Comfort seats: Influence of laptop and tablet use for seat design

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Sales

2008 → febr 2011

desk top → laptop → tablet

Source: HFES2011
Model of Bubb (2009)

- smell
- light
- vibrations
- noise
- climate
- anthropometry
Seat characteristics: angle, form, pressure distribution (foam), adjustability and human body movement/variation of: seat pan, back rest, neck and head rest, feet rest and arm rest.

Model of Moes (2003)
history (reference) + state (soft factors)

- visual input
- noise
- smell
- temperature/humidity
- pressure
- posture/movement

(Vink, 2005)
8. New comfort model

Based on these reflections we propose a new model (see Fig. 4), which is heavily inspired by the models of Moes and De Looze.

Fig. 4. The new proposed comfort model based on the findings of the 10 papers in this
Comfort and posture are related
Productivity is higher upright

Bronkhorst et al., 2008
is upright sitting best?

(Wilke et. al., 2000)
movement in the chair

(Dieën, 2002; Vink & Commissaris, 2005)
differences in posture

viewpoint

hand

} seperated

hand-viewpoint connected
touchscreen work:

Shin (2011) uni Buffalo:
- more neck + shoulder muscle activity
- hand higher location and neck bended
Zhu et al. (2011) uni Buffalo: armsupport reduces muscle activity + discomfort
ideal armsupport?

Hedge et al. (2011): shoulder complaints
24% → 16% n=1504)
armsupport available?

Not always
is a tablet support available?

does it facilitate ideal neck and hand positions?
this presentation

1 body posture and hand held devices

2 experiments

3 consequences for seat design
Part 2: experiments
Experiment 1:

observing 24 passengers 30 minutes driving in back seat, while: laptopping, reading a book and tabletting +EMG
Results (1):

posture strongly determined by car seat

minor sign differences between tasks

-tablet: head bent forward, one arm supported other free and touches screen.

-reading: both hands on the book, one free arm

-laptop: both hands on keyboard
Results (2):
experiment 2 in the research chair
results: posture, pressure, preference

Variation!!!!
Neck: highest discomfort.
Self chosen condition:
-discomfort in neck lowest (p=0.001).
-if the back reclines 5° the seat pan 3° upwards (p=0.027, R=0.667).
-reading: 120-130° back rest angle preferred
-typing on laptop: back rest forward and hands upwards
Experiment 3: observation at home

Cameras while watching TV at home and in a new lounge TV seat:

- much variation and legs.....
Legs off the ground!!! (Rosmalen et al 2009)
4. Study of Gold et al. 2011:

couch position: least discomfort
5. Study of Kamp & Vink (2011):

Most seen posture in 568 train travellers and 175 subjects in public spaces:

- 64%: using devices
- 29%: sleeping
- 29%: watching/watching/relax

(no arm rest use)
3 consequences for seat design

2 experiments

1 body posture and handheld devices
Part 3: consequences for seats

new devices will be there!!!
Consequences

study 1: variable arm support tablet: prevent neck bending

study 2: support variation reading backrest 120-130° key use more upright
study 3: evaluate possibility for legs off the ground for watching

study 4: couch position better

study 5: active device use: more upright