

DESIGN RESEARCH

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DESIGN CENTRE
EVOKES RESPECT

Better health with more design



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COVER:
The Future of Integrated Health
Care, Ergonomidesign's chart of the
interaction flow in a future health
care system.

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Small words – clear signals

Standing aside from ongoing political debates or social changes and saying that no one understands what we have understood is sometimes easy but doesn't do much good. Design is a field where one often encounters people who believe that the world at large does not understand what design can achieve. To try instead to explain and give examples of which improvements one believes in can open doors to new knowledge, new ideas and new solutions.

This issue focuses on design in the health care sector. We have tried to present some examples of what is happening in Sweden but have also examined in depth one case from the UK. The Design Council there has in recent years worked on many projects together with such public sector bodies as the NHS (National Health Service) and the Department of Health. The Design Council has gone from being nicknamed “the Potato Council” for arguing that design makes everything better, to working in a wide range of fields based on the recognition that a need for design exists in a large number of sectors within society. The Design Council's transformation proves that it is not just a matter of getting more money, but that innovative environments can be created everywhere, and that design which is used in a long-term, strategic way can contribute to this. Read more about the importance of money in this issue's survey (page 18).

Design is very much about the user. It is about understanding what the user really needs and questioning the solutions that exist for creating long-term added value. That is the situation in companies and that is how it is with innovation policies. Solutions need to be questioned. And users need to be given a central role in shaping the solution.

Sometimes it is hard to perceive ongoing changes. If they are also occurring over a long period of time, this is almost impossible if one cannot describe them with broad brushstrokes. However, broad brushstrokes can sometime be made visible by small words. 2008 was the year of the previous Swedish government bill on research and innovation. The bill laid down the direction for Sweden's research and innovation policies for the coming years. The bill was 292 pages long and the word “customer” was used four times. The word “user” occurred three times. This year it is time again for a new research and innovation bill. Clear political signals do not only have to be a matter of more money leading to better effects. Clear political signals can actually be as simple as using a word more than four times in a bill of 292 pages.

Eva-Karin Anderman, Head of Research and Education at SVID,
Swedish Industrial Design Foundation.



PHOTO: CAROLINE LUNDÉN-WELDEN

Eva-Karin Anderman



The Future of Integrated Health Care, a map of how the interaction flow should be connected, plus an app for Microsoft Surface called "Helping Hands". The scenario illustrates how Ergonomidesign envisions people communicating with each other and with health care workers in future, quickly reading and exchanging information about biometric data.

Many design challenges in the health care sector

“Few people in the health care sector understand design expertise. But just complaining doesn’t help. I want to create tools to support the patient and increase innovations in the sector.” Anna Thies was the first designer to take part in the interdisciplinary Clinical Innovation Fellowships programme. She regards the health care sector as an important place for designers to work in the future.

The demographic map of Sweden was redrawn a number of years ago. Even then, talk began about how ever fewer young people would have to support and care for ever more older people, about how the tax base was becoming eroded, and about the crisis in the entire health and long-term care sector – both state-funded and private. How would the resources stretch? At the same time, new technology is creating new possibilities and a better chance for both rehabilitation and a healthier old age.

Creating an overall vision for the health care sector is one of the great challenges of the future. One excellent tool in this context is design methodology, something with which

the health care sector is not very familiar. That’s the view of *Anna Thies*, who has a Master of Fine Arts in industrial design, with further training as an interaction designer, and who is now doing her doctorate on the subject of human-machine interaction in the health care sector at the Department of Computer and Systems Sciences at Stockholm University. Recently she was the first designer to participate in the Clinical Innovation Fellowships programme funded by the Stockholm-based Center for Technology in Medicine and Health. The programme was established a decade ago, partly because the difficulties in organising a well-functioning health care service

also became apparent from within the health care sector. In 2010 Anna Thies led a study that resulted in a report on design in the health care sector.* The report organised many aspects of the sector’s very obvious problems in a pedagogical way.

“Until now, developments in the sector have been led by technological advances and medical research,” she says. “But what about the patient? If a person who is in the final stages of his or her life gets a tumour, perhaps their first wish is something completely different than trying to get rid of it.”

PROFILING NEEDED

The people interviewed for the report agreed that the future health care

An increasingly ageing population

In Sweden in 2009 there were 1.6 million people over age 65, or 18 percent of the population. By 2018 that number is predicted to exceed 2 million. In just under 50 years from now, 2.7 million people, 25 percent of the population, will be over 65. Today there are 70 dependants for every 100 people of working age. By 2060 this figure is predicted to rise to about 88 dependants per 100 of working age, which means that 100 people will need to support 88 young and old people. Up to about 2020, the younger group of pensioners (age 65 to 80) will increase the most. Few of them will need personal

care assistance before the age of 80 but then the proportion of them needing help will increase rapidly. By about 2060 it is predicted that the number of 80-year-olds and older will be almost a million. During the first decade of this century the health care costs of the Western world have increased by about 7.9 percent per year. In Sweden health care costs are just over 9 percent of GNP. By 2050, 33 percent of Europe’s population will be over 60 and only 13 percent will be under 16.

(Demographic reports 2009:1, Statistics Sweden and CTMH)



PHOTO: ERINST HENRY

ANNA THIES, a doctoral candidate on the subject of human-machine interaction in the health care sector at the Department of Computer and Systems Sciences at Stockholm University: "I want to improve the health care system in my future career. In the business world, industrial designers often work together with company directors and other decision-makers at the executive level. The same is true in the health care sector. As a designer I will need to discuss and debate with politicians and collaborate with physicians, engineers, and 'ordinary' workers as well as within academia and industry. Doing research and a doctorate is quite simply a means of acquiring authority."

system needs personnel with the right skills who can provide better service. They called for a greater focus on service and a more professional interaction with patients.

Increased demand for more information and service leads in turn to a greater need for profiling within the sector. But the report also highlighted the existence of a sceptical attitude towards solutions that are excessively targeted to special groups because "after all, health care must suit the great majority of people". A need was expressed for greater efficiency and more technological solutions. But new technology also arouses some resistance and a fear that health care will become less "human".

Other areas that require attention in the future include patient safety and the work environment. Accidents, wrong treatment, poor hygiene, communication problems and staff shortages create unpleasant conditions and, of course, also poorer service to patients.

Knowledge about what a designer

could do to improve conditions in the health care sector is poor, not least among the sector's decision makers. Thies made this observation during her eight months as part of the interdisciplinary team that was working out in the field.

"My knowledge was received in very different ways. Sometimes when I came to a ward and introduced myself, I was asked if I was there to redo the curtains. That's not exactly what I've worked with most, either as an industrial designer or an interaction designer."

Her report concludes that there are many inadequacies in how people and machines communicate at a hospital, but also in how the machines function in relation to each other. Many health care workers are also frustrated over the communication problems between the local municipalities and the local county councils, between the patients and the hospitals' purchasing managers, and between patients and people who want to alter and update ingrained routines. As the report states: "The

health care system is complex and the division of responsibilities between the municipalities and the county councils sometimes causes major problems for both the patients and the health care providers."

AREAS OF RESPONSIBILITY

The many communication problems are due largely to the division of the health care sector into various areas of responsibility. Quite simply, the system is not coherent. The design of services is a growing field of study in more and more industries. Service solutions could facilitate various forms of communication in the health care sector too.

Another issue addressed in the report is the clash between designers and the companies that hire them. Those designers who are already working in this sector, for instance with medical technology companies, complain that they are not allowed to work in a sufficiently strategic way. Designers are often brought into projects at too late a stage, which gives them "less room to manoeuvre and somewhat clips the wings of the designer's expertise."

Marcus Heneen of the Swedish design consultancy Ergonomidesign expresses it like this: "Many clients expect to get a little splash of colour here and there on their product. We arrive with a strategic bomb – and then they don't understand the significance of design. They don't understand that over the past twenty years it could have helped them to develop their business on a massive scale."

It is well known that the health care system is governed by various regulations and standardisations. Public sector procurement of assistive devices and products is done by the local county council, which often selects the cheapest products. As a

result, innovations and new solutions tend to disappear before they have had a chance to get out into the market and into the health care system.

For instance, Sweden's municipalities are responsible for the premises and housing within the geriatric care sector. Various regulatory requirements prevent any adaptation to individual needs either large or small – things like room size or the colour of a wheelchair. “Even though many other industries have understood that they must offer a wide range of products to satisfy different customers, many assistive devices still look very similar,” states the report.

The entire health care system is extremely complex and changing one thing can have undesirable consequences somewhere else. One small example is the introduction of separate rooms within hospital wards. If managers prioritise the battle against the spread of drug-resistant bacteria, then having rooms with only one bed in them is a good idea. But many elderly people



Anna Thies dislikes it when health care design is associated only with the choice of furniture and textiles. Yet interior furnishings are also important to hospitals of the future, where patients should be treated more like customers or hotel guests, like at the Practice Clinic at the Old Opera, Frankfurt-am-Main. Interior design: Eva Lorey. (From *Construction and Design Manual, Hospital and Health Centres*, Editor: Philipp Meuser, DOM Publisher.)

feel abandoned and isolated, and their time for “socialising” with the staff is automatically reduced by having single rooms.

A BLEAK PICTURE

With regard to the wellbeing of the Swedish health care system, the overall picture is fairly bleak.

Nevertheless, there are many ideas associated with concrete design solutions that could result in general improvements. However, no one believes in quick solutions; on the contrary, more research is needed on a variety of issues. The relationship between municipalities and county councils must be clarified and the comprehensive approach must be reassessed. The possibilities of using new digital methods with regard to seniors and the functionally challenged should be explored. It is necessary to do a needs survey and then adapt the technology so it can be used by everyone – a goal that involves major tasks for interaction designers. Smart phone apps are also becoming increasingly common in a health context (for joggers, for example) but in order for them to be more significant within the health care system they must be based on real needs. Fresh ideas are also needed with regard to services: it should be possible for future health care to be inspired by various service industries – something that is undoubtedly a topic for the service designer.

It is thus clear that this report on design in the health care sector contains a lot of useful ideas for designers with a variety of specialities. But how much of all this would require new political decisions and/or organisational changes?

“Masses,” Thies sighs. “Political decisions and five years of research – at least.”

Interdisciplinary

The Center for Technology in Medicine and Health (CTMH) is funded by Karolinska Institutet (KI), KTH Royal Institute of Technology (KTH) and Stockholm County Council (SLL). CTMH aims to develop the Stockholm region into a world-class medical technology centre. CTMH collaborates with Stanford University and runs the Clinical Innovation Fellowships programme, which aims to create an interdisciplinary cluster for future innovators in the health care sector.

MedTech West was founded in 2009 by Chalmers University of Technology, Gothenburg University, the University of Borås, the Västra Götaland region and Sahlgrenska University Hospital in Gothenburg. The aim is to initiate, facilitate and promote increased research cooperation between the health care sector, industry and academia.

Clinical Research Centre (CRC) in Malmö brings together research, education and health care to help ensure the improvement of human health. The centre is sponsored by Lund University and Region Skåne. CRC has no established collaboration with any design education institution or design organisation.

The Centre for Biomedical Engineering and Physics at Umeå University (CMTF) is sponsored by Umeå University and Luleå University of Technology and cooperates with the county councils of Norrbotten and Västerbotten. Although the centre has no organised collaboration with the Umeå Institute of Design, there are regular contacts about various projects. There are hopes for increased cooperation in the future.



PHOTO: STEFAN MÜLLER-NAUMANN

A care facility of the future: Orthopaedic Paediatric Clinic, Aschau, Nickl & Partner Architekten AG. (From *Construction and Design Manual, Hospital and Health Centres*, Editor: Philipp Meuser, DOM Publisher, 2011.)

Yet the situation is not completely hopeless. True, Thies had to be assertive to get a Clinical Innovation Fellowship but she thereby opened the door for more designers and it now appears that a lot of interest has been aroused.

“First and foremost it is crucial to get a foot in the door of the health care system at the organisational level,” she explains. “After that, it is most important to have a holistic approach. The sector is built up of masses of specialists who focus primarily on their own speciality to the exclusion

of everything else. Here we designers have the potential to achieve something really big. Designers are trained to take an overall view and can reveal larger contexts. People who work in the natural sciences are good at peeling things away and dissecting a problem. But this is not just a matter of one single respirator at one surgical ward; rather, it’s about many other machines that all relate to each other.”

Another skill that designers can apply to the health care sector is their ability to visualise.

“It’s important to convey visions,”

Clinical Innovation Fellowship

Each year CTMH’s Clinical Innovation Fellowships give six innovators with multidisciplinary expertise in the fields of technology, design, medicine and management the opportunity to work in two teams to learn about the needs of the health care sector by means of close collaboration with a clinic for an eight-month period. The teams’ task is to identify needs and possible solutions to problems. Physicians, engineers, industrial designers and economists are recruited to the teams. The goal is to establish at CTMH a world-leading innovation cluster with wide-ranging expertise. This operational model was developed by Stanford University, USA. Anna Thies was the first industrial designer to receive a Clinical Innovation Fellowship. Two of the candidates for the 2011–12 fellowships have design expertise. The latest round of applications in March 2012 showed that designers’ interest in the Clinical Innovation Fellowships has increased markedly. More info: www.clinicalinnovation.se

she says. “Changes can be hard to understand in advance – they just feel like a nuisance. Being able to show the staff what something will look like or how it will function after it’s been altered can make all the difference. It’s a kind of visual rhetoric.”

Lotta Jonson

** Design inom vård och omsorg – Behov, framtid och möjligheter (Design in the health care sector – Needs, future and possibilities) examines future research possibilities and design needs based on interviews with people from the sectors of health care, medical technology/assistive devices, and industrial design/service design. Authors: Jennie Johansson, Andrej Nylander, Tove Thambert and Anna Thies. The study was commissioned by Konstfack University College of Arts, Crafts and Design and the Kunskapslotsen project.*

Making hard things easy

What do you do when you get sick and are in the Stockholm area? If you go online to www.vardguiden.se then the Swedish design agency Transformator Design has succeeded with at least one of its ambitions – to get you to choose the “right” communications channel. The website hosts the Stockholm Health Care Guide, which aims to tell you everything you need to know about where to access the right health care.

Transformator Design has been working with the Public Health Care Services Committee Administration of Stockholm County Council for more than two years on a number of projects. One of the first was “How It Works”, which focused on one of the basic tasks of the Health Care Guide, to send people in the right direction. The guide is designed to provide service but also direct people to the correct level of health care.

The challenge for Transformator’s service designers is primarily how to clarify in a simple way the complexity of the entire health care system. Everything must function but political goals and strict budget limits must also be taken into account. The health care system is funded by everyone’s taxes so it must be as cost efficient as possible.

Other stumbling blocks were patient security and privacy issues.

“If we can solve the latter, then we

can open the doors to a completely new dialogue between the patient and the health care system. Right now that’s difficult – how can physicians know that they are really sending the information to the right person?” comments *Gustav Gullberg* of Transformator.

“If we look at the last five projects we’ve done for Stockholm County Council, I think their greatest value comes from having been able to integrate local residents in a totally different way than before. This involves ongoing changes that won’t be visible to the general public for another couple of years. For instance, we’ve worked to develop a new level of care between the community health centres and the big hospitals, inpatient facilities and university hospitals.”

E-HEALTH OF THE FUTURE

Another project involves the next generation of telephone service via the Stockholm Health Care Guide. Would it be possible to make use of the competency centres of specialist nurses who provide health care advice – centres that already exist in several different forms?

In yet another project Transformator looked at future e-health services.



Residents must be included much more in the development of electronic services, and the design of those services will mean that it is people who are in charge, not the technology.

“Extremely interesting!” Gullberg says. “We had workshops with contract officials within the health care administration (who decide what a specific form of health care will be like), the health care providers (physicians and nurses who follow the applicable contracts and provide the care) and patients. Previously they had merely been interviewed in a kind of bureaucratic chain, but now they all sat in the same room so it was easy to see where there were gaps and how they could be bridged.”

A HOLISTIC PERSPECTIVE

At the moment he is working on a language service, also within the framework of the Health Care Guide.

“Right now you can phone the Health Care Guide Hotline and describe your symptoms and get advice on what you should do. But what happens if you can’t speak Swedish well? You speak via an interpreter, of course. The major challenge is not the technical aspects – there are phones, telephone exchanges, interpreters, nurses. The big problem is to get those people who need this service to start using it.”

Gullberg says that the Health Care Guide is undergoing a paradigm shift at the moment.

“They’re in the process of counterbalancing the editorial role it has played ever since it was first issued (as a hard copy magazine and as a website in 2002) with offerings: “We have a number of services for you if you need health care.” Instead of merely informing people in a preventive way, a service offering should be right there at



Above: A Transformator Design workshop with a variety of professions represented.

Right: A Transformator Design employee conducts one of many in-depth interviews for an ongoing interpreter project for Stockholm County Council.



the same instant that the need arises.”

Kim Nordlander, who is responsible for the Health Care Guide at Stockholm County Council, is pleased that the philosophy on which all service design is based has gained a firmer foothold both within the administration and among the health care providers. The patient – the user – is always the starting point, and a holistic perspective is applied. To further reinforce this, County Council employees are undergoing on-the-job training organised by the service design agency Usify. The aim is to increase the Council’s purchasing competency in the area of useability and the development of user-centred services.

“We want to build confidence,” she says. “The figures may say something about how well we’ve succeeded. We have two million visits to *vardguiden.se* each year. Each month 140,000 people telephone the Health Care Guide and ten percent of the entire country’s population have their own online account via the personal e-service *My Care Contacts*.

“But a lot more still needs to be

done. People with minor ailments still go to A&E even though they don’t need to...”

Nordlander mentions future quick guides for selected groups, plus plans to carve out the existing service offerings so they become clearer and thereby easier to access. She also refers to a range of other services that will be made available for those people who choose to take part.

“Surveys have shown that people remain healthier if they feel involved. This involvement can be created with digital services. If they’re smart enough and useful, more people will want to use them. And even if not everyone will be able to do so, it will free up staffing resources in the health care system, which can instead be focused on those patients who need them the most.”

Lotta Jonson

Here it's the users who matter ...



Gustav Gullberg of Transformator Design describes a research-focused profession.

What distinguishes a service designer from a graphic designer or a website designer?

"In our view service design should be channel independent. This means that when we start the design process we have no preconceptions. This is a much more unbiased way to work.

"When designers used to talk about users in a design context they presumed that the user in question would want to use the service or product that the designer aimed to develop. But a service designer must look at the recipient/individual as a user with various choices. There is a huge difference between creating a service that people understand, and creating one that they understand and choose to use. In the latter case you have to think of all the other services around the new one: how the person in question lives and what forces drive his or her behaviour. In other words, this approach involves a whole range of different mechanisms and a different approach – going from the 'user' to also thinking of the 'customer'."

Do you feel that clients often want you to deliver a web-based service?

"Absolutely. Some of them think that service design is the equivalent of website design, that it must be web based. I usually say more or less this: A website must function and needs good handiwork. But the greatest value is created when clients understand what is important to the customer. A while ago a bank came to us with a fairly traditional issue that involved the flow of their website. Their aim was that their customers could go from one contract to another. We soon understood that this was a topic where the bank should be sending out a letter instead. But that

requires a bold client who dares to scrap a website project they're already spent a lot of time working on."

How do you work? Your collaboration with other disciplines? Any contacts with researchers?

"Internally we work in teams (three or four people with different areas of knowledge) and always together with the client. We are of course never experts on the specific services that we're dealing with. But we have to understand the service users and then transform that understanding into solutions and development possibilities.

"With regard to contacts with researchers, we have a program with 'embedded' researchers here with us. They are included in our various projects, shadow us and interview us. They do research about us and about service design. Two doctoral students have come from the Department of Computer and Information Science at Linköping University. Most recently we had someone from the Department of Industrial Economics and Management at KTH Royal Institute of Technology. This system is important to our development. We know how or what works in various contexts but we are not totally sure why – but researchers are good at perceiving that or finding it out."

So what do you do in concrete terms to find out "everything" about the users/ recipients?

"We investigate, but not in the usual way. Market surveys are namely fairly useless when it comes to developing services that people like and choose voluntarily. The surveys are quantitative and start from an insider perspective – the questions aren't relevant. We burrow into the issue instead. "Here's an example: We can measure and find out that far too many people go to the wrong level of care (such as A&E) when they become ill but we don't know why. We find out via observation studies and semi-structured, qualitative in-depth interviews. The client's own questions are often posed from an administrative or financial

perspective. Our questions are not specific – rather, we hold a conversation. It's an encouragement to talk, in which the interviewees (the future customers) set the agenda.

"The service designer's job is not linear. Traditionally in a process one team follows the other and the job they've done so far is handed on (from the study to the creative stage). In service design the entire process is intertwined: the understanding and the creativity. We work with tests and preliminary drafts. Often the first proposals are wrong and we have to go back to all the stakeholders and ask new questions. A service designer 'loops' himself forward in an interactive process in order to maintain a continual dialogue with the users."

Is it important that the client is open to changing his or her goals as the work progresses?

"Now you've put your finger on something that's important in all development work. If the client can question his own commission in the course of the development journey, then that really creates value. If all clients were like that, it would never be necessary to launch systems that turn out to be more or less useless after a while. And then the designer can implement the more paradigm-like changes."

Gustav Gullberg graduated in industrial design from Konstfack University College of Arts, Crafts and Design in 2006. Together with three other industrial designers and four market economists he created a framework for how design tools can be used to develop services or business models. These have traditionally been created in rational contexts and have clashed with people when transferred to the real world. The service design methodology makes the world more human and also offers great value potential, according to the master's thesis *Design Thinking in Business Innovation* (2006), which Gullberg co-authored.

An investigative agency

At the Swedish design consultancy Ergonomidesign, founded in 1969, a variety of research projects have helped increase clients' expertise and competitiveness. This research has benefited many – including in the health care sector. Industrial designer Maria Benktzon is among those who have been involved the longest. She has designed numerous products for the health care sector and is in constant contact with the latest in medical research.

Maria Benktzon explains how design can improve and reform the health care sector:

“I thought about the great potential of design as recently as the other day, when I read about a study in an article in the online magazine *Medical Device Summit*. It mentioned that the average health care worker is getting older and older. This means that typefaces must be adjusted so they can still

be read, pill box lids must be easier for weaker hands to open...and not just for the patients.”

Ergonomidesign is currently working with the largest companies in the health care sector in areas like packaging and medical technology, including with medical device manufacturers who make products like ventilators and injection needles for insulin and growth hormones.

“These companies often regard their target groups as being a single homogeneous group, but Ergonomidesign has had a great response to our argument that in the product development process it is incredibly important to focus on unique needs,” comments *Magnus Roos*. He is an affiliated researcher at Gothenburg University's Centre for Consumer Science, but is employed at Ergonomidesign thanks to the independent Swedish foundation Riksbankens Jubileumsfond's Flexit programme to promote in-house researchers. He joined Ergonomidesign due to his knowledge about the emotional experience of products and services as well as his consumption perspective – areas that the design consultancy wanted to understand better and improve its expertise in.

