Explorations into the Social Context of Design

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“This is criticizing not so much Western audiences but the situation this audience finds itself in, the state of culture in the West. For example, for Russians, even now, culture and works of art have always carried certain spiritual, mystic, or — if you prefer — prophetic significance. A similar understanding of culture has to a very large extent also developed in Poland. Here, in the West, culture has long ago become an object of consumption, a consumer property. What does culture mean for them? Culture is what I can have. As a result of my being free. And what does it mean free? — I am free to have what everyone here has. Does culture exist in the West? It does. Thus I can and I have the right to use it. And what does it mean: I can? Well, just — physically, pragmatically — I can. It won't even occur to him to pause and think: yes you can but are you able to digest it? Let's take Goethe for example — you read Faust — but have you been able to read it? […] He thinks: I can go and buy; all I have to do is pay. This is where the lack of spirituality leads.”

Andrei Tarkovsky

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Abstract

Design is in many ways a social process. In this thesis, a number of aspects that make up the social context of design are discussed. This is done by first exploring a way of eliciting “social” requirements and design inspirations and the study of three design processes based on group psychology, focusing on alignment of conceptual representation and conflict. After that, the notion and setting up of online communities is described, and visual semiotics are introduced to acknowledge that the product of design represents embedded and socially formed meaning. Finally, an overall conclusion is drawn. The aim of this thesis is to provide an overview of the qualitative research done in these various areas, in order to uncover the importance and usage of social context in any multimedia design process.

1 Introduction

In writing this thesis about design, being such broad topic, I am finding myself in what Wilpert (2007) calls 'the reversed Jonas trap';

I, too, am attempting to swallow the whale.

Originally meant to facilitate the description of one out of three cases, the one out of these that focuses on social awareness systems, this thesis has taken a turn in adopting two more studies, thereby drastically broadening its scope.

As a result being more qualitative, and sometimes even speculative in nature, I do however believe that I made the right choice in participating in and using three case studies. I personally feel that in obtaining a MSc. degree, the journey is just about to start, making the preliminary trajectory of study a space meant for exploration and not just narrowing down topics of interest. Being new to the Multimedia curriculum, as a previous student of Business Informatics, I want to take this opportunity to find my path, of which this thesis is a reflection.

Some might argue against the variety and width of research topics dug into in this writing. For those, I wish to refer to Appendix A, containing two published papers and one proposal paper, in which all analytical standards are taken into account.

1.1 Research questions

The goal of this thesis is to explore the social context surrounding three design case studies. Hereby I assume that these three design projects, in large part, are representative for multimedia design projects in general.

The problem statement, based on these three cases, is to be seen as twofold:

- What is the influence of social context on multimedia design projects?
- How can this social context be taken into account?

These questions are explored from three perspectives (analogous to Figure 1):

1. That of eliciting requirements and inspiration for design, being the forefront of the design process.

2. That of the project team and project stakeholders involved in a social relation, and;

3. That of the end-product of design being placed in a social context.

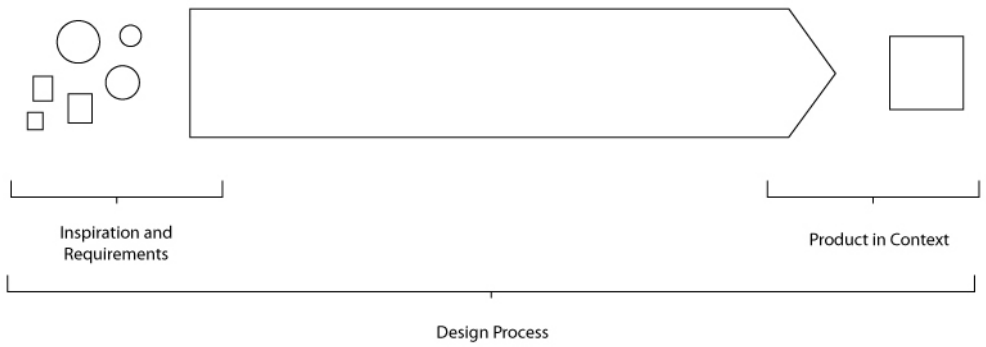


Figure 1: Three perspective on design.

This is however too broad a view on design, forcing us to focus on specific items of interest, which are addressed in the following questions (referring to the problem statement):

- For eliciting requirements and inspiration of social nature:
    - What are contextual inquiries and cultural probes studies?
    - What is their added value?

- Within the design process, seen as a social process:
    - What social factors from psychology can be identified in the case studies?
    - What is their impact on the design process?

- For the end-product of design, performing in a social context:
    - What are online communities?
    - How can these be set up and to what benefits?
    - What is visual semiotic theory?
    - How can this be used as a framework in design?

1.2 Thesis structure

Chapter 2 – Ethnographic Methods

In this chapter, two elicitation methods inspired by ethnography are discussed: contextual inquiries and cultural probes. This will primarily be focused on theory and reviewed literature, forming a basis for Chapter 3.

Chapter 3 – Probes in Practice – Panorama

After the theoretical dissertation of Chapter 2, in this chapter the process of creating probes in practice, and analyzing their returned material, will be described. This is based on one of the three case studies referred to in this thesis, being a research project at the Intelligent Multimedia Group of the Vrije Universiteit, called Panorama.

Chapter 4 – Case Studies in Design – Social Factors

Reviewing three design projects at the Vrije Universiteit, in this chapter we will discuss two issues stemming from social psychology: mismatches in conceptual representations and conflict resolution, both within the design teams and in relation to the stakeholders involved. Most importantly, we will describe how these issues influenced the design process.

Chapter 5 – Online Communities as a Context

Relating to the shifting role of users in becoming active contributors to the design process, as came to our attention in one of the case studies, in this chapter we look into online communities. Within this chapter, conditions for such communities to exist and presents potential benefits for designers are listed, and guidelines for creating such a community are set up.

Chapter 6 – In Retrospect – Visual Semiotics as a theoretical Framework

Here, a theory of visual semiotics is introduced as a means of defining visual meaning is a social construct. Regarding the end-product of a design process, this means that it is inherently made up of visual features that represent a certain socially constructed meaning, which designers might use as a framework for visual design, and which is discussed in this chapter.

Chapter 7 – Conclusion

In this chapter, an attempt is made to draw a conclusion from all that has been reviewed and discussed, mostly focusing on each topic of interest individually.

Appendix A

Appendix A is composed of three papers regarding two of the cases studied:

Vyas, D., van de Watering, M. R., Eliëns, A. & van der Veer, G. C. (2007): Engineering Social Awareness in Work Environments. To be presented at HCI International 2007 conference in Beijing, China.

Vyas, D., van de Watering, M. R., Eliëns, A. & van der Veer, G. C. (2007): Being Social @ Work: Designing for Playfully Mediated Social Awareness in Work Environments. To be presented at HOIT-2007 conference in Chennai, India.

Eliëns, A., Vyas, D., van der Veer, G. C. (unpublished): A theoretical foundation for the aesthetics of interaction and awareness – making sense of the senses.

Appendix B

Here, an exhaustive summary of visual semiotics theory by Kress and Van Leeuwen (1996) is given, possibly in order to be used in future Visual Design courses in the Multimedia curriculum at the Vrije Universiteit.

2 Ethnographic Methods

2.1 Ethnography as a method in design

Social factors, such as social awareness, are difficult, if not impossible to measure precisely (Bødker & Christiansen, 2006). Thus, we need other methods than those focused on deriving and analyzing quantitative data. Following previous research on mediating awareness and intimacy through technology, open-ended observations, contextual inquiries and cultural probes can be used to explore and to get an understanding of social aspects in a specific context.

Finding its way to Human Computer Interaction through the emergence of Computer-Supported Cooperative Work (CSCW) with its emphasis on social organization of activity, and the movement of Participatory Design (PD) in which workplace democracy plays a central part (Dourish, 2006), ethnography as a methodology provides us with a basis for identifying and interpreting social awareness. As Dourish (2006) notes, "ethnography provides insight into the organization of social settings", but one has to be aware not to use ethnography as a purely empirical tool, as this would undermine much of the strength of ethnographic studies that lies in its analytic part. Its determining factor should not be a list of design constraints and requirements based on empirical data, but the more broad understanding of and reflection on the social setting (Dourish, 2006) and, as we will see, its richness in providing inspiration rather than strict design implications.

2.2 User Requirements Elicitation – Say, Do and Make

Sanders (2001) identifies three areas of user research based on the focus and kind of information that can be acquired: say, do and make.

"Say" and "do" relate to our first two methods: observations and interviews/inquiries. "Make"-tools, in turn, allow the participants to describe and visualize their feelings in physical or visual forms (Mattelmäkki & Batterbee, 2002). According to Sanders (2001), traditional methods, which are mostly "say" methods, should be explored in combination with other approaches, such as "make" methods. This combination allows for achieving a more insightful, and holistic understanding of the participants and their lifestyles.

In examining social aspects with regards to designing for users that inherently operate in a specific (social) context, we need methods that take into account that one is not looking for strictly quantitative data; one needs hints on peripheral aspects of life in a specific context, personal interpretations of actions and the meaning of objects, et cetera. In short, one needs rich and subjective information from which an understanding of social awareness in the specific social context can be derived.

2.3 Contextual Inquiries

Contextual inquiry is a qualitative data-gathering and data-analysis methodology adapted from the variety of fields such as psychology, anthropology, and sociology. It consists of observing and talking with users in their workplaces as they do real work (Raven & Flanders, 1996) and is to be seen as an active discovery process in which both the interviewer and interviewed are equal, rather than a process of external evaluation.

Performing a contextual inquiry, as the name says, is not only about getting set information from an interviewee; it can be guided by the specific physical context the person is interviewed in (such as the working environment). Special note should be taken of an interviewee interacting with the environment, or performing a context-related activity.

As social awareness is the understanding of the activities of others by an individual person, build up in and through the interpretation of time (i.e. a sequence of activities performed by another person) and space (i.e. the spatial layout of an office), and keeping the work-environment in mind, we opted for using contextual inquiries as the next step (after observation) in our field study.

In short, and parallel to the first step in contextual design described by Beyer and Holtzblatt (1999), we wanted to get reliable (first hand) knowledge about what the participants do (day-to-day) and what they care about.

Focus of Inquiry

Derived from Beyer and Holtzblatt (1999), but modified to a focus on social aspects, contextual inquiries:

- Reveal the details and motivations implicit in the participant's work and activity.
- Make the participants and their needs real to the researchers and designers.
- Introduce participant data as a basis for making design decisions.
- Create a shared understanding of the data throughout the research/design team.

A contextual inquiry is based on a focus, rather than a specific set of questions. This focus being a perspective or a set of concerns, provides the interviewer with flexibility that allows him to follow interesting avenues of conversation that are not part of a list of pre-set questions (Raven & Flanders, 1996).

Our focus was two-fold, and in a sense very broad:

- Get specific information about the variables in, and components of, social awareness (as mentioned in the previous section), such as activities, occupation of space, the people the interviewed interacts with, etc. And based on this,
- Get rich and subjective information about the participant's day-to-day activities, his/her views on interaction with colleagues, etc. In short, the participant's interpretation of all aspects contributing to social awareness.

The Panorama contextual inquiries

We arranged individual, one-on-one interviews in the participants' offices, asking some of them, based on their role in the department, in advance not to close off for their daily routines during these interviews. This resulted in, for example, one participant having her music running in the background, and other participants checking their e-mail by quickly glancing at their computer screen during the interview.

Based on availability and flow of conversation, these meetings ranged from 30 minutes up to an hour and 30 minutes. To rule out possible biases (as far as possible) or preparations that would undermine the "real" context, we only told the participants that we would like to talk about social interactions at the department, and that we were specifically interested in their personal involvement and related thoughts. As we are focused on social aspects of work, we did not ask the participants to actively perform their specific tasks during the interviews, instead, we wanted them to actively think with us about the social environment at the department.

During the interviews, we tried to encourage the participant to think with us, in a sense to think "out of the box". Raising the question how the participants usually communicate at work (and thus derive awareness information), for example, most of them simply answered that they used e-mail. We asked them what they communicated about (contents of awareness), but also asked them to think of other forms of communication that they use. Going along in the process of exploration, we asked them about (for example) notes they had on their desks, personal items in their room, conference posters they had hung up outside of their office, and if they explicitly used these to communicate to colleagues (and if so, what they wanted to communicate, etc.).

Identities and activities

We wove the notion of identity in awareness context by Glaser & Strauss (1964) ("How I see myself", How others see me" and How I see others") into our focus, by asking the participants about them being aware of colleagues, but also about how they made colleagues aware of themselves. An example from our inquiry is the question "How do you know were a colleague is (when not at his office)?" and moving from that point, asking how the participant makes his colleagues aware of him/her not being at his office. This reflectiveness in questions sometimes led to the participant

thinking aloud about his role in social awareness at work, which we stimulated further by asking for their motivations whenever possible ("Why do you do that?", "Why do you think that...?").

Regarding activities, in some cases, we could identify activities based purely on observations. In some sessions, for example, we were "disturbed" by phone calls or visits, which are part of the day-to-day work of the participant. Note that this is one of the powers of performing a contextual inquiry as opposed to performing an interview in a "laboratory setting" (as described in the introduction of this chapter).

Wanting more information about activities performed (and related interpretations), we asked some participants to describe a typical day at work. Based on that, we could go into more detail on certain aspects, by focusing on the chunks of events that the participant mentioned. This shifting in strategies, sometimes using "a day at work", and otherwise following a list of concerns (the first point of our foci), stimulated us in finding both overlapping and contrasting views across the different interviews.

Sights and sounds

Next to having these partly structured conversations, we asked the participants if we could take photographs of their working environment. This is based on the importance of the influence of spatial layout and customization on (social) interactions stressed by Jordan and Henderson (1995), which was described earlier. It also provides clues about the artifacts (either personal or shared) that are possibly filled with cultural meaning, or are used as territorial markers.

In all cases, we asked the participants to describe the layout of and artifacts in their offices, and in doing so, we probed for meaning, derived from motivations and interpretations. This brought up interesting topics, such as one participant prominently displaying a map of the world in her office in order to stimulate conversation about the countries of interest to the people that visit her office (i.e. country of birth).

To allow for transcription and further analysis, we recorded all conversations in digital audio format (with the permission of the participants).

2.4 Cultural Probes

Keeping in mind both the nature of social awareness and the time constraints of our participants, we decided on following up our observations and inquiries with a cultural probes study. This combination has proven its worth in other studies regarding non-intrusive settings such as described in (Mattelmäkki & Batterbee, 2002) and (Crabtree et al., 2003).

Cultural probes are the result of looking for a fresh approach to understanding user in their environments. In doing so, Gaver et al. (1999) used what they call the "artist-designer approach", which stresses the importance of gathering inspiration rather than design information. In doing so

probes studies focus on rich, personal and incomplete chunks of information, gathered by providing materials that are provocative and playful, and allow the participant to be an active inquirer in his or her own environment en experiences. The latter might raise the question of deploying the probes already increasing social awareness, as participants take a critical stance towards their own environment en relationships with others by using the probe materials.

The cultural probes described by Gaver et al. (1999) have two goals:

1. Establishing and maintaining a dialogue between researchers and participants
2. Providing inspiration for design

Establishing a dialogue can be seen as the active participation of the participants in the design process stressed in contextual design. Using probes, the dialogue is not constrained as it is in for example questionnaires; probes are mostly used when the designers are interested in non-measurable, non-tentative information.

A typical probes package is made up of a set of postcards with carefully selected and constructed provocative images and open-ended questions, geographical maps, a camera with instructions on the kind of photographs that are desired or more strictly, assignments, and a booklet to be used as a diary and notebook (Gaver et al., 1999). These packages are then handed out almost as gifts, so that each and every participants feels that this is something special, which is made for him or her personally. When giving out the probes, the design team is to stress the participants to be creative and personal, and not restrict themselves to set standards, either in tools used (think of colored pencils, tape, collage material, etc.) and views shared (personal, not collective).

After a set time, the probe materials are then gathered and analyzed by the design team, which can hopefully count on creative and personal statements in all sorts and sizes, ranging from drawings and notes to photographs and written statements. Analysis is a time-consuming and difficult process in itself, and its method depends on the needs of the design team. Typically, it consists of well-known methods in analyzing qualitative data in general, such as abstracting given views (both text and images) to keywords and then grouping these into themes or categories. Note that “abstracting” should not be taken as definite; rich data can be useful in generating ideas for design and should be treated carefully as it us at the core of the cultural probes method. This will be discussed in more detail, and based on an actual example, in the next chapter.

As Gaver et al. (1999) mention, probes are traditionally not used as a method in designing for user needs, but more as a method of “discover new pleasures, new forms of sociability, and new cultural forms” in which the designers act as provocateurs in order to explore (novel and original) perceptions of (the use of) technologies.

It usage being proposed in 1999 by Gaver et al., literature shows that cultural probes are increasingly used as a method from which researchers and designer try to directly distill requirements. Being what can be called the “father of cultural probes”, Bill Gaver has tried to correct this view on and usage of cultural probes, which one can’t help but think he believes is a form of misuse or even abuse. According to Gaver, cultural probes should provide inspiration, above all, and if requirements can be gathered from the materials retrieved than that is an added bonus.

As is been shown, probe results can be guided towards aiding in requirements elicitation, with (Crabtree et al., 2003) giving the foremost example. Probes then prove their strength not because of their plus in providing inspiration, but because of them being fairly non-intrusive and focusing on personal issues from the participant’s point-of-view and within a specific context, in contrast to

constant observation or laboratory experiments, which require the researcher/designer physically "being there" and interpreting his/her observations, or rule out possible contextual factors.

Future Probes

Up until recently, and following the procedure Gaver et al. (1999) initiated, methods such as cultural probes have been used to contact individuals within a (target) group. The gathered material from all participating individuals was then brought together by the design/research team, which typically constructs a mapping that represents the group as a whole (such as the analysis methods mentioned earlier on in this chapter).

Amongst others, Postma and Stappers (2007) have questioned this approach, in a sense they propose letting the group itself construct a representation of itself. Quoting them, "most publications focus on the individual perspective of the social context of product use, few attend to the group perspective" (Postma & Stappers, 2007).

In their *context mapping method*, Postma and Stappers (2007) use a two-phased approach:

1. First, "each participant worked individually on a cultural probe", which inquired into personal interests and interpersonal relationships within the entire group. Based upon the probe results, social (sub)groups were identified.
2. Then, each identified group jointly made an expressive exercise (similar to our "tasks"), in this case the creation of a poster representing the group. This activity is to be observed by the designers, as it provides valuable information about how in-group cooperation takes place, what stories are told, and filtered information as the participants corrected each other.

Context mapping, in short, can be described as "the process of informing design teams about the users, their environments, their needs, wishes, and experiences." (Stappers et al., 2007)

The materials gathered in both steps were then analyzed and gathered into concept maps, which surpass traditional social context maps in richness and variety of raw data (such as images). Parallel to the cultural probes study that we performed during the Panorama project (which is described in detail in Chapter 4), Postma and Stappers (2007) aimed at and succeeded in not only gathering inspiration and empathy from the participants (which as (Mattelmäki, 2005) proves is essential in product design), but also factual information on which requirements can be based.

The concept of elicitation methods such as cultural probes and individual concept maps being based on the social relationship of individuals within a group, adding such a phase as described above seems useful in identifying subgroups, which inevitably exist within larger groups.

Letting a group of individual users position themselves into (sub)groups, and having these groups represent themselves in a cooperative, creative (and logged) activity also addresses one of the toughest activities that the design team faces when using qualitative studies such as cultural probes: sorting and interrelating the huge amount of qualitative data on a level that represents in-group relationships. It also sees the users themselves as 'the experts of their experiences' (Stappers et al., 2007) , not to be prematurely (namely in sorting groups) judged by the design team.

A watchful and critical eye from the designer is still needed, as this should not undermine them in trying to understand the participants by going through this mass of personal and rich data.

One also needs to note that all the above counts for *social* constructions; physical or cognitive requirements for an application may, of course, result in totally different groups (although correlation might be interesting in itself).

3 Probes in Practice - Panorama

The contextual interview initiated this dialogue in our study. In cultural probes, this dialogue is reflected by the personal nature of the probes (each participant gets a probe package, addressed specifically to him) and their stimulation of personal expression, in forms that are free to choose for the participant. As Gaver et al. (1999) describe, this is also established by the participant seeing and feeling that the researchers reveal part of their own identities and opinions in the probe material.

