



EXPERT INTERVIEW

# Better ergonomics brings better care

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Prof. Dr. Jürgen Held, a specialist in medical workplace ergonomics, talks about what his field can contribute to the design of healthcare facilities and the challenges of bringing the ergonomic perspective into the design process.

## Better ergonomics brings better care – But how do we get it?

Jürgen Held is a professor of product design specialising in ergonomics at the University of Design Schwäbisch Gmünd in Germany, where he also serves as the director of the university's Ergonomics Laboratory. With several international patents to his name and a track record as a medical ergonomics researcher and design practitioner stretching back over 25 years, Held looks at the field with a wide perspective and has various insights to share about the role ergonomics can play in healthcare design processes.

### The ergonomic thrill

At the base of Held's engagement with his chosen field is the question of how tools are being used, and how these tools can first of all be understood and then improved upon. As Held remarks: "Mankind's use of tools is something very special, a truly fascinating subject."

When these tools are then put to use in the service of helping others in such an essential way as occurs in the delivery of medical care, then the subject's attraction and significance only grow. "When you first take a few steps in this direction, then the field pulls you in even more. Helping other people, contributing to overcoming disease or making it so that patients can live better – the incentives are very strong."

### Prioritising ergonomics in medicine (or not)

#### But does ergonomics, in fact, have a major role to play in the real world of healthcare and hospital design?

In Prof. Held's experience, ergonomics occupies a paradoxical role in medical workplace design. On the one hand, it is a very popular topic that people are eager to talk about and to maintain that they are incorporating into their design decisions.



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Somewhat wryly Held remarks that he could tell a fairy tale about how the ergonomic perspective has come to dominate medical design over the course of his 25 years in the profession. But in fact that is not the story that he has to tell. As he points out, 25 years ago as he got started in the profession, people were talking in a similar way. The problem then – as it continues to be now – has to do with implementation.

No one disputes that ergonomics is a critical element in successful hospital design. But despite this, there is often a tendency to try to work around ergonomic issues without addressing them head on, and without including dedicated specialist input and budgeting for these issues in project planning.

As Held describes it, even though budgeting is often not made available for ergonomics, the participating planners try to manage the situation even so: “Either the architect says that he has so much experience with hospital construction that it’s not necessary, or the engineer says he has lots of experience in product development, or the medical technology planner says that his experience will also cover ergonomic issues. And finally that’s understandable, because what project wants to present itself as missing essential expertise for financial reasons?” Despite this perennial challenge of going beyond talk to action, Held is optimistic. “At the moment, there is a big wave of demand for ergonomic input and perhaps this will bring more movement and energy for the actual implementation.”

## What’s ergonomics really dealing with?

So there is lots of talk about ergonomics and a clear need for ergonomic input in medical design. But what does that really mean? What is the content of the ergonomic input that can be delivered for hospital design decisions? Held’s first point in answering this question is that ergonomics involves thinking

about systems and processes and not simply about individual objects and products. But a system and process orientation in a medical context can easily lead to a degree of complexity that is simply overwhelming. How does one mark the borders of a given system or separate a single process from an ever larger network of interactions?

In some instances, this might push one back towards object-oriented thinking – about an “ergonomic keyboard” or an “ergonomic respirator”. In any case, it will be necessary to anchor one’s ergonomic considerations in a specific and discrete physical setting – for example concentrating on just the ventilation workplace around the patient bed, or on the anaesthesia workplace in the operating theatre. Held explains: “One divides a given space into various functions and divides those functions into rooms and then one begins to think about the arrangement of devices, and so one moves forward piece by piece in this system through various levels and in this way endeavours to reduce the level of complexity.” As these considerations are made, there is always an interaction between the workflows and processes that need to be performed in a given space and the arrangement of devices and equipment that can best facilitate those workflows.



## When can ergonomic input best be integrated into project planning?

There is a recurrent question of how wide or narrow the ergonomic analysis and resulting input should be. If the ergonomic expert is first involved in a project after the dimensions of the rooms have been determined and the connection points for various devices are set, then the possibilities for changing processes and improving the overall ergonomics of a system are substantially limited.

Held identifies a “grey zone” in project planning where some consideration and analysis of processes and process optimisation possibilities does, in fact, occur in the preparatory work of architects and engineers. In his research, however, Held also has found that despite the efforts of involved architects and planners to assess these factors, there typically was a need for more consideration of work flows and processes if an optimal design result is to be achieved. And the users of the hospital systems, whether physicians or nursing staff, often have the wish that their working processes and situation receive more analysis and optimisation than they do in new design projects.

## Gaining acceptance

But even with such wishes, there are still difficulties in implementing ergonomic insights. As Held recounts from his own experience, just because an ergonomic expert says it would be good to arrange a work process in a certain fashion, doesn't mean that the persons performing the work are convinced and going to feel the same way – a problem well known in the field of participatory ergonomics. In order for this input really to be accepted and positively received, there needs to be some sort of “aha experience” on the part of the people performing the tasks. And this moment of insight then needs to be supported and developed through ongoing training in connection with new working arrangements.



## Making things concrete

The most effective way for these insights to occur and for new workflows and arrangements to be positively developed is through concrete demonstration and direction visualisation and testing of new configurations.

Held sees a dual purpose in the use of such workplace set-ups or mock-ups. On the one hand, they make it possible to confirm ergonomic insights through direct observation. On the other, they serve to demonstrate to involved stakeholders exactly what can be expected with a new working situation and to achieve buy-in from persons who might initially be sceptical. All in all, a mock-up can accelerate and simplify the understanding of a future medical workplace.

Whether this type of demonstration occurs in a specially built model or in a Design Center such as Dräger provides to customers, it offers a highly effective opportunity to assess the workflows and processes that will be performed in the proposed spaces. This in turn gives the involved stakeholders and designers the information they need to make specific decisions regarding a multitude of factors such as appropriate room size, the inventory of devices and equipment present in a given space, and their particular arrangement, finally providing significant potential for ergonomic optimisation.

## Reducing complexity

In dealing with the multitude of factors that have to be brought together in healthcare spaces, Prof. Held identifies a basic principle that designers and ergonomic specialists should always endeavour to fulfil – namely, to reduce complexity as much as possible, while still providing all of the necessary functionality required for the various healthcare spaces. “We want to cover a wide range of possibilities, but without increasing the complexity of the environment. Indeed, if possible we would like to reduce that complexity. That has to be a basic part of our mission.”



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- Consultation to improve clinical workflows
- Draft of medical workplaces in our 3D-Tool
- Customer-individual workplace set-up and optimization
- Hands-on workshops with physical mock-ups in the Dräger Design Center
- Virtual mock-ups (additionally, or if a physical workshop is not possible)
- Delivery of BIM and/or CAD data

## IMPRINT

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