PATENTED SOLUTION

Ergonomidesign's Genotropin pen for Pfizer is one good example of individually targeted design. Specially designed for children, the award-winning injection pen for growth hormone has seen flourishing sales. Ergonomidesign pa-

The aim of Pfizer's Genotropin pen, now the market leader, is to encourage children to want to take their growth hormone.



tented the ingenious clip-on covers, one of about 300 patents stemming from the design consultancy's ideas. The designer behind the concept, *Hans Himbert*, says that the work process behind the clip-on covers can absolutely be regarded as an example of applied research.

"We interview users, sketch out ideas, develop them, do more interviews, test various design concepts, create prototypes, do more tests. The patent is for the solution involving clip-on covers, which is a way to personalise the pen. The final patterns for the covers are decided after a series of online tests. We've worked with Pfizer – formerly Pharmacia – for thirteen years. The pen was launched in Europe in 1995, a year later in Japan, and then in the United States. Since then the pen has been updated and improved – all so that children will think it is attractive and easy to take their hormone doses. All the signs indicate that we have succeeded. Today, seventeen years after its launch, the Genotropin pen still totally dominates the market."

ATTRACTION AND CREDIBILITY

Clients are naturally attracted by Ergonomidesign's wide-ranging expertise and many years of experience, but also by the many increases in prices and sales that have resulted from their products. One example is the telecom company Doro, which specialises in user-friendly telephones for seniors, and which saw its turnover in this market segment increase by 890 percent in three years.

"Our knowledge is our most important competitive advantage and must be constantly updated," says Maria Bengtzon. "It used to be much easier to get money for research projects and we developed expertise in many fields. For example, we did fundamental ergonomic and physiological studies of grip-friendliness in everyday tools like knives

Ergonomidesign recently won a gold award in the Design of the Decade competition for its design of the Servo-i intensive care ventilator from Maquet Critical Care. The Industrial Designers of America present the awards, which focus on how a product's design has driven sales.



and bread knives. These studies led to pioneering work to raise the standard of assistive devices for the functionally impaired – an area where Ergonomidesign rapidly gained a global reputation. Today similar projects are very rare but in 2011 we did get money to research physical and digital aids for people with ADHD."

"We are also researching projects that we have initiated ourselves, such as a new holistic view of ergonomics," adds Hans Himbert. "We call it Ergonomics³ and it is a model for the collection of information and insights that are fundamental to groundbreaking design. We analyse

three types of ergonomics: the emotional – that is, how people experience the product, the cognitive – how people interpret and understand the project, and the physical – how people use the product."

"In the design industry we are working with the services and products of tomorrow, which means that we must continually monitor how society is developing. Research is vital for us – it's how we stay ahead and increase our expertise, credibility and ability to attract clients," concludes Maria Bengtzon.

Susanne Helgeson

Smart collaboration

The Swedish biomedical R&D network MedTech West and the Smart Textiles cluster at the Swedish School of Textiles at the University of Borås are combining their expertise to increase the use of smart textiles in the medical field. Their partnership is creating new possibilities for the health care sector via such products as muscle-stimulating outfits, knitted blood vessels and garments that monitor cardiac activity.

Elektrodress is a bodysuit that encourages spastic, stiff and aching muscles to relax. It will be launched on the market this year as an aid for people who suffer from spasticity due to cerebral palsy, a stroke or multiple sclerosis. Physically challenged children will also be helped to increase their range of motion, as will adults who wear the bodysuit and can thereby continue to hold down a job. A Swedish company called Inventions has developed Elektrodress with help from partners such as Smart Textiles.

The deputy managing director of Inventions, *Emma Sjöberg*, explains:

“In 2009 we began a dialogue with the Center for Technology in Medicine and Health (a joint venture between Karolinska Institutet, KTH Royal Institute of Technology and Stockholm County Council). We then came into contact with MedTech West, Professor of Medical Technology *Kaj*

Lindekrantz, and Professor of Mechatronics *Mats Hansson*. The first two mentioned were able to provide clinical partners and Mats connected us with two students, *Johan Gawell* and *Jonas Wistrand*, both at the Department of Machine Design at KTH. They chose to work on developing a prototype of Elektrodress as their thesis project and are now employed by us.

“In the next stage we contacted Smart Textiles and the researchers *Fernando Seoane Martinez* and *Javier Ferreira*, who took on the task of integrating the electronics with the textile, and analysing, testing and evaluating various materials and solutions. Currently our collaboration involves moving towards production, for instance, which sizes are needed, and we have just initiated another project. That one involves greater integration of the textile and the electronics, and identifying solutions for mass produc-

tion. It is a three-year project financed by the Knowledge Foundation.”

Elektrodress is an example of a project that typifies the collaboration between Smart Textiles and MedTech West, which began in depth in January 2012. A number of projects focusing on simplification and cost savings are already underway. The aim is to help simplify the health care process for both the patient and the medical staff, and thereby provide a more cost-effective treatment. There has been a lot of interest and in March some of the projects were presented to a packed audience at a seminar event. Elektrodress was presented, and the programme also included lectures on topics like “The medical applications of smart textiles”, “Glimpses – textile blood vessels”, and “The development of biomedically active textile cell growth materials”. One participant was *Jan Eriksson*, then director of the Sahlgrenska University Hospital in Gothenburg:

“The future poses major challenges to all health care. Huge demands will be made to increase both the funding and the proportion of employees in the sector. The single most important way to solve this equation is better cooperation between academia, the health care

Smart Textiles and MedTech West

have formed a new expertise cluster to develop the use of new and smart textiles within medicine and thereby create new possibilities in the health care sector.

The collaboration is an augmentation of the region's R&D in the field of medical technology and textiles and is part of the investment in the life sciences that is occurring in the Swedish west-coast province of Västra Götaland. An overall goal of this investment is to make the region a leader in life sciences R&D within ten years.



PHOTO: JAN BERG

sector and industry,” he said, and described MedTech West and Smart Textiles as an example of such an initiative.

“This kind of increased cooperation makes it possible to contribute to greater and faster development of technical solutions for better health care that will reduce overall costs and the need for human resources,” he concluded.

Expressing her agreement, Emma Sjöberg describes the collaboration with Smart Textiles as very fruitful. It has contributed both good input and opportunities to test textile electronics, an area where Interventions does not have its own expertise. The collaboration has also added greater legitimacy to the project and contributed to a functional and safe product for the patient.

Susanne Helgeson



PHOTO: HENRIK BENGTSSON

Above: Elektrodress – functional relaxation of spastic muscles. The bodysuit helps physically challenged children to increase their range of motion by stimulating their system of reflexes and encouraging spastic, stiff and aching muscles to relax.

Left: This knitted blood vessel has been developed by the company Y-Graft in one of Smart Textiles’ Company Driven Projects. Innovators Torbjörn Lundh and Erney Mattsson are behind the company.



SID = sensuousness, interaction, participation

SID is funded by the Swedish Inheritance Fund Commission. Doctoral student *Henrik Svarrer Larsen* is funded by the Department of Design Sciences, Faculty of Engineering at Lund University. The main project funding applicant is Furuboda Competence Centre, the project division of the nonprofit Furuboda Association. The project is being run in close cooperation with three Snoezelen units in Malmö, Lund and Gentofte. Eight children per location are participating in the project. Great emphasis is placed on the formulation of the design and development processes so that the children can participate and influence the results. Read more at <http://sid.design.org>.

Named Snoezelen after the two Dutch words for “drowse” and “attentive”, this rehabilitation method gives physically and mentally challenged individuals the opportunity to interact with the world via “experience rooms” in which various sensory experiences are created.

Rehabilitation design

The Swedish tradition of research and development into products and environments for people with functional disabilities is both rich and long. A current project at the Certec rehabilitation engineering centre in Lund involves using experience rooms and interactive artefacts to enable more people to participate in the world.

Imagine a room in which a gentle breeze touches your cheek, a sea of balls bubbles around your body and a calming light show is playing on the ceiling. Such an experience room forms part of a rehabilitation methodology called *Snoezelen* (from the Dutch words for “drowse” and “attentive”). In this methodology, various types of spaces create various states of mind that are intended to give functionally challenged individuals the opportunity to achieve a balance that allows them to interact with the world. *Snoezelen* was originally developed for people with mental and physical challenges but has also proven to be effective with dementia. Research into this methodology has been going on since 2010 in a three-year project entitled “Sensuousness, Interaction and Participation” (SID in Swedish) at Certec, the Division of Rehabilitation Engineering Research in the Department of Design Sciences, Faculty of Engineering, Lund University. The study involves compulsory school-age children and their instructors.

“One of our goals is to further develop and complement the current experience rooms and create new conditions for developmentally chal-

lenged children so they can make use of today’s interactive opportunities. By developing interactive artefacts we also want to disseminate knowledge about the methodology and train ‘ambassadors,’” explains *Per-Olof Hedvall*, project manager of SID and director of research at Certec. As one example of interactivity within the *Snoezelen* context he mentions a bubble “tube” that can respond to a child’s touch.

Doctoral student and interaction designer *Henrik Svarrer Larsen* is also linked to the project. He argues that design brings to the field of functional disabilities new practices, systematics, and theoretical and methodological constructs for work that involves humans and technology.

“Seen from the perspective of the person involved, it is often the various combinations of the individual and technology that determine whether someone can do what he or she wants to or not,” he says. “Design weaves things together and also enables children to use objects because they cannot express themselves through speech. SID gives children a voice via their interaction with objects.”

Per-Olof Hedvall adds:

“Design contributes a way of buil-

ding up thoughts through early mock-ups, a kind of simple prototypes for exploring the terrain. The children in the project are not able to pretend, so we must make the experience comprehensible to them. These early mock-ups are incredibly important and are a prerequisite so that the child can participate and not only the staff. And it is the child’s participation that we want to maximise.”

Rehabilitation design is a fairly new concept within the constantly expanding terminology of design, and is beginning to be used in Sweden as well as in other countries. But it is not yet in use at Certec.

“At least not yet, but the design perspective on rehabilitation engineering is a central aspect of many of our projects.” Hedvall says.

“The purpose of our research and education is for people with functional disabilities to achieve better opportunities through more user-friendly technology, new design concepts and new individual forms of learning. Our work begins and ends with the individual, while both the process and results are often genuinely technical in nature. And of course design methodology is becoming more and more important.” *Susanne Helgeson*

Does more money lead to more and better results?

“Necessity is the mother of invention” is a statement that needs qualifying. Equally so, more funding doesn’t automatically result in more innovations. Nor does there appear to be any direct correlation between innovation and a better or worse economic situation. Reality is more complicated than that, at least if we are to believe the five people interviewed in *Design Research Journal’s* survey.



PHOTO: CARL-ERIK ANDERSSON

Torkel Varg
Head of Styling and Vehicle Ergonomics, Scania

How is the general economic situation influencing the innovation climate in society at large? In your special field?

“Briefly, Scania works with innovation at three levels: long-term research and development with a five to twenty-year lead time, rolling development projects with a market launch within one to five years, and continuous work to ensure our intellectual property rights in the form of patents and design registration for the concepts that are created within the various projects.

“Our long-term activities are of strategic importance and we do not

allow society’s economic cycles to affect them significantly. These activities can also be linked by contracts to external partners such as universities and research institutes, which makes it even less desirable to terminate them. Nor are our intellectual property issues directly dependent on specific projects or economic conditions.”

Do good economic conditions automatically lead to more funding and an increased intensity of innovation?

“No, I wouldn’t say so. For many years we have invested extensive efforts into gradually gaining a better understanding of our customers’ needs and the mechanisms that govern their business operations. One result has been a plan for improving the properties of a number of applications (prototype vehicles) and segments over time, with the aim that Scania will retain its position as a premium brand in the heavy vehicles segment, and do so with good long-term profitability. We know what we need to do.”

Can you give any concrete examples of negative consequences from an over-stretched economy?

“Such a dramatic recession as that of

2008 to ’09 naturally requires measures to be taken. The path set out by Scania’s management, of retaining permanent employees and investing in training when work is slow, has proven to be a success. Some caution in launching new development projects must be regarded as natural in what was then a very uncertain situation.

“In areas of our operations with a relatively high proportion of variable resources, such as Styling and Vehicle Ergonomics, where I am in charge, we experienced a temporary lack of expertise in a couple of areas when contract employees were unfortunately phased out.”

Is the old saying true, that necessity is the mother of invention?

“Definitely! The consolidation put the focus on competency balancing and development. Because we also went down to a four-day week for a while, we perceived even more clearly the need for improvement work in areas that we hadn’t previously addressed. The result has been significantly developed processes and methods, which are still greatly benefiting us as we have gradually returned to a normal situation with more personnel.”



PHOTO: FREDRIK PERSSON

Catharina Barkman
Head of Department, Stockholm
County Council

How is the general economic situation influencing the innovation climate in society at large? In your special field?

“Innovation is a prerequisite for long-term economic growth and development. GDP growth comes from the development of products and services. It is an interesting question as to what extent economic booms or recessions influence the pace of innovation. To be slightly cynical, we could say that bad ideas survive more easily in good times.”

Do good economic conditions automatically lead to more funding and an increased intensity of innovation?

“During a recession there is naturally more focus on saving money and restricting outgoing funding. But the most important thing, especially in tax-funded sectors, is to do a clear follow up and evaluation to assess the cost efficiency and results.”

Can you give any concrete examples of negative consequences from an overstretched economy?

“An economy under strain at various levels can often lead to savings and cuts, which of course have consequences. This applies to both household econo-

mies and the economy of a society. But it also sharpens demands for new ways of thinking and developing operations.”

Is the old saying true, that necessity is the mother of invention?

“No one wants a recession but it’s important to remember that good ideas and innovative solutions can also emerge during a recession. For those of us responsible for procuring health care services, it is important to create the conditions that favour innovation even when times are bad.”



Mikko Jalas
Dr. of Economics, Business
Economics, Aalto University,
Helsinki

How is the general economic situation influencing the innovation climate in society at large? In your special field?

“The economy naturally affects the ability to fund research but perhaps more at the indirect level. If people are constantly talking about a recession, that puts a damper on all development. But the same laws don’t really apply within the fields of economics and sustainability issues.”

Do good economic conditions automatically lead to more funding and an increased intensity of innovation?

“No, it’s important to remember that we cannot order up innovations. It’s not possible to just donate money and expect that will automatically lead to something big and groundbreaking.”

Can you give any concrete examples of negative consequences from an overstretched economy?

“I don’t believe there is any simple correlation. Within economics we say that every success bears with it its own inherent failure: that a big sales success leads to less interest in innovation and therefore that success spreads failure. Apple is a rare exception. But what we’ve seen over the past ten or twenty years is something completely new and important for the future, namely, a much broader foundation for all forms of innovation. This is linked to open source innovation and user-driven developments, for example in the field of surgery, where doctors have developed their own instruments. Hacking is also a type of user-driven innovative activity, which is based on a particular ethical attitude. Perhaps there are greater possibilities of having successful innovations if design thinking is introduced into the development process, because that would mean that users gain a much more important role in the process.”

Is the old saying true, that necessity is the mother of invention?

“Many people would say so. For example, that’s why very little is happening in the energy sector. Few companies are investing in new inventions as long as oil is cheap, even though everyone knows we’ve already reached peak oil. Most just continue as usual in the hope that rescue will appear when things have gone far enough. I dislike that approach and don’t believe in it either. Sometimes it can just be too late.”



Teresa Jonek

In charge of research & innovation at Almega, the employer and trade organisation for the Swedish service sector

How is the general economic situation influencing the innovation climate in society at large? In your special field?

“A worsened economy reduces risk taking generally. Some ideas and investments don’t happen. In the end, it’s individuals who are responsible for innovations. A widespread pessimistic attitude makes many people bide their time. The flow of venture capital also lessens, which makes it harder for entrepreneurs to commercialise their ideas and build new companies.”

Do good economic conditions automatically lead to more funding and an increased intensity of innovation?

“No. It’s not enough, for example, for research funding just to increase when the economy is thriving. I believe that we must ensure that knowledge benefits companies and entrepreneurs so that it can be translated into innovations in the form of goods and services in new or mature markets. Swedish companies can compete by having a good ability to adapt their offerings to the customer. By investing in developing research into services and focusing on cross-disciplinary programmes, we can increase innovative force.”

Can you give any concrete examples of negative consequences from an overstretched economy?

“During a recession, political activities focus largely on trying to keep people in work and minimise unemployment. All the energy goes to that. More long-term strategic investments in such things as research and stronger collaboration between industry and academia disappear. The risk is that when the economy does turn around, no new investments or reinvestments occur in the country. Companies find other more attractive environments in the global marketplace.”

Is the old saying true, that necessity is the mother of invention?

“I don’t believe that. Yes, it can happen, but I believe rather in working with an eye to the future and promoting the collaboration of industry and academia in various forms of networks, clusters or partnerships in order to share ideas and build successful concepts/businesses in new or existing markets.”



Olle Gyllang

Partner and Senior Product Designer, Propeller Design AB

How is the general economic situation influencing the innovation climate in society at large? In your special field?

“In general the economy clearly

affects the innovation climate. Innovations often need investments, which is why the innovation climate is affected when times are bad. But we must distinguish between the innovation climate and the innovation possibilities within large companies and among entrepreneurs/small business owners. In a recession, large companies can invest strategically in innovation and product development so that they can surge ahead when the economy improves. For entrepreneurs it’s harder to get investors and innovation loans during a recession. However, I believe that too few companies who could, and need, to invest in innovation are doing so. Another influence is that some companies strangle the design aspect of innovation when a recession looms. That’s because they don’t regard design as a long-term and strategic investment.”

Do good economic conditions automatically lead to more funding and an increased intensity of innovation?

“No, they don’t. It varies greatly among the companies we work with. It’s more a matter of how people view these issues and of the companies’ own priorities. We can say that a good economy creates good conditions for a good innovation climate.”

Can you give any concrete examples of negative consequences from an overstretched economy?

“Companies that cut back on their innovation and product development and cut costs during a recession often end up in a downward spiral and lose competitiveness. It’s important to invest cleverly and for the long term and to prioritise the right things when times aren’t good.”

So is the old saying true, that necessity is the mother of invention?

“Yes, I believe that. You need to be more creative and more focused at such times.”

EVOKING RESPECT

Health issues, a more sustainable society, more design in the schools, crime prevention measures ... As the concept of design expands, the designer's work now embraces everything from pixels to urban environments. But Mat Hunter of the British Design Council says the organisation prefers to highlight how design methodology can solve social problems rather than just create more jobs for more designers.

“Perhaps it wasn't so strange that we were sometimes nicknamed the Potato Council,” he says. “The message we were sending out was rather like ‘More design makes everything better’. Just like ‘Eat more potatoes and solve all your problems!’ But that was in the past. Nowadays we focus on the demand side, on people's real needs and wishes in many different sectors of society. Our job has become more complex and far from glamorous.”

Mat Hunter, Chief Design Officer at the Design Council in central Lon-

don, jokes with typical British understated self-deprecation:

“The district around us has become so trendy that we hide our slightly dubious façade with a perforated metal screen, so as not to lower the ‘hip’ factor.”

In the past few years he and his colleagues have gained some breathing room after a turbulent time when the Council was almost dissolved. The UK's coalition government that came to power in the summer of 2010 reassessed all activities that were directly

under government control, including the Design Council.

The Council had been in a similar situation before. In 1994 it had been forced to streamline its operations considerably. Under Prime Minister *Tony Blair* (1997–2007) the UK loosened its purse strings somewhat in a spirit of greater optimism but now the financial situation is once again straitened and attitudes are more pragmatic.

The Design Council was moved outside the government's direct sphere of responsibility and became an inde-

The Design Council (DC)

The Council of Industrial Design was established in 1944 to “promote by all practicable means the improvement of design in the products of British industry”. Almost four decades later, in 1972, the name was changed to the more dynamic Design Council. In 1998 the Council moved from Haymarket to Bow Street in Covent Garden.

Despite the past two years' changes to its organisation, the Council's overall task of promoting design to benefit the public remains unchanged. In accordance with the government's wishes, the Council is now independent of direct state involvement. In practice, this means less money and fewer employees even though the big socio-political design commissions continue to come in from the public sector, not least via the UK's public health care system, the

National Health Service (NHS). All the Council's current or newly completed health care projects have links to the NHS.

The Council has just over 50 employees including the just under 20 positions that came with the Commission for Architecture and the Built Environment (CABE), which previously had 120 employees, when it was merged with the Design Council last autumn. Even though both funding and expertise were lost, the merger does have one advantage.

Today's Design Council has become more comprehensive and can deal with everything from “pixels to urban environments”. A holistic perspective is necessary in order to be able to change society, for instance by tackling broad issues of public health.



pendent organisation with charitable status and financed with special funds. Hunter says that even though this means less money, it brings with it some practical advantages.

“We were forced to define ourselves in another way – to discuss who we are and what we stand for. Previously, many people thought they had the right to demand things from us for their own sake. Now we can more clearly emphasise that it’s not our job to promote individual designers or the design industry itself.”

RECOGNITION

The British government’s questioning of the Council’s existence was followed in December 2011 by one major recognition from the Department for Business Innovation & Skills in its memorandum *Innovation and Research Strategy for Growth*. The document states that the Design Council will help the government to create the conditions for solutions to various types of problems within the public sector. Shortly afterwards, Minister of State for Universities and Science *David Willetts* stated that design is an important field of knowledge:

“Design can help organisations transform their performance, from business product innovation, to the

commercialisation of science and the delivery of public services. That is why design forms an integral part of the Government’s plans for innovation and growth and features strongly in our Innovation and Research Strategy for Growth. The UK has the potential to succeed globally but to do so we must harness our strengths. Design is undoubtedly an area where we are amongst the best in the world, with potential to do even better.” (From the preface to *Design for Innovation* published by the Design Council in December 2011 in response to *Innovation and Research Strategy for Growth*.)

NATIONAL COMPETITION

One of the Council’s most important tasks has been to bring together people with various types of expertise. Hunter, who is the creative director of the Council’s dozen-strong department Design Challenges programme, does so via a number of design projects. These are launched following open national competitions on a specific issue. Health care has been one theme, as has how to achieve a more environmentally sustainable society. Several such projects, each with a budget of between half a million to one million pounds, occur simultaneously.

Information about the various competitions is posted on the Council’s website and sent out via Twitter and Facebook. The Council also issues a number of subscriber newsletters that target various interest groups.

“It’s easy to make contact with individual designers, design agencies, or other industry players – we have a strong network there,” Hunter says. “Because we are not a profit-making company but rather a charity organisation funded by donations and we work to benefit the general public, many people are willing to share their net-

Publications

The Design Council regularly reports the results of its various design projects. The intention is for the reports to function both as sources of inspiration and as pedagogical tools for designers, producers and politicians as well as for staff and decision makers in the public sector.