In our case we, as researchers and designers, have chosen or made images and specific visual metaphors that we find suitable and in a sense provocative in this specific setting. This in turn encourages the participants to give us "their choice" in shared, and possibly provocative material.

Inspiration *and* requirements

Next to opening up a dialogue and providing inspiration, we wanted to use our study to get more specific information on social awareness, on which to base future design proposals. In order to do so, we adjusted the probe materials to more specifically focus on life at the department and the aspects of social awareness we have derived from previous published research.

Were Gaver et al. (1999) use phrases such as "Describe your favorite item.", we use "Describe your favorite item in the department." Although being a simple modification in sentencing, this sharpens the scope of the answers given.

The probe packages

The probe packages we devised for the Panorama project, gathered in semi-transparent container maps, contained (see Figure 2):

- "My Personal Work-book"
- "My Logbook"
- A disposable camera
- A set of color pencils
- A drawing pencil
- A marker
- Scissors
- Glue, and
- A set of post-it notes
- Three popular magazines

Instead of providing separate postcards, maps, scrapbooks, notes et cetera, we bundled most of our material in one book, “My Personal Work-book”. The name of this book reflects its personal nature, and introduces the ambiguity that is stressed by Gaver et al. (1999): it is in a sense a book about work, but it also requires some physical work of the participant, like drawing and possibly making collages.

We asked the participants to gather all their material in this book, so that they can easily and quickly have access to all their material and not lose time in having to look up all separate items. The “Work-book” can be read sequentially, again to make it easy to access and quick to use.

Figure 2: A complete Panorama probe package

Time constraints

In contrast to the possibility of quick access to the book, we were afraid that the participants might take too little time to fulfill the tasks, in which case we would end up with quick answers that would lack the creativity (in usage of material) and personal reflection that we were looking for. We tried to counter this by providing them with enough time to work with the probe material and by using visual and written invitations to use all the material that we provided.

The tasks in the "Work-book" can be finished in approximately 4 hours time, but we set a time limit of two weeks. If participants could not spare enough time in these two weeks, we allowed them to work on the probes for an additional week.

Visual invitations

One of the most dominant factors apparent from the data gathered in the contextual inquiries, was the participants having a structural lack of time. This could in many ways influence the way in which participants would invest (creatively) in their personal probes. Our fear was that some participants (predominantly, the ones used to more traditional methods of elicitation) would take "the easy way out" by quickly writing down their thoughts. This, as should be apparent after reading the previous sections, is *not* the only thing that we are interested in as designers.

Therefore, we introduced *visual invitations*: three symbols depicting text, a pencil and a photo camera. In a short explanation within the personal work book, we asked the participants to try and motivate their answers when they see the text symbol, and to enhance their answers with self-made drawings and images from magazines and photographs when they encounter the pencil and photo camera symbols respectively. These symbols, accompanied with a written encouragement to use all the material, were printed next to each task.

As an afterthought, and moving into the realm of semiotics, a quantitative (and larger) study could possibly show if these kinds of visual invitation have any significant effect on the modality (i.e. text, image, drawing, etc.) of the answers given.

"My Work-Book"

After a written introduction on the first page, in which we gave hints on the usage of the materials, asked the participants to elaborate on their descriptions and provided contact details, "My Personal Work-book" contained four groups of tasks:

- Postcard tasks
- Open-ended questions

- A set of maps
- Metaphors

All of the selected tasks were related to the awareness aspects we identified based on (Jordan & Henderson, 1994) (which will be described in more detail at the end of this chapter), such as (social and work-related) activities that take place, the best time at the department, objects that are have a special meaning ("Describe and show your favorite item at the department"), et cetera and the related thoughts of the participant.

We selected the postcards on provocativeness, aesthetics and their match with the questions we had in mind, and framed them on separate pages of the work-book. An open-ended question accompanies each postcard, without hinting to the image on the postcard. This allowed the participant to extract a mood and answer from the image, helping them in searching for inspiration, or to follow his or her own path in answering the question.

Figure 3: A postcard from the Panorama workbook, with the task "Write a message to the whole department staff."

After the postcard-tasks, we asked the participants to describe their life at the department using 6 to 10 photographs. This was directly based on the photo album used by Gaver et al. (1999), and used to get an overall view of the participants' perceptions of their lives at the department.

A distinct task we included was the marking of two maps we provided, one of the department-floor and one of the university campus. Focusing on temporal and spatial aspects of life at the department, loosely based on the Urban probes example given by Paulos and Jenkins (2005) and the original probe concept by Gaver et al. (1999) we asked the participants to mark areas where they meet others, the places they dislike, the places that they visit frequently, the places where they go to

fulfill specific work-related tasks and the routes that they usually take. Additionally, we asked them to share their motivations and thoughts regarding the places they marked.

Metaphors

"Metaphor is one of the most important tools for trying to comprehend partially what cannot be comprehended totally: our feelings, aesthetic experiences, moral practices, and spiritual awareness. These endeavors of the imagination are not devoid of rationality; since they use metaphor, they employ an imaginative rationality." (Lakoff & Johnson, 1980)

Inspired by the "surreal tasks" used by Gaver et al. (1999), we developed five visual metaphors for the participants to reflect on their situation at work:

- The Ivory Tower, representing an elite group of intellectuals and scholars, who are disconnected from practical concerns of everyday life.
- A public square, based on the change of "image" that the university wants to adopt; that of an open, public place to share knowledge. This gives thought to the social aspects of sharing knowledge, and possibly to the role of students within the department (which we also asked for in the open-ended questions).
- A soccer field on which we asked the participants to place their colleagues and themselves, to get an understanding of how the participants view their colleagues (i.e. a goalkeeper being a reliable person).
- A representation of a group of trees, asking the participants to place the names of their colleagues and themselves on the branches of the trees, to trace for example groups of friends (different trees) and hierarchy within the department.
- A representation of a music concert, asking the participants to assign the names of their colleagues and themselves to the people depicted, being either performer or audience, in order to get hints on leaders (performers) and followers (audience) and possibly on disposition and commitment.

All of these were based on a mix of provocativeness and playfulness stressed in previous probe research such as Gaver et al. (1999) and Crabtree et al. (2003) and the current situation at the department as perceived as by us.

The first two metaphors stimulate the participant to see the department of computer science, or the university, as being part of a larger setting (that of society), thus asking them to see their environment from a different perspective. As both of these used "realistic" images, we used them as postcards.

The other metaphors were representations of the concepts they stand for, and were presented as ones the participants could choose from. In this way, participants could choose the metaphor(s) that they thought reflected the department best, and in doing so, give us a hint on how they see the department.

Figure 4: The concert metaphor from the Panorama workbook (note the space provided for customization and writing).

The risk of using metaphors, as has become clear during the probe material analysis (which will be discussed later) is that it might not provide sufficient shared ground for the designer and the participant. In most cases during requirements elicitation, the designer proposes a certain metaphor, paradoxically meaning that the participant is the one who does not know how to handle it. A possible solution, which proved successful in our case, is providing a small variety of metaphors, with the drawback of a different variant possibly providing different information.

Logging time and activities

The second booklet that was included in the probes package was “My Logbook”.

When introducing the probes, we asked the participants to log their activities for at least a two-day period of time (to get an “average” day) within the total time of two weeks. Specifically, the logbook provides a table in which the participant can describe the activity, the associated time and date, the persons that were involved and the overall feeling the participant has about this activity.

This is rooted in the importance of activities and routines in shaping social awareness (Jordan & Henderson, 1995; Crabtree et al., 2003) and the specific (work) setting in which our study takes place. As is the case with the “Work-book”, “My Logbook” also stimulated the participants to describe their activities and related feelings in more detail by having the “three symbols” printed on the front of the book.

Being creative

We added three popular magazines to each probe package to stimulate the making of collage-like visual descriptions and provide the material to do so by adding scissors and glue. Collages can provide both inspiration for design from our perspective, and a means of revealing emotions that are difficult to express in text (Sanders and Dandavate, 1999).

Probe material analysis

The Panorama project, unfortunately enough, ended prematurely. Although this will be discussed in the next chapter, here, it is important to note *if* and if so *how* the cultural probes and contextual inquiries influenced the design of the Panorama system.

Due to time constraints and practical interest in the technological side of the system, the first prototype of Panorama was developed alongside the probes study. This, Panorama's premature termination, and the probes research becoming a study in itself, make safe to say that the probes as of yet have had minimal influences on the actual design of the system.

This section will therefore focus on the way in which we have planned the probes study to contribute to the design and development of Panorama, taking the initial prototype (which will be described in the final section of this chapter) as a basis. A first step in using the probes material is analyzing its results, which is currently still underway.

Analyzing the probe material

Qualitative studies are notorious for resulting in piles of ambiguous and subjective data. After all, they are based on meanings expressed, not on (meanings derived from) numbers. This non-standardized data, in turn, requires classification (i.e. analysis) into categories in order to function as relevant information in research (Saunders et al, 2003; Ghauri and Grønhaug, 2005, pp. 204). Cultural probes being even more personal than standard qualitative methods (participants create their own responses in their own context and in their own time), accumulate even more personal data, which in turn can hamper analysis.

Being common practice in qualitative studies, data gathering and data analysis in the Panorama project were mostly performed simultaneously (Ghauri and Grønhaug, 2005, pp. 202). The contextual inquiries were based on literature studies and ongoing observations, but were modified based on responses from the first interviewees. As we handed out the probes in two "waves" due to availability issues, the same was done for the probes packages.

Our literature study revealed a generic framework based on interaction analysis (Jordan & Henderson, 1994) which we could adapt during our research, providing both a starting point and a theoretical framework for data analysis. "It is an interdisciplinary method to investigate interactions

of human beings among themselves and with objects in their environment. (Vyas et al., 2007a)" Even though this technique was originally used for video analysis, it provided a number of useful foci for understanding the social awareness phenomenon in an academic environment.

Quoting our own writing from (Vyas et al., 2007a, Vyas et al., 2007b, see Appendix A), the modified framework consists of five categories, on which we focused in data collection and analysis:

- Forms of awareness
- Activities of awareness
- Agents of awareness
- Places of awareness
- Contents of awareness

Forms of awareness describe different methods of communication that are used for mediating awareness information. These can be either synchronous (e.g. face-toface, phone calls) or asynchronous (e.g. e-mail, instant messaging tools, post-it notes). The methods for communicating awareness information can be explicit providing direct indications or implicit leaving room for multiple interpretations.

Activities of awareness describe the type of activities within the environment that could mediate awareness information. These can be task-oriented (i.e. a routine work activity) or social in nature (i.e. lunch, coffee break). Often these activities overlap so it is important to take into account the possible relationships between different activities.

Agents of awareness are the people and the objects or artifacts within the environment that mediate awareness, directly or indirectly. People can be seen as individuals and also as constituting groups (e.g. research groups). In this case it is important to understand the roles that the ethical and political issues (e.g. position hierarchy) play in contributing to social awareness, which we incorporated in the probes (i.e. "What socio-political issues at the department trouble you?" under a post-card with a black and white image of factory workers) . We also need to take into account the role of students in forming social awareness within our educational environment, to which we dedicated a question in the probes.

Places of awareness, in a broad sense, describe the geographical as well as the 'social spaces' where interactions take place, including the hot spots of interaction. This can be seen as a multi-layered concept: personal vs. private spaces of staff members within an office, a floor, a building and the whole environment. Inherent to the observations made in this category of awareness is the question: "how does the spatial layout influence the structure of interaction?" This links closely to the maps we provided in the probes packages.

Contents of awareness refer to the actual information being mediated through different interactions. Contents of awareness can be staff members' activities, presence, social and political status, achievements, and so on. This can be explicit (i.e. a note saying that a person will be back at a certain time) and implicit (i.e. artifacts used as symbols or the information at a 'glance'). Both are open to different interpretations by different people, the implicit content being more so.

The contextual inquiries (see Appendix B for the focus points in the inquiries) and the cultural probes questions and assignments were based on this framework, aiming to refine them in the process of analysis (i.e. adding categories which were not used in the initial framework). In our questions and

assignments for both methods we tried to cover all foci, but within this frame still maintain the freedom of expressing thoughts and feelings in a creative way that is inherent to a cultural probes study.

Exactly because of this creative freedom, although apparent, we have to distinguish two categories of retrieved data (looking at the data retrieved from all participants):

- Data that immediately fits into our original framework
- Data that does *not* immediately fit in our original framework

Following the classical forming of categories in qualitative data, otherwise known as *themes*, the first category merely enforced the themes we identified beforehand, which meant "filling these out" with the personal data of each participants which fell into a certain set theme.

The second category should trigger the question if it is necessary to add a new theme to the ones already identified or not. This should be done when a number of the participants points out this theme (implicitly) through their data, which can be identified by the known "Post-it note" method. Simple but (or therefore) efficient, the design team marks columns or areas on a large canvas representing different themes. Next, the team writes down key-words or -images from every participant's retrieved data onto separate Post-it notes, which are then to be put in the most appropriate category and closest to the other notes which data they resemble. Clustered Post-it notes reveal a category, either known or new.

The latter would mean treating this data as a personal anecdote, all of which should be discussed thoroughly within the design team, as these still (either combined with other anecdotes or on themselves) have the potential of revealing innovative and useful ideas.

Assessing the first data gathered through all methods used in the Panorama study (observations, contextual inquiries and cultural probes), three new themes were identified, being (Vyas et al., 2007a):

- Self-Reflections;
- Casual Encounters, and;
- Occasional battles.

It is important to note that these categories should not be seen as definitive and mutually exclusive but as broad concepts for informing design.

Self–Reflections

In the fieldwork we observed several attempts of staff-members to let others know about their identity either in groups or individually by providing information about their achievement, status and announcements. We term this type of interaction as self-reflections.

Several artifacts and devices were used as a carrier for mediating information about self-reflection, to specific others or the whole department. These artifacts and devices included notice boards, staff-room door, printing room door, Post-it notes attached to one's office door and other artifacts

available in common areas. The purpose of self-reflection varied from work-related to personal and even sentimental reasons.

The activity of self-reflection was mainly found in the form of asynchronous interaction, in which senders could publish their information in a physical or digital form and receivers would come across these via their habitual activities at work. Sometimes email and web-based tools were also used for self-reflections. During the contextual interviews one participant mentioned about a web-based system that they used for making other people working on the same project aware of each other's activities. "*I don't use it always but I publish my agenda on this web site so that other people can see what I am up to. Same way I can see other people's agendas and plans*." In the cultural probes and contextual interviews, we found that being socially aware of other members and students in the department was not the most important need, but all the participants agreed that if there is an opportunity they would really like it.

One of the flexibilities supported by self-reflections was its reconfigurability. Staff members could, at anytime, publish their information in a place that is publicly reachable and in the same way could take the information back if they wanted. We observed changes in the physical space because of the self-reflections. In one departmental secretary's office we found a huge collection of Post-it notes stating different 'states of her presence' (see Fig.3). At any time when she needed to leave her office she would look for a ready-made post-it with relevance and stick it on her office door. This was a work specific activity, as she was responsible for about 20-30 staff members in the department.

Sometimes announcements were made on the main notice board of the staff-room. Email or other digital forms of communication were not used for this particular activity. Together with the filled out maps from the probes packages, we could conclude that the staff room is a central point of social and informal activities, making it the ideal place for setting up the Panorama system.

Casual Encounters

We found in our field study that most staff members had very limited time for explicit social interaction while working and that most encounters were initiated and defined by the "*dynamics of the moment*" (as one interviewee pointed out), thus by the context. Casual Encounter was a kind of interaction, where staff members, during their routine activities, interact with the other members and objects within the surroundings that provided hints and cues of social awareness.

Several examples of direct communication were seen, e.g. informal meetings in the staff-room, casual coffee-room chatting, chatting while queuing in the canteen and the printing room. Through these verbal and visual encounters staff members get information about others. These communications included information about professional activities as well as personal and social activities.

There were also instances where indirect communication between staff members occurred. E.g. while checking the mail-box and faxes from the staff room and collecting prints from the printer room, staff members could see mail and prints belonging to other members. This can give an indirect indication about other members' presence or absence. Maps used in the cultural probe study also gave a lot of indications about frequently visited places in the department and in the University. Most instances of casual encounters were closely related to the routine activities of staff members. These included coffee and lunch breaks and also some instantaneous activities like going into the staff room for using the fax machine or collecting post, for example.

The staff room was a common place for most social activities within the department, such as celebrations of different social events like employees' birthday and celebrating after getting funding of a new project. Normally, in this case the employee would use email to announce this amongst his group or friends. In some cases we observed play related activities. Some senior searchers liked playing cards with old friends to freshen their minds. The staff room played an important role in establishing relationships between staff members. In summary, our staff room played a role of social organizing.

Occasional Battles

It is however naive to think that social life does not contain elements of conflict of competition.

Although traditionally seen as having negative influences on, for example group performance, De Dreu and Van de Vliert (1997) show that "suppressing conflict could reduce creativity, innovation, performance, quality of decisions, and communication between group's members. (Medina et al.)"

Panorama being a system that supports social awareness by representing social interactions in the environment could, therefore, use an element that takes this into account. We therefore added a third design concept to the two initially underlying Panorama; the concept of occassional battles.

The current Panorama could typically allow users to upload media related to a conflict, but this would not necessarily reflect the dynamics of such conflicts. Although explicit, a representation in it would be one-sided, and restricted to indirect interaction. We therefore interpreted occasional battles as possible direct interactions with the system (and/or other users), in that sense being an exaggerated, namely escalated, presentation of conflict.

This would directly reflect the observations made in the staff room, namely that of people playing cards and other traditional games, and that of posing quiz-like questions on a specific area of research (typically that of the one posing the question, and the one knowing less about that area being the "victim"), or topping each other with visited holiday destinations.

Using the probe material in design

In designing the Panorama system, we focused on the self-reflections and casual encounters as *methods of interaction* with the system, as these seemed to be most dominant in social interactions between the participants among themselves or with their environment.

Within Panorama s*elf-reflections* are explicit, user-initiated interactions that allow users to contribute personal and non-critical information. A typical example would be a user uploading the birthday card of a colleague.

Casual encounters are implicit, system-initiated interactions, in which Panorama collects information about ongoing activities within the community/environment [HCII]. Within a local, real life workspace, an example would be the system picking up physical activity by a sensor at the entrance of a coffee-room. One can also think of monitoring the amount of uploads, or the level of mouse activity within Panorama, when used as a web-based system.

Next to being our foremost aid in data categorization and analysis, the five categories based on the framework by Jordan and Henderson (1994) mentioned before, were mostly used to group *what and who should be represented* in the system, in a broad sense representing the groups of information that the system should display. The system should be able to represent meetings and activities, but also people and objects, as all of these play their part in the concept of social awareness.

As for self-reflections, this would result in for example photographs of the people that work at the department, photographs of objects that carry specific value to a certain person (e.g. a sports medal or a birth-card) and self-created expressions such as drawings and text messages.

Regarding casual encounters, we could for example identify physical hot-spots of interaction based on the category *places of awareness* presented in the probes as maps of the department. Using this, we rightly aimed at the staff-room being the best place for the system to be placed, and the printing-room and coffee-machine as areas to watch.

The Panorama prototype

Based on these theoretical grounds, and in exploring current and suitable technologies, a Panorama prototype was developed even before the probes were handed out.

Users can contribute to the content that Panorama prototype represents by uploading different media to the system through a form based front-end of the underlying content management system. This allows for uploading text, images and real-time or preloaded video.

Panorama presents this content in a 3D space resembling an art gallery, with uploaded media shown on 3D vertical plains that pass in front of the user, as if he/she was moving past them, thereby indicating the passing of time (see Figure 5 and 6). At the bottom of the screen, Panorama shows a number of preview icons, to provide a calm and “at-a-glance” overview of the latest uploaded items, thus representing what is currently going on in the community. To stimulate curiosity and to cover privacy issues, Panorama can use a number of artistically inspired filters on all types of media, now primarily aimed at real-time video (as not to disrupt the social meaning embedded in self-reflections). On a layer on top of the gallery and preview-icons, moving images (also uploaded media) provide focus points, i.e. just added items or items marked as important (in part for future implementation).

At any time, the user can click on plane that provides content he/she is interested in, after which Panorama switches to presenting the selected media on a non-moving plane facing the user, with additional descriptive text (if provided by the user that uploaded it) (see Figure 6). The preview icons can be used in a similar way.

