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# Teaching Visual Design as a Holistic Enterprise

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**Abstract.** Our approach towards teaching visual design is based on our viewpoint of visualization as a way to elicit understanding and experience. Our teaching practice shows a permanent stress on an analytic attitude and an explicit application of design space to fit the design to the users' culture and context and still stimulate creative solutions.

**Keywords:** Visualization; Visual Design; Teaching Visual Design; Experience; Culture; Context.

## 1 Introduction

Visualization aims at the experience of a human audience. In current design education we tend to focus on designing screen images. We run the risk to forget that the audience of our design is still human and lives in a human context, as does the client of our design.

### 1.1 Our Focus: Visualization as Factor in Meaning and Experience

Our focus is on the human stakeholders of visualization. And here we meet an important separation: The client of design aims at representing a certain meaning, and at inducing a certain experience for the audience. The client's intentions are to be understood from the client's culture. The audience of the visualization, on the other hand, will create the meaning and the experience received [1]. The audience, first of all, is often diverse in cultural background.

### 1.2 Culture and Context as Factors in Meaning and Experience

Meaning and experience are, from our point of view, never to be considered objective attributes of a visual representation. Context varies in many dimensions: at home or in the car; alone or with (known or unknown) onlookers; in a hurry or with plenty of time; looking for something specific or just browsing, etc. A person using a visual representation will interpret this representation based on current specific needs, and

will understand the representation according to the multiple cultures he or she considers relevant for the moment (occupational culture; geographical culture; religious or political culture; social or family culture [2]). Consequently, the meaning attributed to the representation and the experience lived with the representation can not be objectively determined and certainly not fully “designed”.

### **1.3 “Visual” is just a Trigger at the Surface in a Context**

For a human audience, “visual” is just an aspect of an artifact that is experienced in an actual context. E.g., a screen image is experienced as part of a device that has relevant characteristics like portability, opportunities for dialogue, visibility in daylight or in a building. A website may be experienced as shop window for a business that has a physical location somewhere, and the business as a whole is experienced, in addition, through manifold visual surfaces of physical artifacts like mobile phones, business cards and stationeries or leaflets, shop signs, perceived in the context of the home, a train compartment, business meetings and shopping streets.

## **2 Visual Design in Education – Art and Tradition**

The design of visual representations seems as old as humanity. The oldest traces of what now is considered the “modern human”, at least in Europe, are about as old as the oldest remains of human drawings. The earliest documented history of civilization shows the creators of visual representation to be professionals that are educated through apprenticeship. In some cases there is a distinction between the design proper and the implementation, especially in the case of large 3D representations like statues or ceremonial “buildings” (the Egyptian Pyramids). The actual design task, in all cases, seems to be based on a combination of having an explicit goal of the “client” (the ruler, the priest, the commissioner) for the representation (flattering the king or the gods, advertising the power of a tribe and impressing other tribes), understanding the audience (how to impress them, how to make them believe), and considering the context of the finished product (how the cave or the palace will be illuminated, from where the temple façade is supposed to be first perceived by the approaching believers [3, 4]).

It seems the core of this design practice did not change for many centuries, though visual artists in some recent periods claim they do not consider the audience, or they leave any interpretation completely to them. In our current society, we observe a variety of conceptions of visual design. Education in art schools itself shows a broad diversity – we will not consider this in the current paper.

## 2.1 Visualization for Usability

Our goal in teaching visualization as an aspect of the design is the development of usable artifacts. The current practice in this realm certainly shows differences in educational viewpoint.

Industrial design considers the artifact as a whole (considering the functionality, the physical dimensions and characteristics, and the aesthetics) focusing on its use in context, where the visual aspects are considered to support the functionality as well as to increase the product's appreciation in the intended context. How this last aspect will work is in fact hardly approached analytically, and design decisions are often based on the intuition of the designer and the subsequent perceived acceptance by the audience.

