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Visual communication and interaction

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Visual communication is the essential foundation for the design of IT interfaces but there can be very different understandings of this topic. Different academic traditions have their perspective and their vocabulary through which the topic is conceptualised and understood, Practitioners have other concerns and their specific tools and techniques with which they produce the visuals and the communication embedded within.

Though the technological developments have lead to new interdisciplinary approaches, these developments have yet to develop a truly interdisciplinary foundation. Because the field is still new, we each draw, sensible enough, on what we already know and master, when we approach a new area.

The following introduction to the interdisciplinarity of visual communication and interaction presents perspectives from film and media analysis, from communication studies, architecture, development of digital technologies and informatics. It should be read as an attempt to contribute to the interdisciplinary development of a theoretical frame for understanding visual interaction. However, embedded in the frame is a need for further qualification - by integrating a psychological understanding of the human being as an emotive, sensuous, bodily, intellectual and existential being. A possible frame for the initial steps in this work is suggested.

Fragmentary evidence – as affordance for construction of assumptions and interpretations

In his article: *Interacting with Pictures: film, narrative and interaction* Steven Boyd Davis discuss the knowledge gained in filmmaking and how design of interactive media games may benefit. His perspective is that of the filmmaker, and the making of an imagined vision. He reminds us that film is essentially pictorial, and it is not showing, but constructing an aspect of vision which the film-viewer needs/wants - in order to make sense of the film. The filmmaker does this by offering, "fragmentary evidence, organised with a view to affording certain assumptions and interpretations, and the film-viewer (partly on the basis of shared conventions) duly makes those interpretations".

The tools in the creation of the fragmentary evidence is the shot, the camera view (e.g. close up, the camera as the eye of the spectator) the information and the affective expressivity as well as the contextualisation of the shot. These are brought together in the editing, and the contextual information of a shot, the author states, provides the psychologically necessary. From here, Davis turns to interactive media games and suggests that it may be fruitful to evaluate them within the same framework that is as essentially pictorial. He argues that the

design ideally must make the users "believe that they are interactive observers of a world". Davis points out that one of the problems here is the constraint spatiality in interactive media. The author suggests that a way of exploring this is the "make believe" which is to be found in the "spatial maturity" in filmmaking. The essence of this is " psychological immersion.

The paper is written from the perspective of the filmmaker, but the film viewer is ever present. But the film viewer is not an observer, she is a participant and the meaning construction she engages in is intimately tied to the visual viewing. However, in relation to interactive media games it must also be tied to interaction, the users visual interaction with the media. Behind Davis' theory lays the assumption that the human being – is capable of making sense out of the filmmakers fragmented evidence. This is true, but not specific to film viewing. It is a general human competence of meaning construction. Human beings live a life which – seen from outside – is fragmented. Fragmented information, fragmented interaction, fragmented communication, which fragment our actions etc. Seen from inside of the human mind, however, it is coherent because of the human ability to make sense. We are engaged in a constant process of sense making, of seeing coherence where not coherence was and constructing life as meaningful. This life becomes meaningful because we are not observers; we live life and understand it from an embodied point of view. We are immersed in life, whatever actions we engage in – we are not outside it. (Winograd Terry and Fernando Flores, 1984).

Davis brings into the concept of visual communication, the role of the tools and techniques of filmmaking. He also points to essential dimensions in the viewing of the filmmakers imagined vision. However we need tools in order to understand how the psychologically necessary is presented in fragmentary evidence, and how this affords the necessary construction of assumptions and interpretations in the film-viewer?

The inexpressible aesthetic function

The paper by Lisbeth Thorlacius *A model of visual, aesthetic communication – focusing on web* may bring us a possible step closer to a tool which will enhance our understanding of how the psychologically necessary is presented in fragmentary evidence. Thorlacius' paper is theoretical and focuses on the visual and aesthetic aspects of communication. The aim is to develop a foundation for analyses (and construction) of web sites. Concurrently to introducing the visual, aesthetic communication model the author also identifies a second aim: a theoretical discussion of the language functions in Roman Jakobson's communication model and their relation to the visual communication.