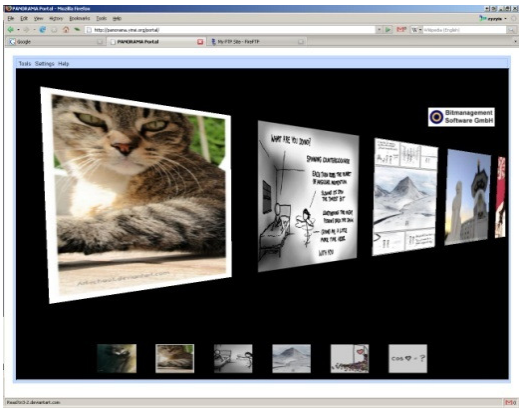


Figure. 5: Panorama's "Gallery view"

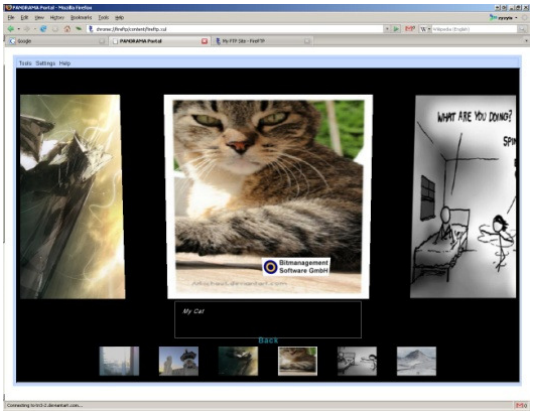


Figure. 6: Panorama's selected media view

The amount of activity measured triggers one out of three sequential configurations in Panorama, each with increased speed of movement of visual elements, and each with an according visual style (e.g. background color). A hectic environment, for example, is represented by fast moving image and video elements, and a red background effect. This allows users to immediately "feel" that a lot is going on in the community.

Panorama's Probes – A discussion

Although we got primarily positive feedback from users on the Panorama prototype in two assessment sessions (one in laboratory setting, another in the staff-room, see Vyas et al., 2007a and 2007b in Appendix A for a thorough description), we have to take into account that explicit ideas have not been derived from the gathered and analyzed probe material. This is unfortunate, as it is one of the strengths of cultural probes as a design method; ideally the probes are deployed before any prototype is made, as not to restrict the design team to a preformed set of ideas. As mentioned, however, the Panorama project involved the creation of a prototype parallel to the probes study, which did not make the probes *necessary* in any sense.

Of course, and even at first glance, they provide a number of very interesting design ideas, such as a participant sorting all his messages and tasks to be handled in a tray with four marked sections: to be done "today", "this week", "this month" and "never". Especially the last section could provide playful and therefore socially worthwhile interactions if used in groups. These ideas will, for now, stay ideas, and I think their strength is best seen when designing an application from scratch, or finding a novel way of incorporating them into the set Panorama prototype. Because of Panorama being practically terminated due to reasons discussed in the next chapter, the exact usage of the probe data has unfortunately yet to be seen.

4 Case Studies in Design – Social Factors

Recalling that design is mostly done in groups, which are as unique as the people in them, and that the products of design perform in a variety of social contexts, we now turn our attention to three case studies that will help in exploring the wide scope of social aspects of design.

Next to exploring and possibly identifying social issues at hand, this section is also used as a manner of recording the studied projects as a whole, in order to stimulate improvements within the projects that are to be continued, repeated, or are still taking place.

In this section, three case studies will be examined, all of which are performed at the Vrije Universiteit in Amsterdam, with me participating in them as a student/advisor (thus resembling a passive form of action research as described in Gordijn, 2003).

First, the so-called Multimedia Design Casus will be discussed, in which an application helping in art conservation was to be developed by a design team consisting of (twenty) students.

Next, the process of designing an application that supports social awareness, dubbed Panorama, in a small research and design team will be examined.

The third and last project that will be reviewed is Clima Futura, a high profile project in which a game for stimulating climate change awareness and learning, which was performed in a large multidisciplinary team.

Project	Type	Key words	Project team
Multimedia Casus	Design & development	Art conservation, 2D and 3D	Twenty multimedia students (and three person staff)
Panorama	Research & design	Social awareness, understanding and representation	One senior lecturer, one PhD researcher, two students, all from multimedia
Clima Futura	Design & promotion	Climate change awareness, learning, ‘serious game’ for teenagers and young adults	Multidisciplinary group of approx. ten students and eight senior researchers, from Earth and Life Sciences, Information Sciences/Informatics and Economics

4.1 Review aspects of the different cases

For each of these projects, we will first give a short project description, including its objectives, the build-up and organization of the design team, the stakeholders involved and the timeframe in which it took place. After that, we will discuss (1) the project context, (2) the design process, (3) the conceptual alignment of the design team and other stakeholders and (4) conflicts that arose during the design process, divided in conflict roles and conflict attitudes. Finally, the project outcome will be described and a discussion is raised on the influences on this outcome. For each project, one or two specific issues will also be discussed, withstanding the need to explicitly classify them.

Design process

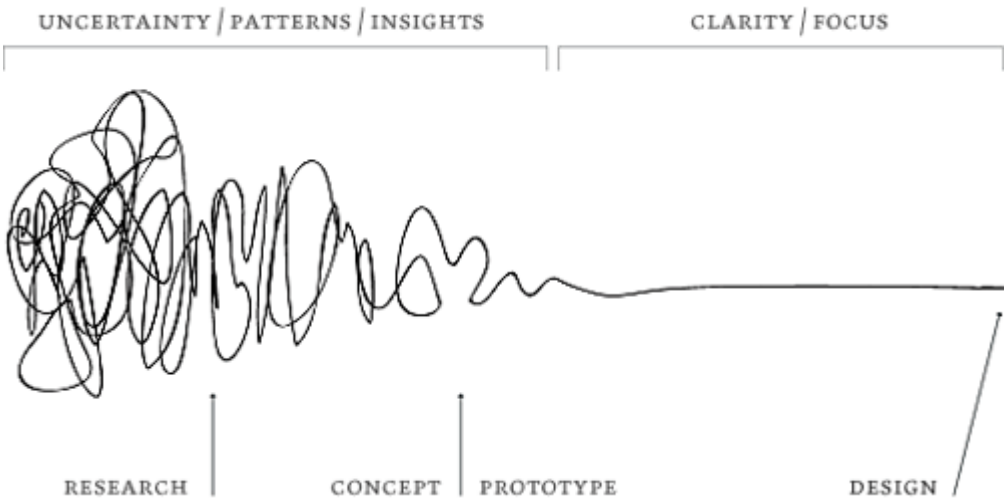


Figure 7: A typical design process?

Figure 7 shows a fascinating representation of a typical, in other words, “normal” design process (http://www.co-d.net/elan/docs/practices.html).

Note that this is not in any way, an alternative view on the traditional design process of software applications such as prototyping, Rapid Application Development (RAD) or the spiral model, such as mentioned in (Van Vliet, 2000).

A quote from Wilpert (2007) seems in place here: “Different phase models abound in the design literature, differentiating from three to 18 different design stages. These are usually pragmatically listed stages defined by the company in order to make sure that, at different points of the design of an object, specific (evaluative/control) actions need to be taken. At the same time this bewildering multitude of stage/phase definitions makes two things clear. Firstly, the definitions will very much depend on the given product or process design and the given company/industry setting which phases

are followed. Secondly, the actual design process, what really happens during process and product design, is still *poorly understood*" (my italics).

Rather, Figure 7 gives a "rare succinct view" (http://www.designsojourn.com/2006/05/) on the difficult and multifaceted aspect of the problem solving approach called *design thinking.* Design thinking stands for the reintroduction of "(design) skills for shaping new alternatives", letting go of the "the assumption that the alternative courses of action are ready at hand—that there is a good set of options already available, or at least readily obtainable" (which is called the *decision attitude*). This so-called *design attitude* on the other hand assumes the best alternative may have to be invented. (http://www.leadershipnow.com/leadingblog/2006/06/) See (Boland and Collopy, 2004) for a more extensive description of *design thinking*.

In its purely visual form, this kind of diagram, although "oversimplified", gives a quick indication of possible problems within the design process, as we will see. It is exactly therefore that I wish to use it as a guide for identifying problems and communicating them, after which we can have a closer look at underlying reasons for these problems existing.

Conceptual alignment of the stakeholders involved

Combining design practice and psychology we can note on two important aspects of a design process being successful (more strictly: minimizing chances of failure), which sound familiar and basic but (too) often seem to be taken for granted:

1. A design team's representations of the (in our case) application being developed, ranging from what are called the "individual object worlds" of the team members to a "shared object world". "The outcome should be that team members construct a socially held representation of the designed artifact" (Dong, 2005).

2. And, the design team's (shared) representation of the application to be designed as opposed to the users' representation of this application (Wilpert, 2007) and that of other stakeholders involved.

Not surprisingly, communication is the single most important recipe in both cases (and according to Dong in all design cases).

Conflicts – Roles and attitudes

Within any group activity, inevitably, conflicts will occur. What matters, are the conflict outcomes and resulting reactions to such conflict, as these can make or break efficiency pillars such as group cohesion, self-image and stress.

In conflicts that arise, a group can emerge being classified as a "winner" or a "loser". Being a "winner" or a "loser" is merely a *role* the group is put into or puts itself into, the resulting effects are more important than their classification. Jansen (2002) and Sherif et al. (1961) list processes that

occur *within* a group in case of a win or loss in inter-group conflicts, as can be seen in Table 1. Note that all referred material from Jansen is translated from Dutch.

"Winner"	"Loser"
– Increase in group cohesion – Decrease in seriousness ("fat & happy") – Intergroup cooperation (social > task) – Strengthened self-image	– Ignore, distort, deny – Internal struggle, splintering – Working harder, increase in stress (task > social) – Learning experience -> reorganization -> stronger, more cohesion and efficiency

Table 1: Group roles after conflict

As has been seen in the previous section, we also need to consider other groups, groups surrounding the design team, most importantly the stakeholders involved. Regarding this, Jansen (2007, pp. 165) compiles the following reactions *in* a group (the "in-group") and *between* groups in conflict (any other group called an "out-group"), as seen in Table 2.

Within the (in-)group	Between groups
– Increase in group cohesion – Increase in loyalty – More task-focused – Authoritarian instead of democratic leadership – Structure/organization – Increase in internal, social pressure	– Other group seen as enemy – Increase in social complexity – Perceptive distortion – Increase in topics of conflict – Less interaction – Stereotyping – Pessimistic anticipation

Table 2: In-group relations during conflict

The previously mentioned are processes taking place within different involved groups; there is inevitably a reaction to a conflict (seeing doing nothing as an action, too). Jansen (2002, pp. 167 - 176) broadly distinguishes five types of reactions to, or *attitudes* in, a conflict:

1. Attack/compete
2. Cooperate/solve
3. Settlement/agreement
4. Avoid/defend
5. Adjust/give in

Each of these contributes to the possible resolution of a conflict and can enforce or dissolve the conflict roles a group has taken upon itself.

Both the reaction(s) and the roles of a group, either in the group itself or towards other groups that result from a conflict, “color” the decisions made within a design process, and the amount of resources a group invests in it, thereby influencing the product being under development. Turning our attention to three observed design processes, we will see how this can be the case in practice.

As we will see, the “Multimedia Casus” case is a prime example of conflict roles *and* mismatches in conceptual representations, while the “Panorama” and “Clima Futura” cases mostly reveal mismatches in conceptual representations. In all, we will see that the design process was hampered by either of the two.

4.2 Multimedia Design Casus

So there I was, awaiting my first multimedia project, in a room full of fellow students of which I knew none. I did not even recognize any of the new faces that filled the room. My anxiety grew as I heard the small talk between these people; it was clear that all nineteen of these soon-to-be-colleagues knew each other quite well. How would I fit in, functionally, but instinctively more important, socially?

Multimedia Casus Context – Goals

The descriptive starting point for our project group was the assignment as formally stated on the staff website:

"Create a VR that realizes a digital dossier for a work of a particular artist. A digital dossier represents the information that is available for a particular work of art, or a collection of works, of a particular artist. The digital dossier should be multimedia-enhanced, that is include photographs, audio and other multimedia material in a compelling manner."

And, more specifically the application had to meet the following requirements (again, as set by the staff):

- It must provide access to all the relevant information;
- It clarifies the information flow among the parties involved in the conservation and presentation the work(s), and;
- It explains and illustrates the added value of the International Network for the Conservation of Contemporary Art (INCCA) virtual knowledge center.

"These requirements are not exhaustive, as they do not include any indication concerning style and presentation qualities. With respect to the contents of the VR, keep in mind that the conservation of art is a delicate issues." (http://www.cs.vu.nl/~eliens/casus/assign.html)

The practical starting point was the already existing digital dossier for Serbian-Dutch performance artist Marina Abramovic, which was made by a team consisting of nine students in the same course, a year earlier. Parallel to this project, but less prominently stated and (therefore?) perceived by the project group, the target group for the application was pointed out, as the application (based on Abramovic dossier in 3D Digital Dossiers paper by Eliëns et al.):

- "Must serve as an information source for *conservators and curators* of contemporary art,
- must present rich media recordings of all artworks, and,
- must provide background information for the general public (non-expert users)" (my italics).

The application was to be made for The Netherlands Institute for Cultural Heritage (ICN) in a timeframe of two months, with the staff functioning as a proxy between the design team and ICN. Although this complicated communication in some ways, as will be discussed, the team could be

certain of the staff's backing when meeting the client (as the staff filtered ideas and concept versions before they would reach the client).

Multimedia Casus Context - Project Group and Stakeholders

The project group itself consisted of twenty multimedia and culture students. Setting a neat example of rapid decision-making, the first meeting resulted in the group choosing to form one design team, instead of two competing teams, and it chose its leader.

In the following week four subgroups, known as task groups were formed to tackle specific problems in the design process: the "concept graph unit" would research the previous and develop a new three-dimensional concept graph, the "guided tours unit" was to find and implement the best way of providing an immersion in three-dimensional space, the "presentation/flash unit" was to present and link all that was made in a usable (and, although not explicitly mentioned, aesthetically appealing) interface, create a visual identity for the group and the application, and make a two-dimensional version of the whole application if possible within the given time, and finally, the "OCMT/XML group" was to create a content management system on which the application should be directly based (using the system created in the previous year). All in line with common best practice in creating an efficient team, following behavioral psychology (Dong, 2005).

People were attached to the specific groups based on their skills and preferences as much as possible (which was asked for in an email directly after the first meeting), and were evenly distributed.

Each group had a group leader, and all was performed under the leadership of "the board", which was made up of the overall leader/decision maker and a sidekick who would advise based on close practical and every-day cooperation with the task groups. Every week, a board meeting took place in which the group leaders and the board would set deadlines, discuss and check upon goals and workflow.

During the design process, two temporary task groups were formed. For the first week, a research group was set up that would create a document to be read by every design team member on Jeffrey Shaw and his work, as to get the right feeling, commitment to a common cause and inspiration.

The second temporary group was the so-called "API group" that would research the possibility of using an Application Programming Interface (API) for 2D – 3D communication. It was set up for this crucial task approximately six weeks before the project's ending, after questioning the ability of VRML to deliver crisp 2D graphics and because of "a strict distinction between 2D and 3D is better when assigning precise tasks to the different units in our project organization." (Quote taken from the API design document). It was made up of three randomly picked members from respectively the concept-graph, guided tours and presentation/Flash units, of which one would drop out three weeks before the final deadline due to personal reasons, and would not be replaced.

Multimedia Casus Design process

What stood out in the Multimedia Casus, was that a common and strictly held view on what the application should look like and how it needed to perform was formed within merely two weeks time, which was formulated in a design document to which no one protested. After that, no discussion took place on this except for some technical issues (as can be seen in Figure 8).

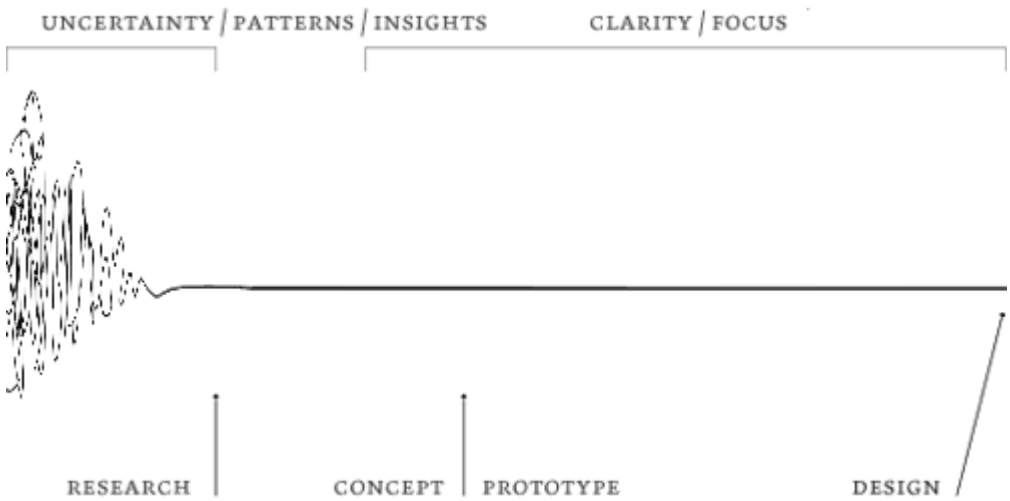


Figure 8: The Multimedia Casus design process.

Initiated by the board, and accepted by the group as a whole, strictly learned methods from Human Computer Interaction on usability were used to rate previous digital dossiers and to improve them from this point of view.

Having the possibility of exploring novel ways on how to use interaction and aesthetics as a means to create a unique user experience, this was cut off by tight deadlines and strictly focusing on usability.

Mismatch of conceptual models

What hampered the Multimedia Casus most, in my view, is the dissimilarity in what Dong (2005) calls "the designer's own mental representation and the socially held representation of the designed artifact", or as Wilpert (2007) says "the frequent mismatch of the designer's and the user's conceptual model" of an application.

Adding to this problem was the fact that it was not merely (and often quite sufficient to cause discrepancies) a client to design team relationship, but a relationship in which the course staff acted as what I would like to call a *social proxy* (not to coincide with the social proxies mentioned in, for example Erickson and Kellogg, 2004) between the client and the team. Instead of two, three stakeholders were involved. In our specific case, and in retrospect, a mismatch between the conceptual maps and expectations of the staff, the client and the design team can be distinguished.

For weeks, the project team (especially the subgroup focusing on guided tour creation) worked on creating a digital and three-dimensional museum, in which the artwork *Revolution*, was just one of the installations shown, and more importantly, which was entirely build for the "average" visitor, not for art curators. This can be seen in, for example, the personas that the Guided Tours subgroup developed for their guided tours: just one out of seven personas and related scenarios touches on the person being interested in art conservation.

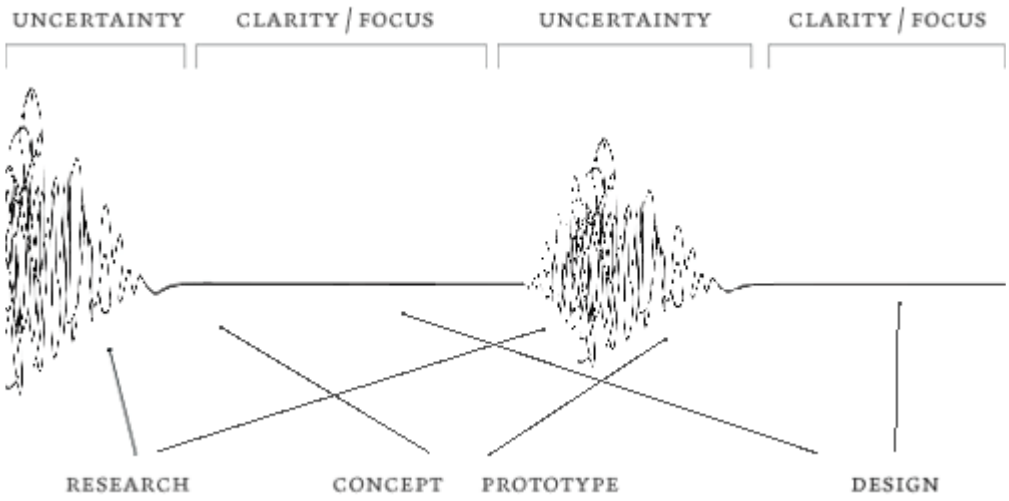


Figure 9: The Guided Tours unit's design process.