Design in the context of architecture is a different approach. Aesthetics as well as *intended* experience seem to be a main focus. Functionality could either be part of the requirements, or, in recent visions, a relatively open space of opportunities to be filled in by the future users of the artifact. The actual *lived* experience and functionality are increasingly left to the prospective users, though Alexander's design patterns [5] in fact are intended to provide the opportunities for this.

Visual design for information products (ICT and multimedia artifacts) is another case. Our current analysis is based on developing and teaching courses in this domain. The students of this type of design curricula are typically focused on the functionality (how it works and how the users work with it) and the message (the content). They frequently expect to apply some intuitive aesthetics and "creativity" for the representational aspects of their product. In many current curricula visual design is interpreted as a course in the use of drawing tools. However, increasingly, there is awareness of the importance of the individual user's experience when developing general design guidelines [6].

## 3 A Vision on Teaching Visual Design for Information Artifacts

Our own context is university education of design of information artifacts for users. This context is in fact rather broad, or even diverse: our teaching has been part of a variety of disciplines and curricula. In all cases we pursue the same goal: we should educate our visual designers to start considering the audience's experience from a holistic viewpoint, taking into account the culture and context of the members of the audience as well as the culture and context of the client's business. Consequently, teaching visual design cannot restrict itself to 2D electronic rendering.

The visual design of information products or of the information aspects of any artifact could be anything like:

- Developing an advertising campaigns;
- Developing a corporate image for e-commerce;
- Developing a web portal for finding courses and registering for these;
- Develop understandable dialogues for using an unmanned gas station.

In cases like this, the visuals certainly are more than just the layout of what is on the screen. Mostly there will be different types of screens involved, to be read in

various contexts (indications of schedule changes at bus stops as well as SMS messages to registered bus travelers; gas quantity and price at the screen as well as printed on the receipt). Moreover, the design involves printed paper, or containers for data carriers, and in some cases promotional giveaways or logos on gadgets and tools.

In the same way (we mention this here for completeness, though we will not elaborate on it in this paper) dialogue design for information artifacts is more than designing the dialogue at the level of menu or command structure, forms and the meaning of mouse clicks. Physicality of the dialogue (how to adjust mobile device user actions to human hands, how to consider physical space, how to consider the cultural meaning of gestures and posture while using the artifact) should be part of the analytic approach to dialogue design.

## **4 Teaching Visual Design**

Our design approach developed over the years, influenced by the design cultures in the various disciplines that hosted our teaching (Cognitive Psychology, Cognitive Ergonomics, Computer Science, Information Sciences, Architecture), by the occupational context of our students (traditional academic environments with students of ages 20-25, vs. adult distance education institutes), and by the geographical cultures that formed the context of our students (Romania, Italy, Belgium and the Netherlands, Spain).

Our general design method has been condensed into the “DUTCH” approach (Design for Users and Tasks from Concepts to Handles [7]). Visual design is just one part of this.

### **4.1 Holistic Visual Design Teaching**

For the visual design teaching we developed a holistic approach. Designing visuals as part of information systems design should from the start proceed with an analytic attitude, where the designer has to be aware of different “forces” that contribute to the effect of the visuals:

- The client of the design intends to provide a certain message (with meaning and related experience) for his audience. The clients intuition has to be understood in relation to (a) his context (his business or “shop” with business goals and a business process) and his culture (the values of his business and the related rules, procedures, and standards); (b) the intended experiences for his customers or audience, and the related aesthetics; and (c) the “language” the client intends to use to communicate his message (with its symbols and meanings). In many cases the client is only partially aware of all this. The designer will have to enter the context of the client and try to collect indications, interpret these, and analyze their meaning for the design [8]. Techniques used here may be derived from Ethnography or Anthropology, like the use of cultural probes and the application of hermeneutics [9], [10].

- The audience of the visuals, the customers of the client of design brings their own context and culture. Increasingly, this group is heterogeneous itself, since information systems are distributed around the world, websites are available and used in a multitude of contexts, and people are distantly collaborating through information systems. Designers often are not able to know where and in what situation their products will be used, and what the background of their users will be. Designers can only try to allow for variety and to avoid representations that might cause unwanted experiences.
- Visual representations will, first of all, be perceived through humans, with the perception mechanisms, the human information processing mechanisms, human memory and decision making that is the object of Cognitive Psychology. Visual designers need to be aware of state of the art knowledge and models, in order to design for “human size” representations.

