Frogs in the OR - Participatory Ergonomics and Design of Hospital's Workplaces

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1. Expertise
Because of time consuming and complicated work, an ergonomist was hired to look at workplaces of the anaesthesia staff in operating rooms (OR’s).

The monitor (M) isn’t in an ergonomic range of view.

2. FIT-System Analysis
During four routine cases, the ergonomist records the anaesthetist’s tasks and movements online with the FIT-System, a new handheld recording technique.

Results:
The monitor of hemodynamics is placed on a flexible mounting device. But it’s position is fixed behind the anaesthetist because of a media-beam, traversing the OR under the ceiling and blocks a position of the monitor near to the patient and the anaesthetist.

From the expert’s point of view, the position of the monitor costs time, causes intersections and complicated work processes for cable attachment and distracts the anaesthetists from patient care during anesthesia.

3. Interview
The ergonomist moderate 18 interview sessions. Each with three questions for a rating about the layout and 19 semi-structured questions for work process description.

Results:
In four routine cases, the anaesthetists spend during surgical procedure nearby as much time for to control and manipulate the monitor and the respirator, as for the tasks related to the patient.

In 200 minutes, he changed 118 times his position from the patient to the monitor and vice versa.

4. Visualisation
The ergonomist reflects all of the results to the users and the decision makers.

Results:
On a five-item scale between “good” (1) and “less good” (5), 12 of 18 anaesthetists rated the equipment arrangement as “good” (mean: 1.6).

The reason for the time consuming and difficult work processes was mentioned in the high number of cables and lines (64% of all statements) which get often in disorder.

5. Co-operative Design
The ergonomist and the users discuss new concepts for positioning of the equipment and the handling of cables. In stepwise convergent changes, new products are realised: The Cable-Bone (a tool to structure and fix the cables) and: The Monitor Frog.

Conclusion/Discussion
In the beginning, the ergonomist’s interpretation and judgement (the monitor’s position is the problem) had nothing together with the anaesthesia member’s problem understanding (the spaghettis of cables are the problem). In this situation, not the expert’s directive but a process of mutual learning between the ergonomist and the users is the best approach to reach acceptance in workplace design. For a task oriented design approach, the users are the experts of their work procedures and Ergonomics is the discipline of disseminating and providing such information for a successfully design!

Sketch, model (1:10), working model (1:1) and the product: The Monitor Frog carries the monitor, is adjustable in the height, can be moved (frog-jump) over and integrated with all types of respirators, over the patient’s bed or over other workplace equipment.

Integrated anesthesia workplaces:
The Monitor-Frog in the OR’s of the University Hospital of Zurich.