As stated in the project assignment, art conservation was to be an important aspect of the application, but up until now this was ignored. Ultimately this resulted in a stand-off at a client meeting between all stake-holders involved, with the design group having to give in and thereby throwing away all the previously done the guided tour work. Shown in Figure 9, representing the Guided Tours group design process, halfway the project, they could start anew.

Adding a dimension

The creation of a digital museum, or, later on in the project, a single room to exhibit *Revolution*, partly reveals the desire of the project group to virtually contain the artwork(s) in a fairly traditional way, and thereby omitting the challenge of integrating the building and viewing of such an artwork (for both visitors and curators) into the concept graph (which, one must not to forget, was in essence also three-dimensional!) in a novel, more seamless way.

This would become one of the main points of criticism from the staff in evaluating the project and its outcome (as described in Wang et al., 2006 and Eliëns et al., 2007), as it "did not achieve a natural transition between browsing the concept space and inspecting/ experiencing the media recordings of the artwork, thus disrupting the natural flow of attention" (Eliëns et al., 2007).

The reason for the project team to do so can be found in the positive feedback from the second review at ICN, in which the manipulation of lighting, texturing and building of *Revolution* were pointed out as most promising, and potentially very useful for conservators. Ultimately, this would

result in the application being two pieces welded together with the marks still being quite, and too, clear; the Concept Graph View, although “flattened” 3D, representing all the knowledge contained within the database, the Guided Tours View providing a way to view and manipulate the artwork *Revolution* in 3D.

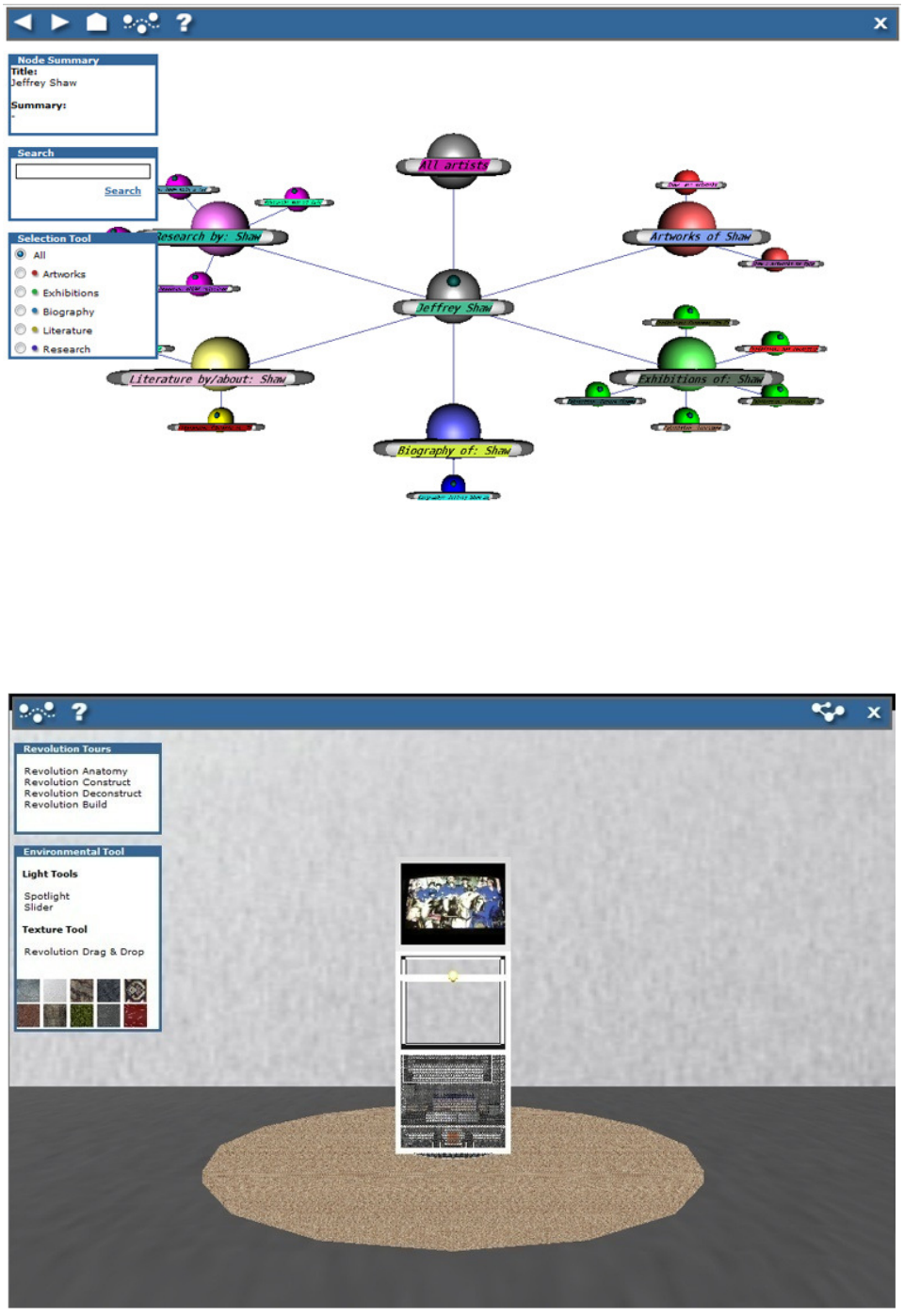


Figure 10: The Concept Graph View (top) versus the Guided Tours View (bottom)

Multimedia Casus - Conflicts

Both Eliëns et al. (2007) and Wang et al. (2006) however, do not delve into or even speculate about the source of the gap in mental representations (Dong, 2005) and thus expectations (or even requirements) between the project/design team, the staff and the clients at ICN.

So why should all this be mentioned in a thesis about the social aspects of design? Because, and quite surprisingly, I believe that the roots of the points of criticism lie in the organizational and the social.

Being part of the design team, as a member of two subgroups (Presentation/2D Group and the Application Protocol Interface Group) and actively having been in touch with the board and all subgroup leaders in most of the decision-making, I know that the communication within the group was fair, and that all necessary resources were available: never before within the course had such a large group worked on a project, and I have rarely seen such a wide variety of interrelated skills. We had specialists in 3D modeling, specialists in Flash and HTML/CSS, specialists in database programming and scripting and, most notably, we had a strong and rigid, but still friendly and open pair of leaders (alias "The Board").

Externally, the team developed what the university staff perceived and would later call "an aggressive posture" towards them (most notably towards junior members of the staff). As this course is still given every academic year, I think it is worthwhile to examine underlying psychological factors.

Stripping away the layers of discussions, even those in front of the client, this posture can be traced back to the *conflict reactions* compiled by Jansen (2002), mentioned in the introductory section to this chapter.

Mixed with the notion of power ("distance of power" in Jansen, 2002) resulting from the hierarchical relation between the staff and the project team (the staff would inevitably grade the members of the project team), the team misinterpret the troubles rooted in the mismatch of conceptual models (Wilpert, 2007) mentioned earlier on, and reacted in (1) *attack/compete* fashion. This is what Jansen (2007) calls "interference with the 'right' choice for conflict reaction" due to the hierarchic structure of organization (in this case of the staff as hierarchically superior to the project team). In short, the team vision was clouded.

Although the team gave in (and had to, for the sake of positive grading and the product succeeding) by starting on the guided tours from scratch yet again (the subgroup sacrificing their Christmas holidays to do so), the staff had a hard time convincing the team to perform other changes during the following weeks and months.

Maintaining a psychological perspective, we can now note that the design team skyrocketed on the scale of self-interest (Janssen et al., 1994, p.15) through which it dug its trenches and spun into a series of (perceived) win-lose conflicts with the staff (again, see Jansen, 2002), with the resulting application being up to the design team's usability standards, but not appealing to the staff's desire of finding new ways of immersion.

Interestingly, the Guided Tours unit, being the group under scrutiny after having made the 3D guided tour that did not focus on curators, developed an ancient form of stress-relief: that of appointing a scapegoat. One group member, who had made clear his doubts on the process, was put under aggressive attention within the unit, until finally being placed into a different task unit (replacement

being mostly deemed the best solution). To some theorists, this is needed for a group to (re)focus attention after conflict, and to continue functioning adequately (Toker, ????).

4.3 Panorama

The initial aim of the Panorama project was to develop an application carrying the same name. Panorama was to be an intelligent, artistically inspired large screen display that would be situated in the staff room of the Computer Science department at the Vrije Universiteit. Panorama would allow staff members to asynchronously interact and engage with information about other members and their surrounding environments with an artistic flavor that would improve their social awareness within the department, and they themselves would be part of this experience.

Panorama Context - Project Group and Stakeholders

The Panorama project was set up by a PhD student, backed by a senior lecturer at the Intelligent Multimedia Group at the Vrije Universiteit. Together with one student interested in exploratory design, and later a second student focusing on implementation, this was the core project team. Two other researchers helped in the exploration of technological possibilities, but were mostly there for support. The client, so to speak, was the Intelligent Multimedia Group itself, as the project was a way of facilitating research and design from which valuable insights and publications could be gained.

Panorama – Design process

Because of Panorama not leading to conflicts as classified in the introduction to this chapter, we will mostly focus on the mismatch in conceptual representations and related communication. Panorama's design process reflects this mismatch, as a fairly normal trajectory spun off into a jungle of new design ideas and concepts, and then coming to an abrupt halt (see Figure 11). As we will see, this was the direct result of different conceptual representations of the individuals involved.

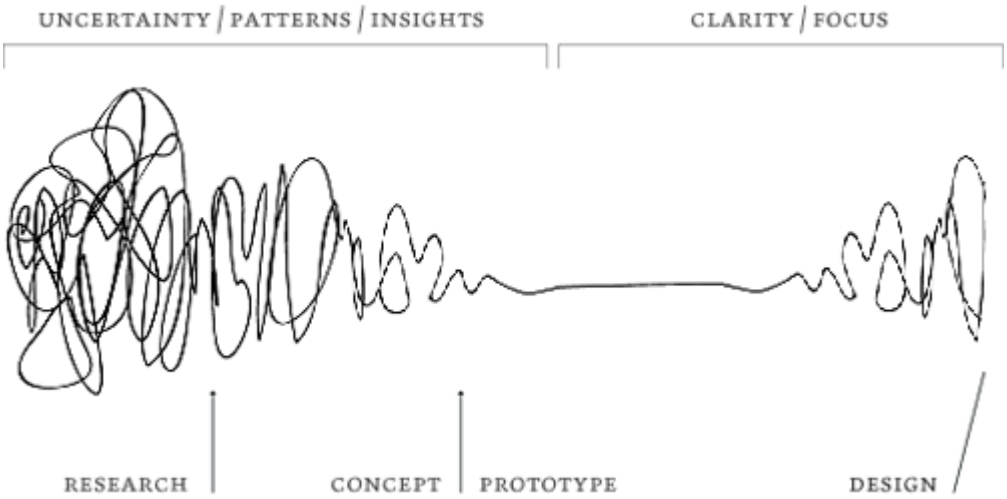


Figure 11: Panorama's design process.

Panorama - Mismatch of conceptual models

During the Panorama project, each of the persons involved created his own view on what Panorama should be and do for him, without a group view taking shape. Thinking of the persons involved, and contrasting them excessively for the sake of comparison, the foremost views were:

- Panorama as a research project spawning scientific publications.
- Panorama as an explorative development project on new technological features in both 2D and 3D content aggregation and representation.
- Panorama as a research and design project in which visual semiotics theory and ethnography is used and tested in practice.
- Panorama as a research and development project that would eventually result in a final product.

Although they do not exclude each other, these mismatches in conceptual representations held within the team, and miscommunication of the views held, led to a number of practical problems.

Most important was that of design and implementation going two different ways. The designer was primarily focused on the system being implemented based on visual semiotics theory (which will be discussed later) and the ethnographic studies he performed (described in Chapter 2), whilst the developer wanted it to evolve based on technological (and promising) novelties. Having to put much effort in gaining a mutual view, communication weakened until it finally halted.

This mismatch also led to two similar positioning papers meant for publication being written but from two different points of view: one paper being focused on the conceptual side of Panorama, being its roots in social awareness, visual semiotics and possibly gaming, the other view being focused on its technical implementation and future.

Adding to this was that the lead researcher had to move to a different geographical location, which paradoxically hampered the Computer Supported Cooperative Work-related research that was actually performed.

Initiated by difficulties in creating a common view on the project, and sealed by the participants either moving to different geographical locations or participating in other demanding projects, the Panorama project seems to be unofficially ended.

4.4 Clima Futura

Clima Futura, in short,is a game about climate change. The primary aim of Clima Futura is to gain experience with the parameters affecting climate change and to give access to climate change related research in a playful manner. The concept for the game has been developed as a submission for the yearly Dutch contest for the communication of science (the “Academische Jaarprijs” 2007), which asked for a proposal document with a formal description of our proposal, the science it propagates, promotional and distribution plans, a cost analysis, and a future planning.

Clima Futura Context - Project Group and Stakeholders

In creating a design proposal, two target groups were focused on: first, the target group for the game itself, being adolescents and young adults in high schools and first years of college, and second the target group for the proposal, being the jury of the contest. These needing a different approach would lead the design team to use classical rhetoric as a guide in persuading both audiences.

The design team itself, interestingly, consisted of nineteen persons, half being students and the rest being a mixture of senior lecturers and researchers and supporting staff (both internal and external to the university). Next to that, these persons all had their own fields of specialty, ranging from environmental sciences to computer science and economics.

Within this team, tasks would be divided in an ad-hoc manner, mostly relying on personal skill, interest and availability. Senior lecturers typically guided the process, while students created content. Both participated in group discussions and were openly allowed to criticize proposals made.

Clima Futura – Design process

In Clima Futura, we had a quick narrowing of insights, which dragged on until the last moment, in which normally clarity/focus should have been obvious to (almost) all team members. Note the contrast between Figure 7 and a modified version (shown in Figure 12) that (with a grain of salt) depicts the design process of Clima Futura.

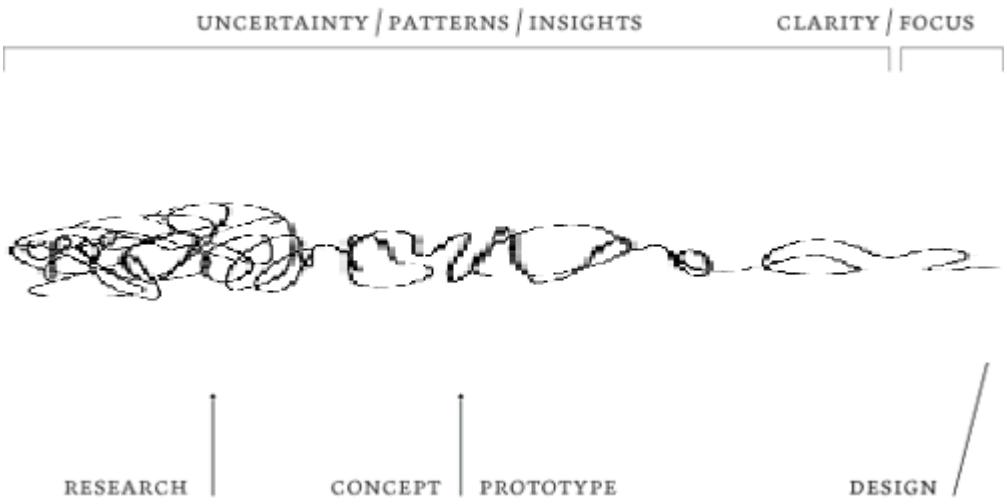


Figure 12: The Clima Futura design process

Curiously, even at the final presentation, most team members were unsure of what the game would actually do, which was made clear during jury-questioning: everything was still open to discussion.

This would normally be a problem in finishing a design, but one has to keep in mind that the aim of the Clima Futura project was to develop a design proposal. Our proposal was specifically made to facilitate different topics of interests, and was therefore not yet narrowed down to a definite view on the game itself (for a more specific elaboration, see the Clima Futura paper in Appendix A). This narrowing down would be done when the jury would accept the proposal. In retrospect, and not having won the first prize, the group should have been more open in being unsure of the strict make-up of Clima Futura. In this part of the trajectory, uncertainties are normal, and can even be considered strengths.

Clima Futura - Mismatch of conceptual models

Another important aspect of the design process was how to combine different views and issues from the wide variety of areas of research that were represented in the design team. Surprisingly, weekly all-group discussion and brainstorm sessions mostly led to a consensus in what needed to be done and by whom.

Two topics of discussion do, however, stand out: (1) how climate-related science would be represented visually and (2) what method to use to persuade the target audience (which will be discussed later).

As for the former, senior lecturers had created a star-symbol that represented all current and important climate related research that the university leads and participates in. This so-called “Climate Star” was adopted even before the Clima Futura project, and was meant to be a major

promotional tool for the department of Earth and Life Sciences. There were “the seniors” wanted the star to be part of the project’s and game’s logo, and wanted to give it a foremost place in the final presentation, the students felt it was unclear and more of a gimmick than a useful addition to the project. In a lighthearted manner, however, the students were forced to recognize and use the star as a symbol for their work and research, which resulted them “losing” the conflict that evolved. Following the introductory theory to this chapter, we can now recognize the group-cohesion among the student increasing (even convincing doubting students to oppose the usage of the symbol), leading to them to abandon the symbol, both as a logo and as a means for representing the scientific grounding of the game. Even after numerous attempts of the senior staff to explain the importance of the symbol, this would not change.

Another difficult part would prove to be extracting knowledge from the team’s specialists and use it in the game itself. Initiated by the senior multimedia lecturer within the group, a small group of students representing all areas of research was asked to contribute “ key game moments” on a standardized set of small cards in a real-time focus group session, now known as the “game description format”. Linking these game events would form in-game scenarios and grounded steps in decision making.

Appendix A contains a proposal paper in which the design process and game description format are discussed more thoroughly.

Convincing the audience – revamping rhetoric

Presumably (and conveniently) rooted in HCI tradition such as described in Dix et al. (1998), design teams seem to assume that following set guidelines on usability and not going over the wild side regarding aesthetics (“it has to look ‘nice’”) is sufficient to ensure an application will be adopted by the target group. Although this can be the case for applications designed in close cooperation with a specific and limited target group (and exclusively for this group), most applications nowadays are inevitably shoved into a market full of potential contestants. Therefore, I do believe that this is an outdated assumption.

What is needed is the feeling of having to *convince* a target group, or rather, an audience. Both previously mentioned case studies (Multimedia Design Casus and Panorama) are either designed using traditional HCI methods or for a secluded target group. Clima Futura, however, literally spawned the question *“how do we convince the jury that they invest their prize money in our design?”*. True, the questions was raised due to the fact that the proposal had to be presented in public and due to the prize money involved, the latter being odd as the design of any application involves money as a valuable resource. Nevertheless, the question was there.

Analogous to the “jury-question”, this also raised the notion of convincing the target group, being adolescents from 12 to 26 years old and high school teachers.

This mainly involves two interrelated aspects,:

- How to convince the target group and/or jury of *the application itself* being trustworthy, and;
- How to convince the target group and/or jury of *the information provided by the application itself* being trustworthy.

Clima Futura being meant as a "serious game" with a difficult (as in critical) target group, it was also important to define the way in which this audience would actively and willingly absorb a "serious" message, first in getting them to play the game, second through playing the game. Our worst fear was that of the target group getting bored by the promotional material, or by playing the game.

Initiated by the senior multimedia supervisor within the project, we would set for a classical but seemingly effective approach: that of classical rhetoric as taught by Aristotle, being *Pathos, Ethos and Logos* (see also Eliëns et al., 2007). As a recap:

1. *Pathos* (the Greek word meaning "to suffer", or "emotion") is the appeal to the audience's emotion.

2. *Ethos* (the Greek word roughly meaning "the theory of living") is the persuasive appeal of the speaker/author, who has to "appear both knowledgeable about the subject and benevolent" (Burton, http://rhetoric.byu.edu/Persuasive%20Appeals/Ethos.htm). According to Cicero, "in classical oratory the initial portion of a speech (its introduction) was the place to establish one's credibility with the audience." (Burton, 2006) More loosely and quite differently, one can see this as an appeal to what is ethically sound.

3. *Logos* (the Greek word meaning "ratio" or "reason"), in turn, refers to logical appeal.

Within the project itself, we would use this approach in two ways. First, we tried to appeal to the target group using *pathos* by creating a "gloom and doom" trailer for the game, as is common practice in the gaming industry and if correctly done can stimulate interest in and desire to play the game.

