

textiles and innovation at dtu

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integrated material design and biomimetics
section for innovation and sustainability
dtu management

future textiles – theme day on technological and intelligent textiles,
centre for textile research, copenhagen university, 3. november 2009



why our interest?

we would like to stimulate the development of new
innovative products

textiles offers new opportunities

but

designers use and think in the materials they know



materials & properties



a **material** is not a complete entity in itself - there is important (material) information in how it is applied in an **object** and used in a **context** (fx abs plastic vs. lego building brick)

a material has properties like density, hardness, conductivity, strength, stiffness, ...

an application (an object) has properties like weight, softness, strength, stiffness & flexibility, ...

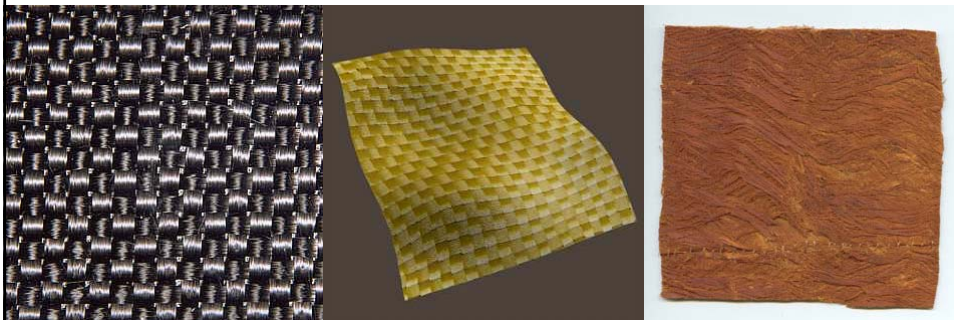
an application in context furthermore has perceived properties like hygiene, cosiness, (un-)pleasantness, masculinity, ...



textile materials & properties

what is a textile material? technically it is made from fibres hold together in 2 or 3 dimensions using physical locking or friction (like weaving, knitting and felting) – no glue!

a textile material has tensile strength, it is flexible/foldable and can follow a 3d-shape to some extend.











textile materials & properties

some materials are comprehended as textiles even though they are glued!

other materials are not comprehended as textiles even though they are technically defined as such.

so, what makes a textile material? the flexibility / foldability?
the softness? the non-reflective appearance? the cosyness?

research projects

focus on cross disciplinary innovative processes within material selection and material/product development.

present projects in 'integrated material design and biomimetics' include

- the potential of materials project
- the flex-form project
- the beetle project
- textile innovation

present textile related project within user driven innovation include

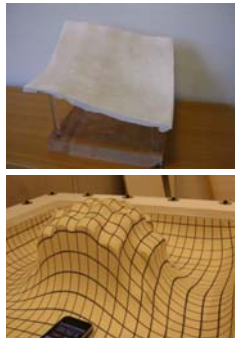
- textile qualities



the potential of materials project (2007): a new way of applying textile materials in architecture and design - ncsu, ka, 3xn, dtu



the flex-form project – development of flexible tooling for single-production of free-form shapes.



the beetle project – development of new types of nano-structured visually aesthetic surfaces utilizing structural colours and interference inspired by nature.



Interactive Inspirational Tool for Responsive Textiles

Context:

MSc project in Design & Innovation, with **DIFFUS** and 

Objectives:

- To communicate and explore some of the possibilities and potentials within responsive materials and textiles to designers, using an inspirational tool consisting of physical examples of responsive textiles.
- To gain hands-on experience with responsive materials and textiles.



Interactive Inspirational Tool for Responsive Textiles

Means:

- Development of physical examples of responsive textiles



The textile that can move



The textile that has eyes and blinks back to you



The textile you can talk to



Interactive Inspirational Tool for Responsive Textiles

Means:

- Workshops with design and architect students where the responsive textiles are staged in different ways

Conclusions:

- What is underneath the top fabric is the most interesting
- The inspirational influence of the responsive textiles is sometimes subtle



Workshop with architect, art and design students in Strasbourg



Workshop with textile design students at the Danish Design School



Interactive Inspirational Tool for Responsive Textiles

Results:

- The responsive textiles can act as idea triggers or as solution proposals
- Inspirational qualities affected by generic character and by complexity
- Role of the semantic properties of the responsive textiles
- Influence of mindset (textile, industrial, or engineering design)



Each textile design student picked five words to describe the textile that has eyes and blinks back to you. The bigger the word, the more students used it.



Integrated Innovation with Textile Materials

PhD project

Objective:

To contribute to increased textile innovation – that is to the development of new products made of textiles – with focus on new ways of using these materials.

Research questions:

How can the potentials of textile materials be communicated, explored and developed in cooperation with architects, designers and users?

1. Which properties/qualities define a material/product as textile for different actors and with which justification?
2. What is necessary in order for designers or architects to choose to work with textiles in new use contexts?
3. Which methods and tools for the staging of experimental design processes can be used in order for different actors to cooperate about the development of ideas for new textile products?



Integrated Innovation with Textile Materials PhD project

Means:

- Case studies
- Design experiments
- Action Research

DTU



How to create better study/work environments with textiles?

Clouds by Kvadrat



How to rethink interior decoration with textiles?

Soft House by Sheila Kennedy



How to create flexible housing with textiles?



textile qualities – user driven innovation use or non-use in health care

dtu – hanne lindegaard, ulrik jørgensen, kira thume, rikke okholm
kolding design school - vibeke riisberg, lene wul
danish design school - mary-ann hansen
kvadrat - anne højgaard jørgensen, sandra karlson
trevira neckelmann - christina adolph

purpose in front of object: how can textiles be used for more healing environments?



textile qualities – user driven innovation use or non-use in health care **with kvadrat**

present: objects (curtains, sheets, towels,...)

future: functions (noise reduction, privacy, identity, hygiene,...) > improved and new products (innovation)

different methods with user involvement:

field studies in a hospital context (present situation)

idea laboratory / design games with hospital employes, relatives and patients (future possibilities)



more information

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