Designing Human Technologies

Designing Human Technologies is a design-oriented Strategic Research Initiative supporting Roskilde University's new Humanities and Technology bachelor programme ('HumTek'), and its three dimensions: Design, Humanities, and Technology. The research initiative involves many researchers from different departments and research groups at Roskilde University through a shared interdisciplinary research and educational collaboration. As a creative research initiative it focuses on change and innovative thinking. The innovativeness is a result of the strongly interdisciplinary perspective which is at the heart of *Designing Human Technologies*. This research field thus cuts across the four main areas of the Humanities, the Social Sciences, the Technical Sciences and the Natural Sciences and involves RUC researchers with all four perspectives.

Designing Human Technologies is a **design**-oriented research field, the purpose of which is to be constructive (to make designs) and solution-oriented in close dialogue with citizens and users (who identify a need or a problem). The university's special contribution toward fulfilling this purpose is (1) to provide an analysis of the relevant issue, (2) to design solutions for particular issues through, for example, action research and (3) to reflect on how designs are used and incorporated in human lives. We have a basic **human** principle that users, target groups, and other central stakeholders must participate in the design and the design process, in ethical and society-related concerns, and in evaluating how designs fulfill needs and solve problems. *Designing Human Technologies* subscribes to a broad **technology** concept including information and communication, mobile, environmental/sustainable and energy technologies and technologies relating to performances and experiences, urban design, climate adaptation, etc.

The research takes a process-oriented and participatory approach and involves interaction between different user interests and designs. It is based on empirical, typical case- and action research-oriented studies undertaken in partnerships with public institutions and private-sector enterprises. A particular strength is the interdisciplinary approach facilitating intensive research of the interactions between different human technologies, and the ways in which humans and technologies are integrated. The concept of *Human Technologies* indicates this very integration. *Designing* is analytical, constructive and reflective: The research conducted questions how human technologies work, how they are understood, what knowledge can be acquired from taking part in designing human technologies and in which ways research can contribute to these processes.

Purpose

Designing Human Technologies consists of many researchers and research groups, each having well-established activities, but also having different networks, research domains, backgrounds, approaches and theoretical frameworks.

The purpose is to establish and strengthen a common research identity at RUC, comprising all academic resources with design interests. The goal is for *Designing Human Technologies* to become a new hallmark for RUC by 2016 and at the same time to constitute one of RUC's beacons in interdisciplinary research.

The research initiative should create the best possible conditions for researchers to meet, exchange findings and experiences, set up collaborations and carry out joint projects across research groups and departments. The strategy is to enable the currently existing well-

established research groups representing the many different epistemological and ontological theories at RUC to enter into dialogue in order for synergies to develop.

The focal point of the research initiative should be research. There should, however, also be support for the development of new graduate and PhD programmes targeting the HumTek area.

Focus

The research initiative addresses three issues/themes. Common to all three themes is a concern for the ethical aspects, through which researchers can explicate their reasons for and opinions on research activities and findings. Two of the themes refer to application areas ("Development and design of socio-technical systems" and "Aesthetics, experience and learning"), the third theme cuts across application areas ("Design as a scientific method").

Issue/theme 1: Development and design of socio-technical systems

Technological developments have increasingly narrowed the gap between social systems and technological systems. Today, human, social, material and technological systems are interconnected in ways that differ significantly from what characterised former societies. This trend can be seen in all areas of society: organisation and IT system development in for example the health sector, development of urban spaces, design of performances, design of museum events, development of environmentally friendly alternative technologies in the building and transport sectors, etc.

The focal issues in this context are the development and design of socio-technical systems for social benefit. The purpose is to provide research-based knowledge aout the development and design of new, innovative socio-technical systems in all those areas where RUC has special skills: health promotion, health and IT, environment/sustainable technology and renewable energy technologies, in relation to the service innovation area, business administration and network-based public sector management, museums and performances, etc. The initiative is based on the design, development and testing of prototypes and specific useful solutions in each of these areas in close collaborations among users, designers and researchers. The intention is to work pro-actively and solution-oriented and to draw on action research, knowledge on user-driven innovation and other collaboration-oriented methods, in relation to which RUC has special skills.

Apart from the above special characteristics, research in the development and design of socio-technical systems at RUC can be characterised as follows: Focus is on a solution that "works" rather than on what is "true" or "not true". Focus is on creative, innovative new design(s) based on current and imagined technological and social opportunities rather than on how socio-technical systems have so far been built within a specified area. Focus is more on practical, interdisciplinary problem-solving and research than on mono-disciplinary problem-solving and research. The objects of research comprise design and design processes in connection with construction and re-construction of socio-technical systems, and – in its basic form – research comprises studies of humans, objects, contexts and the interaction between these elements.