Second, and more traditionally, we opted for using all three aspects of rhetoric in our final presentation in front of the jury; showing the trailer appealing to *pathos*, the status and knowledge of our senior researchers and the audience's feeling of "needing to do something about this universal problem" to appealing *ethos*, and the scientific research as a basis to our project (and the game) appealing to *logos*.

Within the game, *pathos* would be provided for by the (interactive) video material used, as it was mostly of tragic or awe inspiring nature (ice crumbling, people in distress after floods, etcetera). *Ethos* would be based on the ethical aspect of making decisions within the game, and as a certain learning aspect, namely as a sort of media literacy. What in-game video material, and which in-game advisors does the player trust?

Finally, the scientific climate models we proposed to underlie the game, and the players influences on these models by making decisions within the game environment would provide *logos*: a combination of decisions would (mostly) result in logical consequences. We say "mostly" because of

the fact that our influence on climate is made up of a large factor of uncertainty (called " climate sensitivity"), which we planned to use as a difficulty factor in the game.

In the end mostly killed by the student members of the project group as guide in presenting the final proposal, which revealed a student – senior division within the group yet again (thinking of the Climate Star), the Pathos, Ethos and Logos approach helped in defining the ways in which we would market the game (i.e. by using a "gloom and doom" trailer), and the ways in which the game should bring forward serious issues in an appealing way.

5 Online Community as a Context

So , as designers we have managed to get our game adopted by a number of users, possibly even by making use of lessons learned from Aristotle. What comes next? Ideally, we would want these users to create a community; a living social context that revolves around our particular game.

In this chapter, we will look into this social phenomenon, as it can help developers in (re)designing and refining an application by for example getting feedback from within the supporting community and lengthen the application's lifespan by ultimately, and under the right conditions, the community taking over the development role.

This examination is based on the limited amount of literature that exists on online communities that support either games or "serious" applications, and from my own experience of active participation in and observation of such a community over a period of 8 years.

5.1 Defining "Online Community"

To start with, Stolterman et al. (1997) define an online community as "a group of people trying to achieve something as a group of people that are using new information technology as a mean". Simply said, a group of people join forces for a period of time to discuss and contribute to a topic, not in real life, but using a virtual network such as Internet.

People come to online communities seeking information, encouragement and conversation (Arguello et al., 2006). They gather around similar interests, and form communities as it lies in man's nature (Kihlman and Johansson, 2000), and they contribute to get quicker answers to their questions, to show their skills, and more conceptually, because of compassion and respect for others (Kollock, 1999).

For those not familiar with the topic, think of a gardening convention: participants gather around a topic of their interest, show their skill, and help each other. Talk is not restricted to this particular topic, though; participants will also engage in all kind of small-talk not related to gardening. Newcomers, too, will come to the convention with particular questions, and if not responded to correctly, they will presumably not participate in future conventions.

5.2 Online Communities - Benefits for Developers

Creating and supporting a "healthy" online community provides the developers of an application a number of benefits, that can be summarized as:

- Contributing online communities lengthen lifetime of an application by expanding it in modifications, refining it with new rule sets, maps and exploring new modes of usage (in games, gameplay).
- Online communities provide valuable feedback (after discussion, not loose-cannon) and ideas on which future development can be based.
- Online communities provide support (help and possibly patches etc.) to the application's users.
- Although marginal, a communities can act as a talent-pools through which developers can contact talented contributors (on all aspects of the community, from modding, skinning to documentation, concept art and technical support) directly and thereby bypassing the normal pyramid-like model of working oneself up in the business (similar to Frith's pyramid model from popular music in Shuker, 2001, pp. 114).

All of this is done at no cost for the original developers at all, as community members use their own resources for participating in the community. The question however is, if developers will put their resources into facilitating the necessary conditions for a community to form and to exist.

5.3 Conditions for an Online Community to exist

Setting up an online community should first involve taking into account the necessary conditions for such a community to exist (McArthur and Bruza, 2001), which are:

1. Purpose,
2. Commitment,
3. Context and
4. Infrastructure.

First of all, a community needs a *purpose*, which can either be a practical purpose/goal, such as limiting carbon dioxide emissions in a certain area, or (and often so) a shared interest, such as (parts of, or as an activity *playing*) a particular game.

Secondly, another condition is that of *commitment*, which stands for "the repeated, active participation committed to the purpose of the community" (McArthur and Bruza, 2001). Here, there are two important interrelated factors in success: (1) that of the community's willingness to respond (reciprocity), and (2) that of the individual's willingness to stick with the group over time. If a first-time participant, a newcomer, does not get a reply within a certain amount of time (which no study has yet attempted to measure), he/or she is likely not to come back ever again.

Thirdly, a community needs a *context*; "attributes whose values remain more or less fixed or stable, thereby providing the secure foundations on which a community can be built." (McArthur and Bruza, 2001) This is made up of a shared common knowledge within the community, its popular beliefs, and the social rules and policies it uses.

The fourth and last condition is that of an *infrastructure* being in place, which facilitates communication. This supporting, physical infrastructure is made up of technology and shared resources such as databases, web servers, chat programs (such as mIRC and MSN), forums and websites.

5.4 Guidelines for creating an Online Community

Based on these conditions, and partly following Kihlman and Johansson (2000), a number of practical guidelines for creating and supporting an online community can be defined:

1. Create a *virtual meeting space*, which is stable, reassuring and interesting. This mostly means creating an interesting and appealing homepage, that attracts the people that the designers want as participants. Next, it should be made possible for participants to *add content* and discuss it with each other, which can typically done by setting up a forum. Following our gardener convention metaphor, this forum should minimally contain the following topics: newcomer information, technical support, content sharing and a place for off-topic discussion.

2. Give the members *influence over the information*, which means that participants can contribute without censorship, and have the possibility to get to know others by being able to know who posted what message, and by being able to reply to that message.

3. Give the members *influence over the environment*, so that they can modify it in coherence to their needs ("customization"). Participants should be allowed to create new forum topics, choose a color theme, and even modify the shared interest. In many online communities, the shared interest is modifiable by the community members, making it a major topic of discussion and participation ("modding" for games, for example). This means however, that this shared interest should be made modifiable by its designers, for example by being made up of customizable modules.

4. Give the community a *history*, so that discussions and other shared events are recorded and can be referred to in the future. Such a documentation acknowledges what the community can accomplish and acts as a guideline for social rules and behavior.

5. Give the community a means of *punishing and regulation*; a small group of participants will inevitably break social rules, and a larger group will ask for drastic changes, all of which have to be regulated.

5.5 Setting up an online community in practice – Clima Futura

Following these guidelines, we can define how an online community for the previously mentioned climate game "Clima Futura" can be set up, which is an actual statement from the promotional part of its proposal document.

First looking at the four conditions stated, we might say that climate change is an uniformly shared purpose. For commitment, context and infrastructure, we can follow our guidelines of setting up a community:

1. Creating a *virtual meeting place*.

   For Clima Futura, we developed a website that was to appeal specifically to the target group, without losing valuable scientific information (which can be found at http://www.climafutura.nl, which is securely hosted at the university). Basing color and composition on popular gaming sites (which will be discussed in the next chapter) and putting the trailer at the introduction page, it was made to attract and maintain attention. On linked pages, it facilitates the necessary scientific background of the project and game, a way of contacting the design team (an electronic form) and it shows the design team visually (as if to say "you can be part of this team").

   An important missing item is the forum, which should be built to facilitate an community. This can be done using widely used free, open-source packages and creating the topics mentioned above, and adding a topic on scientific background as it is a major part of the project (and game).

   Some time having passed since being at the forefront of attention, the forum should be brought to the attention of potential participants by word-of-mouth, both online and in real life. Online, this might be done by posting on existing game forums, by using viral adverts, or by setting up a Clima Futura Hyves or Facebook.

2. Giving the members *influence over the information*.

   Using an open-source forum package, such as… facilitates the posting without censorship, and enables the designers or forum regulators to define the level of configurability of the forum. This can mean allowing users to post anonymously, the possibilities of replying, etcetera. Getting newcomers to stay can be done by creating newcomer topics at the forum, but also by facilitating an ingame tutorial, or as an alternative provide a forum topic or website that in simple steps, guided by screenshots or ingame videos, points out how to set up the game, how to play a specific scenario, or how to add a movie to the game (etcetera).

3. Give the members *influence over the environment.*

   In designing Clima Futura, the multimedia team within the project first made an overview of existing games of similar nature. Only one out of the six reviewed games allowed players to contribute to the game, which made the team realize that this was a chance for Clima

Futura. Not going into too much detail, Clima Futura is to be open-source and made using a modular architecture, in which participants can contribute video and image material, new scenarios and minigames and even new scientific climate models (see the proposal paper in Appendix A). As a promotional tool, "design your own minigame" forms were handed out at major events, which allowed participants to write down and draw their ideas, and made them feel contributors already. Ideally, this would be taken over by the forum or a digital form.

4. Give the community a *history*.

   For a game such as Clima Futura, ideally, one would want to implement a feature that records the actual game a player plays. This allows other players to share their moments of interest, and discuss them with other players. Recording programs such as Fraps can be propagated to take over this role externally, being a good alternative for the costly endeavor of creating recording functions within the game itself. This being a technical matter, one might also think of including a function to make (a sequence of) screenshots, so that these can be shared on the forum. A forum should always allow users to search into older topics, or even refer to those topics. Functions such as celebrating the 100th user, setting up polls, giving out awards for the nicest screenshot or contributed movie, and competitions all help to facilitate "shared events" that ultimately create a shared history.

   Following the *Quakeworld* and *Elderscrolls* communities, if a willing base of contributors is established, a Wiki //link! can be extremely helpful in sharing knowledge on a more steady base.

5. Give the community a means of *punishing and regulation.*

   Mostly referring to the forum, the design team should appoint administrators that regulate the forum in terms of topic creation and overlap, grouping similar discussions, and punish evil-doers by for example (technically) banning them. Best being made up of members of the design team and the community, weekly or monthly meetings can help in defining rules and regulations for competitions, new topics, polls, etcetera.

5.6 Online communities – Discussion

A division that is gaining importance, but which we have not discussed is that of the virtual environment the community uses for communication. This can be either:

- External to the community's shared interest, which is most common. Think of an online community about self-made art such as Deviantart.com, or discussion boards on books, et cetera. The shared interest does not support communication as a tool.

- Internal to, in other words embedded in, the shared interest, such as game/an application. Communication is exclusively facilitated by the application's interface. This often leads to

hybrid constructions in which in-game communication takes place and therefore supports in-game collaboration, which is extended by external facilities such as forums.

Within this chapter, we have mostly looked at the second of these. It is however difficult to establish the exact impact of virtual environments themselves allowing for community building, as most research on this topic is very recent and am as of yet difficult to analyze unambiguously. Typically, this is an interesting topic for future research in general, but also regarding Clima Futura.

Most research in this chapter being based on long standing communities, it is important to emphasize that community building is difficult, as it is inherently dependent on human beings that have a multitude of different online activities to choose from. Guaranteeing a community to be successful is therefore never possible, but future research might statistically test the importance of the aspects mentioned in this chapter to provide some sort of measure of successfulness.

Last but not least, the only risk in creating an online community is that the community's views can clash with those of the company. When an online community comes up, the developers in a sense lose part of their ownership of their application (Cox, 2000). Therefore, the original developers must include a strategy for introducing changes without alienating the existing community, and should therefore be prepared to go into discussion with the community when necessary (Cox, 2000).

6 In Retrospect – Visual Semiotics as a theoretical Framework

Having discussed the usage of the end product of the design process in its real-life and virtual social contexts, we come to the point of looking at the product itself. More specifically; at the product's visual features that give hints on how it is to be perceived and (therefore) used.

Our application will be made up of different combinations of visual cues such as color, placement of user interface items and presented (media) content. Although this can be rooted in theories such as usability design and related theories on cognition and perception, we should acknowledge that all these aspects come to form a certain *meaning*, in other words, how the application should be rated and read.

In this chapter, we argue that for designers (and students alike), it is important to acknowledge the embedding of meaning and when having obtained such a *visual literacy*, possibly actively using this as an aid in design. This is based on a theory of *visual semiotics* for Western culture, introduced by Gunther Kress and Theo van Leeuwen in their book "Reading Images: The Grammar of Visual Design" (1996).

6.1 Visual meaning as a social construct

Different cultures and subcultures create their own reading of the visual, for example based on different notions of (the visual representation of) reality, which brings us to the point of defining *meaning as a social construct* (Kress and Van Leeuwen, 1996).

The key element in any semiotic theory is "the sign", or "sign-making" (Kress and Van Leeuwen, 1996).

A *sign* is defined as a "motivated conjunction of *signifiers* (forms) and *signifieds* (meanings)" (Kress and Van Leeuwen, 1996). In other words, a *sign* is a combination of (in our case) visual elements used to represent a certain meaning. The visual elements here are the *signifiers*, the (partial) representations used, and the *signified* is what they stand for, what they tell us. Together, these form what we can call a *visual grammar*, a (new) way of defining and communicating about the visual.

The *sign-maker* wishes to express a certain meaning, and in doing so uses and combines the signifiers that are at hand and that in his/her opinion (or subconsciously) are best suited to signify what is to be communicated/meant, in a specific social group.

Noting that interpretation is culturally and socially formed ("What does a specific signifier signify?"), we should therefore see visual communication as being *coded* (Kress and Van Leeuwen, 1996). This is of growing importance, as more and more so, we are living in a visual culture.

6.2 Multimodality

What is mostly ignored is that visual signifiers are not presented in just one *mode*: they do not function in a vacuum, and they can have different forms. They can be images, shapes, colors, texts, or combinations of those. Adding to that, they are made using a specific type of tool, or distributed through a specific type of media or on a specific kind of material, or again be a combination of all of these. All of these hint us on how to interpret a (set of) signifiers; all of these have their function within the creation of meaning that is attributed. This is what we call *multimodality*.

As an extension of this, we should see images as combinations of elements with different modalities, which form a larger part: images then become *multimodal texts*. When analyzing an image, we can then look at the elements it is made up of, what these elements mean by themselves, and what this specific combination represents.

This is important to designers ("the sign-makers"), as a number of constructs can be identified (and therefore, used) that define the relations of visual elements in an image, among themselves, but also towards the viewer.

6.3 Narrative and conceptual structures

The two foremost constructs used in creating relations between represented participants (the objects/persons represented in an image) and represented participants and the viewer(s), are (1) *narrative structures* and (2) *conceptual structures*.

Narrative structures, as can be derived from the name, tell a story, *within* the image. Typically, such images represent a certain *change* or a specific *action*. They do so by using vectors, which are (oblique) lines that connect participants. This can be used to address the viewer, as the famous Uncle Sam recruitment poster does, but it can also suggest relations amongst participants within an image (for example by using eyesight).

Conceptual structures do not tell a story, but present a participant as it is, generalized and relatively stable in time. This is typically used to show what a participant is made up of, such as a country made up of provinces, or a fashion model showing a set of clothes. Conceptual structures are also used to classify participants in taxonomies, and for attributing symbolic meaning to a participant.

6.4 Representation and Interaction

A specific aid in relating the viewer to a represented participant is that of positioning the viewer using (1) contact in terms of eye-contact ("gaze"), (2) social distance ("framing") and (3) attitude or point-of-view ("perspective").

When a participant looks at the viewer, he/she demands something of the viewer, and suggesting being “one of us”. Not looking at the viewer, the represented participant dwells within his own world, in which the viewer is offered a glimpse.

Social distance is established by the size of frame used in an image, in other words, the closeness of a represented participant to the viewer. This *framing* of a represented participant suggests a specific relation between that participant and the viewer, such as *an intimate/personal relation,* which uses a close-up, or a “normal”, social relation which uses a medium shot/framing (and so forth).

Attitude or point-of-view suggests a level of involvement or attachment, and a level of power. Parallel horizontal positioning of the viewer and the represented participant makes the viewer involved with the participant, while an oblique angle suggest detachment. Vertical positioning marks power, as a high-angle suggests the viewer having power over the participant while a low angel reverses this suggestion.

6.5 Modality markers and modality prints

Modality, the truthfulness of an image, “is realized by a complex interplay of *visual cues*” (Kress and Van Leeuwen, 1996, pp. 167, my italics). These cues are, for example, color saturation, the amount of background detail, the range of colors used, etcetera (for an exhaustive list, see Appendix B), and they all contribute to us seeing an image as representing reality or not (i.e. a different reality than that of 35mm color photography that is our nowadays standard).

A specific combination of (the value of) these cues can form what we call different *coding orientations*, being the definition of reality representation as used in a specific social group. Technical orientations, used by engineers, use a totally different instances of the cues mentioned, than for example sensory orientations such as seen in food commercials.

This means that for every social group we are designing for, we can (try to) create a so-called *modality print*: a specific combinations of values of cues that for this social group form the foremost reality.

6.6 The Meaning of composition

Having discussed ways in which relationship between and amongst different participants in an image are constructed, a third element of contributing to its meaning exists: that of *composition*, “the way in which the representational and interactive elements are made to relate to each other, the way they are integrated into a meaningful whole” (Kress and Van Leeuwen, 1996, pp. 181); the image’s layout.

Composition uses three interrelated systems:

1. *Information value*, which is the positioning/placement of the elements. This is realized by left – right, top – bottom, and centre and margin combinations.

2. *Salience*, which is the amount of the viewer's attention an element attracts, realized by background – foreground placement, relative size, colour contrasts, differences in sharpness, etcetera.

3. *Framing*, the connecting or dividing of elements, signifying that they belong to each other or not. This is done by elements creating connecting or dividing lines or by frame lines.

Regarding *information value*, Kress and Van Leeuwen (1996) propose that the meaning of horizontal placement is structured as: the *left side* of an image/multimodal text standing for *Given*; presenting something the reader is to know already, and the *right side* of an image/multimodal text stands for *New;* presenting something the reader must pay particulate attention to (which is new or problematic to the user).

The same can be said for vertical placement: the top of an image/multimodal text stands for *Ideal*; presenting "what might be", thereby often appealing to emotion, the bottom of an image/multimodal text stand for *Real*; presenting "what is", being practical and informative (possibly establishing current values or opinions).

A central element(s), as can be imagined, attracts most of the viewer's attention, and is to be interpreted as "the nucleus of the information on which all the other [surrounding] elements are in some sense subservient." (Kress and Van Leeuwen, 1996, pp. 206)

Next to this, *salience* is a complex relationship between size, sharpness of focus, tonal contrast, colour contrast, placement (e.g. top and left from centre are "heavy"), perspective, overlap, texture, etcetera, and suggests the importance of an element/participant depicted (creating a hierarchy).

Framing, in short, can be suggest elements to be related to each other by connecting elements, such a vectors, contrasting shapes, and abstract lines (see Appendix B for examples).

6.7 Visual semiotics in practice

This fairly theoretical story leads us to the question how visual semiotics can be used in practice. This can best be described by two examples from two of the case studies mentioned in previous chapters: Panorama and Clima Futura.

Visual semiotics in Panorama

First, one has to recall that Panorama was meant to visually support social awareness, mostly based on user-provided content such as photographs, postcards and personal notes to other members of the community.

Needing to map this content to on-screen and three-dimensional objects (and their movement), we opted for using visual semiotics theory as an aid in decision making. After all, we were embedding (social) meaning into our application, which had to be carefully mixed with the meaning that users attribute to their uploaded content.

Quoting Eliëns et al. (200?): "Identifying bottom with plain, top with ideal, left with given and right with new (according to semiotic theory), we arrived at the following identifications:

- self reflections: plain → ideal/new
- casual encounters: plain → ideal/given
- contextual stories: ideal/given → plain/new
- personnel faces: ideal/new → plain/given
- occurring events: ideal → plain

For example one may remark that people's faces become more familiar in time, and that in the process of getting to know them we see more of the plain reality of people. Naturally, different interpretations and different designs are possible.

Apart from the spatial characteristics of these flows of information we also used the speed with which the images move across the screen as a parameter of design. For example events and occurrences move very fast, while both casual encounters and self reflections move slowly. Faces come across the screen with intermediate speed. To give self reflections more visual salience, the images are displayed in a non-transparent way, whereas all other flows of images merge with the background due to transparency. Although it is debatable whether the interpretations given above hold, we found the heuristics given by semiotic theory extremely helpful in deciding how to represent the information as flows of images in space/time."