The design of visuals requires a holistic process: the main concern is not the layout of a 2D screen or print, but the total visual image of the client’s business or mission as conveyed with the information system. The single visuals are elements in this, as are the dialogues between the different users and the information system, and as is the context in which the system is provided and the possible interaction with, or awareness of, other users and stakeholders of the system.

In trying to develop an analytic overview of all this, the designer in fact is mapping out a design space (what should be provided, what should be avoided, what should be considered as forces influencing understanding and experience) that reveals the freedom left for creative design solutions. From here the designer can make choices, that should be supported by reasons referring to the design space, in order to allow the client to understand and accept the design, or (possibly only in a future context) collaborate with the designer to re-specify the intentions and requirements.

## **4.2 Design in Context**

Designers work from their own understanding and context. Their understanding is a developing awareness of the various forces mentioned above. They should be aware of this fact as well, and avoid suggesting early on to the client or the customers of the client that the design is close to being finished. Early attempts and envisioning can best be presented in what is clearly recognized as sketches, whether electronic or physical. Interactions and processes, as well, should be provided in formats like story boards. These provisional design specifications should, though, be presented to be actually used, i.e., manipulated and tried out, in context, to allow the client and his customers to imagine what the real thing would look like, feel like, behave like, and would effect their current way of doing relevant activities.

Both the client and his audience will have to be partner in developing, jointly with the designer, an understanding of the feasibility of the direction of the envisioned solution.

### 4.3 Teaching Design – the Process

Our courses shaped themselves based on our design vision and the students' active participation. We tried not to start with actual design activities before basic understanding was available and we tried not to bother students with seemingly endless theory and description of techniques before allowing hands on activities. Our courses currently tend to be composed of several stages:

- Introduction to Visual Design, where we illustrate the concept of visual identity, and embark on a first analysis of a client's intentions followed by an attempt to design, for a real client, visuals to support this.
- Discussion of static representations, introducing the concepts of experience and of branding. Here we also illustrate a brief history of graphic design and design styles in recent western culture, and challenge our students to develop, for a real client, designs for artifacts like a business card and stationary.
- Development of dynamic representations. We start by showing problems in actual designs like websites that send the user astray and video recorders that refuse to be programmed, which allows us to introduce the needs and techniques for user testing. We provide our students with a model for the dynamics of experience design [1]. We discuss the concept of graphical languages and of scenarios for human-system interaction, and ask our students to develop sketch type solutions for a real client problem.
- Design for human perception and action. Now we go in depth about human information processing, and show applications of state of the art techniques like eye tracking showing how people in certain cultures read, browse, scan, and act based on visuals. We combine this with a discussion of visual design evaluation techniques and practical exercises with these.
- Developing a visual design for a real client request. In this final phase the students are asked to work in small teams (2 or 3 if we are able to arrange that) for a client from outside the university, solving a real visualization problem. This exercise starts with an analysis phase, and ends with the production of a design documented with the whole process and including the design space analyses and rationales, finalized with a presentation to the client. If we are lucky enough, we may have several design teams competing for the same client.

Taking advantage of the fact that we have such a broad variety of student populations, we always make sure we show our students examples from colleagues from other student cultures (architects vs. computer scientists; young university students vs. adult distance education students), where we stress the different ways to analyze the clients' context and the different rationales that came with the design decisions.

In the next section we will show elements of some of these final design products to illustrate how our students struggle and what we learn from this.

## 5 Learning from Students

The most realistic part of our courses may be found in the last phases when student teams develop competing designs for real outside clients. Our students designed for large organizations, shops, and single craftsmen's workplaces. The actual clients profoundly influenced the analysis, the design, and the way assessment turned out to be possible in a real context, and the interpretation of it.