Researchers and research projects representing all of RUC's main areas are invited to participate in the development of this research area. The criteria for participation are: 1. That the purpose of the research is to solve a specific and practical societal issue; 2. That the research involves the construction or attempted construction of a new and innovative socio-technical system combining technological and social elements in a new way; 3. That it takes place in close collaboration between relevant stakeholders such as users, local change agents, designers and researchers; 4. That the researcher or research group explicitly considers their project

a design project, the purpose of which is to provide general or area-/sector-specific research-based knowledge on the design of socio-technical systems.

Issue/theme 2: Aesthetics, experience and learning

It is possible to conduct research in many subject fields or themes under this headline. We propose an orientation toward the following three general aspects: product, process and media.

- Product-based and physical location-based experiences. *Experiences* comprise events (for example design, experience-based learning, concert design, festival, learning space, temporary urban space) and other forms of spatial design (for example experience design, curating and museum communication). *Product* comprises intangible products: video, games, plays, 3D interactive installations, software architecture. Product as an aspect comprises perspectives on the work/design product, its aesthetic shape and expression (the artistic mode of expression, narrativity and style of the product).

- Process. Learning as a process employing different types of productions (for example students, museum visitors) uses various virtual and physical technology platforms for learning games, learning space, e-learning platforms, etc. It also comprises collaborative work processes, dialogical and iterative understandings of design and design methodology and conditions for design as a *creative process* – to perform intended work (in the design process) towards unintended concept development. Experience-based learning and productive processes are considered integral elements and support the learning and design process.

- Media. Cross-medial means of communication and use of modality where affordances such as spatial, auditory and visual communication are explored. In this context, we invite students/researchers to consider the product-related consequences of the choice of media in design processes, (cf. McLuhan, "The Media is the Message"), for example, the meaning inherent in the modality we choose. Thus, the media is considered a methodical tool used in the process of creation.

A common feature of the three aspects is that we can raise a number of ethical questions in connection with the use of aesthetics, experiences and learning design. Ethics also forms part of the researcher's rationale and opinions on his/her academic field. Creating experiences and aesthetics is increasingly used in areas such as welfare services and processes in society, for example in marketing, user and citizen involvement, political campaigns, etc. Ethical questions arise, for example, in respect of the limits of designing sensory experiences and products. From a critical perspective, it will be explored where the line is drawn for promoting aesthetics and the experience society. From a more affirmative perspective, it will be considered in which way aesthetic design can improve society, for example, by opening and being

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open to sensory and creative aspects of everyday life or by extensively humanising communication, processes and the welfare system.

Issue/theme 3: Design as a scientific method

Everybody is capable of making design, but how do we make design scientifically? Basically, design as a scientific method is about creating design for the purpose of learning and providing new knowledge. What guidelines, directions or examples are required for us to be able to consider design a scientific method in line with other scientific methods? Do the repeating, predicting, tracing and measuring of elements carry the same weight and meaning when we are designing for the future than if we were studying the present? This research initiative will study and develop design as a scientific method:

- *Exploratively* by providing a description of and by comparing a number of different scientific methods within the area. In this context, the book project *Situated Design Methods* plays a key role (see below).

- *Analytically* through studies of how designers (and professionals, i.e. professional designers, artists/artist craftsmen, performers of experimental methods such as historians/archaeologists working "to create design") may provide knowledge on systematics in relation to the design process and its central moments of iteration, abstraction and evaluation.

- *Proactively* where projects within the research initiative through action research develop and test methodical approaches, thus focusing on "research-through-design" within different domains. Projects stated under issue/theme 1 will typically help to contribute in this context.

What we intend to achieve is not a specific cookbook type of method, but rather a methodology, i.e. the science of all the specific methods and approaches falling within the framework of design as a scientific method. Such methodology will undoubtedly have some of the following meta-characteristics: *Iteration*, because you seldom or never (?) succeed in creating a design in the first attempt. *Abstraction*, because the specific design artefact seldom is of interest to others than those directly involved. *Evaluation*, because it is not until a design is evaluated that you note whether the solution of a problem or the fulfilment of a need is associated with it.

Studying "Design as a scientific method" can be approached in many ways. One of them is to study how design research is conducted – what methods or what specific techniques are applied? In this context, this issue/theme can easily be linked with the two other themes, for example, the method used in socio-technical design.

A different way of studying design research is by describing a method and then testing it and evaluating the result. Such evaluation could take place in the laboratory, for example by letting two groups solve the same problem, with only one group having access to the new method, or it could be done by taking a naturalistic approach involving the right users and the right problems in the right context.

Context, is, in other words, a key concept relating to design as a scientific method. Many have claimed that it is hardly possible to use the same method in all situations. There is a need for something situated, i.e. something that appropriately takes the situation into consideration either by rendering the method situation-specific or by allowing the user to stop during the process to consider the situation and set a "course" (application of the method) accordingly.