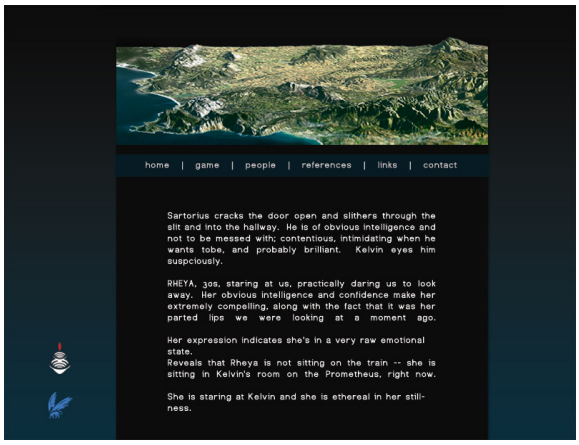
One might question what this added to the system, but responding to that, we should note that participants in both assessment sessions (described in Chapter 2) did not question the movement of the different types of content and media. In a strange way, they felt familiar with it. This is of course in a large part speculation, which indicates the need for future (and more rigorous) research on the topic.

Visual semiotics in Clima Futura

The visual design side of the Clima Futura project, in retrospect, reveals a number of decisions that are implicitly based upon the visual semiotics theory by Kress and Van Leeuwen. Most notably, this influenced the final design of Clima Futura's website.

In creating a website, we (being part of the design team) first started by investigating the visual aspects of other game-related sites. These sites typically address our target group (high school and first-year university students) in an appealing way.

Our conclusions from this were, that we would need our website to have a dark background, with contrasting light fonts. At the top of the page, a large image, combined with the logo (that was in development separately) should set an intense and gloomy mood. This directly follows from websites such as those of Guildwars.com, and resulted in initial proposals shown in Figures 13 and 14.



Figures 13 and 14: Initial Clima Futura website proposals

What we were doing, unconsciously, was defining the modality print used in gaming websites, and using this print for our own site, in order for it to be identified as a game website, and promoting a game that is appealing and fun.

The project group, however, was not taken by the dark and moody feel to the website, as it portrayed the struggle with climate change to be a lost cause, which undermined the game being open to a "positive ending". Editing the black background to blue, and creating an atmospheric image that represented both negative and positive climate-related choices to be made in the game, the Clima Futura team gave us an OK to implement the concept as shown in Figure 15.

Within that process, however, we got valuable feedback from a veteran designer, who stated that the atmospheric image and the showing of other visual material such as game screenshots, clashed in a struggle to gain most attention. Seeing this as a problem regarding salience described in semiotic theory, we came up with less visually-packed concepts (such as Figure 16), that focus on the game

screenshots. Again asking the whole Clima Futura group for feedback, they however preferred the visually rich website that we initially proposed.

Figures 15 and 16: The OK'd proposal and a clean version.

Implicitly having learned lessons about salience in this process of design and redesign, we decided on using the initial proposal, but implementing a way that would focus the viewers attention on the game screenshots when clicked on. This resulted in a Javascript being used, that fades out the background and centrally places the game screenshot, making it the centerpiece of attention.

6.8 Visual semiotics – A short discussion

Thinking of the discussion after the presentation on visual semiotics held for the Visual Design class of 2006/2007, one might ask for statistical proof of such a theory. Although admirably attempted by one of the student in a small experiment, as of yet, Kress and Van Leeuwen's theory has not been quantitatively tested. Therefore being what Popper calls a "pseudo-science", we can only note that future research might give relief to those in need of such statistical evidence. Regarding the material in this chapter and the approval of the majority of Visual Design students, we cannot help but conclude that the theory itself seems to have a lot up its sleeve.

7 Conclusion

Arguably having choked on the whale from the introduction, throughout this thesis, we have looked into a selection of social aspects of multimedia design processes.

We have argued that these aspects, however trivial or far-sought some might seem, can have a significant impact on such processes, as design is inevitably becoming a social endeavor, grouping people of a multitude of disciplines, skills and interests, either as users/audiences or as being designers themselves.

First ethnographic methods, more specifically contextual inquiries and cultural probes, have been discussed. This showed that social factors, although being hard to measure, can theoretically be turned into concepts that aid design.

Following this, in Chapter 2, the cultural probes method of eliciting requirements *and* inspiration is described from a practical point-of-view, in the context the Panorama project, which aimed at supporting and stimulating social awareness at the Computer Science department of the Vrije Universiteit.

Shifting our focus from elicitation to the design process itself, Chapter 3 identified key social issues within design teams and their relation to other stakeholders involved. This has been done by looking into three case studies, all representing recent design projects: a multimedia casus project to help in art conservation, the Panorama project, and Clima Futura, being the design of a climate game. Mismatches in contextual representation(s) and reactions to conflict have been shown to severely hamper two out of three of the projects.

Coming directly from the Clima Futura proposal document, the notion of online communities is then discussed in Chapter 4. This was done based on the observation that an increasing number of people is contributing to the design process of multimedia applications by providing content created within such communities. Having assessed possible benefits, such as aiding newcomers and getting feedback from within the community, a number of guidelines for setting up an online community has been given.

Specifically looking at the end-product of a design process, Chapter 5 introduced visual semiotics to define embedded visual meaning (of the end-product) as a social construct. First having described the visual semiotics theory by Kress and Van Leeuwen (1996), this theory has then been identified and used in practice to show its potential as a framework aiding in design. Appendix B, although being “work in progress”, contains a more exhaustive description of this theory.

Although being wide in its scope, we may conclude that our explorations have brought to attention a number of social aspects that, if accounted for, can contribute to the design of multimedia applications. Following the evolution of contextual design, the increasing multidisciplinary of design teams, users becoming designers themselves, and seeing our product of design as inherently being embedded with meaning, the social context of design, now, but even more so in the future, may never be overlooked.

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Appendix A

//add Panorama papers and Clima Futura paper

Appendix B

Visual Semiotics Theory

Having discussed the usage of the end product of the design process in its real-life and virtual social contexts, we come to the point of looking at the product itself. More specifically; at the product's visual features that give hints on how it is to be perceived and (therefore) used.

Our application will be made up of different combinations of visual cues such as color, placement of user interface items and presented (media) content. Although this can be rooted in theories such as usability design and related theories on cognition and perception, we should acknowledge that all these aspects come to form a certain *meaning*, in other words, how the application should be rated and read.

Different cultures and subcultures create their own reading of these visual features, for example based on different notions of (the visual representation of) reality, which brings us to the point of defining *meaning as a social construct* (Kress and Van Leeuwen, 1996).

In this chapter, we will describe and discuss a "grammar of visual design" based on Western culture, a theory of *visual semiotics* introduced by Gunther Kress and Theo van Leeuwen in their book "Reading Images: The Grammar of Visual Design" (1996).

We argue that for designers (and students alike), it is important to acknowledge the embedding of meaning and when having obtained such a *visual literacy*, possibly actively using this as an aid in design.

Next to that, this chapter should be able to be used as an introduction to the topic in the Visual Design course at the Vrije Universiteit, in which I have given small lecture/presentation on visual semiotics in the academic year 2006/2007.

Conceptualizing Aesthetics

Introducing or propagating a theory that aims to conceptualize the visual, will inevitably be and has historically been frowned upon.

From an artist point of view, the offense lies in the perceived decomposition of what has been called the "X factor" in the Visual Design class of 2006/2007. We can theoretically strip away layers of technique, such as composition and materials used from, say, a painting, but can we arrive at a point in which we define the artist's judgment, talent and instinct?

Before starting in following Kress and Van Leeuwen, I want to make clear that this is by no means an attempt at even touching on this so called "X factor". I do not believe this can be done as of yet, and I do not wish to do so. What is important is that any creation, inevitably, has meaning embedded in it.

This chapter is merely a compilation of thoughts on the visual features (which we will later call *signs*) of a creation that *can* be identified to form meaning, which I do think is important looking at the increasing need for a common visual literacy.

Unfortunately, and imaginably, it is not easy to provide a similar "disclaimer" aimed at those following, for example, Kant. As described in Eliëns et al. (2000?), "Kant emphasizes that any attempt to conceptualize the judgment of beauty is doomed to fail, or may at best be determined empirically, in an ad hoc manner."

However, and regarding art, I share the thoughts expressed by Cynthia Freeland in her book "But Is It Art? An Introduction to Art Theory" (2001, pp. 158 - 160) (these specific thoughts being based on those of theorist John Dewey): art is a cognitive undertaking.

Artists express thoughts and ideas in a way that can be transferred to the audience, and they do so within a specific context. Artists communicate with the audience, which in its turn has to interpret their works of art; "interpretation" here being a rational interpretation that explains the *meaning* of an artwork. Following her thoughts, I, too, do not believe one explanation being the right and only one, but some explanations come closer than others. Any critical and specialist analysis will help in explaining art; "not to tell us what to think, but to enable us to understand the works of art and to respond to them accordingly" (Freeland, 2001, pp. 160).

Semiotic Theory and Visual Literacy

The sign, signifier and signified

The key element in any semiotic theory is "the sign", or "sign-making" (Kress and Van Leeuwen, 1996).

A *sign* is defined as a "motivated conjunction of *signifiers* (forms) and *signifieds* (meanings)" (Kress and Van Leeuwen, 1996). In other words, a *sign* is a combination of (in our case) visual elements used to represent a certain meaning. The visual elements here are the *signifiers*, the (partial) representations used, and the *signified* is what they stand for, what they tell us. Together, these form what we can call a *visual grammar*, a (new) way of defining and communicating about the visual. Potentially, we will be able to use such a grammar in communicating about conceptual maps, discussed in Chapter X, and as a tool in structuring the visuals of our application prototypes.

The *sign-maker* wishes to express a certain meaning, and in doing so uses and combines the signifiers that are at hand and that in his/her opinion (or subconsciously) are best suited to signify what is to be communicated/meant.

Think of a sign as we see it on a nearby street; a combination of colors, forms and embedded symbols (such as a cross) inform us, as readers of the sign, not to litter our garbage here, or not to cross the street. This example is restricted, as we might do the same for a realistic commercial advert: based on the typography, the material it is printed on and the images that are used, we feel whether we can trust this company's product, or whether we want to visit this specific party. A company logo even tries to express what a particular company stands for (or wishes to stand for), purely in form, color and composition.

Most objects we see, stand for something more conceptual, representing a certain meaning. Why was the iPod initially made in white? Why are websites for metal and gothic bands mostly black?

In a sense, all this is similar to verbal language: words and grammatical constructs make up sentences and texts, which have a different meaning than the words on their own. And, as in verbal language, different social (sub)groups use different representations: (to generalize, as an example) engineers use technical drawings, food commercials use photographs with soft natural colors, one newspaper uses screaming headers and lots of images, the other only uses written text, etcetera.

Noting that interpretation is culturally and socially formed ("What does a specific signifier signify?"), we should therefore see visual communication as being *coded* (Kress and Van Leeuwen, 1996).

Visual Literacy

The question is whether we are as educated in visual grammar as we are in verbal grammar. Do we know how images affect us? Are we able to explain what we do when reading an image? Even if we do know a code exists, do we know how it influences us?

Kress and Van Leeuwen (1996) distinguish two kinds of this *visual literacy*:

- One in which "visual communication has been made subservient to language and in which images have come to be regarded as unstructured replicas of reality", and;
- One in which language "exists side by side with, and independent of, forms of visual representation which are openly structured, rather than viewed as more or less faithful duplicates of reality." (Kress and Van Leeuwen, 1996)

These do exist side by side within our culture, and the authors argue that we are in the middle of a shift from the first kind, focus on verbal/written language, to the second kind, being focus on the visual as a separate means of representation. Control over language seems to decrease (think of the large variety of visual material presented on TV, on the streets, SMS- and MSN-spelling, etcetera), and codification of and control over the visual seems to increase (think of imaging processing software being widely available, image databases with readily made/stock images, etcetera).

More and more so, we are living in a visual culture. We therefore need a new understanding of the visual; we need a new visual literacy. This even resounds in Dutch politics of today, in which most parties support the introduction of media literacy as a compulsory course in high schools.

Elaborating on "news" examples, think of the well-known television footage of the statue of Iraq's former leader Saddam Hussein toppling over. We were believed to see hundreds Iraqi's pulling cheering while pulling the statue down in front of American soldiers and a horde of journalists, symbolizing the approval of American intervention and the willingness to move on. Recent analysis and reconstruction have shown that this scene was completely set up by a specialized "Psychological Operations (PsyOps) unit of the US Army, that just happened to drive past the statue. Having assembled a group of passers-by and having called a wide array of journalists, the tearing down could begin, all filmed from very close by. Newly found film material portraying the same event, shows the scene from a few hundred meters, from which we can clearly see that the area is strictly under control of military personnel guiding the few Iraqi's that are there. The "crowd" itself is mostly made up of journalists and US soldiers.

To summarize, and partly quoting Kress and Van Leeuwen (1996):

1. "Visual communication is always coded. It *seems* transparent only because we know the code already, at least passively – but without knowing what it is we know, without having the means for talking about what it is we do when we read an image."
2. "Societies tend to develop ways of talking about codes only with respect to codes that are highly valued, that play a significant role in controlling the common understandings any society needs in order to function." Until now, written language is valued most highly, but (it is argued that) this is changing in favor of a visual communication. We are, therefore, in need

of a new visual literacy, a new way of acknowledging, understanding and communicating about visuals.

Multimodality

What is mostly ignored is that visual signifiers are not presented in just one *mode*: they do not function in a vacuum, and they can have different forms. They can be images, shapes, colors, texts, or combinations of those. Adding to that, they are made using a specific type of tool, or distributed through a specific type of media or on a specific kind of material, or again be a combination of all of these. All of these hint us on how to interpret a (set of) signifiers; all of these have their function within the creation of meaning that is attributed. This is what we call *multimodality*.

As an extension of this, we should see images as combinations of elements with different modalities, which form a larger part: images then become *multimodal texts*. When analyzing an image, we can then look at the elements it is made up of, what these elements mean by themselves, and what this specific combination represents.

The front page of a news website (seen as an image) is a typical example: we see columns of written text, keywords that function as links, images and movies possibly relating to those written texts. We also see colors, possibly to focus attention, divisions by lines or typographic themes and a composition of all the things observed. Why is this done, and if done on purpose, how are we guided, by whom and why?

Narrative Representations

A first step in defining our visual grammar is seeing and acknowledging that images, however realistic, are not simple (and "faithful") reproductions of reality (Kress and Van Leeuwen, 1996, pp. 45): they are socially constructed, either purposefully or not, by their makers. Recalling Kress and Van Leeuwen (1996, pp. 45): "pictorial structures are never merely formal: they have a deeply important semantic dimension."

In order to do see this, we will discuss the two most dominant visual structures: *narrative representations*, in this section, and *conceptual representations* in the next section.

Narrative structures, as can be derived from the name, tell a story, *within* the image. Typically, such images represent a certain *change* or a specific *action*.

A Narrative Example: "The British used Guns"

As an example of a narrative representation, see Figure Xa, taken from an Australian schoolbook about British colonialism, (the image being) titled "The British used Guns": we see two British soldiers sneaking upon and looking at a group of Aboriginals that have gathered around a campfire.

Figure Xa: “The British used guns”, a narrative structure.

Looking at it more formally, we have two groups of objects, one of which indicates a direction towards the other (i.e. by “looking at”, and by the direction of the guns), Strictly, the other is directing its focus on another object, the campfire, but we will leave this as it is for now. This can be formulated visually, as in Figure Xb.

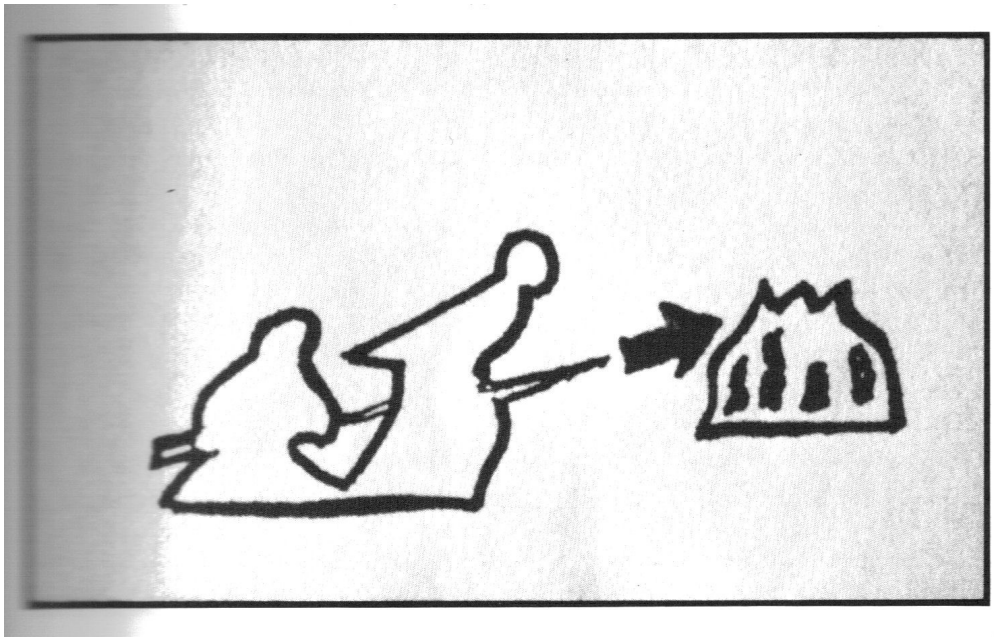


Figure Xb: Formalizing “The British used guns”.

In Figure Xb, we have simplified the image by defining its foremost forms, or objects, and by adding an arrow depicting the action that is taking place (in this case, “looking at”). Together they form our narrative, which can even be verbally defined as “the soldiers are looking at the Aboriginals” (in its simplified form).

Noting this, we are now able to add two new elements to our grammar: the *participant* and the *vector*.

Participants

A *participant* is the object or element which relation(s) towards a world is represented. In our example, the British soldiers form a group of participants, and the Aboriginals form a different group of participants. They are the “actors” in this scene.

Be aware that in any semiotic system two types of participant exist (Kress and Van Leeuwen, 1996, pp. 46):

1. The *interactive participant*, which is the participant being in the act of communication (and constructs images, talks about them, etcetera). In the example we, as the ones looking at, and writing and reading about the image, are the interactive participants.

2. The *represented participant*, which is the participant *about* whom or which we communicate, the one being portrayed in an image. The participants we distinguished within the example image, are the represented participants.

Vectors and Transactional Structures

In narrative representations, participants are connected through *vectors*. Vectors are formed by depicted elements that form an oblique line, often a quite strong, diagonal line. In our example, we have identified the vector in Figure Xb, which is formed by the direction of the guns, arms and the direction of looking of the two British soldiers.

Vectors are often created by depicted the bodies and limbs of or tools used by the participants. This is however not always the case: in abstract images or in diagrams, arrowheads are used, and in typical film openings, the car driving on the diagonal road is an “actor”, the road being a vector.

The presence of a vector is the hallmark of any narrative visual (Kress and Van Leeuwen, 1996, pp. 57).

Having mentioned the term “actor” in the previous paragraph in an unfortunately chosen film setting, it is time to define what types of participant a vector can connect:

1. The *Actor*, from which a vector departs. The Actor is mostly the most salient participant, the one on which our focus is being directed (e.g. by compositional means, contrast, etcetera).

2. The *Goal*, at which the vector is directed.

When both an Actor and a Goal exist in the structure, we call this a *transactional* narrative structure. The relation between the Actor and the Goal can either be unidirectional or bidirectional (the latter can be divided in simultaneous and sequential bidirectionality). //Figure?

Figure X: A bidirectional transactional structure.

An image can, however, consist an Actor without a Goal, as can be seen in, for example, the (film poster for Easy Rider (Figure X2). We call this kind of structure a *non-transactional* narrative structure. In such structures, literally, no transaction takes place, nothing is "done to" or "aimed at".

Reactional Processes

A specific kind of process within a narrative structure occurs when a vector is formed by an eyeline, which is called a reactional process. As Kress and Van Leeuwen (1996, pp. 64) define: "When the vector is formed by an eyeline, a direction of the glance of one or more of the represented participants, the process is *reactional*, and we will speak, not of Actors, but of *Reacters*, and not of Goals, but of *Phenomena*." Again, the Reacter is the participants the vector, or eyeline, departs from, and the Phenomenon is what is glanced at. The Phenomenon itself can be a participant, but it may also be a whole visual proposition, such as a transactional structure.

Figure X gives an example of this kind of embedding: the woman (the Reacter) is looking at a man who himself is an Actor in a transactional process with the water.

