is no important person living here. This is a slum, so the government treats like it’.

As boundary objects, the hand-drawn social maps did not remain static, but rather became part of a process of exploration to communicate, collaborate and cooperate. For example, prior to finishing one of the maps (and prior to the discussion) it did not have visual indicators or labels for bakery, food shops, telephone booths, and ‘play place’. Please refer to Figure 1 (labels: A, B and E). These labels were added onto the map as the discussion progressed. Hence, the final version of the social map is also an artefact of the discussion that the object itself instigated.

The significance of the problem of drainage in the lives of residents of Sudarshan Layout is also reflected in ‘self-documentation’ digital camera exercises. During the discussion session on the photographs, similar issues emerged:

*Sarsu: this is drainage [Referring to Figure 1(label: K)]. There is no proper connection for drainage. So any time dirty water will come out. Children play at this place so they
will get some problems. So children’s health is not good. So most of time we are suffering from this problems.

Satish: Now they have dug there [Referring to Figure 1(label: L)]. They dig so much for cable wires and chambers. We are having so many problems. Like the road is not clear. Before it was clear but not now […]

Mani: No, before drainage water was going out. Some problem was there. Now government gave the permission to build chambers and proper road. I used to go to school that way. But road was not good. Drainage water was coming out so it was difficult to go. Now they are putting new pipes. It is good for everyone. I think it will be done in three weeks […]

Sarsu: No three weeks, it will take three months. I know our government.

The subsequent discussion associated the problem of drainage with issues of social and civic exclusion, and with inefficient working methods of the government’s municipal body that disregarded the real problems of the local population. As Pink (2007: 84) states,

Photographic interviews can allow ethnographers and informants to discuss images in ways that create a ‘bridge’ between their different experiences of reality. Photographs can become reference points through which informants and ethnographers represent aspects of their realities to each other.

Similarly, the discussion on the photographs revealed the AC3 members’ experience of reality as one that is constantly faced with various social, civic, economic, bureaucratic and health problems. As an outsider, I was aware of the existence of many such issues in urban slums, but I was unaware of how these are interrelated and impinge in the daily lives of the residents of slums.

It emerged that the problem of drainage is significant with regard to the housing options available for the local community, and takes on another significant dimension: on the maps, the bigger houses of Sudarshan Layout were referred to as ‘Buildings’ and were highlighted in red, while smaller houses were referred to as ‘Small houses’ and were highlighted in blue. Please refer to Figure 1 and Figure 2. A ‘Building’ is used to indicate houses that are new, have roofs made of cement, have a bathroom and possibly multiple rooms. On the other hand, a ‘Small House’ signifies an old one-room tenement, with a roof constructed of sheet, and the absence of bathrooms. During the discussion on the map, it emerged that the differentiation between ‘Buildings’ and ‘Small Houses’ relates strongly to many other aspects in the lives of local residents. While ‘Building’ means safety, protection from rainwater and disease, ‘Small Houses’ indicates low flooring, water seepage from ceiling, water flooding, inconvenience, health problems and lack of sleep during the monsoon period. This aspect was indicated in camera exercises and was referred to in the photographic discussion as well. Please refer to Figure 1(labels: I and J).

Star and Griesemer (1989: 408) explain how ‘boundary nature is reflected by the fact that they are simultaneously concrete and abstract, specific and general, conventionalized
and customized’. These visual artefacts as boundary objects are ‘plastic enough’ to adapt to the local needs of representation of aspects of life in Sudarshan Layout, and at the same time are ‘robust’ and heterogeneous enough to afford a common identity and structure across different social worlds. Their meanings are constantly negotiated, reconstructed and re-appropriated. The digital photographs and social maps have been part of my Master’s thesis, the presentation for my thesis defence and my digital photo collection, and are part of this article. Similarly, the AC3 members have used the photographs in a photographic exhibition, for personal documentation and representation, and in a presentation on a blog. These visual artefacts as boundary objects are part of a constant process of negotiation of meaning.

CONCLUSION
This article is based on findings of an ethnographic field research conducted at Sudarshan Layout, an urban slum in Bangalore, India in February 2009. The methodological approach followed in this research was inspired by the EAR and the PRA methods. This approach was participatory in nature and involved collaboration with the members of AC3, a group consisting of local youth of Sudarshan Layout. During the fieldwork, the unique opportunity arose of employing visual methods such as ‘self-documentation’. This involved the creative use of a digital camera, and the use of ‘social map-drawing’ exercises. Through these exercises, various visual artefacts such as hand-drawn social maps and digital photographs were created.

In this article, I described how these visual artefacts also acted as boundary objects that enabled a dialogue and promoted negotiation of meaning between the participants and me. As boundary objects, these visual artefacts acted as a bridge between the two different social worlds of the AC3 members and me. Furthermore, these artefacts did not remain static, but rather became part of a process of exploration to communicate, collaborate and cooperate. They assisted in and mediated building a holistic understanding of some of the problems associated with poverty, such as lack of proper drainage, an issue that severely affects the quality of life of the entire local community. As Liebenberg (2009: 445) states:

Experiences and meanings become tangible through visual representation and may be understood in ways that other conventional forms of communication may not allow […] through use of visual material, researchers may discover and demonstrate components of community lives that may be subtle or easily overlooked.

These visual artefacts also balanced the power equation between the researcher and the researched, since they facilitated in building the relationship with the AC3 members. As Sime (2008) and Pain and Francis (2003) have pointed out, the active participation of young people in visual methods involving the creative use of the camera and drawing can provide valuable insights.
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REFERENCES
Sambasivan, N. Rangaswamy, N., Cutrell, E. and Nardi, B. (2009), ‘UbiComp4D:

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