Thorlacius introduces and distinguishes between the expressive function, which relates exclusively to the addresser, and the emotive function, which is ascribed to both the addresser and addressee (the film maker and the film viewer, the designer and the user etc). The emotive function is further analysed and specified as: the addresser may possess/may not possess expression of emotions which he evokes in the addressee/or expressions of emotions may unintentionally be evoked in the addressee by the addresser. This differentiation is interesting because it opens for the possibility of in depth analysis of the emotive and aesthetic expressions and perceptions in both the film maker and the film viewer. Hence the "psychologically necessary" which Davis speaks of, and which is presented in fragmentary evidence may also come within our grasp.

Thorlacius also develops the concepts of the formal aesthetic function, which is understood as the ability of visual language to communicate aesthetic expression – the expressible. This concept conditions its opposite, namely the *inexpressible aesthetic function* the origin of which is the senses and feelings. It is defined as the ability of visual language to communicate that, which cannot be classified. The latter is important because the author's interest is the mutual experience (not the individual) of inexpressibility. It is the addresser and the

addressee's (or the designer's and the user's) experience of not being able to express that which they perceive. Returning to Davis' analysis, these concepts may give us a handle for analysing the emotive expressions of the filmmaker that afford a process of necessary construction of "assumptions and interpretations" in the film-viewer.

Thorlacius' paper is from written from the perspective of communication theory. However, embedded in the text is a perception of the human being on the other side of the screen. Thus she talks of the inexpressible which is not just the designer's experience –but also the users experience of not being able to express that which they are perceiving. Yet Thorlacius, when turning to the concept of interaction, define it from point of view of the user, but as physical – not as interpersonal or as mental interaction. It may be very operational to identify interaction as physical. However, the communication of a web site cannot be separated from the mental interaction. It seems to me that a web site has as a prerequisite, that a human being starts interacting with it. Somebody has to key the site address, somebody has to click and navigate inside the site, but a prerequisite to this is that that somebody interacts psychologically with the site. It is not sufficient for a hand to click on the mouse buttons in order for the communications to work. Here the architectural concept of visual communication as embodied spaces, the essence of which is immersion may help us.

Embodied perceptual experience technologies

Andreas Lueschers' perspective is architecture and the educational models (design representations) taught from as oppose to those of the computer. *The Physical Trace* is the title of his paper and he focuses on image representations (in architecture, theatre, paintings, sculptures etc). It is especially "the representation of three or more dimension of information on two-dimensional display surfaces and the simulation of a full spatial experience with horizontal, vertical and temporal extensions" which the discussion moves around. Luescher introduces us to historical evidence of visualization techniques of environmental representation, which incorporated possibilities for "sensual engagement, material exploration, and a connection with the real". This involved synthesis of touch, sound and movement, and experience, because these representations required the "participation of the spectator; for dynamic, physical involvement in the process of creation". Experiences, which would result in bodily, sensual, emotional and intellectual understandings.

One such representation is the panorama e.g. in paintings, the experience of which is "qualitatively different from looking at a picture isolated within a frame. .. The panorama made it necessary to move not only ones eyes and head, but also ones body in order to assimilate the vast continuous picture". Hence the history of representations also becomes the history of immersion in the image, and it is not just the history of visuals but also of embodied perceptual experience technologies. This is also the case in architectural design where experiments with representations turned experiences into bodily, sensuous, time and spatial constructions. This was and is done by letting students construct in 1:1 scale in solid materials, instead of just drawing 1:10 on (flat) paper. From this basis Luescher stages the discussion and he questions the claimed revolutionary potential of the computer of imaging and the promise of immersion. He points out that computer representations remains screen-bound, small-scale and impenetrable and treats architectural constructions as drawings. Not that Luescher rejects the computer in education – but he argues that when and how to use computers must be seriously contemplated.