We show that "sketching" includes envisioning physical artifacts in a real world context. Sketching, in this case, applies tools from Adobe's Flash development tool to (physical) jig saw and paint brush. Sometimes, business cards or brochures were found to be 3-dimensional and to act as a partner in interaction.

Assessment includes having the intended audience physically manipulate the artifact (turn the brochure to read the back side, open the folder to take out the pictures). We will show that this holistic way of developing visual design, in return, has a profound effect on conceiving the meaning of visuals in context, and, hence on the "classical" screen design.

### 5.1 Designing for "Remote" Clients and Users

In some cases our students worked for real international organizations (including CHI conferences, IFIP TC 13). A difficulty here is that the client is often in fact not a single person but a heterogeneous group, speaking different first languages that are all different from the designers' language, and the client can be reached only through long distance communication, even if in real time.

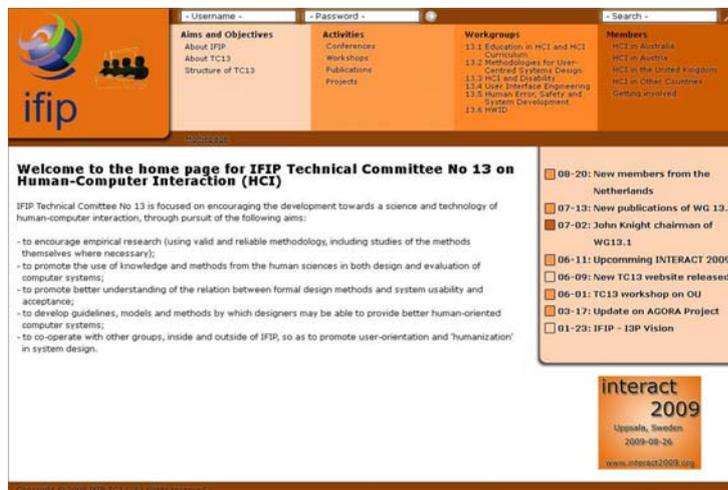


Fig.1. Website front page design for IFIP TC13

One example considered IFIP TC13, the technical committee on human-computer interaction, which needed a new website and related paper hand out. Our design teams

in this case consisted entirely of Computer Science students. The student teams developed several competing solutions. At the end, all students as well as the teacher agreed on the “winning” design where the web-based hypertext structure (See Figure 1) was, additionally, used for dynamically navigating the paper brochure, see Figure 2 and 3.