Open sources are an important principle for the Council, as is the view that not only successful projects should be publicised. The Council’s work approach can be described as “trial and error” rather than “success or failure”. Mat Hunter, Chief Design Officer at the Council, says it can be just as much a learning experience to find out what doesn’t work as what does. The more consumer-focused *Design Council Magazine* was published from 2007 to ’09 but was discontinued for economic reasons.

“Maximum value for money is number one today,” Hunter says. “Of course there is a risk that one loses a lot of soft values as a result.”

All the Council’s reports and all issues of the magazine are available for download as pdf files at: www.designcouncil.org.uk.



Mat Hunter

(opposite) trained as an industrial designer at the Royal College of Art and has a degree in interaction design from Central Saint Martins College of Art and Design, London. He was hired in 1995 by the IDEO design agency in San Francisco and took up his present position as Chief Design Officer at the Design Council in 2008.

works with us. Of course, the design sector is an important partner for us. But I personally find it more enjoyable to work with other sectors of society than those which have always been focused on design – organisations that are open to design-related processes to solve difficult existing problems.

“At the same time, I would also like designers to regard their own role slightly differently and be more of a driving force. Design work should generate new products and services with the aim of improving society – that’s the framework within which we operate.”

One of the Council’s more extensive projects in the first decade of this century was called “Design Out Crime”. About a dozen reports detail

Broken glass is one of the most common causes of injury at pubs. To reduce the number of such incidents, two glass prototypes were developed as part of the “Design Out Crime” project. One absolute requirement was that the new form of glass should feel like glass rather than plastic. The

the project’s various aspects. It was criticised at an early stage for focusing on symptoms instead of attacking the root of the evil. Critics also said the project was too broad and its solutions were sometimes too shallow. Is this not a risk of all projects that address complex social problems?

“Yes,” Hunter agrees. “You need both research and some depth if you are to get to the heart of the matter. As well as having an extensive contact network, you also need expert knowledge and extensive analysis. Designers must not regard themselves as the definitive experts. Particularly in the service sector or when people’s daily lives are involved, user-driven design methodology plays an important role. It is also an issue of democracy. How on earth

design commission involved an in-depth study of how various types of glass behave when they are broken and how different types of glass shards can injure the body. The Design Bridge design agency developed a model with a thin transparent film of biological resin on the inside, making the glass

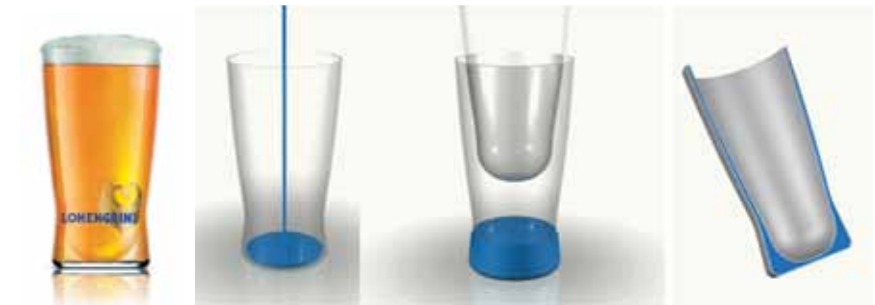
can we implement change if both the experts and the users don’t accept the solutions and take them to heart?”

The modern Design Council includes psychologists, ethnologists, sociologists, economists, behavioural scientists and other specialists in its projects. This trend in the UK is the same as that found elsewhere in the design research world.

A SUCCESS?

The streamlined Design Council is organised into various teams. The national design competitions are Mat Hunter’s main responsibility. His colleagues have more consultative duties, or concentrate on small and medium-size enterprises, or work with educational issues.

considerable stronger than ordinary glass. The second prototype, twin wall glass, has been a huge success in a number of countries. The glass is basically unbreakable and consists of two thin glass membranes with resin between them, made in a similar way to laminated windscreens for cars.



The publication at the right discusses behaviour at pubs and how design can reduce physical injuries. It can be downloaded from the Design Council website. “Design Out Crime” gradually became a joint project between the Council and the Home Office’s Design & Technology Alliance Against Crime.



The Council promotes the introduction of more multidisciplinary, design-related training at the university level but also wants to disseminate design knowledge at the primary and secondary school levels.

Would it be fair to say that the Council has achieved some of its original goals to increase design's importance in achieving an improved society?

Hunter says yes, some of those goals have been realised. The Council has educated the general public, who can now better distinguish between good and bad design. The Council has also radically changed the consumer market: in order to succeed, companies that make consumer goods must now use designers.

“Other areas are not up to speed yet,” he says. “The public sector still has a lot to learn. The design of public sector services is often still dreadful. How can we make social services more accessible? For instance, it's far easier for people to buy vegetables online than it is for them to fill in their tax forms. Scientists and engineers are also a group that does not yet recognise design's potential. They don't understand that design must be involved at an early stage when a service or project is being developed.”

Does Hunter believe the Design Council to be an influential organisation?

“Yes and no. We bring together various fields of knowledge in the name of design and ensure that design solutions influence developments to a significantly greater extent than before. But if money is a proof of power, and we compare our funding with that going to scientific research and development – then we are truly underdogs. That is true in many countries, alas.”

Lotta Jonson



Reducing Violence and Aggression in A&E by Design

Every day more than 150 incidents involving violence occur at A&E (Accident and Emergency) departments at UK hospitals. The project “Reducing Violence and Aggression in A&E by Design” has worked with the question: How can we reduce violence as much as possible with as little money as possible? The starting point was obviously the idea that simple design solutions can produce



good results. Five different types of solutions, detailed in a thick report, are now being tested this spring at three different hospitals.

The sum of 60,000 pounds per hospital has been allocated for this task.

The pictures show the development work including workshops plus some of the final proposals in the form of apps and clearer signage systems.

Design for Patient Dignity

“Design for Patient Dignity” concerned making a hospital stay as pleasant as possible, and embraced not only a kind reception but also welcome letters, furniture and patient garments.



Your stay

Your nurse: **Its** — Observation ward

For today

Day:

Ward routines

Meal times
We operate protected mealtimes to all of our adult inpatient areas. At set times throughout the day, all areas support clinical activity stops to help patients eat their meals in a calm atmosphere.

Meal menus will be circulated each morning, or at an appropriate time after your admission.

If you have a problem with your appetite please inform your named nurse.

Visitors

Our hospital visits are busy areas. They are a place of work for our doctors and nurses and a place of rest and recuperation for our patients. Please ensure that your visitors only come to visit you during official visiting times.

Visitors are welcome to use the cafe facilities provided at the south entrance of the hospital. A maximum of two visitors at the bedside.

10am to 12pm

3pm to 8pm

Your belongings

We aim to provide a planned, safe, efficient transfer to an appropriate ward or discharge home once you are well and stable.

Items to keep with you

- Personal toiletries
- Reading glasses
- Hygiene & nightclothes
- Change of clothes in a small, appropriate bag.

Valuables

We are unable to accept responsibility for the safety of personal belongings, unless you give them to us for safekeeping. If you require this service, please ask the nurse who is looking after you.

Imperial College Healthcare **NHS**

About your ward

You have been admitted to the **Its Observation ward (also open office)**. The ward aims to provide a comprehensive observation and assessment of your needs. We will plan a programme of care with you and your nurses.

We aim to provide a planned, safe, efficient transfer to an appropriate ward or discharge home once you are well and stable.

Your accommodations

We take the privacy and dignity of our patients seriously. We try to ensure sleeping arrangements, toilet and washing facilities are single sex wherever possible. Please respect the **male/female** signs posted around the ward.

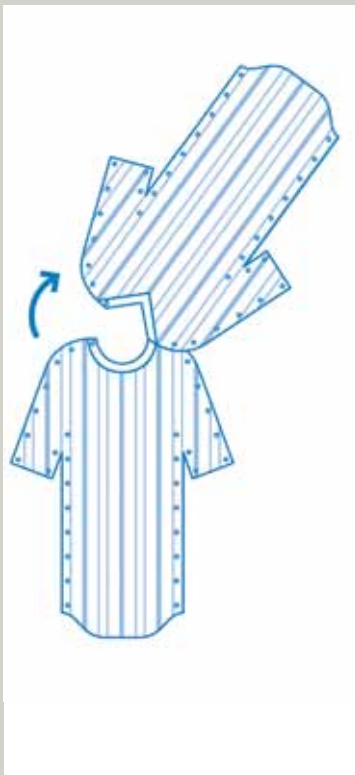
Infection prevention

Please wash your hands. You and your staff can help us by always washing your hands with soap and water after using the toilet before you enter or leave a ward, please wash your hands if really dirty and apply alcohol gel hand rub for other hand. Simply rub for 20 seconds if hands are not clean and get it on every surface.

Feedback

Your views about our services are important to us. To make a comment about our services, please talk to a member of your nursing team.

To ensure that your feedback is responded to efficiently we are using patient experience tracker technology in our hospitals. The feedback mobile device allows patients to respond to few questions about their care while still in hospital. Once downloaded, the information is returned to the ward or department weekly to allow staff the chance to make immediate improvements.



Below and left: Patient garments should be functional but also attractive in their colours and patterns. The project was not about aesthetics but about dignity and self-worth. From that perspective, the fashion aspect of the patients' clothes is also of some significance.

Right: Easily being able to divide off and create a separate “room” was regarded as being important in the “Design for Patient Dignity” project.



Design Bugs Out

“Design Bugs Out” concentrated more on how the hospital setting could be made safer and more hygienic. The project ended up focusing on both improved comfort for patients and a better work environment for the staff.

Living Well with Dementia

Living Well with Dementia
Calculations predict that by 2021 one million people in the UK will be suffering from dementia. The starting point for the “Living Well with Dementia” project (presented in April) is that “there is a lot of difference between merely living and living well”. Five different design teams worked on five different themes and focused on both services and products. The results include suggestions about how dementia patients could use a guide dog during the early stages of their illness and a discreet ankle bracelet with technological support that they could wear day and night (see image far right). Another concept tries to increase their appetite at mealtimes with the help of a fragrance-release system (image at right). A third idea is for a web- and mobile phone-based jobseeking service for carers of dementia patients. The results will now be tested and evaluated and it is hoped to disseminate them to everyone who cares for dementia sufferers. This project, like the others mentioned here, was done in cooperation with the UK’s Department of Health. Patient and professional organisations have been involved in the process, and researchers from various academic institutions.



Public design

The benefits that designers can offer social services are the same as in other sectors: better offerings but also an innovative approach. Great Britain is a leader in the development of social innovation and design. A number of British design consultants were also pioneers in the field of service design. This is partly because the public sector discovered the benefits of design at an early stage but it is also linked to the fact that the service sector took over when the manufacturing sector disappeared. One example of this trend is the British project Design Against Crime, which has been going on since the Home Office asked the Design Council at the beginning of the 2000s whether design could help to prevent crime. *Caroline Davey* and *Andrew Wootton*, who have led the project since its inception, have implemented a number of subprojects in various social sectors. The study in this issue of *Design Research Journal* focuses on how the design process helps to solve some of the problems associated with youth crime, and should be of interest to a Swedish context too.

Research into design within the public sector is in its infancy. A number of interesting projects are underway, not least in the health care sector. We look forward to additional exciting contributions in the future. But the current graduation projects at Sweden's university design departments show that students are also interested in public sector design. We chose to publish in this issue a student project done at the Department of Industrial Design, Lund University. Industrial designer *Emma Lööf* focused on public transport, asking how can we create a "good journey" for functionally impaired individuals. The answer to this question will benefit everyone, and her study of what "a good journey" involves should be of interest to a sector that badly needs new ways of thinking.

In several issues we have published articles about new methods and tools for the design process. When one sector develops there occurs a knowledge transfer between different sectors. For example, *Raid Hanna's* article about parametric tools is an example of how CAD techniques developed for architects can also be employed by textile designers. Another little-explored field, described by *Magnus Rönn* in his article, is the competition aspects involved in the choice of design partner. This is a process that applies not only to architects. Even though architectural competitions have their own distinct nature, knowledge of this topic is also very valuable to other design disciplines.

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ENGAGING YOUNG PEOPLE IN DESIGNING AGAINST CRIME

BY DR CAROLINE L. DAVEY, ANDREW B. WOOTTON & MELISSA MARSELLE

“Children today are tyrants. They contradict their parents, gobble their food, and tyrannise their teachers.”

Socrates (469–399 BC)

ABSTRACT

Young people are being encouraged to participate in projects that have a direct impact on decisions about environments and spaces, including the public realm of towns and cities. This paper describes a programme developed by the *Design Against Crime Solution Centre* at the University of Salford (UK) in partnership with the young people’s charity Catch22 – called *Youth Design Against Crime (YDAC)*. YDAC challenges young people considered ‘at risk of offending’ to address problems in their neighbourhoods, using a process of research and design to help generate innovative and evidence-based solutions to crime problems. This paper outlines the YDAC programme, and presents initial findings from a process evaluation conducted in 2011. These show the value of the design challenge in improving young people’s confidence, knowledge, qualifications and skills, and fostering better relationships with adult participants, including police mentors. Teams of young people developed creative solutions to problems, and were able to convince stakeholders involved in policing, community safety and urban planning of the value of their ideas.

INTRODUCTION

Since the 1990s, the UK has expressed commitment to local citizenship and public involvement in design, planning and regeneration. The ratification of the 1989 UN Convention of the Rights of the Child (CRC), which highlighted the need for children to participate in decision-making, was taken forward in the UK by the 2004 Children’s Act, the *Every Childs Matters* agenda and a ten-year Children Plan (DCSF, 2003, 2005). Despite this, according to Day et al (2011):

“Children’s voices have been notably absent from UK planning and regeneration policies throughout the past two decades”, and “there has been comparatively little attention to children’s roles in shaping a wider regeneration agenda. It would appear there has been something of a missed opportunity...” (p. 2).

One reason for this may be because young people and children tend to be portrayed in the media and political rhetoric as a source of problems rather than of solutions—especially in the public realm (Waiton, 2006; Day et al, 2011).

As the quote that heads this paper demonstrates, such views of youth are not new.

Evidence suggests that young people—especially males—are more at risk of committing criminal offences or engaging in anti-social behaviour. In general, the risk of offending peaks between early adolescence and the mid-20s, and then declines (Farrington, 1986; McVie, 2005). Factors linked to offending and anti-social behaviour include neglect, violence and abuse in childhood, as well as living in a low income family, with a history of unemployment. Offenders are prone to negative beliefs and emotions, such as low self-control, anger, hate and distrust of others. They seek the immediate rewards that criminal activities appear to offer, rather than longer term life goals, and adopt a confrontational style that may mitigate against educational and career success (Burt et al, 2006).

However, we should not only consider the links between young people and offending. Evidence also shows that young people aged between 16 and 24 are more likely to be victims of crime than other age groups (Flatley et al, 2010). In England & Wales, the 2006 Offending, Crime and Justice Survey showed that just over a quarter (26%) of young people aged between 10 and 25 were a victim of either personal theft or of violent assault in the previous 12 months (Roe & Asche, 2008).

This paper describes *Youth Design Against Crime (YDAC)* – a programme to engage young people in design-led crime prevention, developed by the Design Against Crime Solution Centre and young people’s charity Catch22. Supported by youth workers and teachers, and mentored by local police officers, multiple teams of up to nine young people are challenged to address issues of crime and community safety in their neighbourhoods. The ideas generated are presented to senior local stakeholders, from agencies such as the police, planning authority and local council. YDAC is novel in that it is aimed at young people who have come to the attention of school and/or police authorities due to behavioural problems, and may be excluded from school and following an alternative curriculum.

THE LITERATURE

A wide range of activities have been identified worldwide that engage young people in decisions about the public domain. There have been large-scale events, such as the International Children’s Conference on the Environment and the World Urban Forum, and the emergence of participatory design approaches, such as co-design, which was developed

during the 1970s and 1980s. Urban studies centres have supported children to map their local environment and engage with residents about planning issues. This helped children become formally recognised as a stakeholder group by the Town & Country Planning Association (Day et al, 2011). Through nationwide programmes, attempts have been made to improve the quality and accessibility of youth services and develop spaces exclusively for young people. In the UK, *myplace* used capital investment to secure high quality youth facilities. In the Netherlands, *Kids & Space* aims to involve young people in public space planning (see www.kidsandspace.nl). In Germany, *Jugend macht Stadt!* (*Youth Makes the City!*) has enabled young people to contribute to the development of cultural and physical aspects of urban environments (BMVBS, 2010a & b, www.plan-zwei.com). In addition, designers of urban environments are now expected to consult with young people in order to promote ownership, especially regarding facilities designed specifically for their use—such as schools and youth centres (Hampshire and Wilkinson, 1999).

Participation in decision-making processes that impact on the lives of young people and on their communities is considered a fundamental right, and the basis for modern day democracy (Hart, 1992). Ideally, young people should be able to gain leverage over adults in position of power and influence, in order for ideas to be implemented and for relationships between the generations to be positively transformed. Influence over adults may emerge from the process, but results may be unexpected. For example, the ‘Banners for the Street’ public art project in Massachusetts (USA) in the 1990s started as an arts showcase for young people, but “... quickly took on a more political dimension when the participants discovered the poor quality of living conditions within the neighbourhood.” (Frank, 2006, p.360).

Engagement should bring benefits for young people, who should not simply be used to serve the interests of adult stakeholders. Hart’s Ladder of Children’s Participation (1992) is the most widely applied scale of measurement (Day et al, 2011). The Ladder consists of eight rungs, the bottom three of which are classified as ‘non-participation’, as children’s views are simply co-opted to validate adult decisions. For Hart, true participation does not begin until the fifth rung, and then escalates according to children’s power to direct matters and the reducing influence exerted by adults. The top two rungs on the ladder imply a high level of independent decision-making by children, with adults performing more of a role as partners. Matthews’ examination of participation in UK regeneration

programmes (Matthews, 2003, p.268) focuses on the real participatory levels of Hart’s ladder. Matthews identifies four different levels of engagement, ranging from ‘dialogue’ (listening to young people), through ‘development’ (adults working on behalf of and in the interests of young people), ‘participation’ (young people working within their communities), and ‘integration’ (young people working together with their communities).

There are a few examples of creativity being used to engage young people in planning and design. Inter-generational ‘Charrettes’ have been used, where creative thinking is directed towards a single issue within a foreshortened time frame. These enabled children to connect classroom-based learning to community-based research and practice, helping build relationships between children and adult participants—including professionals, community members and university students (Condon, 2008).

It is suggested that the participation of young people in design brings with it a range of benefits, including (Day et al, 2011; Frank, 2006):

- *Personal benefits to young people* – such as improved confidence, self-esteem, assertiveness and sense of control over the environment
- *Development of ‘life’ skills that help young people progress* – communication skills, creativity, problem solving skills, design skills, map interpretation and better understanding of community processes and the needs and perspectives of different social groups
- *Educational benefits* – related to academic achievement, attendance and behaviour at school
- *Enhanced civic and social responsibility* – including better understanding of community issues, enthusiasm for community participation, informal networking between young people, change in behaviour (toward the community and environment), increased sense of community and ownership
- *Changes to physical and social environment* – improvements in design, planning and use of space
- *Social benefits* – changes in adults’ attitudes towards young people and development of better inter-generational relationships.

In relation to some projects, there is a real sense of ‘distance travelled’ by participants, with empirical evidence regarding the benefits to young people tending to focus on impact at the end of the intervention (Day et al, 2011). However, there is a lack of research into the longer term

impact and implications of youth engagement projects. In addition, further research is required to more fully understand changes in perceptions of young people held by adult participants and the implications of attitudinal change for inter-generational relationships.

YOUTH DESIGN AGAINST CRIME

Background

The Design Against Crime (DAC) Solution Centre has been supporting designers in addressing problems of crime, anti-social behaviour and feelings of insecurity since 2000 (Davey et al, 2002; Design Council, 2003; Wootton & Davey, 2003, 2005). The term 'design' does not refer merely to the physical design of the environment or products within it, but also relates to: (a) the process of research, analysis and evaluation; and (b) the formulation of integrated systems of delivery and value adopted by stakeholders. The Solution Centre's values, methods and approach are informed by Human-Centred Design and Systems Design—a focus on the constituent systems of meaning, learning, delivery (practice) and value (impact).

Recent research projects have focused on community safety and addressing the social and behavioural causes of crime in existing environments. The research project *City Centre Crime: Cooling Hotspots by Design* (Aug 2007–Jul 2008) investigated problems areas (so-called crime hotspots) in Manchester's city centre, and involved the development of a methodology for determining the relationship between the design, management and use of the urban environment and crime problems occurring within it. The project resulted in 20 practical design interventions to address crime and anti-social behaviour issues (Wootton, Marselle and Davey, 2009; Wootton, Davey and Marselle, 2011). Press coverage of the project led to the Solution Centre being contacted by UK charity Catch22 about the possibility of engaging young people in design against crime. In collaboration with Catch 22 and Prudential for Youth, the Solution Centre developed the *Youth Design Against Crime* (YDAC) programme, to engage young people in generating ideas to tackle crime and anti-social behaviour problems in their neighbourhoods.

The Youth Design Against Crime Programme

YDAC acknowledges that young people are too often seen only as "trouble-makers" and their opinions ignored by adults. It offers teams of young people the opportunity to challenge such stereotypes by creatively tackling crime and anti-social behaviour in their community and developing design ideas that "make a real difference". In addition, young

people completing the programme and associated workbook, have the chance to gain an ASDAN Wider Skills Level 2 Problem-solving qualification.

The YDAC programme is structured to run over ten to twelve weeks, as shown in Figure 1, below.

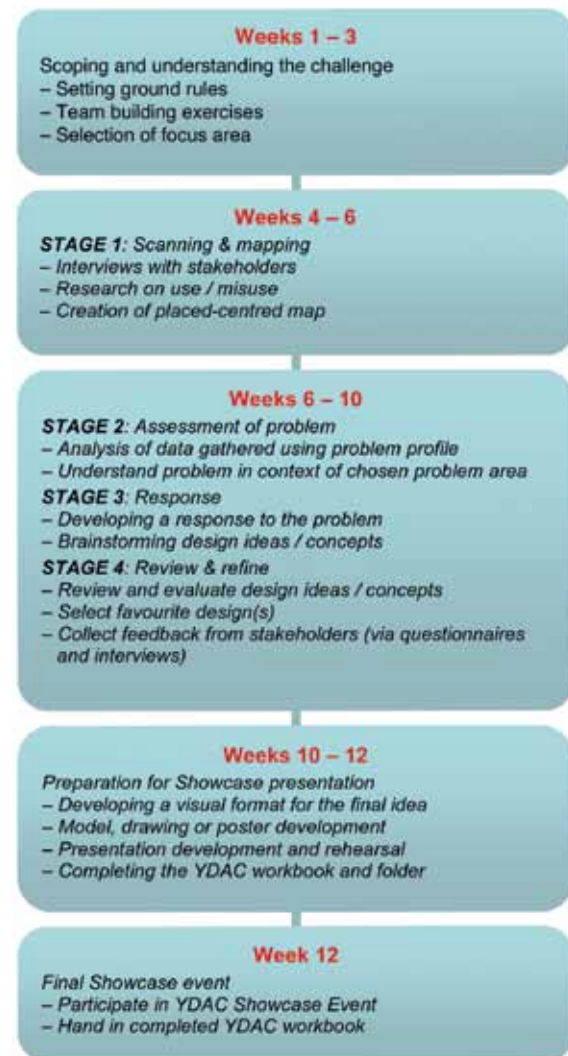


Figure 1. Example 12-week YDAC programme schedule.

