

## **ART+COM AND THE ART OF COMMUNICATION**

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### **Introduction**

Much attention recently has been given to the idea of multi-disciplinary work and education practices as technological developments allow or necessitate role distinctions to blur. Does this have a particular influence on the practice of design studios and consultancies? By its nature, design is already a multi-disciplinary endeavour - taking elements of the arts, technology, human factors, psychology to name but a few, to distill; a solution that is optimised and balanced for functionality and aesthetics.

A successful design solution is represented by its product as much as by the process from which it originated, and offers a testament to both the grouping of expertise and the environment which fosters innovation in the context of functionality. But how can organisational structure and practice influence success in the context of using cutting edge digital technologies in creative and meaningful ways? Through a series of case studies, this paper examines how one design firm, ART+COM, a multidisciplinary group set up in the 80s, has attempted from its inception to foster a sense of innovation in this domain, through a mixed repertoire of projects and ever changing role divisions.

The company produces almost exclusively custom made interactive experiences for public spaces, exhibitions and events, and therefore it is central to its operation to continuously reinvent its production strategies, collaboration models and technological know-how.

Their work can be roughly categorised into three fields: commercial, cultural and research, yet the boundaries are often very vague. Commercial projects are commonly developed as communication tools for large corporations and exhibited in trade fairs, headquarters and showrooms. Cultural projects take place mostly in museums, where the installations are often independent experiences, the subject matter and form being discussed and developed in tight collaboration with the scientists. Research projects are in-house developments of promising but not yet deployable ideas about interactive spaces that gradually build a library of technological and conceptual tools for thinking.

Where it is obvious that technological expertise must be following the current developments in the field, equally important is an active research and involvement in the trends of relevant areas of design, in academia and commerce. It is worthwhile to note that while the financial stability comes largely from commercial projects, the company design portfolio is largely biased towards the cultural and research projects, because they embody more clearly the innovation the clients look for in the company.

### **Roles**

#### **Part time benefit**

A very important aspect of the innovation is its employees' activities outside the company context. A number of the designers either hold academic positions or teach part time in a university (Universität der Künste, UCLA), many of the software developers are actively

involved in the hacker scene through C-base<sup>1</sup> and CCC<sup>2</sup> (Chaos Computer Club), local and international "geek" communities, and its project managers also curate art exhibitions. This kind of active exposure to the academia, hacker culture and art scene all bring new perspectives to the company that are essential in its mission.

Because of these external roles, number of the staff are therefore only working part time, having occasionally longer breaks from the company operation. The resulting perspective on the new trends, technologies and research directions filter to the thinking in the company projects in a beneficial way.

### **Artist engineer pairs [case 1]**

In the beginning, the research in new media art and design was largely done by artist-engineer pairs, where the exchange of conceptual potential and technological feasibility took place in intense conversations between two people. A good example of such work is the "Invisible Shape of Things Past"<sup>3</sup> (Figure 1) by Dirk Lüsebrink and Joachim Sauter.

The project utilised the then cutting edge real time 3D computer graphics rendering as a means to create virtual film-objects generated from old film sequences and placing them in 3D space for interaction. The created architectural shapes were simultaneously striking shapes and a new way to organise film material in spatial fashion. This was very revolutionary at the time when Virtual Reality was still seen as an attempt to recreate the reality in digital form.



FIGURE 1. Invisible Shape of Things Past capture of Potsdamer Platz in Berlin

As ART+COM expanded, the individual pairs became larger teams. While this expansion made larger projects possible, and widened the areas of expertise in both fields, the roles were perhaps a bit more polarised, and many projects had either technological or content bias. Technological projects were more advanced in terms of computation, but took place within a tighter design context. The content driven projects employed more straightforward technological implementation but concentrated on the design and conceptual depth.

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<sup>1</sup> <http://www.c-base.org>

<sup>2</sup> <http://www.ccc.de>

<sup>3</sup> Shaw, J., Weibel, P. (2003). Future Cinema, MIT Press, 431

## Sequential work chain [case 2]

With this kind of role division, the worst case scenario is when the design team crafts a concept based on their technological understanding of possibilities and then “commissions” the software and hardware development team to execute the idea. Due to lack of communication or common vocabulary the result can be far from optimal. The designers do not understand what is economically possible with the chosen technological approach and the software developers solve problems too literally from the designers' proposal, failing to see the conceptual idea behind it, that might be much more effectively executed with a slightly different approach that the designers simply thought impossible.