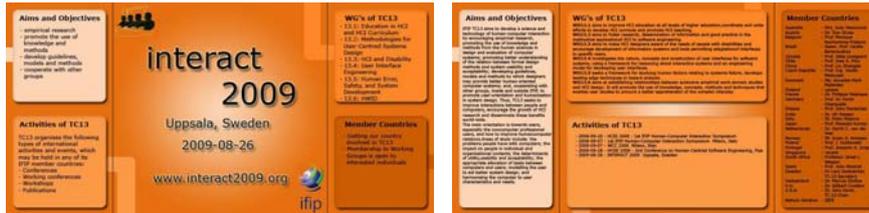


Fig.2a and b. Single page brochure front and back side design for IFIP TC 13

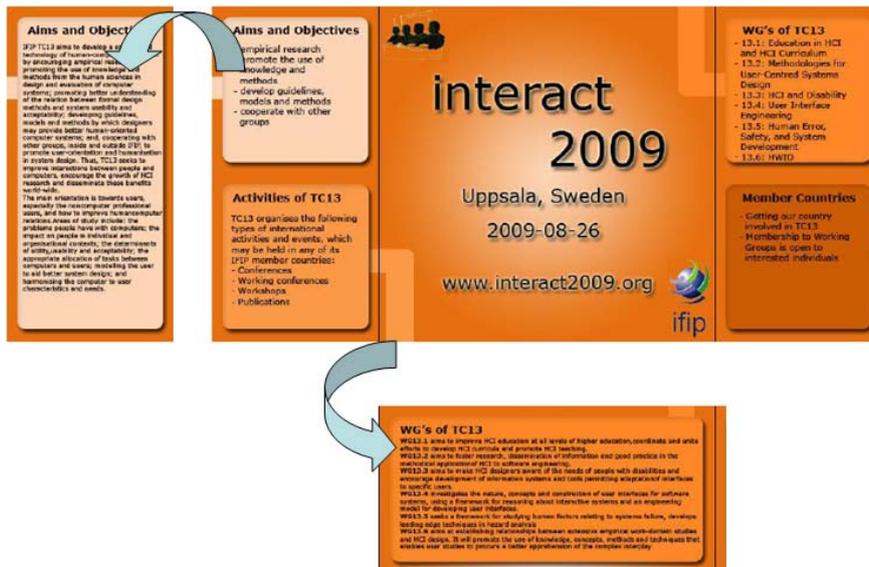


Fig.3. Indication of how colors support the hypertext navigation for the IFIP TC 13 brochure design.

The students viewed paper as just another type of information system that could be navigated in any structure to be designed. The client, though, judging as a group by email vote, chose another design where the brochure featured the traditional linear reading navigation that characterizes most products of the now centuries old printing and reading habits. TC13’s culture of using paper did not match the students’ design space.

## 5.2 Designing for an Arts and Crafts Culture

One of our clients was a jeweler couple that managed its own store, in a small alley in an old historic Sardinian town. One of the design team started with developing a “mood board” that shows an impression of the client and their customers, as well as the context and the type of products with the aesthetics.

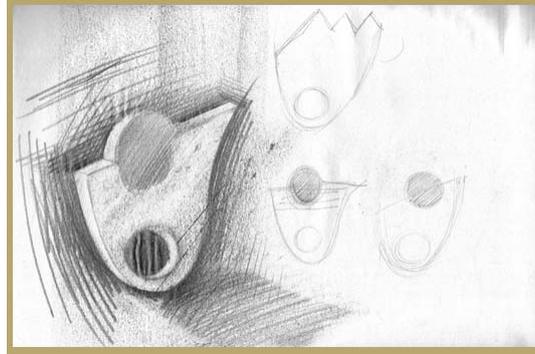
Based on the client’s production style, sketches developed (Fig. 4) that were finally transferred into a logo (Fig. 5), sketch for a new shop sign (Fig. 6), for a 3D business card finger ring not unlike the actual products of the client (Fig. 7) and for a folding brochure(Fig. 8 and 9).



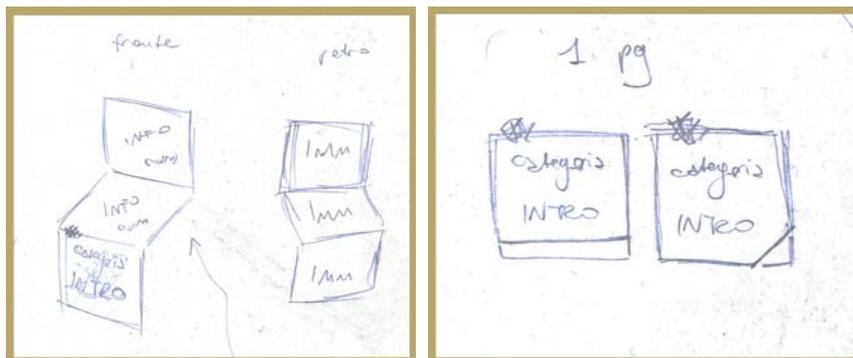
**Fig.4 and 5.** Sketches based on client’s products, and logo based on that.



**Fig.6.** Sketch for a shop sign



**Fig. 7.** Sketches for a 3D business card with the shape of a ring



**Fig. 8 and 9.** Sketches for a folding brochure and the navigation with it.

## 6 Conclusions

Teaching Visual Design for users is a holistic enterprise. It requires a permanent attention to analytics as well as a requirement for explicit design rationale. In doing so we have shown our students are able to be creative and to focus on the audience. However, cultural differences are the most difficult issue to handle. The cultural and contextual aspects of the client's intended user experience, as well as the resulting audience's actual experience, can only be managed successfully if the client is available to actually partner with the designer.

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