In the first three weeks, the young people undertake team-building activities, including identifying individual strengths and weaknesses and creating a team name. They also identify the area that will be the focus of the team's YDAC activity.

The Scanning & Mapping stage (weeks four to six)

involves researching the focus area, considering why the area is important to team members, researching whether the area really has problems and understanding why. This enables young people to tackle problems of concern to them, and to use their own personal experience to identify and understand issues.

In collaboration with the police mentor, the team members must research crime and anti-social behaviour problems in the area as experienced by other users. This may involve discussions with police officers, interviews with local people (e.g. residents, shopkeepers, area management and maintenance staff) and visiting websites (e.g. www.upmystreet.com). YDAC provides the young people with a template and questions for conducting a structured interview to identify the location of problems and the causal factors associated with crime and anti-social behaviour. The research enables the young people to understand the problems and issues from the perspective of different stakeholder groups. This kicks off a process of consultation with local people, and encourages design concepts that reflect the requirements of all stakeholders.

From information collected via interviews, site visits and observation, the young people develop a 'Place-Centred Map' detailing changes in legitimate and illegitimate activity over time. For example, this might indicate where young people choose to 'hang out' (and why); and the activities taking place in different areas at different times.

Through this work, the teams identify the most common/significant crime and anti-social behaviour issues. Insight into their causes is gained by developing a 'Problem Profile'. This involves organising research findings on offenders, victims, behaviours and the environment to help identify the causal factors associated with different crime and anti-social behaviour issues. The structure and content of the Problem Profile is derived from the *Crime Lifecycle Model* developed by Wootton & Davey (2003).

In weeks six to ten, the group use creative ideation and brainstorming methods to develop design concepts in response to their research. These design ideas are evaluated by the young people in terms of their potential impact on: users; crime and anti-social behaviour; and the quality of the area. The group also considers whether any aspects of their design proposals might cause the seriousness of crime or anti-social behaviour problems to increase. A final design concept is selected and further feedback sought from stakeholders regarding its strengths and weaknesses.

In weeks ten to twelve, the young people develop drawings, models, presentation materials and argument to

communicate the benefits of their final design proposal to the judging panel at the YDAC Showcase Evening. They include details of how the design was researched and developed, as well as how the team developed in terms of its thinking, skills and ability to work together.

At the showcase event, each group is given ten minutes to present their finished design in any way they choose to the judging panel and an audience of family, friends and invited stakeholders. After their presentation, the group spends five minutes answering any questions the judging panel has regarding their design idea, its implementation or the process by which it was developed. The groups are judged on: the strength of the design idea; the evidence base of the idea (including the research and consultation that was carried out); and teamworking. One group is selected by the judging panel as the YDAC winner, and receives a trophy, while all runners up are awarded medals and certificates of completion.

Running the programme

Five YDAC projects have been initiated to date: Greater Manchester YDAC (2009); the London borough of Southwark YDAC (2010); the London borough of Lambeth YDAC (2011); Salford YDAC (2011) and Bolton YDAC (2012). Together, these projects have directly involved over 200 young people aged between 12 and 19 years from schools and youth groups. The young people have generally poor educational backgrounds, with some having been excluded from school or involved in anti-social behaviour and identified as 'at risk of offending'.

The four teams of young people in the Greater Manchester YDAC identified the following problem areas on which to focus:

- An isolated subway (motorway underpass) close to the team's school that attracts robbery, anti-social behaviour and serious crime.
- A pedestrian route to a local shopping precinct with several problems. For example, groups of street drinkers congregating on the public seating, creating a climate of fear.
- A local public park and sports ground that is underused (except by drug dealers and their clients), poorly lit, poorly maintained and considered unsafe by local residents.
- The playing field next to the team's youth centre, which has become a hot spot for drug dealing.

At the final showcase event in November 2009 (see figure 2), all four teams presented their design interventions. A

Judging Panel made up of senior decision-makers working in the areas of crime and community safety in Greater Manchester were tasked with selecting the winning team. Inspired by the high standard of the ideas, the judges pledged on the night to provide funding to implement the design solutions of all four teams.



Figure 2. Greater Manchester YDAC Showcase Evening.

The YDAC projects delivered in London and Bolton differ slightly from the original 2009 Greater Manchester programme, as these each involved groups of young people from a single school—so-called ‘alternative curriculum’ students. This meant that their YDAC activities were undertaken as part of their school lessons, falling under the subject area of ‘citizenship’.



Figure 3. Young people and judges at the London Borough of Southwark YDAC Showcase Evening.

Evaluating the programme

An evaluation of the first four YDAC projects was undertaken by the Design Against Crime Solution Centre with funding from Catch22 and the University of Salford. The evaluation aimed to identify the impact of YDAC on young people and adult participants, and provide recommendations on how the design and delivery of the YDAC programme might be improved. Focus groups were conducted with young people, youth workers and police mentors, and telephone interviews with Showcase Evening judges. The full evaluation will be completed in May 2012.

Initial findings show that young people had doubts and reservations about the YDAC programme, when it was first presented at the Launch Event. YDAC was perceived as just another school project that would yield little benefit for young people. Some young people exhibited low levels of self-esteem, assuming that their involvement in YDAC was because they were “bad”. Others doubted their ability to complete the programme.

“I just didn’t think that we would have got a good enough idea to make it all the way to the end, to the final.”

Young person

YDAC presented a number of challenges for the young people to overcome. Some had to get to know team members, and participants reported feeling “shy” when first confronted with new social situations. Some individuals were unwilling to contribute to the work of the team, which presented difficulties for other team members. Young people had to cope with the stress of identifying and developing a suitable design solution to present at the final event. They also had to complete the YDAC Workbook, which was considered relatively academic by youth workers and not something the young people would normally do.

Over the course of YDAC, the young people developed a strong team spirit. As they became aware of strengths and weaknesses within their team, they demonstrated their ability to help those individuals who had problems.

Focus group findings confirmed that the young people were the prime decision-makers in terms of both the problems upon which to focus, and the design ideas to develop and present at the Showcase Evening.

“The thing I liked about it: we chose where we can work; what place we can work on. They [youth workers or police mentors] never chose for us.”

Young person

Youth workers stated that being given responsibility for decision-making motivated the group:

“They [the young people] actually took full ownership of it... They were as excited, or more excited than the staff in the end.”

Youth worker

Participation in the YDAC project improved the confidence, knowledge and skills of the young people. Young people were able to overcome fears about talking in public and deal with setbacks. They were also able to use their confidence and skills positively by, for example, talking to the community, presenting their ideas on stage and generating ideas to address problems. Young people often have direct experience of crime and anti-social behaviour and therefore bring new insights to design activities. For one participant, becoming confident was described as “life-changing”.

When interviewed, young people said how ‘proud’ they felt—for winning, for coming second or for completing the programme. Participants were aware that they had seen something through to the end—which is typically difficult for this group of young people.

The sense of achievement felt by young people was clearly evident to those watching the Showcase event. An intentional ‘side effect’ of the YDAC process is that it helped generate better relationships between the young people and teachers, residents, community workers and the police. As one police mentor remarked:

“... I feel I have broken down a barrier between myself as a Police Officer and the group. What I have been a part of in the past few weeks has opened my eyes and made me realise that these young people really do care about their community and really do want to make a big difference.”

Police Mentor

Another police officer stated that she is now able to chat to members of her team when she sees them in the neighbourhood. A schoolteacher said that her relationship to class members has improved, since completing YDAC.

While judges may pledge funding for good ideas, funding or feedback about progress is not always forthcoming. Some focus groups members felt that this was demotivating for young people.

DISCUSSION & CONCLUSION

The process as output

The Design Against Crime approach integrates consideration of crime and anti-social behaviour within the creative design process, involving research, idea generation and evaluation (Design Council, 2003, 2011; Wootton & Davey 2005). The focus is on improving the quality of the solution to crime problems—the design output—through the application of holistic and human-centred design principles. Consequently, the value and impact of designing against crime is normally considered in terms of its output. With regard to YDAC, however, it is the *process* of designing against crime that is the primary focus, bringing benefits to young people and adult participants alike.

While the literature highlights the value of engaging young people in regeneration and planning processes (Matthews, 2003; Frank, 2006), the YDAC programme was not designed as a consultation method for use in urban planning projects or regeneration programmes. Rather, it was designed to meet the needs of the participating young people.

Young people steer, adults support

Hart (1992) emphasises the importance of children and young people making decisions about issues that impact on their lives. In YDAC, responsibility for decisions on choice of focus areas and creative design solutions rests with the young people. They identify the problem area on which their team will focus, and select the design ideas that will be developed and presented at the Showcase Evening. The Youth Workers and Police Mentors act as advisors, supporting the work of the team and enabling specific actions, such as liaison with local residents and businesses, or providing more detail on crime problems. This aspect of YDAC is important for two reasons. Firstly, it helps generate in the young people a sense of ownership of the project and intrinsic motivation to create a good design. Secondly, the young people bring to their projects a level of ‘inside knowledge’ and insight into the issues in their local areas that is often simply unavailable to outsiders. For example, one group of young people identified problems related to prostitution in their area about which the police had no prior knowledge.

It is important to note that design activities in YDAC are undertaken without direct support from professional designers. This correlates with the primary emphasis of YDAC on the process over the output. In contrast, co-design projects require professional designers to work alongside participants to ensure that outputs meet specific development goals.

Managing expectations

At the end of the YDAC process, the teams of young people present the design solutions they have researched and developed to a panel of judges. In effect, young people are entering a competition, with the goal of being judged the team with the ‘best’ design idea. From the outset, the YDAC organisers emphasise that there is no guarantee *any* of the young people’s ideas will be implemented – even the winning team’s. However, the organisers do take steps to maximise the potential for this to occur. In particular, efforts are made to select judges with responsibility for community safety, regeneration, urban planning and development. This increases the possibility that positive comments by judges on an idea’s quality will be followed up with action on its implementation. More than once, a YDAC judge has asked of a fellow panel member, “Why are we not doing this?”

At all Showcase Evenings held to date, promises have been made to implement ideas presented by at least one team of young people. This inevitably raises expectations amongst participants. However, the organisers are aware that promises made on the night may not come to fruition, and that even if they do, the process of implementation can lengthy.

As an example, one YDAC team’s designs for improving a problematic underpass took two years to become a reality. For this reason, effort needs to be directed at managing expectations amongst participants, both at the YDAC Launch Event and following the Showcase Evening. In addition, resources need to be dedicated to monitoring and supporting the uptake of ideas and communicating progress to young people and adult participants.

Enabling creativity

Designers and other stakeholders are aware of the power of creativity, and that much of that possessed by young people goes untapped (Condon, 2008; Day et al, 2011, Frank, 2006). However, ‘design’ is not ‘art’. Design is the focused and intelligent use of creative thinking to solve problems and meet identified needs and requirements in an elegant way (in terms of costs, resources and aesthetics). Therefore, really understanding problems and needs, is the key to developing successful new designs. For this reason, the authors believe that the research process is central to the success of YDAC. Some focus group participants expressed concerns, however, that the academic nature of the workbook and design process would deter young people, when first introduced to the programme. It is notable that such concerns were raised primarily by adult participants – the young people

interviewed did not suggest any struggle with the YDAC process.

The authors contend that the ‘creative challenge’ nature of YDAC is an important component, and that providing a more simplified, less-challenging process (for example, by reducing the need for the teams to understand the problem, its context, or others’ perspectives) would significantly reduce the personal impact experienced by the young people – as well as leading to less valuable design solutions being developed and potentially implemented.

Benefiting young people

The YDAC process calls for young people to work together in teams and to present their design ideas to a panel of high-profile judges at a public event. In order to achieve this shared goal, the young people must develop their team working, interpersonal and communication skills. Presenting at the Showcase Evening is both daunting and exciting, and generates a real sense of team spirit and accomplishment for the participants. Engagement in the YDAC process increases young people’s self-confidence, raising self-esteem through involvement in activities of benefit to the community, rather than through rebellious or aggressive behaviour (Lo et al, 2011). Similar improvements in attitudes and skills are observed in other youth engagement projects (Day et al, 2011; Frank, 2006). As with some other projects, there is a real sense of ‘distance travelled’ for YDAC participants (Day et al, 2011, p. 62), not least due to YDAC’s targeting of young people considered “at risk” by police and school authorities.

Secondary benefits: community

The YDAC process requires young people to understand the behaviour of all the users of an area—both legitimate users and offenders. This means consulting with different stakeholders and attempting to understand issues from their perspectives. While this has the practical benefit of helping the teams come up with better design ideas it also has a ‘community building’ effect, helping build bridges between the young people and different social groups in their neighbourhood. The literature confirms young people’s ability to consider needs of others in their thinking.

“... Given the opportunity, most young people have insightful and practical ideas which take into account the needs of the whole community.”

Malone, 1999, p.18, in Cameron and Grant-Smith, 2005, p.32

Research shows that offenders are prone to negative beliefs and emotions, focus on short-term life goals and may adopt a confrontational style (Burt et al, 2006). Acting rebelliously and aggressively in front of peers may also be a misguided means of boosting self-esteem (Hales, 2006; Lo et al, 2011). The skills gained through YDAC may help militate against offending and anti-social behaviour in the future by building self-esteem, fostering teamwork and enabling young people to collaborate in achieving a goal of benefit to the community.

While YDAC built bridges between young people and adult participants, such as Police Mentors and teachers, the evaluation showed that further steps must be taken to support improved relationships with the wider community. For example, in the most recent Bolton YDAC (delivered after the evaluation), budget was allocated to providing free coaches to bring family and community members to the Showcase Evening venue.

Through better publicity and follow-up of YDAC ideas generated, the community can be made more aware of the young people's commitment to their neighbourhood. Indeed, YDAC may be seen as a methodology for engaging community members and increasing social cohesion (Krupat, 1985), and further research is required in this area. In partnership with Catch22 and partners in several EU states, the Solution Centre is exploring ways in which YDAC might be rolled out as a national programme in the UK, and how it might be piloted in other European contexts.

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PARAMETRIC TOOLS IN ARCHITECTURE: A COMPARATIVE STUDY

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KEY WORDS: Parametric CAD, non-parametric,
creative decision making, statistics

Parametric tools have recently increased in eminence in architectural practice with several claims made about their potential as a creative design iteration tool to enhance design decision making and problem solving. This paper carried out a survey of two types of architectural practices: one that predominantly uses non-parametric CAD tools and another that primarily employs parametric CAD. The results from the survey were analysed statistically. The findings show that parametric tools did not help conceptual work at the early design stage. Also there was very little difference between both tools regarding their potential in dealing with complex geometry. However parametric tools were found to enhance creative decision making more than non-parametric tools. Their benefits for structural and environmental optimisation, fabrication, articulation of facade patterns and the creation of design variants were also highlighted.

1. INTRODUCTION

Parametric modelling (PM) enables the creation of 3D models of buildings with embedded parameters. (Lee et al. 2006) The data that is fed into these parameters is volatile and changeable, and thus, if a designer changes the values inside the parameters, the form of a geometrical entity changes. The manipulation of building form such as twisting or rotation can be linked to angle parameter; when the angle changes so does the form. These processes make PM packages an ideal tool for the generation of multiple and alternative design solutions or design variants.

There are two types of parametric modelling tools that are popular among architects both in education and practice. The first type includes programmes such as Grasshopper in Rhinoceros (Payne and Issa 2009) and Micro station's Generative Components (GC) (Chadwick 2007) and has an obvious data tree where the association between parameters and components is visually apparent, i.e. wires in Grasshopper. The second type, which includes programmes such as Autodesk's Revit deals with building information modelling (BIM) and has a hidden data tree where the only visible screen is the one which shows the geometry. The first type has also the additional advantage of being able to deal with complex geometry which every so often is associated with NURBS (non-uniform rational B-splines) entities.

Recently the popularity of parametric design in architectural practice has risen with many offices opting to create groupings for advanced geometry research and surface annealing. Examples include Arup's Advance Geometry Group (Bosia 2011); Gehry's set of 'dedicated design teams' (Glymph et. al 2004) and the Computational Geometry

Group in the architectural practice of Kohn Pedersen Fox Associates (KPF), London. (Dritsas and Becker 2007) Additionally, a link between parametric modelling, pursuit of complex geometry and digital fabrication has been reported in the literature. For example, it has been suggested that 'Parametric modelling has the ability to generate complex forms with intuitively reactive components, allowing designers to express and fabricate structures previously too laborious and geometrically complex to realise'. (Pitts and Datta 2009)

Burru's work (Burru et al. 2001) is a good example on the use of parametric tools to analyse Gaudi's 'ruled surfaces' in the Sagrada Familia and recreate his complex geometry in the reconstruction of building parts that were not finished by Gaudi. Parametric principles were also deployed in a minimalist approach to produce a set of 'ruled surfaces', from a limited number of curves and this approach can conceivably be used to portray building geometry. (Prousalidou and Hanna 2007) Furthermore, Burru (2011) examined the geometrical concept of 'doubly ruled surfaces' and argued that this type of geometry does not only facilitate construction and fabrication in a file-to-factory procedure but it can also be used conceptually to highlight 'a useful distinction between the fundamentals of architecture and the aesthetic priorities of sculpture'. (Burru 2011) He went on to state that doubly ruled surfaces are, 'a subset of ruled surfaces, have at once a geometrical simplicity and a visual sophistication. Their aesthetic ranges from the subtle way they direct light across their surfaces to their ready descriptibility, both in terms of representation and fabrication'. (Burru 2011) However, beauty is not the only attribute of ruled surfaces; they also have great structural strength. If every point on a ruled surface has 2 lines that are completely contained in the surface, then the surface is called 'doubly ruled'. (Iselberg 2009)

One of the reasons for the recent adoption of parametric tools and approaches in design has been identified as being the need for a tool which offers both flexibility and speed. (Salim and Burru 2010) They stated 'the adaptation of parametric modelling has reformed both pedagogy and practice of architectural design.' However, data flow programming which is the norm in parametric tools offers little flexibility in changing the association between parameters and this is considered as a weakness in parametric tools. (Davis, Burru and Burru 2011) The alternative, logic programming, which is claimed to be better but not ideal, is described, 'adept at translating explicit models into parametric models, but lacking continuous

flexibility.’ (Davis, Burry and Burry 2011)

Schnabel (2007) advocates the use of parametric techniques to create solutions to problems at the early design stage. Schnabel (2007) goes on to suggest that parametric tools ‘allow a deeper comprehension of the design objectives and aids designers in their decisions to find solutions’. Aish and Woodbury (2005) summarise their insights into the advantages of using parametric tools in design: ‘parameterization can enhance search for designs better adapted to context, can facilitate discovery of new forms and kinds of form-making, can reduce the time and effort required for change and reuse, and can yield better understandings of the conceptual structure of the artefact being designed’. As disadvantages, they list: ‘additional effort’ and the amplification of ‘complexity of local design decisions’. In addition, they cite the difficulty of instant interaction between several screen views as a problem of parametric tools in practice. (Aish and Woodbury 2005)

Holzer et al.(2007) examined the relationship between parametric design and the optimisation of structural design during the early stages of the design process. They made two important conclusions on the limitations of PM at the early design stage. First, it is extremely difficult to construct an overall PM that can cope with the ‘disruptive nature’ of alterations mandated by the multidisciplinary design team. Second they commented that ‘variations of the values of parameters sitting on a high level in the design hierarchy caused dependent child parameters to lose their logical association’.

From observations in practice, Hudson (2008) highlighted a conflict between ‘published theory’ and visual evidence regarding the deployment of parametric modelling in architectural design. He suggested that while the theoretical literature on PM focuses on their use at the conceptual design stage the evidence from observing practice indicates that their deployment occurred at the design development stage rather than at the conceptual stage. Shepherd (2011), an engineer, examined the parametric approach to engineering design and analysis when he received the architectural parametric model for a stadium from the architect’s team. The building form was formulated using relations and parametric rules between objects rather than the conventional way of using CAD to model a building through entities such as lines. He cited two main advantages to this process: a significant improvement in workflow between the architectural and engineering teams which resulted from sharing a single parametric model and the speed of structural design optimisation. Hudson (2009)

argues that the ‘process of developing a parametric model can begin with incomplete knowledge of the problem’. This suggests that parametric modelling may well be possible and can occur at the early conceptual design stage.

Another area of design where parametrics became a very potent tool is the creation of ‘patterns’ for decorative facades in buildings. Schumacher (2009) argues that ‘articulation is the central core competency of architecture; and designed patterns provide one of the most potent devices for architectural articulation.’ He predicts a ‘new era of parametric architecture’ where the use pattern as a source of innovation will yield a high level of design articulation in building facades. This, according to Schumacher (2009), will lead to the intensification of ‘surface difference and correlation’, and will ultimately result in ‘dynamic, high-performance ornamentation’.

However the intellectual landscape for the use of computers in architectural design was mapped earlier by Jencks (1997). In his treatise ‘new science=new architecture’ Jencks argues that there is a shift in thought, a departure from the old Newtonian linear science to other forms of science such as that of complexity, fractals and non-linear systems. He calls on architecture as ‘a form of cultural expression’ to have a similar shift in the framework of thought, citing three ‘seminal’ buildings of the 1990s to support his thesis of shift. Gehry’s Bilbao, Eisenman’s Aronoff Centre, Cincinnati and Libeskind’s Jewish Museum in Berlin ‘are three non-linear buildings and were partly generated by nonlinear methods including computer design’, maintains Jencks. Furthermore, Jenks (1997) goes on to question the role of metaphor in the three buildings and concludes that ‘new science=new language= new metaphor’. In summary, it is obvious that parametric tools have many advantages over traditional (non-parametric) CAD tools in terms of form finding and dealing with complex geometry through their reactive components. However, the literature review reveals that some of the claims regarding parametric modelling are contradictory and in some cases rely on anecdotal evidence. The contradiction between researchers is clear when PM is discussed in relation to its use at which stage in the design process, for example Schnabel (2007) advocates the use of parametric tools to find solutions at the early design stages, whereas Hudson (2008) and Holzer et al. (2007) concur that they are useful at the developmental and not at the early stages of the design process. Schumacher (2009), on the other hand, views their creative potential as a generative device for façade patterns which can significantly increase ‘architectural articulation’ of building facades.

Some of the researches describe the use of parametric workflow from the perspective of using it in a single building and make generalisations from that. Therefore, it seems there is a need for a consensus on some aspects of parametric modelling use in architectural practice. More importantly we should aim to ascertain whether parametric tools do help or hinder the creative decision making of problem solving in design.

