Abstract: Sources of inspiration, such as garments, works of art or natural objects, are used throughout the knitwear design process to establish the context for a new season, to provide a basis for concrete design and to set colour schemes. Through a combination of observational studies, experimental techniques and computer modelling, the ‘Mechanisms of Inspiration in Novel Design’ (MIND) project seeks to understand the use of sources of inspiration in the knitwear industry. The goal of the research is to provide a basis for improved support for designers in terms of computer tools, organisational support and work-oriented education.

Keywords: sources of inspiration, creativity, knitwear, CAD

1. Introduction: The MIND Project

The ‘Mechanisms of Inspiration in Novel Design’ (MIND) project seeks to understand how designers use sources of inspiration to create designs by observing professional knitwear designers working both in normal industrial contexts and in set tasks and experiments. Having visited 15 companies in the U.K. and Germany so far, we have found that individual practices used in industry incorporate...
common patterns which can be codified. The project shall apply techniques of cognitive science (such as knowledge acquisition, cognitive and computational modelling (e.g. Aitkenhead and Slack, 1985) to analysing the design process and understanding design creativity. The aim of the project is to provide support for designers at the beginning of the design process. This includes considering how to expand the scope of CAD systems to support idea development, proposing practical changes to the design culture (Eckert, 1997), and enabling more effective design education based on a better understanding of the creative process.

2. Knitwear Design and the Use of Sources of Inspiration

Knitwear design combines artistic design with technical constraints under market pressures. Design from inspiration is a matter of selection, abstraction and transformation. The low resolution and technical idiosyncracies of knitwear put particular constraints on the transformation of sources of inspiration (see Figure 1). Transformation can range from literal adaptation, through adaptation of characteristic elements, to an abstraction of a colour scheme or an interpretation of a mood. The skill of the designer lies in identifying and selecting suitable sources and ‘seeing’ them as a knitted design. The project is studying how designers research the fashion context of a coming season, plan a collection, and design individual garments. The research is likely to contribute to a better understanding of design creativity, spatial reasoning, early design processes, and the knitwear industry.

In knitwear design, sources of inspiration can include:

- **other garments** from market leaders and competitors, and from history. Knitwear designers look especially for knitted garments, but tailored garments also show lines, proportions and colours.

- **representations of garments.** Designers study trend forecasting materials, trade literature and fashion magazines. Fashion photographs also communicate the mood of the design, the context within a collection, and the projected image of the customer.

- **artifacts from other domains**, especially textile and craft designs.

- **natural phenomena and objects**, and representations of them.

The designers obtain sources by visiting fashion shows, going to shops, looking through magazines, pattern books and art books, and encountering scenes and objects in day-to-day life. Many designers
comment that they sometimes cannot look at objects without instantly transforming them into knitwear designs. Knitwear design is rarely started from scratch, but design ideas are placed into the context of fashion through these sources of inspiration.

Sources of inspiration thus serve multiple functions in the design process:

- they provide a **context for the fashion** to be designed;
- they provide **information** about the ranges and capabilities of competitors;
- they are used as the **source of features**, such as necklines or proportions;
- they provide a **basis for adaptation** for detailed designs.

We have also observed that designers often discuss designs by reference and analogy to previous designs — so that sources of inspiration provide a sort of “index of communication”.

---

**Figure 1. Adaptation of a source of inspiration:** The image is adapted to a 30 X 15 grid, with abstraction and alteration of detail and proportion. Shading and detail in the original are replaced with outlining and colour contrast in the adapted version, in order to retain visibility in the knitted fabric. Note that the inspirational image could as easily have come from a Chinese vase or from life.

---

3. **Computer Support for Designers**

Despite their marketing claims, the existing CAD systems do not support idea generation by knitwear designers. They are highly sophisticated intelligent systems supporting the programming of power knitting machines. Most notably, the knitting machine builders Universal, Stoll and Shima Seiki have produced systems which create the highly complex instructions for a knitting machine from a
colour coded representation of a fabric. The Stoll and Shima Seiki systems also produce a simulation of the knitted fabric, but this requires a completed knitting program and so is not useful in early design. Programming a power knitting machine still requires considerable technical skill, and historically, all of these systems were developed for knitwear technicians. The MIND project investigates the question of suitable computer support for the very early stages of the design process, based on our understanding of the thinking and working practices of designers. We hope that our results will lead to support for the abstraction and transformation processes of sources of inspiration in the design of specific garments.

4. Design Education

In knitwear education, idea development is taught as an holistic process that comes naturally to a design student and is improved through encouragement by teachers. Our detailed analysis of the creative process will partially de-mystify design creativity. It is likely to allow teachers to identify sub-processes, such as the abstraction of features in sources of inspirations, and to present them systematically. This will help both to release the students’ creative potential for idea development and to prepare students for the pressures of industry.

5. Conclusions

Sources of inspiration serve important and clearly definable roles in the knitwear design process: e.g., they set the context for a new design and provide a basis for adaptation. By systematically investigating these roles using techniques that move directly from in situ observation through controlled tasks and experimental studies, to computer modelling, we hope both to gain useful insights into the transformation processes that designers apply, and to produce results in a form directly relevant to computer support and education.

References:
C.M. Eckert, 1997, Design Inspiration and Design Performance, The Open University, Computing Department, Research Report 97/02

Acknowledgment:
"This research was supported by a grant from the (UK) Economic and Social Research Council under the ESRC Cognitive Engineering Programme (L12730100173) to Marian Petre, Helen Sharp and Claudia Eckert"