Human Factors Engineering Applications for Infection Prevention and Control
Dr. Hugo Sax, University of Geneva
Teleclass sponsored by GOJO (www.gojo.com)

Warning: Listening to this talk might result in addiction and frequent hilarious observations.

Part One >> Human Factors as a Field

Frederick Winslow Taylor (1856–1915)
Time-motion studies
'Scientific management'
1881 US National Tennis Champion

Time-motion studies 1885 Frank and Lilian Gilbreth

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Frankfurt Kitchen 1926 by  
Margarete Schütte-Lihotzky

WW 2

Transportation  
Electronics/computers  
Environmental design  
Architecture  
Consumer products  
Energy systems  
Fields of Application  
Medical devices  
Organizational design  
Management  
Manufacturing  
Office automation

Oil field operations  
Aging  
Health  
Sports  
Recreation  
Fields of Application  
Forensics  
Speech Synthesis  
Nuclear Industry  
Farming  
Education

Human Factors and Ergonomics Society (*1955)  
IF 2009: 1.458

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Latent errors or system failures pose the greatest threat to safety in a complex system because they lead to operator errors. They are failures built into the system and present long before the active error. Latent errors are difficult for the people working in the system to see since they may be hidden in computers or layers of management and people become accustomed to working around the problem.


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Development of an evaluation tool for ergonomic alcohol-based handrub dispenser placement

Finding
43%1 occasions a walk of > 5 meters was undertaken at hand hygiene opportunity

Conclusion
Transition starting points represent ideal locations to handrub while walking

D = Dispensers

Human-tech

Stage Model of Human Information Processing

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Physics
- Light intensity
- Wave length

Psychology
- Perception
  - Based on experience, mental models & context
- Sensation
- Eye functions

Top down
- We depend on the quality of the signal.

Bottom up
- We see / hear what we expect to see / hear.
  - Expectations
  - Context

Top down
- We depend on the quality of the signal.

Bottom up
- We see / hear what we expect to see / hear.
  - Expectations
  - Context

17:06:09 (KLM first officer) – Ah roger, sir, we’re cleared to the Papa Beacon flight level nine zero, right turn out zero four zero until intercepting the three two five and we’re now (at take-off ??).
17:06:13 (Captain) - We gaan. (We’re going)
17:06:19 (Tenerife control tower) - OK

Bottom up
- We see / hear what we expect to see / hear.
  - Expectations
  - Context

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Stage Model of Human Information Processing

The ‘Door Study’

Experiment

CIAFBIKGDBNABBCKCNUSA

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Chunking enhances memory

Before touching a patient
Before a clean/aseptic task
After body fluid exposure risk
After touching a patient
After touching the patient surroundings

7 ± 2 items

Before
After
Before
After
Before
After

Stage Model of Human Information Processing

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Infection control and prevention suffers from a **action/feedback disconnect**

Making things visible/tangible

**Speed Indicator Device**

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Khan BA, Hui KY, Hui SL, Guleri R, Tricker J, Campbell NL, Farber MO, Bousani MA, Buckley JD.

Electronic Hand Hygiene Reminder System

12,924 HH opportunities for the 12 rooms; 30-bed hematopoietic stem cell transplant/hematology unit

Typical HF evaluation methods
- Ethnographic analysis
- Focus groups
- Iterative design
- Meta-analysis
- Subjects-in-tandem
- Surveys and questionnaires
- Task analysis
- Think aloud protocols
- User analysis (persona)
- ‘Wizard of Oz’ experiments

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<th>Date</th>
<th>Event</th>
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<tr>
<td>26 May</td>
<td>Safe Injection Devices: 10 Years Out … Where are the Gaps?</td>
<td>Ed Krisiunas, WNWN International Inc.</td>
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<td>30 May</td>
<td>Benchmark and Performance Measurement</td>
<td>Zahir Hirji, Bridgepoint Hospital (Toronto) and Leslie Forrester, Vancouver Coastal Health</td>
<td>Sponsored by GOJO (<a href="http://www.gojo.com">www.gojo.com</a>)</td>
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<td>30 May</td>
<td>Free Teleclass – Live Broadcast from CHICA-Canada Conference</td>
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<td>9 June</td>
<td>Using Checklists to Prevent Healthcare-Associated Infections</td>
<td>Prof. Peter Pronovost, Johns Hopkins University</td>
<td>Sponsored by Virox Technologies Inc. (<a href="http://www.virox.com">www.virox.com</a>)</td>
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<td>14 June</td>
<td>Free Teleclass – 10th Anniversary Lecture: Environmental Surfaces and Pathogen Spread: After 10 Years, Are We Really Any Better Off?</td>
<td>Prof. Syed A. Sattar, University of Ottawa</td>
<td>Sponsored by Virox Technologies Inc. (<a href="http://www.virox.com">www.virox.com</a>) and Diversey (<a href="http://www.diversey.com">www.diversey.com</a>)</td>
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