2. CASE STUDY

In order to find a consensus about the use of PM using parametric tools in architectural practice, we conducted a survey of two types of offices: non parametric and parametric. Furthermore, the research also aimed to test the null hypothesis (H0) that *'there is no significant difference between traditional CAD practices (non-parametric) and parametric practices regarding their use of CAD in the design process.'* The word 'significant' implies a statistical significance or a P value which has to be <0.05 for the difference to be accepted as sufficient to reject the null hypothesis. (Bryman and Cramer 2011) If the null hypothesis is to be rejected, then the target hypothesis (H+), which is the opposite and sometimes is called the research hypothesis, will be confirmed. The research design which is diagrammatically represented in Appendix 1, is based on Popper's hypothetico deductive method of 'deduction-hypothesis formulation-hypothesis testing.' (Popper 2002)

Questionnaires were e mailed to over 60 architectural offices from UK and Europe and returns were received from only 18 traditional (non-parametric CAD) and 14 parametric CAD practices. Traditional practices are those which use CAD tools primarily for drawing automation and three dimensional modelling and visualisation. There were two types of questions, closed and open ended, which were intended to gather knowledge and data on the use of CAD parametrically and non-parametrically in the design process. There were also few questions concerning the impact of CAD tools, both parametric and non-parametric, on 'creativity' in design problem solving. The questionnaire used Torrance's seminal work as a framework to define creativity; offices were asked to answer the questions on creativity using this framework. Torrance (1966) identified four main parameters for creativity: fluency (generating a volume of ideas); flexibility (to do with the variety of ideas); originality (uncommonness of ideas); elaboration (advancing an idea). This ensured that there was no misunderstanding on what the dimensions of creativity are. The relationship between Torrance's 4 dimensions of creativity and the

research design of this paper is displayed in Appendix 2. For a detailed review of creativity and its measurements, see (Hanna and Barber 2001). The returns were statistically analysed using the Statistical Package for the Social Sciences (SPSS). A summary of the findings from this survey are presented below.

3. FINDINGS

3.1 Descriptive Statistics

The bar chart in Figure 1 shows some differences in attitudes toward the use of CAD by both office types. In the chart, the Y-axis represents the percentage of offices who answered yes to the questions on the nature of CAD usage within the design process. The chart indicates that every office in each category (100% of the sample) uses CAD for drawing automation, 3D modelling and visualisation. On façade design around 30% of non-parametric offices use traditional CAD whereas around 85% of parametric practices use parametric CAD in façade design. Parametric practices suggested that they use parametric CAD to morph any shape, a series of shapes or articulated patterns to any building surface and create well-articulated building facades. One of the strengths of parametric tools is that the basic geometrical entity for a facade pattern while maintaining its basic shape, changes in proportion to follow the curvature of the surface. Parametric CAD scored higher than non-parametric CAD in areas of design variants, fabrication, work flow and optimisation (structural and environmental). Surprisingly, non-parametric CAD was more effective as a tool than parametric CAD at the early (conceptual) design stage. Five parametric practices commented that parametric CAD is very rigid as a design tool at the early stages. Among the negative feedback received in the questionnaire returns were statements such as: 'creation of 3D entities is laborious'; 'it is all data structure between parameters, components and wires'; 'you need to have a concept and a 3D conception of a form before you start, otherwise this thing is useless'; 'no device like a mouse and no graphical screen, how can this be useful at concept formulation?'; 'you need to move between two screens, one for data structure and another for graphics, it is not easy to keep moving between the two and have a design concept in your head'. (See figure 1)

On the design issue of exploring complex geometry parametric CAD was used by 90% of parametric practices whereas non parametric CAD was used by 70% of non-parametric offices. Among the 70% were architects who hinted that the 'creation of surfaces based on elliptical curves

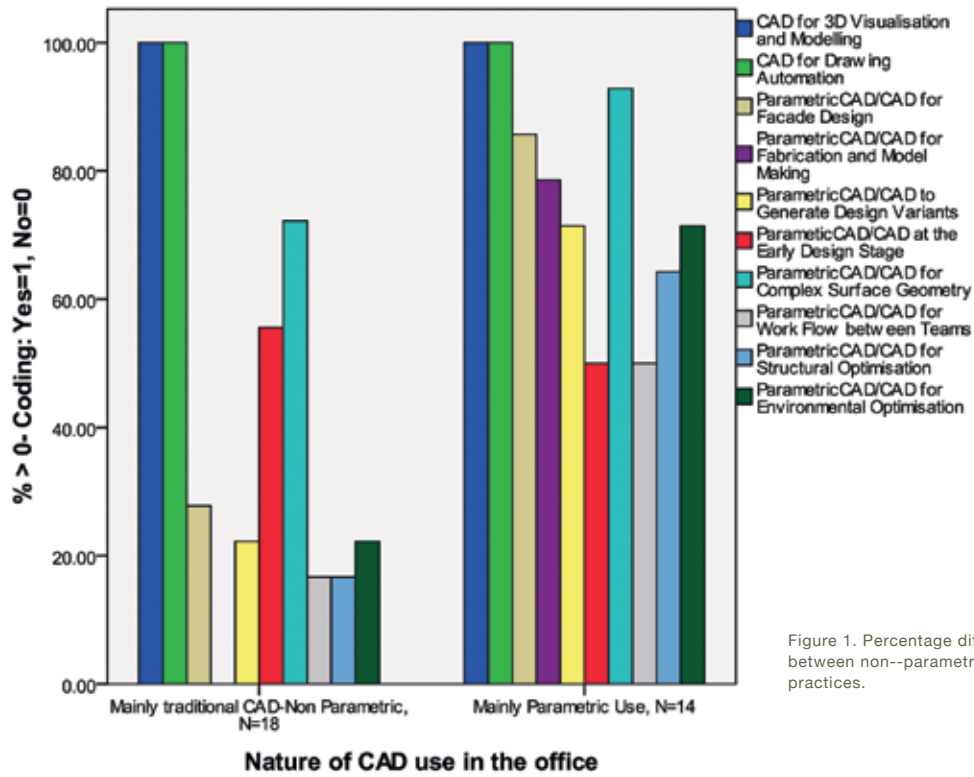


Figure 1. Percentage difference between non-parametric and parametric CAD practices.

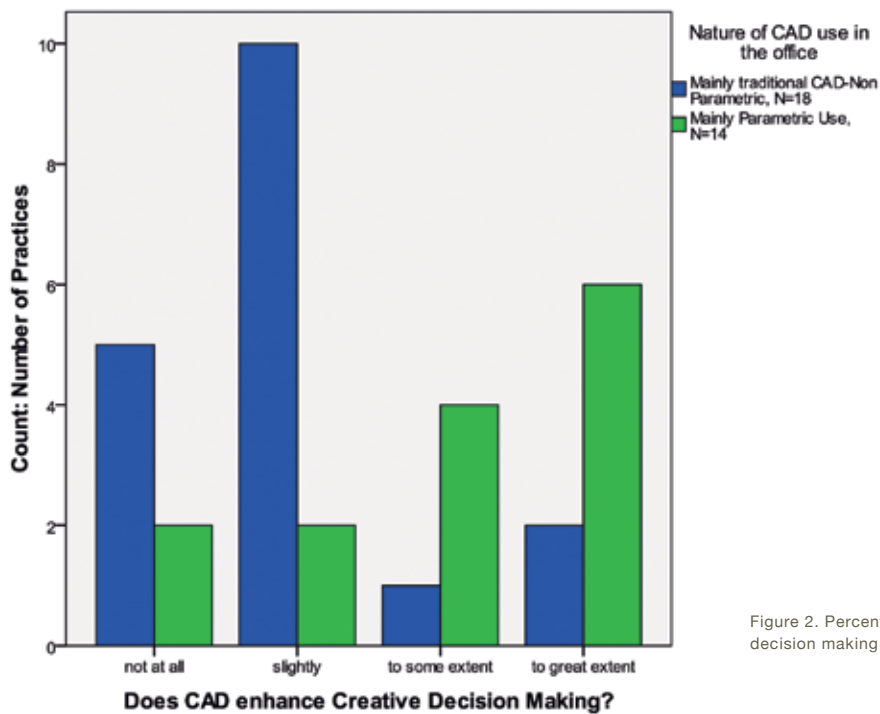


Figure 2. Percentage difference on the creativity of decision making by office type.

is really easy with the Rhinoceros software’ and that the use of 3D digitising arm makes this process easier. One practice said that ‘we move all the time between CAD and physical models using 3D digitisation’.

On the difference between practices regarding the creativity of problem solving in the design process, Figure 2 displays the findings on this variable.

A quick glance at Figure 2 reveals that parametric CAD was seen by its users as more enhancing to the creative decision making process than non-parametric CAD. Ten practices out of a total of 14 intimated that parametric CAD helped their creative decision making ‘to some extent’ and ‘to great extent’. This implies that although parametric CAD performed less than non-parametric CAD in terms of its effectiveness as a design tool at the conceptual stage, parametric users must have felt that there is more to creative decision making than just the conceptual stage. Designers must have considered such issues as performance optimisation, generation of design variants, fabrication and façade design, all to be very significant elements of creative decision making, i.e. creativity of design process.

3.2 Inferential Statistics

The above figures clearly confirm that there is a difference between parametric and non-parametric practices in terms of attitudes toward CAD in the design process. However, there is nothing to suggest whether or not the computed difference is statistically significant. The paper used the Analysis of Variance (ANOVA) test in SPSS to compute the variance between both groups which is represented in Table 1 by: Mean Square; F statistics; Significance. The two variables that did not show a significant difference between parametric and non-parametric practices ($P > 0.05$) were: the use of CAD at the early design stage and its value as a tool for exploring complex surface geometry. The finding on the latter variable, of no significant difference between parametric and non-parametric CAD on potential for exploring complex geometry is surprising as it is in disagreement with current established beliefs on this issue. For example Chadwick (2007) maintains that parametric design tools use ‘the power of symbolic math – through graphical and scripting tools - in order to generate complex geometry with component relationships.’ Also, what makes these tools very powerful in experimenting with complex geometry is their ability to logically link 2D and 3D geometry in a rule-based situation; a modification of one component will automatically force a change in other components in conformity with ‘the applied rules’.(Chadwick 2007)

Table 1. ANOVA results by office type. P (significance) <0.05 means that the difference is statistically significant and not due to chance

			ANOVA Table				
			Sum of Squares	df	Mean Square	F	Sig.
ParametricCAD/CAD for Facade Design * Nature of CAD use in the office	Between Groups	(Combined)	2.643	1	2.643	14.891	.001
	Within Groups		5.325	30	.178		
	Total		7.969	31			
ParametricCAD/CAD for Fabrication and Model Making * Nature of CAD use in the office	Between Groups	(Combined)	4.862	1	4.862	61.875	.000
	Within Groups		2.357	30	.079		
	Total		7.219	31			
ParametricCAD/CAD to Generate Design Variants * Nature of CAD use in the office	Between Groups	(Combined)	1.907	1	1.907	9.584	.004
	Within Groups		5.968	30	.199		
	Total		7.875	31			
ParametricCAD/CAD at the Early Design Stage * Nature of CAD use in the office	Between Groups	(Combined)	.024	1	.024	.092	.764
	Within Groups		7.944	30	.265		
	Total		7.969	31			
ParametricCAD/CAD for Complex Surface Geometry * Nature of CAD use in the office	Between Groups	(Combined)	.335	1	.335	2.216	.147
	Within Groups		4.540	30	.151		
	Total		4.875	31			
ParametricCAD/CAD for Work Flow between Teams * Nature of CAD use in the office	Between Groups	(Combined)	.875	1	.875	4.375	.045
	Within Groups		6.000	30	.200		
	Total		6.875	31			
ParametricCAD/CAD for Structural Optimisation * Nature of CAD use in the office	Between Groups	(Combined)	1.786	1	1.786	9.375	.005
	Within Groups		5.714	30	.190		
	Total		7.500	31			
ParametricCAD/CAD for Environmental Optimisation * Nature of CAD use in the office	Between Groups	(Combined)	1.907	1	1.907	9.584	.004
	Within Groups		5.968	30	.199		
	Total		7.875	31			

On whether or not parametric and non-parametric CAD tools do enhance creative decision making, the ANOVA test also calculated differences between the two groups, which were found to be statistically significant (Table 2: $P = 0.009$, < 0.05); designers using parametric tools gave the CAD tool a higher score on helping creative decision making than users of non-parametric CAD tools. This result can be explained by the fact that ‘creativity’ as a concept is ‘generative’ in terms of ideas and parametric tools are also ‘generative’ by their nature. In other words the generative ability of parametric tools to create alternative and multiple design variants by changing the rules and sometimes numbers makes the iterative process more innovative in finding the most efficient design. Furthermore, the impact of parametric tools on creativity in real life projects has been described as follows: ‘the Bishopsgate tower by KPF, and the Dostyk Towers by NBBJ and E/Ye Design - demonstrate tremendous creativity based on a highly developed sense of intuitive design.’(Chadwick 2007)

Table 2. ANOVA results on CAD’s impact on creative decision making by office type. P (significance) <0.05 means that the difference is statistically significant and not due to chance

			ANOVA Table				
			Sum of Squares	df	Mean Square	F	Sig.
CAD does enhance Creative Decision Making * Nature of CAD use in the office	Between Groups	(Combined)	7.875	1	7.875	7.875	.009
	Within Groups		30.000	30	1.000		
	Total		37.875	31			

Finally we wanted to calculate how much a variance or a change in one variable (from parametric to non-parametric) can cause a change in another variable (creative decision making). The paper used the Spearman rho correlation test in SPSS to establish the magnitude of association between the two. The results are presented in Table 3.

Table 3. Correlation of parametric/non-parametric CAD's with creative decision making. P (significance) <0.05 means that the difference is statistically significant and not due to chance

Correlations			Nature of CAD use in the office	CAD does enhance Creative Decision Making
Spearman's rho	Nature of CAD use in the office	Correlation Coefficient	1.000	.449**
		Sig. (1-tailed)	.	.005
		N	32	32
	CAD does enhance Creative Decision Making	Correlation Coefficient	.449**	1.000
		Sig. (1-tailed)	.005	.
		N	32	32

** . Correlation is significant at the 0.01 level (1-tailed).

The correlation between the two variables, Table 3, is significant at the 0.01 level which means that this relationship is 99% logical or causal and has a very slim probability of only 1% that it occurs due to statistical chance. To calculate variance the value of correlation coefficient (0.449) has to be squared, which gives a value of 0.201. This implies that a change from a non-parametric CAD tool to a parametric one will produce a 20% increase in creative decision making. However, one has to accept the limitation of this assertion in that it is mathematical and statistical, thus it is valid in theory. However, one may not get the same result in real life situation in architectural practice, as there could be so many intervening variables that will affect this relationship.

4. CONCLUSION AND DISCUSSION

A single case study with a limited number of variables can at best refine a hypothesis than establish new knowledge. The study also has some other limitations. For example, the sample size was too small to arrive at any firm conclusions and thus any conclusions drawn from this study have to be taken with due care. Unlike a large sample, a small sample size is also very prone to statistical errors since a small change in a response to a question either way can swing the results significantly. Additionally, the author could not find any surveys of parametric practices to compare the results with and tone down the findings, despite repeated literature searches.

Having stated the limitations, some tentative conclusion, though, can be drawn from this study. First, parametric CAD tools were found lacking at the conceptual design stage.

In fact non parametric tools fared better in this regards. The author is a competent user of parametric tools such as Grasshopper and it is his belief that parametric tools are complex, difficult to learn by a novice CAD user and arduous to use at the early design stage. They don't lend themselves to be used like traditional CAD software where the generation of 2D and 3D entities is straightforward, quick and direct. The illustration in Figure 3 may explain this better. In a non-parametric CAD system such as Rhinoceros, you can draw a line easily and directly by choosing the line button and clicking on two points on the screen. This is similar to the way we draw a line with pencil on paper. In parametric software such as Grasshopper, you need to create 2 point components and a line component and drag a line (wire) from each point component into each of the two input channels, A and B, of the line component, Figure 3. This is not a straightforward procedure.

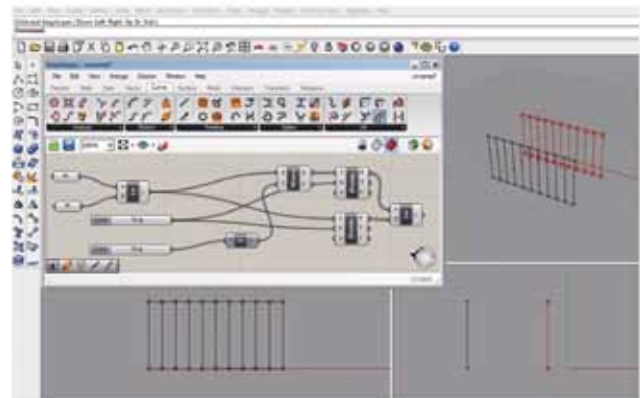


Figure 3. Direct drawing in Rhinoceros and indirect drawing using components and parameters in Grasshopper

In one operation, you can also divide the line into several pieces using the divide command in Rhinoceros, copy it and move it upwards on the screen using the mouse. In Grasshopper the procedure is far more complicated. First you need to create the divide component and link it to a slider that controls the number of divisions. Then you will have to create the move component, specify the direction (x, y, z) of the move by creating a vector, another component, and a slider to specify the distance for the move. One could argue that this process is cumbersome and incompatible with the conceptual design stage where the link between thinking and drawing on the screen has to be immediate rather than convoluted.

Further, parametric tools were considered to be slightly better than non-parametric regarding the way they deal with

complex surface geometry, but the difference was not found to be statistically significant ($P=0.147$, >0.05). On enhancing creative decision making in design, parametric CAD tools again proved to be more desirable aids than non-parametric ones despite their weaknesses at the conceptual stage. Evidenced by several P values <0.05 and coupled with the fact that parametric CAD tools were perceived, on average, as having a higher performance and being more supportive of the design process than non-parametric tools, this research has to reject the null hypothesis and accept the alternative conjecture that parametric CAD tools do in fact differ from non-parametric tools in offering designers more potential and opportunity to enhance design performance. Table 4 gives a summary of findings.

Table 4. Design process variables: differences between parametric/non-parametric CAD, based on levels of P (significance) <0.05 , obtained in previous tables

Variables where differences existed between Parametric and Non-Parametric CAD= Reject the Null Hypothesis		Variables where differences DID NOT exist between Parametric and Non-Parametric CAD= Confirm the Null Hypothesis
Façade design	Type A	Use at the early design stage
Digital fabrication		Use for exploring complex surface geometry
Generation of design variants (an indicator for creativity)	Type A- indicator to double check Type B	
Improve work flow between design teams	Type A	
Use for structural optimisation		
Use for environmental analysis and optimisation		
Enhance creative decision making (4 dimensions of creativity)	Type B	

In closing the findings from this study on parametric CAD can also be useful to disciplines other than architecture, for instance textiles. Collaboration and cross-over of ideas between the two disciplines is well documented in the literature, i.e. project Listener, which is labelled as ‘an architectural research probe’ by its authors. (Ramsgard-Thomsen and Karmon 2012) They state:

‘In developing the textile pattern and material specification for Listener we created our own interfaces between architectural design software and CNC knitting. Listener is developed across a diagrid base pattern. The diagrid defines the holding pattern creating a base diagram from which the deformations of the pattern can be determined. Responding to an imagined scenario of occupation and interaction, our aim was to distort the diagrid creating fields of varying intensity, suggesting a higher degree of responsiveness around particular areas of the body. The pattern is designed using parametric software that allows us to interactively programme the design environment.’ (Ramsgard-Thomsen and Karmon 2012)

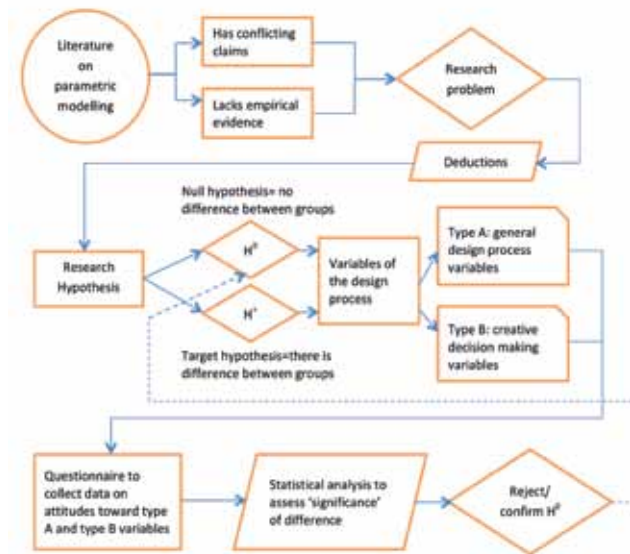
Perhaps this is just the beginning, where the digital fabrication of materials in architecture and the architectural articulation of patterns in facades, both inspired by parametric software, can stimulate information based thinking in textile knitting.

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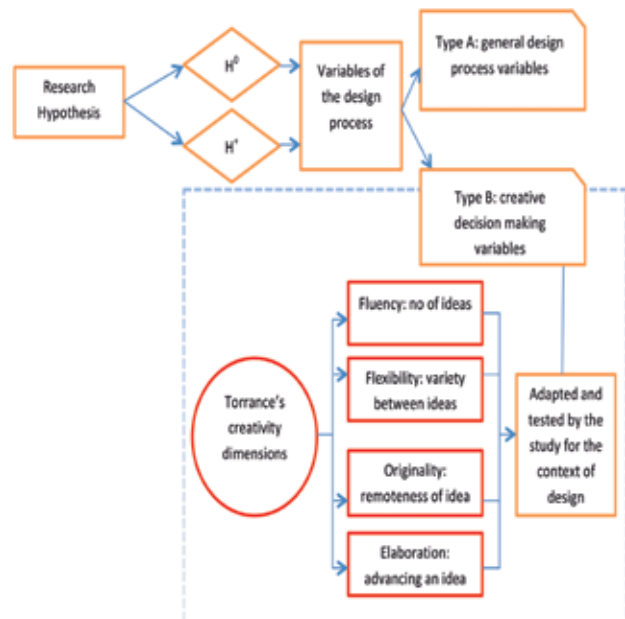
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Appendix 1: The research design.



Appendix 2: Relationship between Torrance's 4 creativity dimensions and the research design.





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THE PREQUALIFIED COMPETITION

– empirical findings on selection of design teams
in ten invited competitions

BY MAGNUS RÖNN

KEY WORDS: Prequalification, Architectural competition, Invitation, Procurement, Organizer, Client, Architect firms, Competition teams

ABSTRACT

This paper presents findings from a study of prequalification in architectural competitions. The aim was to develop knowledge of how organizers in Sweden select architects/teams to invited competitions. Prequalification is a selection procedure used early in the competition process for identifying suitable candidates for the following design phase. The research question is about how the organizers find these candidates.