Throughout the years, the software team has built an in-house rendering engine, “Y60”, that has been used in several ART+COM projects. It has its beginnings in a project called “TerraVision” (1994) (Figure 2) , which was a novel use of real time 3D graphics technology to enable almost infinitely scalable levels of detail in 3D geometry and texturing. One could view the world from outer space and subsequently zoom in until one would see a view inside an office building. The inception of this project was more of a technological challenge, and the design solution was more to do with adapting a relevant story concept to illustrate the technology effectively. Over ten years later, Google has popularised a very similar idea in its GoogleEarth<sup>4</sup> service, mapping large areas of the world in various resolutions. In this instantiation the technology has become the scaffolding, an addition to design library, and available to vast number of designers.



FIGURE 2. TerraVision in ICC in Tokyo

Since TerraVision, the Y60 engine has been extended with many features dealing with animation, content management, different special effects etc. These features were gradually built according to the requirements and challenges posed by the running projects at the time. In other words, the engine development has been an attempt to respond to the changing directions in the concept development for which it has been used. The outcome of a completed project has become the source for inspiration, and understanding of the possibilities to future ideas.

## Computational design [case 3]

Recently, the roles have been changing. Due to the adoption of computational design as a central approach in many projects, the designers understanding of the technology is very different. In

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<sup>4</sup> <http://earth.google.com>

fact, the term 'computational designer' represents a completely new role, in between software development and designer. A similarly hybrid role, arguably introduced to the general public by the design agency IDEO, is that of 'interaction designer'. In between software and hardware development, human factors, psychology and various fields of design, the interaction designer's role is to have enough understanding of each respective field to see the potential that can be attained, given experts in all the areas. While the interaction designer's "focus is on defining the complex dialogues that occur between people and interactive devices"<sup>5</sup> through building scenarios and prototyping user experiences, and thus is really applicable to larger organisations, requiring a large number of specialists of different areas to realise the concepts, the computational designer is him/herself bridging between two disciplines in production phase

A programming environment called Proce55ing,<sup>6</sup> initiated at the MIT Media Lab, is commonly used as a sketching tool by the designers. Proce55ing offers an easy to use, stylised Java programming environment which, while slower than the languages often used by programmers, is structurally similar, and thus ideas can be easily translated to lower level code and to the Y60 rendering engine to improve its performance. This approach employs computational thinking as a core element in interactive graphics and is simultaneously already in the same domain as the software developer's tools for creating the final application.

Algorithmic thinking on the creation of graphics and sounds equips the designers with a vocabulary more in common with the software developers, even if they might not be able to write the final code themselves.

Today, the designers have adopted a fully-fledged Java development environment, and have recently produced several projects independent of the software development team. The advancement in hardware speed and software libraries has made it feasible to execute complete projects in large scale using only Java. There are, however, still many situations where Java's performance is not enough, but very often the understanding of the potential of the programming environment has enabled the designers to facilitate a technological solution in an elegant and appropriate way.

The first project in which Art+Com employed this strategy was commissioned by the Jewish Museum in Berlin. The project called "floating.numbers" (Figure 3) is a 9-meter long interactive table installation, where the visitors can activate a digit out of a stream of numbers flowing across the surface. The installation, although employing real time graphics, does not attempt to reproduce any photorealistic scenery, but instead a stream of numbers float in an abstract space of lines and colours. The appeal of the installation is in the behaviour and character of the individual numbers floating across the table, and the stories, images and animations attached to them, and accessible to the visitor.

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<sup>5</sup> [http://en.wikipedia.org/wiki/Interaction\\_Design](http://en.wikipedia.org/wiki/Interaction_Design)

<sup>6</sup> <http://www.processing.org/>



FIGURE 3. floating.numbers at the Jewish Museum in Berlin

Many times, when not informed well enough about the technology, designers have many assumptions about what is easy and feasible. Much of this is however only assumptions and not essentially about the underlying core concept. When these assumptions are obscured, the software developers attempt to realise them the best they can, failing to abstract the essence that might be much more elegantly done in a different way still maintaining the fundamental concept intact. Since floating.numbers was done exclusively in the design department, such disconnection did not exist, and the aesthetics was driven by computation.

#### **Parallel design [case 4]**

In a recent project for O2 mobile carrier, a new approach was employed, where the in-house rendering engine, thus far only accessible to the software developers, was extended with an interface to Java. This meant that the designers could write code that would utilise the engine's superior performance, but could do so from within a familiar programming environment. The software developers' role thus shifted into more strategic planning, organising and structuring the system in such a way that the designers could “play” with it themselves. This form of play is essential in developing applications through computational design. One needs to see the code in action to decide which part to adjust or improve. Many times unintended results trigger further ideas and lead the development much further than was thought in the beginning. This kind of playful programming is very different from traditional software development, and an essential characteristic of computational design.