Figure X: A reactional process with the Phenomenon being a transactional process.

As a thought experiment, regard Figure X2.

Figure X2: Embedding reactional processes.

Parallel to non-transactional structures we have identified earlier, reactional processes can also be non-transactional: the Reacter might look at something which is located outside of the picture frame, as is seen in Figure X.

Figure X: “What are they looking at?”, a non-transactional reactional structure.

Widely used in popular magazines and tabloid newspapers, this specific kind of reactional process can be used to link a person in an image to a participant in a totally different image on (for example) the same page, thereby *suggesting* a transactional process (a specific relation) between them.

All of these *processes*, or *vectorial patterns*, can be combined within an image, presenting a different meaning through each combination. Processes can indicate thought, direction of movement, relations between participants, the conversion of one participant into another, etcetera, and processes can even be used without using participants at all (see for example Kress and Van Leeuwen, Fig. 2.27, pp. 69).

Circumstances

Looking back at our “The British used Guns” example (Figure X), we may now note that the fire by which the Aboriginals gather can be seen as a participant too, and that we can say the same for, for example the guns carried by the British soldiers. We call these *secondary participants*, related to the primary participants in other ways than by means of vectors. Leaving these secondary participants out of the image would not conflict with the narrative structure we have defined, but it would cause

a loss of (valuable) information. These participants are referred to as *Circumstances* (Kress and Van Leeuwen, 1996, pp. 71), and can be divided in:

1. *Setting*: locative circumstances which relate other participants to a specific participant (location). This requires a contrast between foreground and background (i.e. by softer focus, contrast in colors, etcetera).

2. *Means*: the tools used in an action structure, such as the guns in the "The British used Guns" example. These tools are not linked to the primary participant through a vector, but may themselves form a vector in an action structure.

3. *Accompaniment*: although no vector connects two or more participants, these participants are clear to have a relation, to belong to each other in some way or another, due to spatial positioning, similarity in color, etcetera.

//Summary figure from pp. 73?

Although individual examples might be debatable, one should be aware that narrative structures are used for commercial purposes in many ways. Figure X2 shows a nice example of a commercial add guiding the eye past the company logo to the specific drink being sold, purely by using vectors.

Figure X2: Using vectors as a means of "guiding the eye of the potential customer".

Conceptual Representations

Next to visual structures being narrative, representing change and action, they can be *conceptual*, "representing participants in terms of their more generalized and more or less stable and timeless essence, in terms of class, or structure or meaning." (Kress and Van Leeuwen, 1996, pp. 79).

Within these *conceptual representations*, we can distinguish three types, all of which will be shortly described:

1. *Classificational* processes
2. *Analytical* processes
3. *Symbolic* processes

Classificational processes

Classificational "relate participants to each other in terms of a 'kind of' relation, a taxonomy. (Kress and Van Leeuwen, 1996, pp. 81)" This means that at least one participant is a *Subordinate* to another participant, which is called the *Superordinate*.

A classificational process can either be a *taxonomy*, a *flowchart*, or a *network*.

For taxonomies, there are two possibilities. The Superordinate is clearly depicted, which we call an *overt taxonomy*. Foremost abstracted examples are tree structured diagrams, which immediately make clear that over taxonomies can be single-leveled or multi-leveled.

Without the Superordinate being clearly shown, we speak of a *covert taxonomy*. The most important feature of covert taxonomies represent the subordinates as being equal, mostly realized by a symmetrical composition. This is for example used in product advertisements, such as shown in Figure X4; although all three girls are different, they all "look good" because of the product they all use. The product is what they share, the Superordinate.

Figure X4: A covert classificational structure.

In our thoughts on the creation of meaning and the construction of a reality, it is important to note that classificational processes do not necessarily reflect "real" classifications. Someone has made choices in which subordinates to include, and what Superordinate to use.

Classificational processes can also adopt features of narrative diagrams, which can be seen in *flowcharts*. Still, a classification of elements is given, but the relation Superordinate – Subordinate is horizontally oriented. Often, this relation can be seen as representing a process (of conversion), but maintaining the classification of the general (Superordinates) to the more specific (Subordinates).

A fairly recent kind of diagram provides a classification, but without the linearity included in flowcharts: the *network*. Being less hierarchically structured then both taxonomies and flowcharts, however, a network represents the equality of and relation between associated participants in an unstructured way.

Analytical processes

The second kind of conceptual representations, *analytical processes*, "relate participants in terms of a part-whole structure." (Kress and Van Leeuwen, 1996, pp. 89)

Two kinds of participants can be identified here: one *Carrier* (the whole), and any number of *Possessive Attributes* (the parts).

The image of a fashion model wearing a specific set of clothes is a very concrete example, as we can see the model as the Carrier and the clothes as the Possessive Attributes. The participants in the narrative structure of "The British used Guns" (Figure X), although less obvious, can also be seen as Carriers: we can see what kind of equipment they used and what type of clothes they wear. Mostly, however, the Carrier is secluded and is made most salient (i.e. by removing the background) and the centre of the composition, either abstracted for better distinction of the Possessive Attributes or not.

Kress and Van Leeuwen define seven types of analytical processes, which I will only summarize briefly due to them being very or too specific for the context of this writing (see Kress and Van Leeuwen, 1996, pp. 94 – 106):

1. *Unstructured analytical processes*

   Here, the Possessive Attributes are shown, but not the Carrier itself. These kind of processes do not show specifically how the Possessive Attributes form a larger whole.

2. *Temporal analytical processes*

   Here, the Passive Attributes are related to each other *in time*, the Carrier being a time line. A typical example is that of human evolution (being the Carrier) and its various stages depicted as participants (the Possessive Attributes).

3. *Exhaustive and inclusive analytical processes*

   In exhaustive analytical processes, *all* of the Carrier's Possessive Attributes are shown, as in, together they account for all of the Carrier, as opposed to inclusive analytical processes, in which only *some* of the Possessive Attributes are represented.

4. *Conjoined and compounded exhaustive structures*

   Best thought of in term of pie-charts, in conjoined exhaustive structures, the Possessive Attributes are *disengaged*, whereas in compounded exhaustive structures, the Possessive Attributes of the Carrier are *welded together* while still remaining distinct.

5. *Topographical and topological processes*

   Topographical process accurately represent the physical spatial relations and relative location of the Possessive Attributes, such as is the case with construction images for electronic circuit boards. Topological processes "only", although accurately, represent the logical relations between participants, the way in which they are connected, but not the actual physical size and measurements (think of electronic circuit diagrams).

6. *Dimensional and quantitative topography*

   Here, visuals are drawn to scale, but not based on the physical or geographical relation between Possessive Attributes, but on quantity or frequency of "aggregates of participants that are taken to be identical." (Kress and Van Leeuwen, 1996, pp. 103) Pie charts and bar

charts (being one-dimensional) are the best example of dimensional and quantitative topography.

7. *Spatio-temporal analytical structures*

   These add the temporal to the dimensional and quantitative topographic processes, making charts two-dimensional, for the sake of comparison. Confusingly, we can either see these as narrative structures, but also as the Carrier being divided into quantified Possessive Attributes, making them analytical.

Symbolic processes

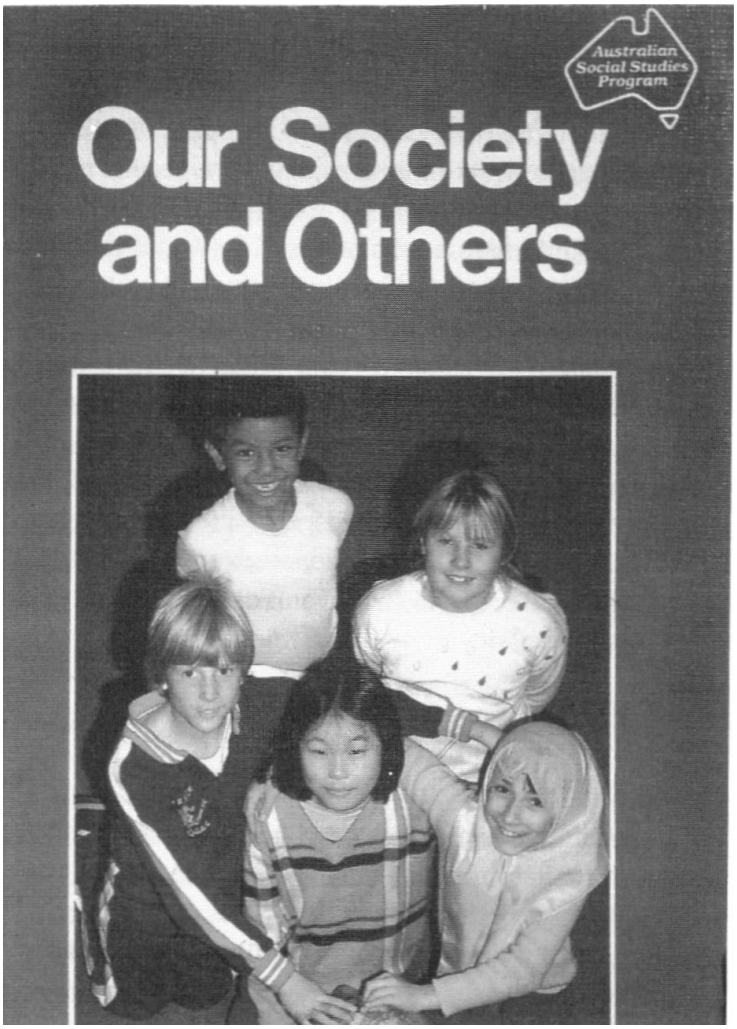
"Symbolic processes are about what a participant *means* or *is*." (Kress and Van Leeuwen, 1996, pp. 108), and can either be *attributive* or *suggestive*.

A *symbolic attributive* process consists of two participants: *the Carrier*, whose meaning or identity is established in the relation, and the *Symbolic Attribute*, which represents the meaning or identity itself. Symbolic attributes are typically emphasized by means of salience (i.e. contrast, placement, etcetera) and usually seem out of place in an image, or have historically established symbolical meaning.

Symbolic suggestive processes consist of only one participant, *the Carrier*. The Carrier's symbolic meaning here is established in another way, such as the creation of a certain mood due to background colors and setting. These processes suggest the meaning and identity of the Carrier coming from within, whilst attributive processes suggest this being established externally (Kress and Van Leeuwen, 1996, pp. 112).

Embedding

//Example of embedding, based on Figure


Australian Social Studies Program
Our Society and Others

Representation and Interaction: positioning the viewer

Up until now, we have distinguished represented participants (the participants depicted in an image) and interactive participants (the ones looking at the image and communicating about it), and we have discussed ways in which the represented participants can be presented, either by narrative representations or by conceptual representations. Not only can represented participants have relations among themselves, there are also the relations of the represented participants and the interactive participants, and the relations between interactive participants themselves.

It is now time to turn our attention to how interaction between represented participants and interactive participants can be designed, and how the position of the interactive participant in relation to the representation can be established. Three constructs are commonly used to do so, being:

1. *Contact*, with the usage of gaze (eye-contact)
2. *Social distance*, with the variations in framing of the image
3. *Attitude*, with the variations in point-of-view (perspective)

Each of these will be shortly described within this section.

This relates to the notions of *context of production* and *context of reception*, which have two elements in common: the image/representation itself and the social knowledge of understanding them, in other words, a knowledge of how social relations and interactions can be encoded in images (Kress and Van Leeuwen, 1996, pp. 120). However, the producer of the image (the "sign-maker") is able to *read* and *write*, whilst the viewer is only able to *read*.

Image Act and Gaze

A widely used means of establishing direct contact between the represented participant and the interactive participant (which from now on I will call "the viewer"), is that of establishing eye contact between them.

In doing so, this (1) creates a visual form of direct address, acknowledging the viewer explicitly, and (2) allowing the producer of the image to *do* something to the viewer, which is called the *image act* (Kress and Van Leeuwen, 1996, pp. 122); the participant's *gaze* demands the viewer to engage in a kind of imaginary relation with him or her.

Note that using this construct is, in essence, creating a vector, or multiple vectors, from the represented participant towards the viewer.

Formally, we can define two types of *gaze*:

- That of *demand*, in which the represented participant(s) look(s) at the viewer, demanding the viewer to engage in a relation. This creates the sense of similarity, being "one of us" (for example, as a role model: "You can be like me"). A classic example is that of "Uncle Sam

wants YOU for the US Army" as a recruitment poster. More recent examples are found in computer games, in which all means are used to immerse the user in the given virtual environment (see Figure X).

- That of *offer*, in which the represented participant(s) does/do *not* look at the viewer, only presenting a glimpse into the world of the represented participant of which the viewer is a (mere) spectator. This, in turn, creates the sense of dissimilarity, being "other then", (for example, as a different social class, or being a lone visionary). An example could be the end shot in //Italian director, in which both represented participants look away from the viewer, creating the sense of them being isolated, living in their own world.

//image stil from movie

//

Size of Frame and Social Distance

The second construct in creating interactive meanings of images, is that of "size of frame", the choice between close-up, medium shot, etcetera (Kress and Van Leeuwen, 1996, pp. 130).

Defined in social sciences, we all (unconsciously) use invisible boundaries for the distance between ourselves and others in our daily lives. "Close personal distance" for example is the distance at which we can reach out to someone, typically the distance between intimates or us and the ones we trust. Roughly stated, the more intimate we are with a person (on a social level), the smaller the physical distance between such a person and ourselves, for example in a conversation.

This translates directly to still images, or best imaginable, cinematography, both giving a constructed view that suggests we are close to someone (or can/need to be), that we can trust the participant, or in contrast portraying someone as a stranger, or a "loner".

Figure X gives a visual overview of shots used in cinematography, thereby also showing the (perceived) contrasts that can be achieved.

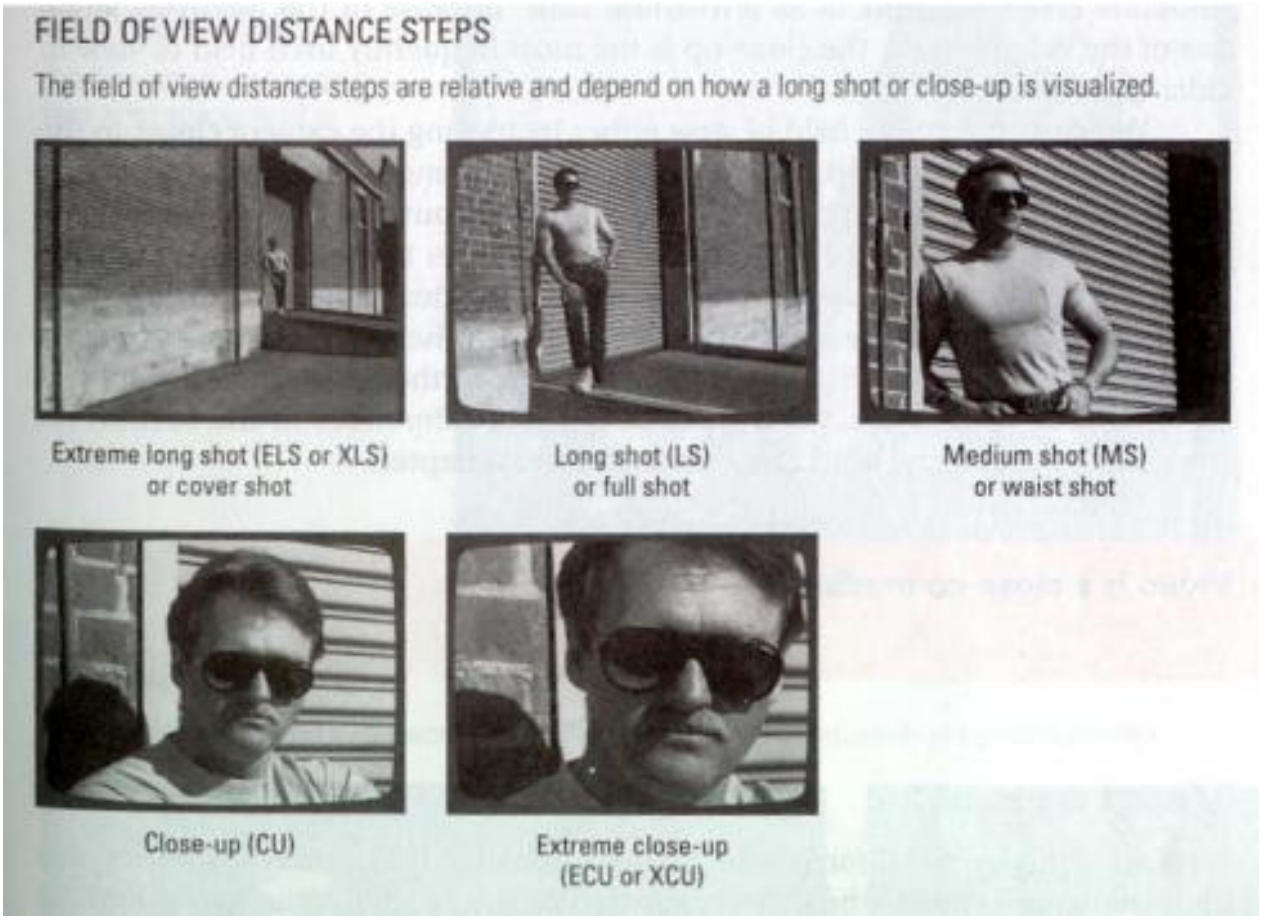


Figure X: Different social distances established using size of frame (here, in cinematography).

This *framing* of a represented participant suggests a specific relation between that participant and the viewer. Generally, three types of such relations are suggested: (1) an *intimate/personal relation*, which uses a close-up, (2) a "normal", *social relation* which uses a medium shot/framing, and finally, (3) an *impersonal relation*, established using a long shot.

Using this, a newspaper can for example disassociate its readers from a committed crime by showing it as reconstruction through a long shot, but relate the readers to the victims by showing their faces as close-ups/portraits.

Perspective

The third way of creating a relation between the represented participant and the viewer is that of using *perspective*, that of defining a point of view for the viewer.

Regarding perspective, in Western culture there are two kinds of images (Kress and Van Leeuwen, 1996, pp. 136):

- *Subjective* images, which have a build-in (thus, predefined) point of view. These images use (central) perspective, and only allow the viewer to see what there is to see from a particular point of view.
- *Objective* images, which do *not* have a build-in point of view. These images do not use (central) perspective, and "reveal everything there is to know" to the viewer.

//sentence

Subjective images

Within subjective images, the producer of the images has a number of choices with regards to where the viewer is positioned within the space that is depicted. This involves choosing a (1) *horizontal angle* a (2) *vertical angle*, each of which embed a different meaning into the image (and can be used in combination with each other).

//(1)

The *horizontal angle* chosen, suggests a level of involvement or attachment, known as the degree of "ourness":

- Using a *frontal angle*, in which the viewer faces the represented participant(s), suggests the viewer being "involved" with the this participant, in a sense being the same (belonging to a common group/class).
- In contrast, an *oblique angle* creates a sense of detachment, the feeling of *not* being aligned with the represented partipant(s).

Figure X gives an example of both of these types of horizontal angels, as we, as viewers, face the Aboriginal children in a classroom from an oblique angle, while seeing the (white) teachers from a frontal angle. This is taken from the same book as "The British used Guns" image, which was meant for white children, and in this image (unconsciously) aligning them with the white teachers, and not their Aboriginal counterparts.