With Luescher the representations become not just visual but material and the interaction is both physical and psychological. The architectural concept of visual communication as embodied spaces, which requires immersion takes the visual communication out of the spectator or observer perspective and into the perspective of the actor – interacting with physical material. With this the embedded assumption of a psychological being in Lueschers'

description becomes more visible. Knowledge of the psychological faculties at work here and the subjective experience would be yet another, but essential contribution to our understanding of the interaction. However, we need to be able to understand not just the embodied experience in the construction of the physical spatial representations, and the embodied movement in physical spatial representations. Exploring when and how to use computers may be done by studying the representations of visual communication on computer and the experience of persons interacting with these virtual representations. Keyboard and screen based computers can never be embodied spaces. However, I will take the liberty of rewording Lueschers' statement into an entirely different claim; Computers do offer representations, which embed possibilities for sensual engagement, virtual exploration of material and a connection with the electronic images and animations of designers imagined vision. These representations require the participation of the user and the experiences may enhance intellectual, sensual, emotional and even bodily understandings. However, exploration of and experiments with the medium is necessary if we are to develop a better understanding.

Movements in virtual spaces and that which is cannot be represented.

The paper *The eye of the user- the influence of movement on users' visual attention* by Helle Petersen and Janni Nielsen reports on one such experiment. They explore the communicative potential of movement in interface design. Concurrently they discuss their exploration of two specific user test techniques: eye tracking and mind taping.

The representations they work with is visualisations of movements, which were designed to 1) catch the eye of the user, 2) direct users' attention and provide an aesthetic experience without 3) distracting, irritating or preventing user from decoding relevant information. In experimental terms Petersen and Nielsen define movements as graphical objects, which shifts location, transform shape or change texture. They draw on a classification of movement in film production, and distinguishes between primary movements: moving object, secondary movements: screen motion and tertiary movements: moves between pages. These movements may be initiated automatically, in which case user has no control, or the movements may be initiated by user. They develop a set of six guidelines for design and reports on the design and testing of two kinds of movements: automatic movement of objects (primary movement), and user initiated move between pages (tertiary movement) followed by an automatic moving object (primary movement).

They ask the very essential question: What goes on in the user mind, and describe the two techniques they explore in the study: Eye tracking, using a headset with video recordings of respondents eye movement and Mind tape. The latter may be described as a conversational interview, where the recordings of respondent's eye movements are the object of and act as the trigger for, the conversational interview between respondent and researcher.

The analysis – though the data is rather cursory – seems promising: Movement holds much promising potential as a communicative tool in interface design. And the techniques for testing do not only give access to cognitive processes that ran associatively while user interacted with a system, but equally interesting, the techniques seems to give us some insight to tacit processes in human cognition – or to that which is cannot be expressed.

Using visualisation of performer's movement in physical space to control light and sound

Before we get to the possible contribution from a psychological theory to the concepts of visual interaction – I want to introduce Jeff Burke works at UCLA's HyperMedia Studio. His approach is also experimental, and he explores new digital technologies for traditional production of theatre, film and television. In his paper *Interactive performance environments*

and the visualization of actor movement, he describes the development of performance spaces with wireless sensing systems that adapt to the actions of performers. In essence it is a *visualisation, an automatic diagramming of human motion as it develops over time*. Burke wanted to use performers position and movement to control theatrical lighting and sound. For a production of Ionesco's *Macbett* he developed a system of networked software modules where the performance tracking was done with a small wireless microphone worn by each performer. He wanted to understand, not just how the performer moved but also how long time the performer would stay at different locations on the scene. Experiments with the two-dimensional visualization system allowed him to see how the stage was used over time. With the aid of the visualizations and the possibility of determining the position of the performer he developed some very special magic staffs for the witches in *Macbett*. He built the position and motion tracker into the foam head of the staffs, and to the audience the power of the two witches must have been a delightful fright. The movement of the staff controlled the sound and lighting. One witch would conjure powerful thunder and lightning by raising her staff quickly in the air – the speed and strength of her thrust controlling the effect. The other witch could create ripples of darkness, colour shifts and the sound of whirling wind by swirling her staff. Again the intensity of the effect was controlled by the power of her movements.