Another example of the more strategic role for the software developers is a research project in XML (Extended Markup Language)-databases, where large libraries of client-supplied material can be easily and flexibly included in interactive installations.

Ultimately this kind of shift of roles has brought the designers deeper into the programmers' domain, making the conceptual design decisions more informed and enabled much more effective experimentation and playful development of the applications than was possible before when the execution of the designers' ideas were done by software developers.

The programmers' role has shifted on one hand more to the strategic planning and to developing more robust libraries of components the designer's can use, and at the same time also potentially

tackling even harder computational projects, essentially consulting for the designers' in parts of the code that are beyond the designers' computer science capacity.

Pushing this capacity is a currently running project for the London Science Museum that deals with the science of alien life. Leveraging a TV series based on several astrobiologists' imagined alien worlds<sup>7</sup>, the interactive exhibit is a playful encounter with an alien ecosystem. The visitors can interact with the different creatures in a constrained artificial life simulation and lead through narrative describing the features of the planets and its inhabitants. The challenge for the project was to complement, and not compete with the established visual quality of the TV series, inventing a completely new experience, while retaining a connection to the TV show. The project combines 3D real time graphics in an abstracted way with graphic overlays, merging two genres of computer game design together with simple artificial life simulations and cellular automata. While the concept and software development in this project is by and large done by the design team, some hard problems necessitating fast 3D processing has been done by software developers.

### **Post-design [case 5]**

The project TimeScope (Figure 4) demonstrates a more product-oriented approach to design research, somewhat of a rare endeavour for ART+COM. This interactive installation appears as a pair of digital binoculars mounted on a post. Unlike traditional binoculars, however, TimeScope has a monitor built in the viewfinder, and a few buttons, a computer, and a camera mounted on the front side.

The initial usage of the time scope was to blend different historical images to the live view of a given space in a city. The visitor can do a virtual time travel and see how the location has changed over time. By turning the scope left and right one can pan in the images.



FIGURE 4. TimeScope in Wittenberg Platz in Berlin

Much of the development has gone into making the system economical and robust and weatherproof for outside installations with the assumption that there is an international market for the TimeScope product.

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<sup>7</sup> <http://www.nationalgeographic.com/channel/extraterrestrial/>

Once a system is ready and usable, however, it is easy to "lock" in on the given usage of the system, and not see its wider potential. To help potential clients see beyond this narrow focus of product functionality, ART+COM continued development on TimeScope within the conceptual realm. A team of designers completed a library of further conceptual uses in order to trigger the imagination of potential clients. By showing various different ways of using the system with a network connection or traces of previous users' interactions, for example, the project could be expanded into a variety of seemingly brand new uses.

## **Future**

To large extent the projects in the last fifteen years at ART+COM have been screen or projection oriented, and the physical qualities have been generally designed to support the digital displays. The next paradigm shift to be expected is towards more physical displays and interfaces. The challenge for the designers in this transition is to acquire a level of understanding in electronics and material sciences that is essential to create more tangible interactivity, increasingly at the core of public space installations.

Similar to the computational design shift the "middleware", the modularisation of electronics circuitry, makes the design of circuitry more accessible for designers in order to get familiar with the possibilities of this new domain.

## **Conclusions**

Through the case studies in this paper, we have shown the continuously transforming role of design in the context of a new media design agency working in the field of public space installations. Phil Tabor described the role of a designer to "read the newspaper daily"<sup>8</sup>, metaphorically referring to being aware of a very wide perspective of perhaps seemingly unrelated fields, which is the source for inspiration, evaluation of potential feasibility and a measure of originality. The key is in finding connections between seemingly unrelated ideas. The introduction of computational design is in this sense a very natural continuation of the interdisciplinary work philosophy, where the field of computer science has become another tool for thinking in the design process. The "hard" problems remain to be solved by the experts of specialised fields, but the designers' role is in seeing their potential. Paradoxically, design inventions are often self-evident once discovered, and hence often harder to appreciate than those that are at the cutting edge of a specialised field.

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<sup>8</sup> [http://flow.doorsofperception.com/content/tabor\\_trans.html](http://flow.doorsofperception.com/content/tabor_trans.html)