There are ten competitions examined in the study. Five municipal competitions and five organised by government clients. The reason for the selection of cases is that the public sector is a major organizer of competitions in Sweden. The methodology of the investigation is a combination of mapping, case studies and document review. Results show that there are 375 applications from architects in the competitions. 43 architect firms/teams (11 %) have been invited to competitions. The vast majority of the applications (84 %) came from Sweden. This is explained by the fact that organizers require Swedish as the competition language.

All the organizers used a selection process that included two distinct phases. The clients start by checking whether the applications meet the requirements specified in the invitation. This is followed by an evaluative phase with assessment of the architectural offices professional profile, supported by relevant reference projects and personal references. Decisive in the final assessment is the organizer's evaluation of the candidates' ability to produce the project with architectural quality, to combine creative solutions with functional demands and to cooperate with developers and contractors. The assessment in the second evaluative phase is performed with the support of three different models: voting among reviewers, scoring merits in applications or by an overall assessment of candidates.

1. INTRODUCTION

This paper looks into the prequalification of architectural firms in contemporary architectural competitions in Sweden. Prequalification begins when the organizer draws up and extends an invitation for the competition. Architectural firms express their interest in participating by sending in their applications. A group of persons from the organizing body, a section committee, will then go through the applications and point appropriate candidates. Despite the significance of prequalification has for the forthcoming assignment there are surprisingly few studies that focus on the selection of architects for invited architectural competitions.

Leentje Volker (2010) has investigated how public clients

in Holland contract architectural services. There is a strong dissatisfaction among architects in Holland on bureaucracy, high costs through and excessive requirements from public clients compared to the scope of the projects (Kroes, Meijer, & Visscher, 2009). Volker and Lauche (2008) note that the selection of architects for competitions and the judging of competition proposals resemble each other.

In Denmark prequalification in competitions has been studied at the School of Economics in Copenhagen by Kristian Kreiner and Merete Gorm during 2008 and 2009. The study from 2008 describes the perspective and experiences of promoters. Kreiner and Gorm seek knowledge about prequalification using questionnaires directed at public and private promoters/clients. I am analyzing documents from a strategically chosen group of public organizers in order to provide new empirical evidence important for the profession. My study only includes only public clients, as opposed to private promoters, who must select firms/teams in accordance with the Public Procurement Law.

Purpose and research questions

This paper describes the results from an explorative study of prequalification in a Sweden. The main object was to gain more knowledge about how architects are invited to competitions. Of primary interest for the research were the first three steps in prequalification: *invitation*, *application*, and *selection*. Since there are many more applications from architectural firms than are able to participate in an invited competition, the organizers are forced to make a selection. This crucial point will be investigated in this paper with the help of the following research questions:

- *How do the competitions highlight their attractiveness?*
- *What competence and information are sought from the requirements in the invitation?*
- *Which criteria steer the evaluation of the candidates?*
- *How is the selection process organized?*
- *What evaluation models are used by clients to choose the firms/teams?*

Theory and method

I have used a theoretical reference frame that include following research strategies for gathering and processing data:

- *Mapping:* The study began by mapping The Association of Swedish Architects' home page for competitions. The investigation was limited to public competitions during 2007–2009. There were 20 invited competitions during that period organized by public clients.
- *Case studies:* Ten of 20 invited competitions were then

selected for cases studies, five competitions with municipal clients and five with governmental clients. The cases has been studied separately and thereafter compared with each other (Stake, 1995; Johansson, 2007). By means of comparison, the similarities and differences were identified.

- *Document review:* To get access to the competition documents the organizers were contacted by mail and telephone. I asked for notes from meetings, decision material, protocols and invitations to prequalification. The documents were analyzed by “close reading”. The key words and meaningful sentences were noted and interpreted in their context (Milos, 2010).

2. RESULT

The ten competitions included in the study generated 375 applications. 315 out of 375 submissions (84%) are from Swedish architect firms. 60 out of 375 (16%) applications are submitted by foreign firms. 43 architect firms (11%) have been invited to competitions. 38 of the 43 invited firms/teams (88%) come from Sweden, three from Denmark and two from Norway. One reason why the competitors are mainly from Nordic firms/teams is the organizer’s requirement that the competition language must be Swedish. The organizer’s rule on language reflects their wish to follow up references and acquire information on how the architects cooperate with clients, developers and contractors.

Interest and attractiveness

All competitions in architecture and urban design are not of equal interest. Some competitions in the study were more attractive to the firms/teams than the others:

- 2009 competition for housing Västra Kajen in Jönköping town (62 submissions)
- 2009 competition for an exhibition building (visitor’s centre) in Laponia (54 submissions)
- 2008 competition for an exhibition building (visitor’s centre) at Lake Vänern (51 submissions)

Least interesting were the following competitions:

- 2007 competition on Entrance to Skuleskogens National Park (9 submissions)
- 2007 competition for an exhibition building (visitor’s centre) at Stendörren (22 submissions)
- 2007 competition for an exhibition building (visitor’s centre) for wetlands in Kristianstad (29 submissions)

These differences can be sought in the competition tasks. The competition for new housing in Jönköping, which is a larger housing project, has for example more candidates compared with the entrance to Skuleskogens National Park,

which is a smaller project. An equally important result is that among the competitions for exhibition buildings (visitor’s center) there are cases with both strong interest (54 applications) and weak interest (22 submissions). The competition tasks and how challenging they are for the architects seem to be an insufficient explanation. There must be other driving forces behind the differences in the architect firms’ response to the invitation.

Price level and interest

The organizer influences the competition with economic compensation. The amount of the prize money varies from 300 000 SEK to 1 million SEK. The organizer’s compensation to the competitors also differs, from at least 100 000 SEK per architect firm/team to a maximum of 200 000 SEK.

Three competitions had lower prize remunerations than the others. These cases have an award sum of 300 000 SEK – 400 000 SEK. Compensation to the architect firm/team is about 100 000 SEK – 125 000 SEK. Altogether 80 architect firms wished to participate in these competitions.

The three “highcost competitions” have a prize amount of between 750 000 SEK – 1 000 000 SEK. Remuneration to the architect firms/teams varies here from 150 000 SEK to 200 000 SEK. The higher remuneration level generated 158 applications, which are twice as many applications. The result shows that the economic conditions have a significant influence on the attractiveness of the invited competitions.

Submission requirements and design criteria

The submission requirements and the criteria for assessing the applicants in the invitation reveal the kind of information that will be used to select candidates. There are a number of “must haves” and design criteria for evaluating candidates, which appear repeatedly in investigated invitations. They are:

- *Curriculum Vitae:* CV for responsible architects in the design team.
- *Reference project:* 3–5 reference projects relevant to the competition assignment. Usually 2 out of 3 projects should have been implemented.
- *Client references:* contact information for reference persons of the clients in the projects mentioned (promoters, contractors).
- *Project organization:* a plan showing how the assignment should be carried out on the site and how the necessary knowledge/professions should be coordinated for the project.
- *Quality system and environmental policy:* Statement of the firm’s internal system for quality assurance and environmental policy.

- *Finances and taxes*: Documentation of company's economic situation and paid taxes. The information must not be more than 2 months old
- *Affidavit*: an affidavit that the company has not filed for bankruptcy, is not under court administration or committed any grievous error in the practice of the profession.
- *Contact information for the applicant*: company's registration number and name, telephone number, e-mail of the contact person.

The document is an expression of administrative and economic security together with professional competence and design profiles. The "must" demands in invitations represents a rational decision making process in contrast to selection by architect critique (Svensson, 2008).

Design criteria

The final choice of architect firm/team for the invited competition is based of criteria described in the invitation. The candidates' suitability is determined according to:

- *Architectural quality*: How has the architect applied the concept of "good architecture" in the reference project?
- *Creative ability*: How has the architect developed innovative solutions to the architectural and functional problems of the reference project?
- *Collaboration*: How has the architect cooperated with the client, the promoter and the contractor on the reference project?
- *Competence and resources*: Does the competition team have the professional competence and the resources required for the assignment?

These four design criteria reappear in all selection processes. The criteria had two steps: *what* and *how*. The first step pointed out values the organizers felt were especially worthwhile, which in this case are: Good architecture, creativity, ability to collaborate, as well as competence and resources. The first step describes *what* is important in the appraisal. Then comes the second step in the evaluation, which is a question. The second step is about *how* the organizer should go about the evaluation. The organizers learn about the architects' qualifications by questioning their references. This dialoguebased evaluation is decisive for selecting which architect firms/teams will be invited to participate in the competition.

Selection committees

All ten organizers had appointed special selection committees to review the candidates. The committees were made up of between three and six persons. Some of the reviewer later

returned in the competitions process as representatives for the organizer on the jury.

The Association of Swedish Architects participated in the organizers' selection committees both as advisors and decision makers in accordance with the decisionmaking documents. Suggesting selection principles, informing about criteria for evaluation and describing the profiles of architect firms can be regarded as "consumer advice" from The Association of Swedish Architects. But participating in the decisions is not problemfree. It may be regarded as going against the principle that all members be treated equally and be offered similar conditions. I have not come across any extensive criticism concerning the participation of The Association of Swedish Architects as a decision maker in prequalification. The Association's participation may be seen as a counter weight to the organizer's tendency to choose "a sure thing", wellknown architect firms they are familiar with and who can show implemented projects relevant to the competition task. According to the Competition Committee, The Association usually encourages organizers to "invite an untried firm to compete with the more established ones" (The Association of Swedish Architects 2010, p 9).

Selection process

Municipal and governmental organizers begin the selection process in the same way. It starts by checking if the candidates have fulfilled the requirements. The search for appropriate candidates is a two-stage selection process with an initial check of "hard" requirements followed by a "soft" assessment where references, profession profile and merits play a key role. Most companies have good order in their finances, administration and references and proceed to the next phase. But in two of ten cases there were an early elimination of 31 candidates by "strict" selection committees. The difference between "strict" and "liberal" organizers lies in how professional competence is defined, evaluated, legitimized and included in the competition.

Three model types appears in mixed forms, but is here simplified for the sake of clarity. The models may be called voting model, scoring model, and judging model.

The prequalification for the 2008 competition for an exhibition building (visitor's centre) at Lake Vänern (Victoria House) is an excellent example of the voting model. Characteristic for this model is that the selection of candidates takes place successively through a series of votes until they had 5 favorites. The decision principle is based on comparison and personal approval.

The 2009 competition for Stora Torget (Main Square)

in Visby town illustrates the scoring model. The design criteria for evaluating professional merits in the invitation are transposed to a point scale (1–5 p). The three candidates with the highest points are then invited. The principle behind this model is that the organizer can find appropriate firm/team by mathematically means.

The 2007 competition for the exhibition building (visitor's centre) for wetlands in Kristianstad represents a third way to select candidates. The townplanning architect pointed out how interesting the design teams seemed to for the task. The model is based on the organizers making an overall judgment. The thought behind this is that it is possible to find a desirable mix of design team by weighing different aspects into a comprehensive whole.

3. DISCUSSION

The organizers try to steer the competition process by ex ante principles. This means that they want to control processes "ahead of time" through the competition tasks, the competition conditions and the selection of firms/teams. This is steering through prequalification. How can the findings be understood?

1. Attractiveness: The first research question is about the competitions' power of attraction. The number of applications by architect firms appears to be part of a professional praxis; it is a way for established firms who have been able to manage a portfolio of implemented projects to compete for an assignment. The competitions with the highest prize sum and largest remuneration generated more applications than the "low prize competitions". The economic conditions are more important than the assignment itself and how this challenge is described in the invitation by the organizer. Another factor is future assignments. A larger building project from this point of view is more interesting than a lesser design assignment. However, it is very difficult to get a clear picture from the invitation about the extent of the work involved for the winner. The language demands can explain the attractiveness of a competition from a European perspective. All of the organizers in the study have required Swedish as the competition language. This demand makes competitions of extra attractive for Swedish candidates. The requirement gives the competition culture in Sweden a national stamp with a Nordic touch.

2. Information: The second research question focuses on the competence and information sought by the organizer in the invitation. Beyond the requirement lies a standardization tradition, which probably comes from the legal regulations

for negotiating architectural services, supported by guidelines from The Association of Swedish Architects and The Swedish Federation of Consulting Engineers. The prequalification invitation outlines various types of information: documents, design projects and verbal communication are sources of knowledge. The financial requirements results in written documents favor established firms with good economies free from payment defaults. CVs are written sources of information on design teams and their professional skills. The description of the project organization in the application gives the organizer a futureoriented picture of the competition. In their invitations, eight out of ten organizers request that teams cover several professional fields.

Reference projects are representations of projects (photos, illustrations, drawings and descriptions), which the selection committee must interpret by architectural critique to get an idea about the firms' design capabilities. Reference projects should be both implemented and relevant to the competition assignment. The demand makes it impossible for newly established firms to proceed in prequalification. The requirement for reference persons at clients leads to verbal information. The organizer wants to be able to get an idea about the architect firm through direct contact with promoters and entrepreneurs. It is mainly in the final judging of candidates that organizers have contacted the reference persons for information about the architect's ability to cooperate. The answers from the reference persons are a mix of personal experiences and general judgments. Volker and Lauche (2008) also noted the promoter's selection of firms was based on the architect firm's reputation, particularly that of the project leader. According to Kreiner and Gorm (2008) Danish promoters follow their own experiences and network in their selection of architect firms. On this point my study gives a rather different picture of how organizers obtain information about the candidates. The invitation's requirement for references is a basis for systematic feedback about experience in prequalification.

3. Design criteria: The third research question looks into the design criteria public organizers use when evaluating a candidate. Municipal and governmental organizers look for design teams, which can combine their wish for quality, creativity and professional competence with financial security and sensitivity towards the demands of the client. The design criteria are of an open nature. This can be explained by the fact that these criteria are part of a dialoguebased assessment. Selection committees develop knowledge of the candidates' design qualifications by addressing questions about reference

projects. The design seems to reply. This dialog is a form of architectural critique (Attoe, 1978; Benedict 2007; Rönn, 2011). In three municipal competitions the selection process was completed afterwards using criteria, which are the basis for categorizing candidates from their professional profiles. Categorization may be seen as a search for a productive difference between candidates to give a more interesting mix of competing firms/teams. Taking the best candidate from each category in the competition allows the organizer access to a mix of teams with different profiles and qualifications.

4. Organization: The fourth research question is aimed at knowledge about how public organizers arrange their selection process. The five governmental run competitions were all organized in cooperation with the municipalities and local participants. Competitions serve here as a means for coordinating national, regional and local interests. Also the municipal competitions involve coordinating several parties; regional interests and internal administrations such as town building office, property office, or technical office. Thus there is a complex organizational structure in the competitions, which may explain the multidisciplinary challenge in task. The collective decisionmaking procedure by selection committees contributes to the increased similarity in the assessment of the candidates' merits.

There was an extensive cooperation between the organizers and The Swedish Association of Architects in the competitions studied. According to the rules the competition program should be approved by the organization. The Swedish Association of Architects has the right to appoint two members of the jury. The organizer purchases the services of the jury secretary or the competition administrator from the association. In three cases The Association of Swedish Architects also participated in the organizer's selection committees and actively participated in the final selection of firms/teams. This cooperation reflects the central role architectural competitions play in the profession.

All organizers have arranged the selection process in two main phases: an initial formal control of the applications for the requirements followed by a second value assessment of the candidates based on criteria. The control of how requirements are fulfilled shows that there are "strict organizers" who eliminate many applications at the beginning of the selection process. "Liberal organizers" only reject applications that have been sent in too late or are missing the required documents. More organizers prefer to wait with eliminating candidates until the value assessment part of the prequalification. The only requirement that can be answered

with a clear "yes" or "no" is that the application be sent in on time with the required documents. The requirement for a "relevant reference project" on the other hand, is something that must be seen in relation to the competition task. On this point experienced persons trust their professional judgment to a greater extent, focusing more on the content of the application and become "liberal".

The organizer's selections committees can be assumed to be more liberal towards architect firms they know or have worked with on projects. It is a decisionmaking principle that can explain why so many foreign firms are eliminated in the initial control made by "strict organizers". Ambiguities in their applications appear to be more risky compared with known architect firms (Hemlin et al, 1990; Kreiner and Gorm, 2008). It is the "sure" candidate who goes on in the evaluation. Organizers who protect themselves against any mistakes in the procurement also become stricter in reviewing the applications. As a consequence of the 2002 revision of the LOU (Swedish Public Procurement Act) it has become easier for bidders to stop procurement when there are serious shortcomings in the material (Lennerfors, 2010).

5. Evaluation models: The fifth and last question concerns models for evaluating candidates in competitions. Three fundamental models are used in the final judging of submissions and can be summarized as voting, scoring and judging. The selection committees use the models to identify significant differences in the quality of the submissions, motivate the selection of design teams and legitimize the decision. The use of fundamental models can be explained by the organizers need for systematics when choosing candidates for a competition. Models reflect a professional praxis, a methodology based on experience to highlight qualities in applications and evaluate architect firms. The legal aspects of prequalification have probably strengthened the desire for professional evidence in the selection process for municipal and governmental clients.

It is in the second evaluation phase of prequalification that the models become methods for evaluating and ranking candidates. Characteristic for the voting model is that the selection of candidates takes place through a series of votes. The favorites proceed to the next phase. Remaining at the end will be the candidates the selection committee thinks most of and therefore judge to be more suitable than others for the competition. The voting model is an assessing procedure in architecture, which is firmly established in architectural education and professional practice. Judging is based on evaluation and comparison (Rönn, 2010). The scoring model

has a point system, which presumes that the candidate's merits, as described in their application, can be graded according to a scale previously decided upon. Then the points are added up. The result is a mathematically based ranking. The candidates who get the most points are invited to the competition. In the judging model the organizer's evaluation is made considering a steering entity in the background. By weighing together qualities using architectural critique the organizers arrive at a decision about which firms/teams are most suited to take part in the competition. The final choice of candidates is made aiming at the idea of a superior wholeness. The evaluation is presented to the competition candidates. How the organizers judged their merits remains an internal secret by the selection committee.

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HOMEPAGE

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ARCHIVES

County Administrative Board of Norrbotten: 2009 competition for an exhibition building (visitor's centre) in a national park (Laponia), **Region Gotland:** 2009 competition for Stora Torget in Visby town, **WätterHem** (public company) and Riksbyggen (private company): 2009 competition for housing at Västra Kajen, Jönköping town, **National Property Board Sweden:** 2008 competition for an exhibition building (visitor's centre) at Lake Vänern (Victoria House), **Vaxholm town:** 2008 competition for Cultural Centre in Vaxholm town, **County Administrative Board of Östergötland:** 2007 competition for an exhibition building (visitor's centre) at Lake Tåkern, **County Administrative Board of Västernorrland:** 2007 competition for a new entrance to national park (Skuleskogen), **County of Jönköping:** 2007 competition for a new Music & Theatre in Jönköping town, **County Administrative Board of Sörmland:** 2007 competition for an exhibition building (visitor's centre) for nature reserve (Stendörren), **Kristianstad municipality:** 2007 competition for exhibition building (visitor's centre) for wetlands in Kristianstad.



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GOOD JOURNEY – A HELPING HAND FROM A TO Z

BY EMMA LÖÖF

This paper is a compressed piece of my final Master thesis in Industrial Design that was performed in year 2008. I made it as an Industrial Designer and former student at Lund University, Lund Institute of Technology, Department of Design Sciences and Division of Industrial Design. The requirement was to perform a design project through all phases of the design process, the subject itself was voluntary. I decided to combine my interests in service design and user focus together with earlier experiences as rehabilitation assistant within healthcare (considering both disabilities and elderly etc).

ABSTRACT

To travel with public transport and at the same times have a pleasant and relaxed journey is not a guarantee. Stress, insecurity and confusion can strike everyone, with or without disabilities. A political goal 2010[1] was to reach an accessible society in Sweden. We have now reached year 2012 and even if the society has improved considering accessibility there are still some roads to go. Tools that can be used are design and architecture etc. In my role as a designer I choose to include and focus on people who may have problem with information and navigation.

Three definitions created the framework for the project. Cognition; the thinking process where information and knowledge is received worked through and supplied. Democratic design; accept that people are different and does not exclude possible users. Public transport; a possibility for people to travel in an organized way in a common vehicle. The result of this project is a service that offers the information that is essential to fulfill a journey from A–Z.



Above: Focus areas and goal.

BRIEF

Public transport is a hot subject, which is the result of a desired reduction in carbon emissions and cities with a growing population. Alternations, renovations and new products are made with the goal to reach accessibility, to get a good result it's important that all decision makers understand that we all are unique and not a homogenous mass. About 10–20 % of the Swedish population has for example some kind of disability [2] and the population

is getting older than before. To use public transport from A-Z may be a problem for people with permanent or just temporary cognitive disabilities. A journey can be filled with negative feelings such as stress, insecurity or bad confidence and it can be hard to get in touch with important and relevant information. -Is it possible to change a sometimes stressful, unpleasant and confusing situation into something positive? -Is it possible to create a good journey also for people with a cognitive disability? The target group is more or less all people in an urban society who is in need of public transport. The starting point is although permanent or temporary impairments of cognitive abilities, this could mean problem to handle information, planning or dealing with time. All people have problem with their cognitive abilities sometimes even if they don't have any specific diagnoses, it can be noticed when a person is in an emotional affect such as being tired, stressed or angry. The target group may also have additional physical disabilities. The intention was to improve the action of going with public transport to be and feel more clear, manageable and pleasant. The traveler should feel confident to go where and when he/she likes. One intention was to use the needs of cognitive disabilities as demands for a design solution that will benefit a larger group of people. The purpose is to make it easier for an uncharted group to participate in the society on the same conditions as average people. It's also a test of the concept accessible design as a design tool and guidance.

In this paper I present parts from the whole design process starting with my initial Research covering the areas Democratic design, Disabilities, Public transport and future context. This material was filtered, structured and revised in the Analysis phase and created frames and goals to use in the Ideation phase. That phase started very wide, to later become more focused and clear. In the Evaluation phase the next step where to test and compare ideas with help from potential users and towards established goals. In the fifth step the Result is described followed by Final Reflections.

RESEARCH

The start-up of the initial research was to explore an activity that could achieve a higher level of independence for people with cognitive disabilities. An important source of information came from three visits at Grunden Media [3] a daily centre in Gothenburg (according to LSS, Act concerning Support and Service) for people with some kind of cognitive disability. A first meeting with the centers members and staff decided the focus area public transport. Other respondents was the development companies

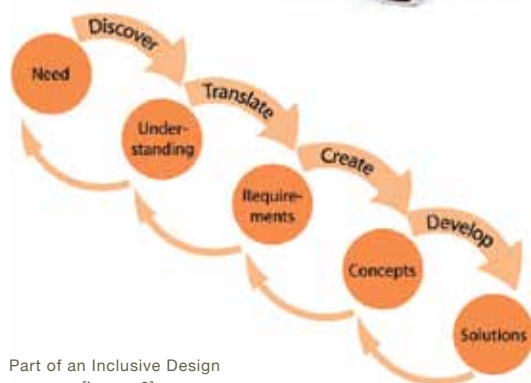
Handitek and Lots Design, which from their perspective answered questions about accessibility, design and approach towards cognitive and physical disabilities. Representatives from Trivector Traffic answered questions about current and future solutions for public transport. Lecturer and researcher Arne Svensk from the research group Certec acted like a sounding board, with experiences from both disabilities and design solutions. A conference on the theme of cognitive disabilities, organized by FKS [4] (Association for Cognitive Support) 2008 provided much useful information about existing disabilities and aids.