To understand the relationship between the physical space and the performer's movement is important to theatre scholars and practitioners, but is not limited to this field. For the creators of the buildings we work and live in, understanding the relationship between the physical spaces the architect design and the way people move in it may improve the functionality - seen from a users point of view. For interface design understanding the relation between physical space – and the movement of objects - becomes important for the design of dynamic representations, which may embed possibilities for sensual and emotional engagement. Maybe even the possibility for virtual exploration of the electronic images and animations of designers imagined vision. The fundamental requirement is the human participation and studying the interaction with the symbolic representations may enhance our understanding of the how the computer-mediated representations in the interface interact with intellectual, sensual, emotional and bodily cognitive processes.

Visual Interaction

Visual communication is mainly understood by the authors as visuals, though it may be called image representation, visual language, pictures, or pictorial depending on the academic perspective. In their discussion of visual communication the common theme, which emerge, is the question of *representations* – and I would say especially, *that which cannot be represented*.

That which can be represented seems to be that, which we can see, feel and/or touch and move into. However, it is the other theme, that which cannot be represented, which emerge, not surprisingly, as the concept which is only lightly discussed. It is labelled: the psychologically necessary, the psychological immersion, the emotive function, the inexpressible aesthetic function, or described as psychological interaction, and as tacit processes in human cognition. But the concepts are only cursory contemplated. Is this because being that which cannot be represented, it also becomes that which cannot be discussed? The theory of visual aesthetic communication with its explanation offers us a way out. Thorlacius argues that *inexpressible aesthetic function* the origin of which is the senses and feelings is the ability of visual language to communicate that, which cannot be classified. And this is a mutual experience of inexpressibility which both the designers and the user's experience despite the fact that they are perceiving the inexpressible.

But how does this joint experience come about. The understanding of the filmmaking as construction of imagined vision, and the discussion of the role and the affordance of representations in architectural design, may enhance our understanding into *immersion*. However, whether talking about representations in film, in computers, yes even in the case of

the physical spaces talked of in architectural representations, the concepts of immersion is a psychological category. Though architectural representations do embed body, senses and emotions (as such the process of immersion is enhanced) they are architectural mock-up – not the real thing. If we turn to the Interactive performance environment – the actor and the effect of her movements on stage, her immersion is obviously physical – but also psychological. However, Burke's focus is the developer and the user of the digital technologies, and the visualisation - which is the object of discussion here – is an abstract visual representation of body, movement and time. The developer of the digital technologies may sit down in the theatre and observe how the technology functions and thus experience the actor moving on stage, the lightning, the thunder – but it is not the developer who is moving. To experience the move he has to project his senses and his body onto the stage. The representation he deals with is a visualisation, an automatic diagramming of motion over time in a given space.

Space and movements, which is another theme emerging in the papers, becomes the issue here. In the papers space may be perceived as physical and virtual space. Movement may take place in any of the spaces, and is understood as physical bodies moving in space, projection of body and movement into a space by person, movement of physical objects or moving imaged physical objects in space. But movement of bodies in space becomes irrelevant when talking about visual communication – because visual communication and interaction has as a prerequisite immersion and this immersion is psychological – or as one of the authors write – mental.

Concluding reflections

There are *two actor perspectives* in the papers. One is the creator, the designer, the architect and what they create, or design. It is how they do it to obtain what they intend which is the key issue in visual communication and interaction. But it remains uninteresting without the other actor, the user, the film-viewer, the student. What they experience and how they experience is the other side of the coin. The theoretical frame of visual communication and interaction seems to need a theory of the human being. Integrating a psychological understanding of the human being as an emotive, sensuous, bodily and intellectual existential being could maybe help us understand better how the designer, the developer, the architect creates that which cannot be represented but also help us understand how the inexpressible, that which cannot be represented but is the psychologically necessary – is experienced and how that experience unfolds.

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