In addition, RUC researchers are capable of designing things in a scientific manner, such as a new "experience cylinder installation" for a museum. This is a third form of research in design as a scientific method.

Status of plans and activities (January 2013)

The research initiative will formally commence as a RUC Strategic Research Initiative in 2013, but started as a research initiative for the Department of Communication, Business and Information Technologies (CBIT) and the Department of Environmental, Social and Spatial Change (ENSPAC) respectively in 2012. In 2012, work was performed on six main activities:

1. Review of description, focus, milestones and budget

In 2012, five meetings were held with the Steering Committee and three with the reference group. A seminar was held on 27 November with all participants of the research initiative.

The description of the research initiative is set out in this document which was approved at the meeting with the Steering Committee on 21 February 2013.

2. Organisation

A management team and a reference group have been set up for the research initiative:

> Director: Jesper Simonsen (CBIT)
> Deputy Director: Michael Haldrup (ENSPAC)
> Reference group:
> - Jonas Larsen (ENSPAC)/The most important publications from the research group (MOSPUS)
> - Thomas Budde Christensen (ENSPAC)/Environment, Energy, Transport - Regulation, Innovation, and Climate Policy (METRIK)
> - Erling Jelsøe (ENSPAC)/Health Promotion (SUNDFREM)
> - Jan Pries-Heje (CBIT)/User-driven IT innovation (UDI)
> - John Scheuer (CBIT)/Organisations, change and management (VFL)
> - Lisbeth Frølunde (CBIT)/Knowledge, Production and Communication (KPC)
> - Sara Malou Strandvad (CBIT)/Visual Culture and Performance Design (VISPER)

3. In-house seminars

Study groups have regularly been held (four times per semester) where RUC researchers and international guests have given presentations.

4. Book project

The book project is a follow-up on the book *Design Research: Synergies from Interdisciplinary Perspectives,* Routledge, 2010.

The title of the new book is: *Situated Design Methods*. We have received no fewer than 30 abstracts for chapters from 40 authors which is an indication of a strong interest in contributing to methodology-oriented literature, highly demanded by the Humanities and Technology students. So far, 21 contributions have been selected to constitute the basis, on which the book is to be written.

A two-day seminar was held at "Søminestationen" on 24-25 October 2012 when the draft book and its chapters were reviewed.

The book will greatly demonstrate RUC's distinctive research in the field. The book is to be divided into four parts under the headlines: Methods for Projects; Methods for Collaborative Processes; Methods for Aesthetic Experiences; Methods for Sustainability.

The schedule is:
- 15.03.2013: Deadline for full chapters
- 17-18.04.2013: Seminar II at "Søminestationen"
- 01.06.2013: Deadline for revised chapters
- January 2014: Publication

5. International conference

On 12-16 August, RUC/CBIT held *The 12th biennial Participatory Design Conference (PDC'2012)*. The conference attracted a record high number of participants (225) from 25 countries.

In connection with the conference, a new international handbook in Participatory Design was published (Routledge International Handbook of Participatory Design), a special issue on Participatory Design (MIT Press Journal: Design Issues), and RUC launched a new world portal (pdcproceedings.org), giving access to and providing free text search for all research published from the Participatory Design conferences since the first conference in 1990.

6. PhD network

RUC has filed two applications to The Nordic Culture Fund and the Clara Lachman Foundation respectively for the funding of a Nordic PhD design network. However, both applications were turned down. The process has gathered researchers from Denmark, Norway, Sweden and Finland and was followed up by a meeting at Malmö University and a meeting at the Participatory Design 2012 conference. The plan is to file new applications to raise funds for setting up a Nordic PhD design network.

An introductory, combined network meeting and PhD seminar will be held at "Søminestationen" on 26-28 May 2013.

Milestones and budget for the Rector's grant

The research initiative has planned milestones as set out in the table below. Measurable milestone results appear from the bullet list in the left-hand column, instruments and activities in the middle column and an estimated budget in the right-hand column.

Apart from the Rector's grant of DKK 3 million (Voucher no. 3191),
- ENSPAC allocates DKK 750,000 to the research initiative as a contribution by means of resources from researchers employed at ENSPAC.
- CBIT allocates DKK 750,000. (Voucher no. 1101), which amount is administered separately as a grant primarily aimed at CBIT employees.