Democratic Design

In the brief was accessible design described as a goal for the project. In this Research phase it came clear that this topic exists with different explanations, formulations and methods for a successful result. To me it was not important to choose one direction more to use the best parts. In the report the term is called Democratic Design [5] and accepts that people are different and does not exclude possible users. The following short text describes five directions that was found and used as inspiration and explanation for how accessible design can be made.



Washing machine by Panasonic. [Image 1]



Part of an Inclusive Design process. [Image 2]

Universal design, USA, is mostly focusing on physical disabilities and architecture, it is a concrete concept with seven principles [6]: Equitable use, Flexibility in use, Simple and intuitive use, Perceptible information, Tolerance for error, Low physical effort, Size & space for approach and use. Inclusive design, UK is more wide and philosophical [7]. It also includes social, emotional, cultural, ethical and sexual differences and has a toolkit [8] [9] to use as guidance. Standardization, Guide 6 is guidelines [10] created by the European standard organizations with the ground in Inclusive design. It is a long list with the aim to encourage accessible solutions. Design for all is a European project [11], that is similar to Inclusive design but was (at least) from the beginning mostly disability oriented. The Swedish version Design för alla [12] is a result from the Swedish design year 2005. Design med omtanke/Considerate design [13] [14] is a project in Västra Götaland, Sweden. They make interventions and evaluations with existing public spaces in focus with green thinking including. The design process exists in four steps: Common foundation, A sustainable starting position, Aiming for the future, From idea to action.

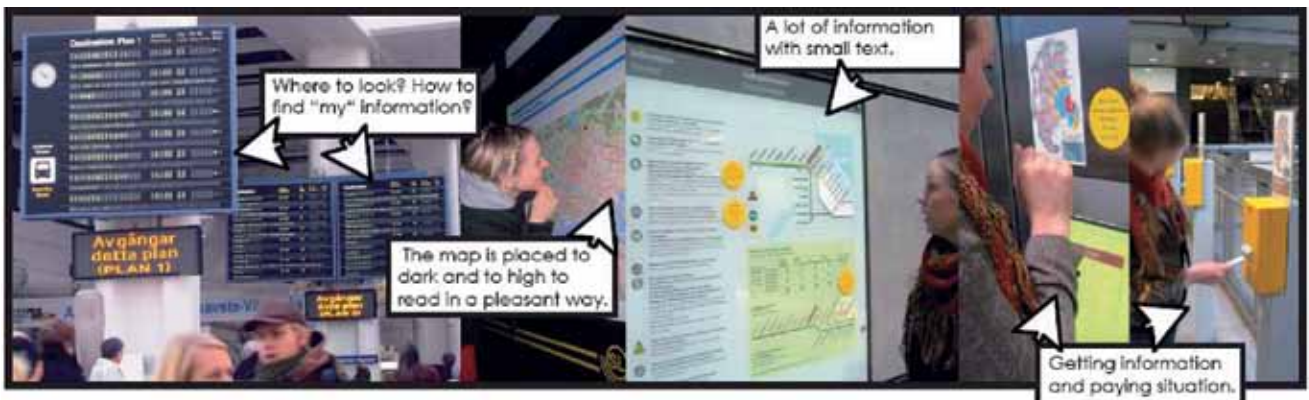
Disabilities

A person can become disabled by birth, a damage, disease, later in life or just shortly. A handicap occurs when there is a mismatch between a person and the surrounding. A better adjusted environment can lower a handicap even if the disability remains [15]. In the following chapter an investigation was made about possible needs, similarities and differences of people with cognitive disabilities with focus public transport.

The cognitive ability is about understanding and solving problems with help from the own senses including perception, memory, concept formation, reasoning and attention [16]. It's also connected to numerical and verbal skill. How much a person is able to use the thinking resources is very much dependent of external experiences [17]. A person with one or more senses with low function has a cognitive disability. Information about this very miscellaneous focus group and different diagnoses should be seen as approximate. It can take longer time to learn, to assimilate information, to navigate, to read & write and to plan for the future. Common diagnoses inside the spectra are Acquired cognitive disabilities, Asperger's syndrome, Attention Deficit Hyperactivity Disorder, Autism spectra, Down syndrome, Intellectual disability and Tourette's syndrome. Design with respect to groups with special needs can be divided into two directions. An aid is suited only for a special need and is something a



The thinking process [Image 3]. Being insufficient... [Image 4]. Superman temporarily loses his power [Image 5]. Aid compared to design for all [Image 6].



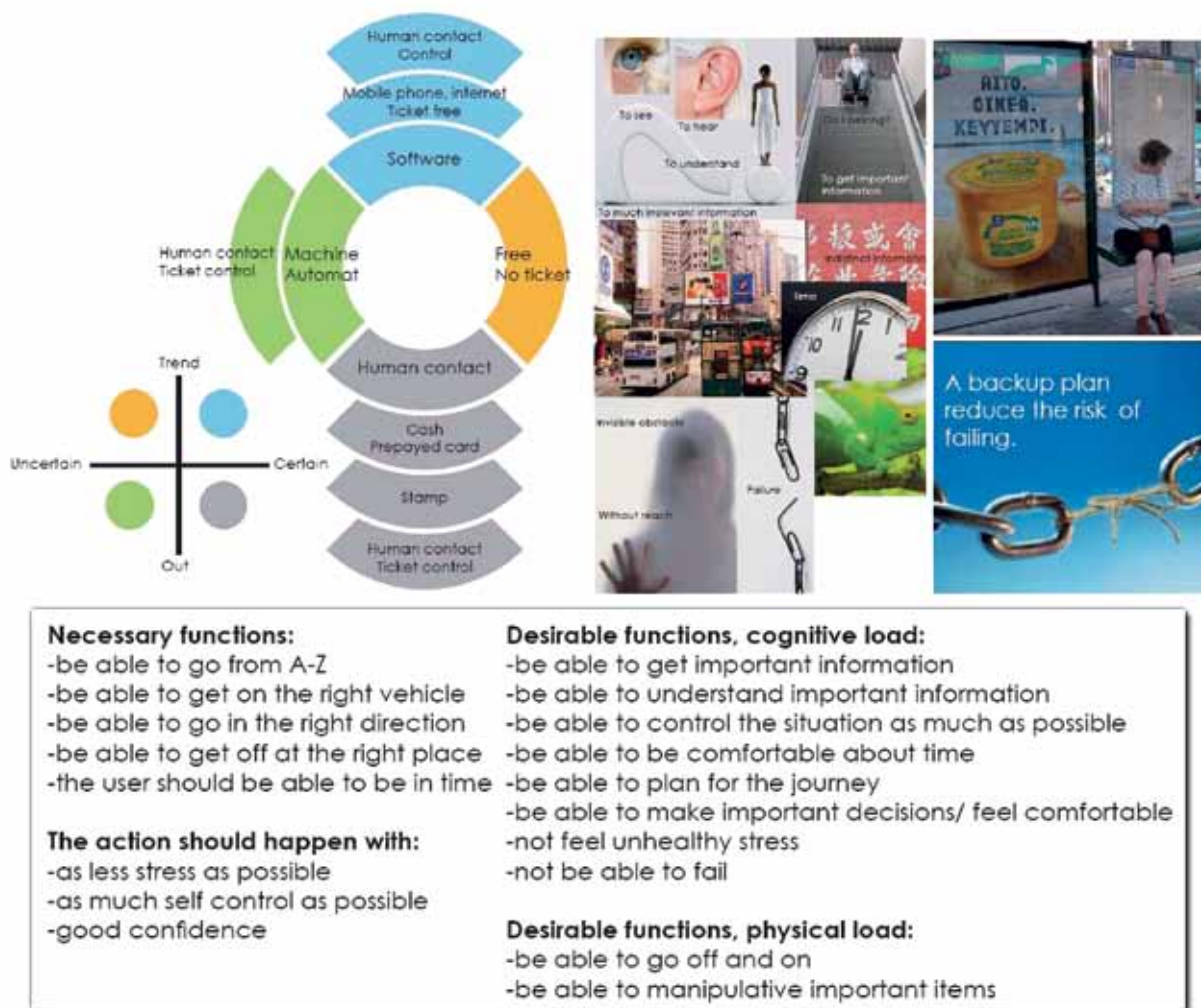
Research made in Stockholm, Gothenburg, Copenhagen, Norrköping, Hallsberg etc. A fusion of existing bus route creates a new hypothetical tram line [Image 7].
● = Bunkeflostrand-Kvarnby ● = Lindängen-Scaniabadet ● = Scaniabadet-Kvarnby

person only uses it if it's really necessary. The focus is on its function and the aesthetics has often a lower priority. A product with a Democratic design perspective appeals a broader user group and is as nice as other objects in the society. The solution is made with the understanding that very few fits into the mould of "normality". A good tip while designing for a dynamic diversity is to take in account different senses, one example is people with lowered sight who are in need of good light, big letters and contrasting colors. A visual message can be reinforced by a combination of text and image and a dark frame can make it easier to concentrate [18]. Electronic products can strengthen and clarify activities with feedback in form of sound, structure (Braille etc), color or light.

Public transport and future context

Public transport is a non-profit making service used by a huge range of customers. During the meeting with Grunden Media it came clear that public transport gives cause to a lot of feelings both positive and negative. It is an important tool to reach activities in the society, but it can also be an obstacle that prevents the same. The reactions involve both the physical forms of the vehicles and management of information. Documentation of different travel environments between Copenhagen and Stockholm was made to compare obstacles and opportunities. The largest general shortage was lack of continuity and too much irrelevant information.

It is becoming more and more common to consider tram systems as a solution to the need of an expanded public



Trends, problems and needs. A function analysis was made to decide and rate important goals and functions for the project.

transport in bigger cities. A tram is a good environmental choice with a stiff structure. Modern tram systems are called Light rail and are separated from the rest of the traffic which makes it safer. To set limits for the project a new hypothetical tram line between Scaniabadet-Kvarnby in Malmö[19] was formulated as future context. It is a growing city with a real need to expand its public transportation especially considering the areas between Rosengård and Västra hamnen.

ANALYSIS TO FIND CLARIFICATION AND GUIDELINES

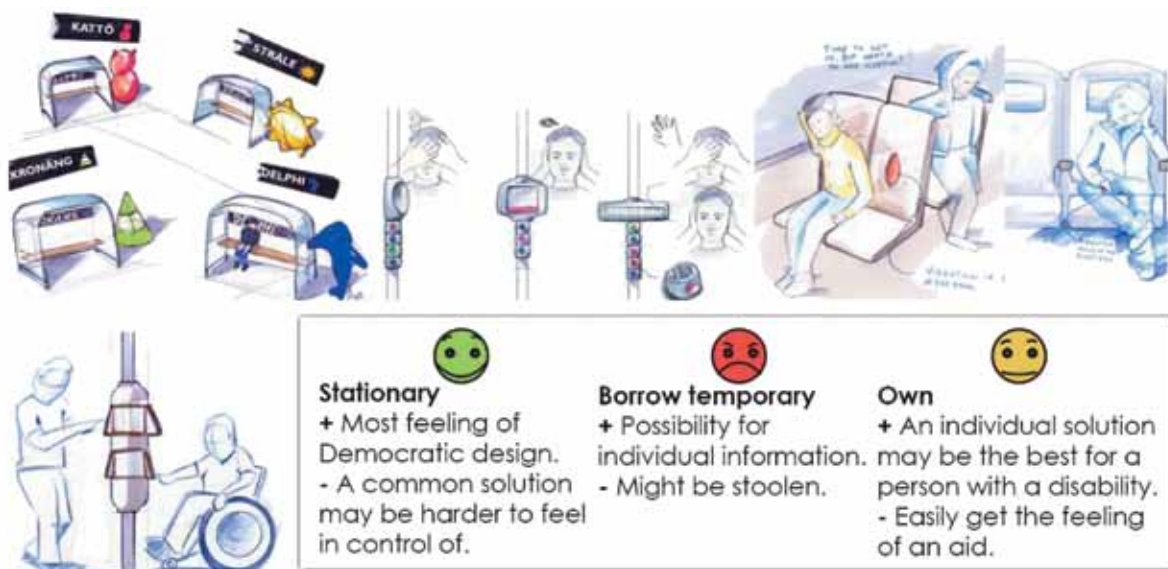
A Trend analysis was made over social and political trends connected to public transport today. One factor was of course the goal to reach accessibility in Sweden 2010 (it continues).

The analysis also show that human contact is disappearing and solutions with software are growing. The possibilities to buy a ticket on the vehicle are disappearing, that demands more from the traveler. Discussions and experiments of a free [20] or discounted transport are ongoing especially for children, students and parents with child in pram or senior citizens (also for sick, disabled and early retired). Arguments that would benefit people with cognitive disabilities are time saving, a shortening of the activity chain and less stress. The environment is an important, trendy and necessary factor that affects public transport. Sweden is one of many countries that have signed the Kyoto protocol which means that the percentage carbon dioxide must be lowered.

An analysis of Problem and Needs was made considering cognitive disabilities towards public transport without too much generalization. Problems can be stress, discomfort, insecurity, bad confidence and that some people pretends to understand more than they actually do. It can be hard to deal with time in relation to distances, to get enough feedback, to recognize, to remember and to concentrate. Some users cannot or have hard to read time tables. The user can get tired and give up if the activity chain is too long or complicated. A human contact can influence in a both good (a helping hand) and bad way (confrontations). Questions that can appear during the journey are: How much time is left? Where is the bus going? Where are we now? How do I pay, should I pay? An auspicious environment reduces the negative consequences of a cognitive disability. Needs to meet up towards the target group are a short activity chain and logic order. Many people with cognitive disabilities need to plan their time well and some kind of help for the memory. A new object should feel interesting, stimulating and fun. Text should be easy to read and only have one important thing per line, big lofty letters and no shortenings. It can be more understandable and clear with some kind of back up in form of pictures, vibrations, sound, flashing lights and tactile feedback.

IDEATION

This phase started with a brainstorm with sketches and focus around possible questions such as:



Mixed ideas considering different senses, the memory, recognition and ability to reach etc. A paired comparison.

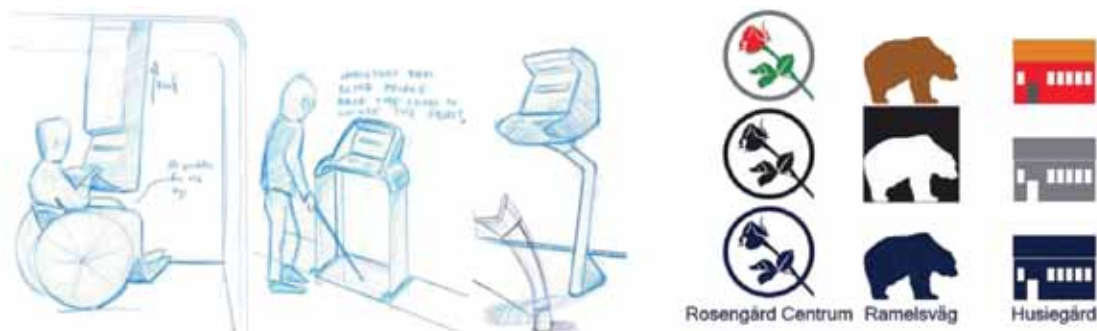
- How can a person feel safe, relaxed and in control while travelling, know where to get off, to deal with time, to get help and the most important information?
- Is it possible to repeat information, to get a quick navigation?
- Where am I right now according to my goal and what did they just say?

An overall solution was the idea of a helping hand during the whole journey both inside and outside the vehicle. The ideas that seemed most attractive were about relevant and individual information and unique symbols.

A paired comparison showed that a stationary solution had strongest value of Democratic design and an idea of a public info pillar started to take form. Mobile or borrowed solutions gave possibility for individual information, but it felt to unsafe in a public environment (risk of being stolen or lost). An own individual solution may be the best for the target group but have the risk to feel like an aid.

EVALUATION

The ideas were evaluated at Grunden Media, Lth and towards the Brief and Function analysis. About 20 interviews



Form for contrasting needs and a final compromise. Symbols for each waiting stop. Evaluation of form and interface.

[21] were conducted in the research and evaluation phases. Many of the ideas affected both the interior and exterior of a tram and its surrounding. To narrow the ideas and to create a strong concept an Evaluation was made. One difficulty with accessible design that came clear is that needs sometimes collides, compromises are in these cases necessary. Separate solutions are not desirable because it has a tendency to divide the users in a negative way, one example is sound that can be necessary for some (people with low sight) but on the other hand be annoying or frightening for others. Another example is wheelchair users that benefits ground with free space and no obstacles compared to white stick user who is navigating with help from different objects in the surrounding.

In the Ideation phase one idea was to use three dimensional shapes that both referred to stuff in the surrounding and that was easy for most people to recognize as a help to highlight specific waiting stops. This idea was later simplified into symbols with both functional and decorative values as a help for the memory and the recognition ability (inspiration from Pictogram and Blizz). The symbols were tested on other users at Lth with the goal to be clear and understandable. In the beginning the symbols had realistic colors, but that was later changed to reduce the risk of being confused of significance of the colors.

A physical part of the initial concept where a helping hand and info pillar, that form was evaluated to find the most ideal dimension, angle and height. The form had to be easy enough to recognize and to have the same look on all spots within the system. Seven 1:1 sketch models of the physical model was made and later evaluated at Lth towards about ten respondents in the ages 25–60. Semantics is always important in good design but may be even extra important for the focus group.

The most important functions for the user interface (screen and key set) were to show the most important information right now for an individual journey adjusted to different kind of needs. According to the research it was beneficial for the target group with one function per object, a short activity chain and clear information in as few layers as possible (preferably none at all). A test of the interface and the different parts of the system was made with help from different printed layouts and respondents at Lth, who gave their opinion about understanding, recognition and logic order. The biggest problem and compromise according to the interface was to keep a clean and minimalistic view and on the same time show the user all possibilities with the info pillar.

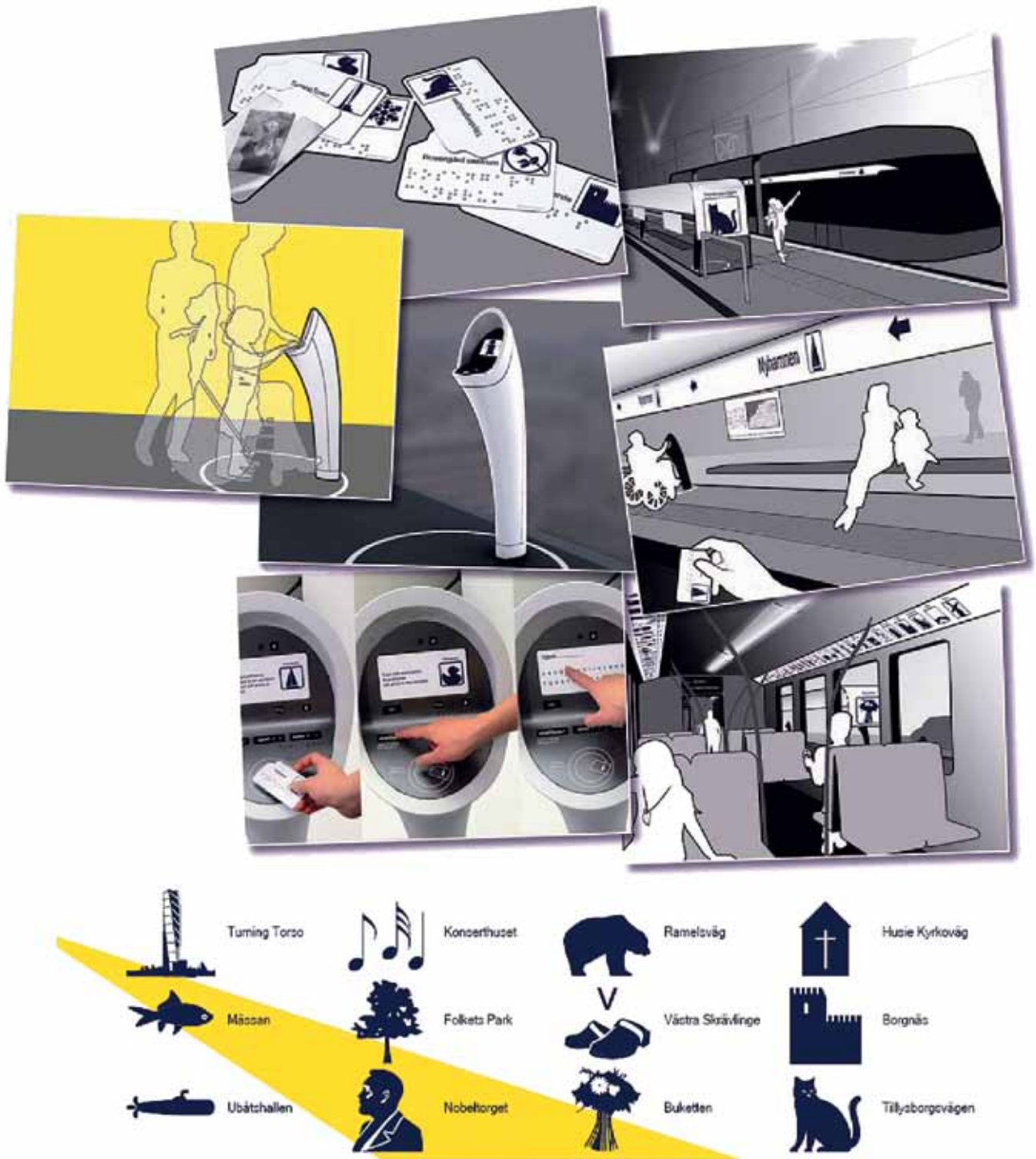
RESULT

The final concept is a system that offers most important individual information to the traveler in real time through the whole journey. The system is linked in a logical relationship with the function to be both a voluntary lifeline and an intuitive guidance. It is a service with the aim to let more people feel confident in a travelling situation (knowing that information/help is in hand). Four scenarios when the system can be helpful: A non Swedish speaking tourist would like to go to Turning Torso for the first time. A person who lives at a caring home is going to his daily centre in the other end of Malmö. Someone needs to switch from a tram to a bus at the central station. A child is going to her grandmother.