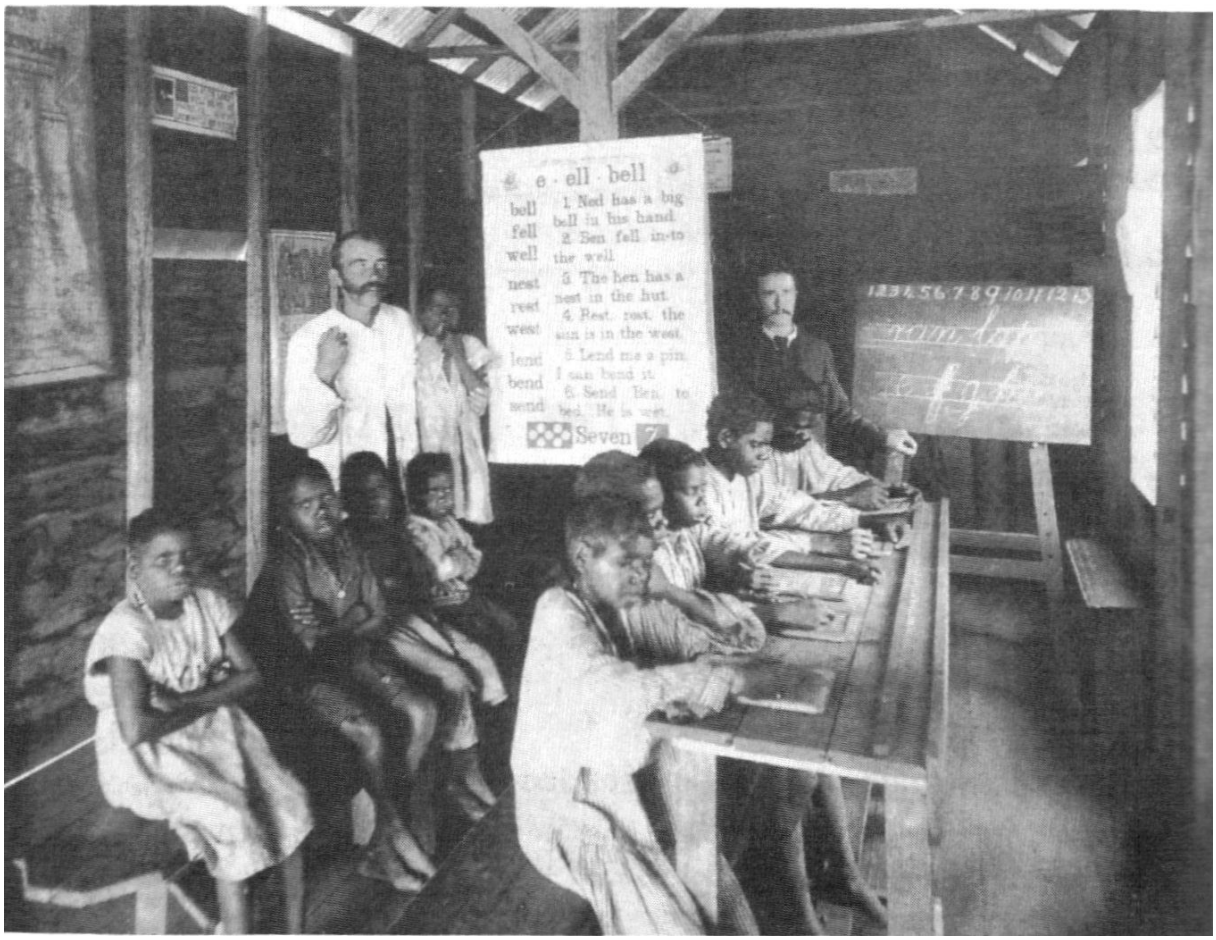


Figure X: An classroom scene constructed using horizontal angles

//use top-image to clarify angles?

//(2)

The *vertical angle* that is used in an image, suggests the *level of power* the viewer has over the represented participant(s) and vice versa:

- A high angle implies *viewer power*;
- Being on the same level implies *equality*, and;
- A low angle implies *representation power*.

This can clearly be seen from images such as Figure X; we, as viewers have power over the "employees".

Figure X: Typical use of a high vertical angle, implying viewer power.

Objective Images

Shortly noting on objective images, we should think of these as constructed too. As Kress and Van Leeuwen (1996, pp. 149) write, "scientific and technical pictures, such as diagrams, maps and charts, usually *encode an objective attitude*" (my italics).

Although they do not use central perspective, they do seem to obey certain principles that hint on embedded meaning:

- A frontal angle is still that of maximum involvement. It is oriented towards action, telling us "how something works".
- A top-down angle, too, is still that of maximum power. It is oriented towards the theoretical, objective knowledge.

It is important to see that elements from objective and subjective images are often combined, thereby portraying something as being objective, but in essence giving us a subjective view. //Gulf War map example?

Modality: designing reality

Entwined with the interpretation of an image, is the question of its *reliability*. Is what we see true, factual, real, or fabricated fiction? The form and features of the image, to some extent, suggest an answer to this question.

As Kress and Van Leeuwen (1996, pp. 159) note, we do not question the reality of photographs; "photographs do not lie". We have seen however, that the producer of even a photograph can use certain constructs to guide interpretation, and we know that the people communicating about an image can verbally do the same.

Still, we need to base decisions on the information we receive, also meaning that we somehow test images on their value and suitability for basing these decisions on (e.g. to trust them). We do so, to some extent, on the features of the image itself, called *modality markers* ("modality" being derived from the linguistic term referring to "truth value" or "credibility") (Kress and Van Leeuwen, 1996, pp. 159 – 160). These are in essence signs embedded within an image.

In this section we will look at how images are presented at being true or not, based on their featured modality markers.

Modality as a social construct

Note that "truth" is socially constructed, and that modality markers are differently perceived within different social groups: modality "does not express absolute truths or falsehoods; it *produces* shared truths." (Kress and Van Leeuwen, 1996, pp. 160).

A "realism" is produced by a particular group through the complex structures which define that group, which also includes the timeframe a "realism" is produced in, and through what technologies. Nowadays, our realism is that of 35mm colour photography, but this has obviously not always been the case; there have been times in which drawings were the only means of communicating and perceiving an event "truthfully". Each realism therefore has its naturalism, its point of reference (in our case, colour photography).

Modality markers

Being less theoretical and more practical, there are a number of key markers of visual modality that can be distinguished (Kress and Van Leeuwen, 1996, pp. 165 – 167):

1. *Colour saturation*, defined on a scale ranging from being full colour to black and white.
2. *Colour differentiation*, on a scale running from the widest range of colours used to monochrome.
3. *Colour modulation*, which is the number of shades of the colours used, ranging from fully modulated to plain, unmodulated colour.

4. *Contextualization*, which ranges from the absence of a background "to the most articulated and detailed background" (Kress and Van Leeuwen, 1996, pp. 165).
5. *Representation*, ranging from "maximum abstraction to maximum representation of pictorial detail".
6. *Depth*, on a scale running from "the absence of depth to maximally deep perspective".
7. *Illumination*, ranging from the fullest representation of light and shade to its absence.
8. *Brightness*, a scale running from the maximum number of different degrees of brightness to black and white, or two brightness values of the same colour.

Note that in any of these, there is the *hyper-real*; the "more than real". Fish-eye lenses, for example give more than "maximal" depth, but are not perceived as representing reality.

We have to keep in mind that, alongside narrative and conceptual structures and interaction, modality markes provide a way of communicating about images; we can describe images using all of these definitions.

Coding orientation

Modality, as we see "is realized by a complex interplay of *visual cues*" (Kress and Van Leeuwen, 1996, pp. 167, my italics). A specific combination of (the value of) these cues can form what we call different *coding orientations*, being the definition of reality representation as used in a specific social group.

Four of such coding orientations can commonly be distinguished (Kress and Van Leeuwen, pp. 170 – 171):

- *Technological coding orientations*, which are focused on effectiveness of the representation as a "blueprint".
- *Sensory coding orientations*, used in contexts were pleasure is the dominant factor, such as fashion and cooking adverts.
- *Abstract coding orientations*, in which the individual is reduced to the general. This is mostly used in "high" art circles, and the ability to produce and/or interpret such images is seen as a mark of being an "educated person".
- The prevailing *naturalistic coding orientation*, being the dominant coding within our culture today, used and understood by anyone who is part of "our culture" (regardless of education or scientific training).

All of these are non-restrictive; we use the naturalistic orientation in every-day life, but when reading a book on engineering and architecture, we might switch to technological and abstract orientations when needed and if we are able to do so.

Modality configurations

From our array of various modality-markers we can now formulate a "*modality print*" for each and every image we encounter. For every modality marker within that particular image, we can mark the amount of colour modulation on a scale from abstract to exaggerated (being "hyper-real", as mentioned before), and do the same for colour differentiation, detail representation, etcetera.

The point on the different scales relative to which a marker is abstract or exaggerated can be naturalism, as in the Figure X, which shows such a modality print. This can, of course, be any other kind of realism (or coding orientation).

Although this still contains an element of subjectivity, it gives us a means of comparing images, and most importantly, it shows that *modality is a social system*: every cluster of similar modality prints addresses a particular kind of viewer or social/cultural group (Kress and Van Leeuwen, 1996, pp. 178). Readers of glossy fashion magazines will be addressed with a totally different modality print than the readers of Science and Nature.

The Meaning of Composition

Having discussed ways in which relationship between and amongst different participants in an image are constructed, a third element of contributing to its meaning exists: that of *composition*, "the way in which the representational and interactive elements are made to relate to each other, the way they are integrated into a meaningful whole" (Kress and Van Leeuwen, 1996, pp. 181); the image's layout.

Composition uses three interrelated systems:

1. *Information value*, which is the positioning/placement of the elements. This is realized by left – right, top – bottom, and centre and margin combinations.

2. *Salience*, which is the amount of the viewer's attention an element attracts, realized by background – foreground placement, relative size, colour contrasts, differences in sharpness, etcetera.

3. *Framing*, the connecting or dividing of elements, signifying that they belong to each other or not. This is done by elements creating connecting or dividing lines or by frame lines.

Again, these do not only apply to images, but to all combinations of text and image; they apply to all *multimodal texts*. This regards *spatial compositions*, to which videos add *temporal composition* (which will not be discussed in this thesis), and as we will later note, to which applications add *interaction*.

Information value

Horizontal Layout: Left and Right – Given and New

Reviewing and discussing a wide variety and number of multimodal texts, ranging from well known paintings to obscure brochures and flyers, Kress and Van Leeuwen have noted a distinction in the meaning of positioning an element within such a text either left or right.

In magazines with two-page layouts, the left page would often give verbal text, for example giving a known introduction to a topic, while the right page seemed to contain the key information, information that is presumably unknown to the readers.

Looking at other kinds of visuals, Kress and Van Leeuwen concluded that, looking at the horizontal layout of compositions:

- *Left = Given*. The *left side* of an image/multimodal text stands for *Given*; presenting something the reader is to know already.
- *Right = New*. The *right side* of an image/multimodal text stands for *New;* presenting something the reader must pay particulate attention to (which is new or problematic to the user).

Figure X gives a typical example: every woman is assumed to have a black dress (Given), however, from now on this dress can be worn without worrying about deodorant giving off on it, by using the product shown (New).

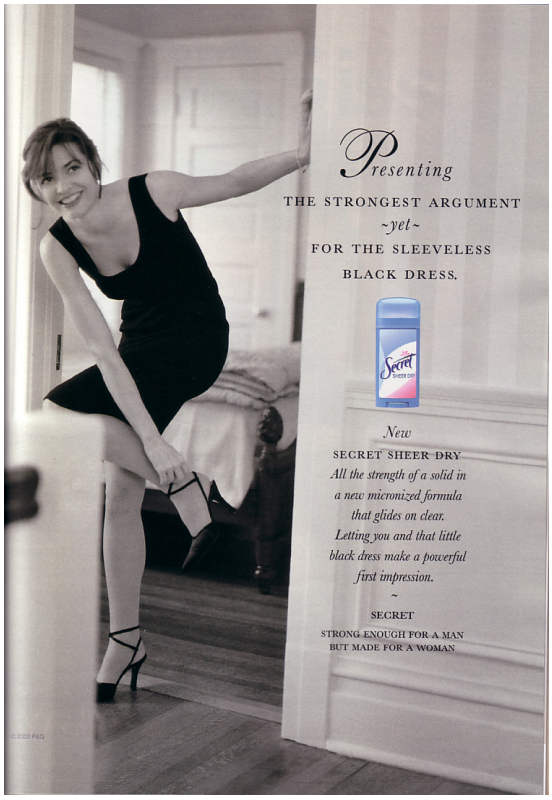


Figure X: An example of Left/Given – Right/New.

The same can be done using vectors: a participant might be shown as moving from, for instance, right to left, which adds to a different interpreted meaning than when moving from left to right: the first often suggests returning to a familiar place (as in the positioning opposing of armies in films on medieval warfare, such as in The Knights of the Teutonic order by Aleksander Ford) or coming within reach of the interactive participant (such as in Figure X2, from the Visual Design course 2006/2007), the latter the opposite. //USE DIFFERENT LAYOUT!

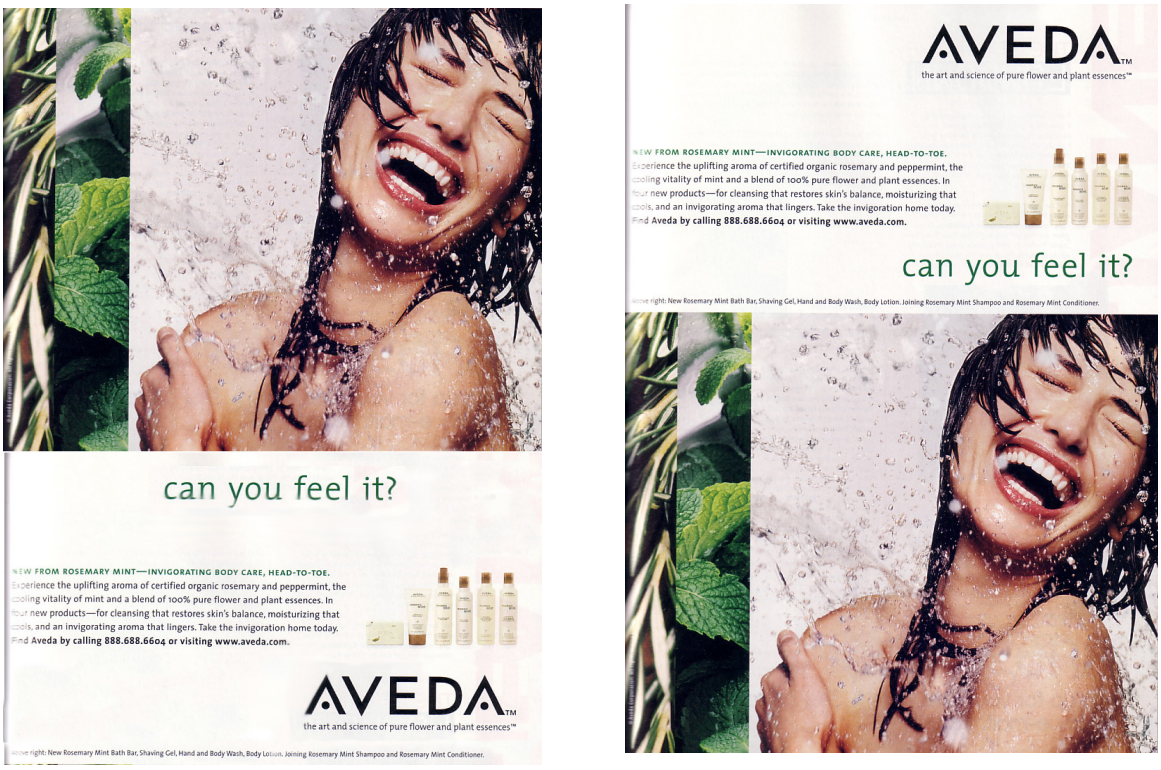
Figure X2: Movement from the New to the Given.

Vertical Layout: Top and Bottom – Ideal and Real

The same kind of related meaning can be given for the compositional values of top and bottom, the vertical layout of an image:

- *Top = Ideal*. The top of an image/multimodal text stands for *Ideal*; presenting "what might be", thereby often appealing to emotion.
- *Bottom = Real*. The bottom of an image/multimodal text stand for *Real*; presenting "what is", being practical and informative (possibly establishing current values or opinions).

Figures Xa and Xb give an example: Figure Xa shows the actual advertisement, which at the top shows the situation " we want to be in" (note the sensory modality print), and at the bottom "how this can be achieved in practice". Figure Xb immediately shows that an inversion of top and bottom elements does not "work", as it is something we are not used to.



Figures Xa and Xb: An example of Top/Ideal and Bottom/Real.

Horizontal and vertical layouts are often used in conjunction, which asks us to observe the positioning of elements of an image or multimodal text relative to each other in both dimensions, combining Given – New and Ideal – Real relations. This also adds the notion of central positioning, as we will now see.

Centre and Margin

Composition can also be structured along the dimensions of *Centre,* the central element, and *Margin,* the surrounding elements. The central element(s) then, as can be imagined, attracts most of the viewer's attention, and is to be interpreted as "the nucleus of the information on which all the other [surrounding] elements are in some sense subservient." (Kress and Van Leeuwen, 1996, pp. 206)

//newspaper figure as example?

This can be in combination with the horizontal and vertical dimensions, the centre then functioning as a *mediator* (e.g. triptych), showing for example the transition of a construction site as it is now to how it is planned to be, but margins can also be identical, showing no division in Given – New and Ideal – Real.

Welding all our previous observations together, we can now divide a two-dimensional plain as is done in Figure X, showing all combinations of Given – New, Ideal – Real and Centre and Margin.

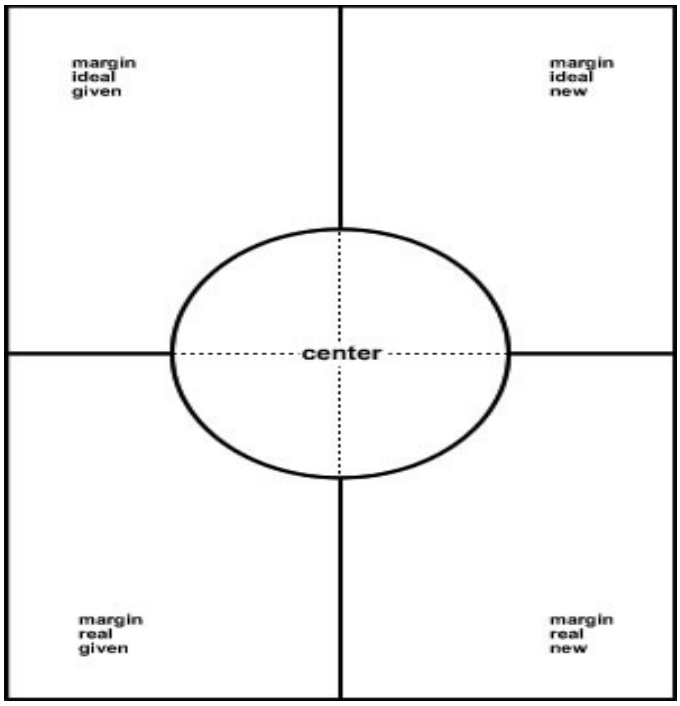


Figure X: Combining compositional values.

Salience

Salience is the degree to which an elements draws attention to itself. It is a complex relationship between size, sharpness of focus, tonal contrast, colour contrast, placement (e.g. top and left from centre are "heavy"), perspective, overlap, texture, etc., and being able to judge it, makes it possible to judge the "balance" of an image (and thus, its centre).

Regardless of the placement of image elements in terms of composition, salience can create a hierarchy of elements, marking some as important, more worthy of our attention than others (Kress and Van Leeuwen, 1996, pp. 212).

An example can be found in a frame from Andrei Tarkovsky's movie Stalker (1979), as shown in Figure X. Its shows the main character at the front at centre of the image, but due to use of contrast and slight off-centre positioning, our eye goes towards the dog moving in the background. //or Margritte image used in presentation?

Figure X: Still from the movie Stalker, the dog being the most salient element.

Framing

Next to relative positioning and using salience, elements within an image can be suggested to be related to each other by connecting elements. This can be done using the previously discussed vectors or by using *framing elements*, either by using depicted elements such as a road connecting a car and a distant city, or a green meadow framing a person, or by using abstract graphic elements

such as connecting or dividing lines and contrasting shapes. This ranges from maximum connection of elements to maximum disconnection of elements.

Vectors and abstract lines typically guide the eye from one element to another element it is suggested to relate to, while frames suggest whether a number of elements belong to the same related group.

Notice the difference between Figure X1 and Figure X2: in Figure X1 the vectors of the white shape in the background point at the represented participant, and there is no contrasting background: the text is what she personally says/stands for. In Figure X2, the text is strictly divided from the participant by a black framing element/background, and no vectors are used: the text is *about* this women, not *by* her.


FORMER SOAPIE STAR GAYNOR WHEATLEY

'NO-ONE IS ALLOWED TO BE THIS LUCKY'

Figure X1: Vectors and lack of framing connect the participant to the text “personally”.

GRETA SCACCHI:

THE MOST BEAUTIFUL WOMAN IN THE WORLD?

She wants to be seen as a good actress, not a cover girl. So far, her stunning looks are better known than her name, but that's all changing . . . fast

Figure X2: Framing and lack of vectors present the text as being "about" the participant.