Milestone	Instruments	Budget
Milestone 1 RUC Centre of Designing Human Technologies Institutionalising the research initiative to ensure its sustainability also after 2016 • The centre is organised and manned at year-end 2015	• Regular study groups, seminars and local conferences to create mutual synergies, collaboration and establish a common identity • Organising management and administrative assistance • Setting up an Advisory Board with 2-6 international members to meet at RUC once-twice per year to discuss and review strategic research and programme initiatives • Developing the research profile of Designing Human Technologies	DKK 50,000/year Total, DKK 150,000
Milestone 2 PhD programmes in Designing Human Technologies will be generated at RUC • Cross-departmental (RUC) PhD programme generated • Nordic PhD network set up • Nordic PhD design course commenced and held at RUC/"Søminestationen"	• Setting up of a cross-departmental PhD course at Roskilde Graduate Schools. Going forward, the course will be available to international students every year • Extended PhD collaboration and the development (and promotion) of PhD offers through partnerships with international partners • Meetings, travels and seminars in relation to planning; giving initial PhD courses at "Søminestationen"	DKK 75,000/year Total, DKK 225,000
Milestone 3 Projects across existing research groups and departments • Completion of a minimum of four projects	• Project support granted to, for example, travels, seminars, conferences, layout and printing of books, equipment, specific task[1] assistance (programming and development assistance, interviews, transcribing, etc.), guest entertainment costs, etc.	DKK 600,000/year Total, DKK 1,800,000

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[1] Assistance = Fixed-term employment of student, research assistant and/or academic assistant

Milestone 4 Internal/external profiling • Active website containing contributions from all participants on an ongoing basis	• Student/PhD classes in website design/layout, downloading of contents from participants, current website updating • Organising regular content contributions from participants • Preparing e-mail banners, slide template, brochures, etc.	DKK 75,000/year Total, DKK 225,000
Milestone 5 External fund applications • A minimum of DKK 1 million/year in external funding after 2013	• Academic assistance for application writing	DKK 33,333/year Total, DKK 100,000
Milestone 6 Activities targeting BFI point production (Bibliometric Research Indicator point production) • Increasing trend, min. 50 BFI points in 2016	• Writing workshop breaks • Conference participation with contributions • Payment to cover visits by international guests	DKK 150,000/year Total, DKK 450,000
Milestone 7 Support for programme development • Presentation on research-based potential for new subject-integrated graduate programmes	• The educational relevance of research groups and projects and the potential thereof in relation to new proposals for education • Limited scope for release from duties to write presentations/papers • Academic assistance for the writing of proposals	DKK 0/year Total, DKK 0
Milestone 8 International conferences at RUC • A minimum of two conferences to be held between 2012-2015	• Costs for planning of, for example, PC meetings held at RUC, etc.	DKK 16,667/year Total, DKK 50,000

Appendices

Appendix 1: Participants (January 2013)

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Appendix 2: The opportunity of the research initiative to profile RUC

Designing Human Technologies is an exploratory, creative area focusing on change, innovative thinking and social commitment. This innovative aspect often derives from the strongly interdisciplinary perspective which is the essence of *Designing Human Technologies*. *Designing Human Technologies* thus cuts across the four main areas: the Humanities, the Social Sciences, the Technical Sciences and the Natural Sciences and involves RUC researchers with all four perspectives. Against this background, RUC provides a research initiative that differs from the perspectives of its other programmes which are usually associated with design and architecture. *Designing Human Technologies* constitute a needed complementary element in this field.

Designing Human Technologies is capable of positioning RUC as the attractive alternative which is committed to solving socially relevant issues in a critical, engaging, innovative, interdisciplinary and experimental way.

- This should constitute the research-related anchoring of RUC's new main area, Humanities and Technology (HumTek).
- This is a new area which is also rooted in RUC's core values such as problem-orientation and interdisciplinarity.
- Basically, the area is founded on critical analyses of existing social contexts and on the generation of innovative solutions through RUC's well-known interdisciplinary and problem-oriented approach.
- This enables RUC to promote the university as a place for in-depth studies of the functioning of artifacts and designs, materially, socially, aesthetically and performatively.
- This may bridge the gap between experienced and more recent environments at RUC that focus on problem-solving design of new technologies and the interaction between humans and their environment. Together, these environments represent a very large knowledge-intensive strength at RUC which is not available at other universities (Copenhagen University, Aarhus University).
- Designing Human Technologies is a new area which is currently on the rise in different international research fora such as "Performance Design", "Participatory Design", "Spatial Design", "Design Science Research", "Science and Technology Studies", "Mobility",

"Transition", etc. For this reason, RUC is right now in a position to take the chance of profiling itself in a new area in which it holds special skills, namely problem-solving and multi-perspective interdisciplinarity.

- RUC uses the interaction between different research traditions and design areas in order to generate interdisciplinarity from the synergies between the different perspectives.
- This contributes to society and its development, for example, by combining people and entrepreneurships in the design of new technologies.
- This should constitute the essence in the development of new graduate programmes for the main Humanities and Technology (HumTek) area.