Inside the system are pictures (also sound) of greatest importance as a backup on screens inside and outside the tram, on the waiting stop, on a personal card connected to the interface. Every symbol has a connection to one unique waiting spot. Places like Rosengård (Approx. Rose court) got the form of a rose and spots connected to Västra Hamnen (Approx. West Harbor) got a water theme in form of a fish or a seabird. The symbols are dark blue and should feel clear, mature and create continuity inside the system. Physical objects/ info pillars were placed at different waiting stops as a helping hand. The info pillar demands the traveler to be interactive with it, but though it's not about money and tickets the traveler don't have to worry about stress or mistakes. The form was developed to be as accessible as possible considering height, angle and to catch some kind of interest. The body is thin and has a subtle curve as a compromise to meet the need of both wheelchair users (need to come close without obstacles) and people who are in use of a white stick (needs "obstacles" to navigate). The user interface (screen and key set) offers possibility to change language, to select or deselect sound, possibility to replace/enhance the written messages with images, sound and tactile feedback (Braille etc). The information is read from left to right and can be seen in three levels of difficulty to reach different persons needs and abilities. 1) To get information while swiping a preloaded card with a specific destination. 2) To get information by a direct action of pushing buttons. 3) To get information by spelling (touch screen), that was a compromise that unfortunately excluded blind people but was on the same time the best solution for most people including the focus group.

FINAL REFLECTIONS

So how did the project go? It was a both complex and



Collage of final concept and parts of final symbols.



Contrasting needs can complicate accessible design [Image 8]. Democratic design creates good design for more people.



interesting journey to perform it. The intention to ease up an important part of the journey for a large group of people was solved with one system that was linked into one unit with one graphic look and form. This was a reaction to the research that show that a big problem in public transport connected to information is the lack of continuity. The information and the actions the traveler is expected to perform today are too varied and dispersed.

Through the whole project I had to struggle with the goal to make an accessible design solution. Many good ideas with a too narrow target group had to be removed and sometimes be replaced with compromises. It can be a good way to go but it is also important to remember that an ideal situation for one person may be the worst for someone else. People in general distinguish themselves on countless variations, what I also realized in this project is that focus groups and delimitations are important even in an accessible design solution.

Advantages that I found while working with Democratic design were clear guidelines to lean on: include more/ exclude less. If that way of thinking is included from the start, the outcome would more or less always reach a broad target group and no after construction in the eleventh hour has to be made (save money and time). I think that this way of thinking and performing are the future and it will come more natural the more designers and constructors “force” themselves to work like this.

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IMAGES

- All unordered images (illustrations, photos, collages etc) by E.Lööf
 [Image 1] Universal Design <http://www.design.ncsu.edu/cud/index.htm> 2008-02-26
 [Image 2] Inclusive Design, www.inclusivedesigntoolkit.com, 2008-02-26
 [Image 3] <http://spacesuityoga.fi/les.wordpress.com/2008/11/brain-763982-1.jpg>
 [Image 4] www.veer.com
 [Image 5] Superman image
 [Image 6] Source of Water faucet unknown.
 [Image 7] Collage made from a map over Malmö. www.eniro.se, E.Lööf
 [Image 8] http://mythfolklore.net/aesopica/images_crane/19.jpg

This section presents dissertations and books in the design field. Have you read something that you think *Design Research Journal* should write about? If so, e-mail us at: designresearchjournal@svid.se.



Time for a rethink?

GUDS UTVALDA ART – HUR KAN PLANETEN ÖVERLEVA OSS?
(Original English title: *The God Species – How the Planet Can Survive the Age of Humans*)

Author: Mark Lynas

Swedish publisher: Ordfront, 2012

In recent year the design profession has been called into question by environmentalists. They argue that encouraging constantly changed fashion trends is not sustainable in the long run – not when raw materials are running out and energy consumption is causing climate change. True, nowadays designers are increasingly focusing on other things than producing knick-knacks, but the issue still remains. In addition, advocates of technology and environmental activists are often standing on opposite sides of the barricades, while designers are halfway in between. Perhaps this latest book from *Mark Lynas* can change that perspective and actually bring the adversaries closer together. Many technological developments in

various fields are already driven by environmental considerations, but much of this then disappears under a wave of emotionally charged environmental discussions.

Mark Lynas has been active within the British environmental movement and is known to be a canary in the coal mine. In this book he does something of an about turn. From having opposed nuclear power and favoured a small-scale approach and organic farming, he now talks about large-scale technological solutions and geoengineering, including climate manipulation. In an interview with Sveriges Radio in conjunction with the launch of the Swedish translation of the book, Lynas commented:

“We need a new environmental movement which doesn’t allow ideology and old preconceptions to outweigh modern science, but which instead dares to be optimistic about technology. If my book has a central message it is that we should become more pragmatic and less romantic. Quite simply, we must use all the technologies and the economic and social strategies which have the best chance of success.”

The *God Species* works through all the major environmental problems in chapters with names like “The Nitrogen Boundary”, “The Freshwater Boundary”, “The Aerosols Boundary”, “The Ozone Layer Boundary”, and so on. Lynas also shows how various environmental issues often come into conflict with each other. However, he does not believe that the dangers were previously exaggerated, but says he has realised that it is not possible to change people’s values or consumption patterns. We must therefore change tactics; for instance, he now says that we need nuclear power, but alongside renewable energy sources.

Lynas raises these difficult issues in a very personal but highly readable style and in impassioned prose. It is as if he is thoroughly fed up with all the

dystopian depictions of the future. So what should we do instead? He says it is science, research, technological progress and intelligence that will save the world – with the help of our joint effort. He concludes by saying: “The truth is that the global environmental problems can be solved. Let’s roll up our sleeves and do it.”

Let’s hope he is right. Or at least that his book can loosen the previous deadlock between environmental proponents and innovators – that would be good enough. For the design sector, too.

Lotta Jonson



Selling to businesses

SELLING DESIGN SERVICE

Author: Elisabet Fluff Kärrberg

Publisher: A designful mind, 2011

Selling Design Services is the result of a graduation project for the Master’s degree programme in Business & Design at HDK, the School of Design and Crafts at Gothenburg University. After having explored the field of service design with regard to the literature, research and practice, *Elisabet Fluff Kärrberg* has written a manual for how designers can sell something as abstract as a service. The book goes through all stages of the sales process, the value of design at various levels within a company, and how to communicate to the customer the value of design. A number of problems and obstacles are identified and suggestions given about how

to overcome them. The last chapter is a conversation between a designer who is trying to sell design services to a customer who lacks experience of design. The chapter shows in a good way how dialogue's various twists and turns are linked to the various stages of the sales process.

Lisbeth Svengren Holm

Designers meet companies

FRÅN FRÅGA TILL FÄRDIG PRODUKT
(From enquiry to finished product)

Author: Marcus Jahnke, Marie Loft

Publisher: University of Gothenburg, Business & Design Lab

“What happens in the encounter between design practice and the hope for innovation?” is the subheading of *Marcus Jahnke* and *Marie Loft*'s 80-page document. In a number of workshops they had three designers/design agencies meet with a group of employees of three different manufacturing companies. The aim was to get the companies to “experience” what design can offer in practice in the real world. The authors summed up their report as follows: “The project has generated many insights, not least into how design can contribute to understanding innovation from a meaning-creating perspective.”

More in-depth discussions and an extension of the study are underway and will be presented in Jahnke's upcoming dissertation.

Lotta Jonson



Hospitals of the future

CONSTRUCTION AND DESIGN MANUAL, HOSPITAL AND HEALTH CENTRES
Vol 1. General Hospitals and Health Centres
Vol 2. Specialist Clinics and Medical Departments

Editor: Philipp Meuser

Publisher: DOM Publisher, 2011

CONSTRUCTION AND DESIGN MANUAL, MEDICAL FACILITIES AND HEALTH CARE

Building Typologies Public Health

Author: Philipp Meuser

Publisher: DOM Publisher, 2011

The move away from buildings for sick people and towards guest-friendly care facilities for satisfied customers is the topic of the first two volumes of the *Construction and Design Manual* series, which offers more than 700 nicely laid-out and easy-to-read pages of photos and text. A third volume focuses on other types of medical facility (dentists' offices, pharmacies, etc.) under the motto “between tradition and the Modern Market”. Almost all the examples are German but the background facts and historical depiction apply to European conditions as a whole. The key term for all three books is “the future”, and the focus lies on the relationship between what can be practically implemented (from the human, economic or social point of view) and new technological equipment in an age when the focus should always be on the patient. The series is impressively rich in content

and the books are a suitable reference source for health care staff, architects and designers, among others.

Lotta Jonson

For the politicians

BRUKARENS ROLL I VÄLFÄRDSFORSKNING OCH UTVECKLINGSARBETE
(The user's role in welfare research and development work)

Editor: Lars Rönmark

Publisher: University of Borås

There is a lack of documentation about user participation in the welfare system, concludes this report from the University of Borås. The report gives many examples of how users can be involved in research and development work, and also presents a range of practical methods for user participation. Suitable reading for politicians, as well as researchers who want to develop their cooperation with users and user associations.

Lotta Jonson



Measuring design effects

Few organisations or companies are prepared to invest money in design if they have no chance of reliably calculating the possible results.

In our last issue we mentioned that six design-related organisations have jointly applied for EU funding to work with the OECD to try to find methods to measure the effects of design work within various councils. The organisations are Barcelona Design Center (BCD), Copenhagen Business School, DesignAustria, the University of Cambridge, the Hungarian Intellectual Property Office (Hipo), and the Swedish Industrial Design Foundation (SVID). They clearly have a strong belief that design really can make a difference. The EU has now given these organisations a grant of one million euro, and represen-

tatives of the six met for a kick-off at the end of March. Also at the meeting was the EU official in charge of design, *Christine Simon*. For just over two years the following issue will be addressed: How can design be used to create economic growth? How can we measure this?

In Sweden SVID will work together with the Swedish Agency for Economic and Regional Growth, the Swedish Agency for Growth Policy Analysis, and Statistics Sweden. A number of companies will be analysed based on specific parameters and the same approach will be used in the other countries involved in this project. It is important that the national studies are transparent so that the results are fully comparable within the entire EU. The work is scheduled to finish by the end of June 2014.

More EU and design

The secretariat of the European Commission's Design Innovation Initiative (EDII) is at Aalto University in Helsinki, Finland. To date no major news has been reported from that direction but it is hoped that work continues behind the scene.

A while ago 13 of the 15 members gathered together with some 40 guests to begin discussions about a policy document on the role of design in society. The main focus is on defining the balance between "functional, emotional and social elements with regard to user-driven innovation."

The basic issue is the same here as in the afore-mentioned EU project: to first and foremost make the design sector visible. Then it can become a force to be reckoned with.

Big changes from simple solutions

Idékatalog – sociala innovationer för äldre (Ideas directory – social innovations for the elderly) is the name of a publication issued by Vinnova (the Swedish Governmental Agency for Innovation Systems) in collaboration with Malmö University and the Center for Social Entrepreneurship Stockholm (CSES) at Stockholm University's SU Innovation. Vinnova argues that testing new ways to solve all the challenges faced by the welfare sector also helps to develop areas for future growth and entrepreneurship. In addition, the organisation says that social innovations are particularly important, not least because "they aim to increase people's well-being by identifying and meeting social needs."

The results present a number of inspiring examples as well as examples of the valuable local initiatives that have become very important in the daily lives of the elderly both in Sweden and abroad.



The ideas directory (in Swedish) can be downloaded as a pdf from www.vinnova.se under publications. The directory also has its own website, which can provide further inspiration: www.idekatalogen.se.

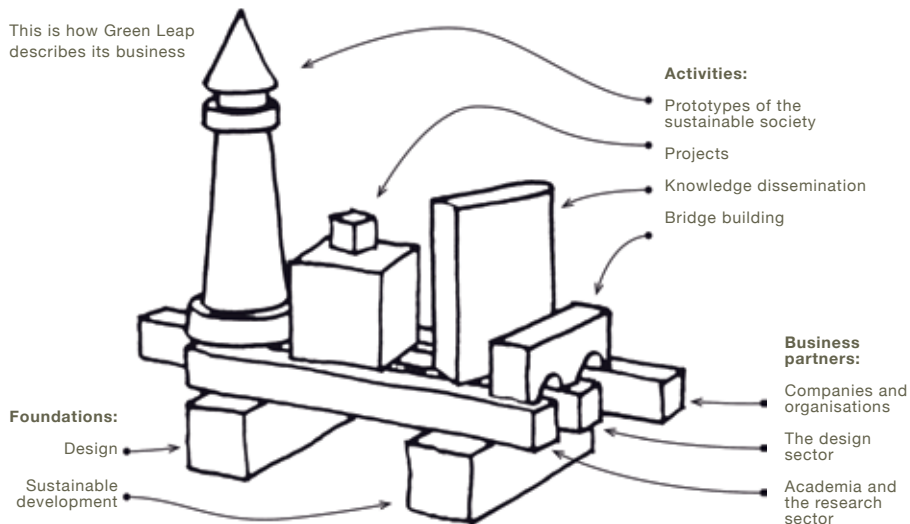
The directory also says that sometimes we can use very small, simple means to create solutions that become very significant to both the individual and society. One example is a network called *Ärtor i Haga*, which has brought together widowers who had no previous social contacts. Another is a knitting project that makes the most of women's skills. A third is a German lifestyle magazine for the elderly. The directory also contains additional inspirational reading.

How much of this has involved

various types of design solution? Vinnova's *Johanna Ulfvarson* replies:

"We consciously chose not to involve the word 'design' here as it was not part of the government mandate. I'm aware that much of the contents of the ideas directory are linked to design, but the fact is that people are not yet always totally ready to hear about the concept of design in social contexts. We've noticed that even terms like 'social innovation' can meet with opposition."

She mentions a conference entitled "SOCAP: Designing the Future", which was held in Malmö from 8 to 10 May, and which brought a range of professionals from the social sector, social policy makers and representatives of various design fields. The focus was on design issues and no one was afraid to use the term. Let us hope it is only a matter of time before the term becomes more widely used. See more at: <http://designingthefuturemalmu.socialcapitalmarkets.net/>



A green leap forward

A new meeting place for design and sustainable development is opening its doors this spring in Stockholm. Named Green Leap, it is based at the KTH Royal Institute of Technology. Konstfack University College of Arts, Crafts and Design is also involved. Green Leap focuses on the interface between design and sustainable development. The new venture's partners come from three directions: the design sector, the academic and research sector, and companies and organisations. Green Leap will work mainly in project form. The plan is to develop scenarios for an attractive and sustainable future, visualise technological research, try to develop new products based on such research, explore user behaviour, and develop new business models.

One overarching project is entitled "Prototyping the future" and aims to make the sustainable society concrete so that people can better understand the context. Green Leap will remain a distinct group but will form part of the Centre for Sustainable Communications (CESC), which is funded by Vinnova.

The head of Green Leap is Sara *Ilstedt*, professor of product and service design at KTH. Her fellow group members are industrial designer *Teo Enlund*,

previously professor of industrial design at Konstfack, and doctoral students *Loove Broms*, *Karin Ehrnberger* and *Anna Holmquist*.

Summer focus: Health

The Summer Design Office concept aims to use projects by design students to show companies and public sector organisations the power that exists in working with design methodology. Ever since the start about 120 such "offices" have been organised and about 600 assignments from companies and public sector bodies have been carried out. A summer design office consists of six to eight students, who work under supervision for seven weeks on a number of design-related assignments. This year the theme is health. Vinnova has funded five such offices, and there has been enough room to also bring in students from the areas of behavioural science and health care. This year's projects will focus on mental illness at the workplace and among children and young people and other topics. Three of the projects will involve fieldwork and existing design agencies, which is also new for this year. www.svid.se/sommardesignkontoret

2-6 JUNE

Diagrams

CANTERBURY, UK

International interdisciplinary conference covering research on the theory and application of diagrams, including architecture, artificial intelligence, education, graphic design, human-computer interaction, etc. www.diagrams-conference.org/2012

6-8 JUNE

Persuasive 2012

LINKÖPING, SWEDEN

Main theme: Design for health and safety. The 7th International Conference on Persuasive Technology is expected to gather researchers, practitioners, and students. www.ida.liu.se/conferences/persuasive2012

11-14 JUNE

CAD'12

NIAGARA FALLS, CANADA

Computer-aided design conference that also addresses sustainability, green energy, and architecture, plus CAD-related medical and social issues. www.cadconferences.com

11-15 JUNE

DIS 2012

NEWCASTLE UPON TYNE, UK

DIS2012, Designing Interactive Systems, is an interdisciplinary conference about the future of interactive systems design and practice. www.dis2012.org/

28-20 JUNE

Designing Food and Designing for Food

LONDON, UK

International conference that aims to bring together researchers in all imaginable fields that relate to food, food production, food history, etc. and to promote communication and interaction between academia and the design sector. www.fooddesign2012.com

1-4 JULY**DRS 2012****BANGKOK, THAILAND**

DRS 2012: Bangkok (DRS = The Design Research Society) will focus in particular on 'Re:Search: uncertainty, contradiction and value' in contemporary design research, education and/or practice.
www.drs2012bangkok.org

8-9 AUGUST**DMI 2012 International Research Conference 2012****BOSTON, USA**

The goal is to create an inclusive conversation among academics and design management (design strategy, product and interactive design, etc.), to examine the ways in which design thinking can inform innovation currently and in the future.
www.dmi.org

12-15 AUGUST**ASME 2012****CHICAGO, USA**

The 9th International Conference on Design Education. Theme: Scholarship in design education and the creation of archival literature in this area.
www.asmeconferences.org

12-15 AUGUST**12th PDC****ROSKILDE, DANMARK**

The conference will focus on attempts to define and create new possibilities within participatory design.
www.pdc2012.org

23-24 AUGUST**HAID 2012****LUND, SVERIGE**

The 7th International Workshop on Haptic and Audio Interaction Design (HAID). For researchers and practitioners interested in the combination of tactile technologies and sound, a challenging research area in interaction design.
www.haid.ws

3-6 SEPTEMBER**ICDHS 2012****SÃO PAULO, BRAZIL**

8th Conference of the International Committee for Design History and Design Studies. Theme: Design Frontiers: territories, concepts, technologies.
www.fau.usp.br/icdhs2012

2-5 SEPTEMBER**Design, Development and Research Conference 2012****CAPE TOWN, SOUTH AFRICA**

The second Design, Development and Research Conference has two new themes: ICT for Development (ICT4D) and Instructional Design (Education).
www.design-development-research.co.za

5-7 SEPTEMBER**Eco-Architecture 2012****KOS, GREECE**

The International Conference on Harmonisation between Architecture and Nature is driven by the depletion of natural resources and the need to preserve the balance of nature.
www.wessex.ac.uk/ecoarch2012

6-10 SEPTEMBER**Interior: a State of Becoming****PERTH, AUSTRALIA**

The conference focuses on the interior in flux by exploring and challenging the world of the interior as a state of constant and dynamic 'becoming' rather than 'being'. Major themes include the concept of adaptive re-use.
www.idea-edu.com

11-14 SEPTEMBER**Design & Emotion****LONDON, UK**

8th International Design & Emotion Conference, where practitioners, academics and industry leaders meet and exchange knowledge and insights concerning the cross-disciplinary field of design and emotion.
www.designandemotion.org

18-20 SEPTEMBER**ICDC****GLASGOW, UK**

The 2nd International Conference on Design Creativity addresses issues regarding cognitive processes underlying design creativity, computational models of design creativity, and practical processes to incorporate the human and social dimensions.
www.icdc2012.org.uk

24-27 SEPTEMBER**Making****NOTODDEN, NORWAY**

International Conference on Materiality and Knowledge. The conference aims to provide an outlet for international and interdisciplinary knowledge production within the Making Disciplines/ Making Professions/Making Education.
<http://making.nordfo.org/>

3-6 NOVEMBER**HEALTHCARE DESIGN 2012****PHOENIX, USA**

The Healthcare Design Conference is devoted to how the design of responsibly built environments directly impacts the safety, operation, clinical outcomes, and financial success of healthcare facilities now and into the future.
www.healthcaredesign.org

14-17 NOVEMBER**Cumulus: Projecting design 2012 – Global Design Bridge****SANTIAGO, CHILE**

www.duoc.cl/cumulus2012/

13-15 DECEMBER**ICOVACS 2012****IZMIR, TURKEY**

The theme of the 2012 conference is "Value Chain Sustainability through Innovation and Design"
www.icovacs.org

Design or research?

Why not both!

It is not uncommon for design and research to be pitted against each other. Business partners from both industry and academia often ask which is one really doing – design or research? Yet the two have far more in common than what divides them. So perhaps we don't actually have to draw such clear lines of distinction?

In the research context we normally talk about various traditions. The most common division is between the positivist and the humanist research traditions, or Galileo and Aristotle. According to the Galilean view, our entire world consists of matter in motion, which we can measure and express with the help of mathematical models. What distinguishes the two traditions is their view of human beings. According to Aristotle there is a subjective element present: an individual's own will influences what happens. Most researchers in the design field work with this latter tradition – the one that focuses on the human being and acknowledges our possibilities of making our own decisions.

In the design field – especially in the Nordic countries – we often look at the world from a very similar perspective. We base much of what we do on a human perspective, or a user perspective as it is usually called in the design context. We try to understand what drives the intended user and how we can work to help individuals and society function in a way that feels fit for purpose.

When it comes to creating something new, observation is the primary tool of both the researcher and the designer. The designer observes how the users function, identifies a problem and then tries to do something to improve the situation. Observation is equally important to the researcher – it is the observation that no one has addressed a specific (scientific) problem that is the starting point for new research.

In both contexts we strive to solve problems. First we must understand which questions are the right ones to ask, then try to answer them, and finally find solutions.

But surely the work processes themselves must differ?

No, actually not. Both begin by discovering what is already on the market. The designer does a background study of similar products – finding out what has been written or published about them, what the users are saying and so on. From all this, the designer then does an analysis to summarise the current situation before he/she can start to develop a new product or service. The researcher starts by finding out what is already on the market, checking what the experts are saying and so on. From all this information, he or she then does an analysis that becomes the basis for further work.

The practical procedure from the background analysis to a final product or service can vary. The most typical approach in the design field is to

sketch, test ideas, refine one's thoughts and finally polish the end result so it can be presented to the client or to a wider audience. In writing a scientific article, the usual procedure is to write a first draft, test ideas, refine one's thoughts and finally polish the end result so it can be presented to whoever ordered it or submit it to a journal or conference to gain a wider audience. In both cases the actual work is a craft: time and practice make one better and better at sketching, doing 3D modelling or writing.

Even the stereotypical images of the researcher and the designer resemble each other: spiky hair and a generally distracted air. The only difference is that the designer is often portrayed with somewhat thicker spectacle frames...

Nowadays design methodology is acknowledged to be a creative process; design thinking has become a concept within the research world. But perhaps the researcher and designer have always been this close to one another. It is just that we have finally managed to put our finger on a working method that both have long regarded as natural!

Anna Valtonen



Anna Valtonen is rector of the Umeå Institute of Design at Umeå University. She gained her doctorate in 2007 at the University of Art and Design Helsinki, now Aalto University in Helsinki, with a thesis entitled "Redefining Industrial Design". She is also chairman of the board of SVID.



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