The influence of the sound environment on vitality in an open-plan study environment.

Ella Braat-Eggen
Academie voor Bouw & Infra Avans Hogeschool
PhD student Built Environment TU/e
Supervisors: Maarten Hornikx, Armin Kohlrausch
The acoustic quality of open-plan offices is related to:

- tiredness
- stress due to disturbance, decrease of performance

VITALITY & WELL BEING

How About Open-Plan Study Environments?

Disturbed by background noise:

- 7% not at all
- 29% slightly
- 26% moderately
- 32% very much
- 6% very much

Bron: P.E.Braat-Eggen, 2017
Activities in OPSEs

Games, social media
Studying for exams
Consulting each other
Brainstorming
Mathematics
Creative
Software
CAD
Writing
Reading
Searching for information

Activities disturbed by noise
1=totally not 5=very much

Activities carried out in OPSE
1=never 5=always

Bron: P.E.Braat-Eggen, 2017
Disturbing sounds in OPSEs

% students disturbed by noise...

- Walking
- Non-intelligible speech
- Intelligible speech
- Telephone ringing
- Services, mechanical noise

Bron: P.E.Braat-Eggen, 2017
**Cognitive tasks:**

**Duplex-Mechanism Account of Auditory Distraction (DMAAD)**

**Attentional Capture**
- AAABAAAAA or Name
- Distracts attention from focus task

**Interference-by-process**
- Semantic process:
  - Reading, Writing
  - Automatic processing background speech

**Literature:**

Health in the Built Environment – lunch meeting June 2019
Study

What is the influence of a realistic sound environment (background speech and room acoustics) of an open-plan study environment on the performance and disturbance of students who carry out a realistic student task?

Hypothesis

if the intelligibility of the background speech increases

the performance of the semantic task will decrease

and the disturbance of the student will increase
Design

Sound Scenarios:

Background Speech

Occupancy Rate:
Low - High
3 – 14 Students Talking

Language:
Native - Foreign
Dutch - Swedish

Room Acoustics

Finishing Materials:
Absorbing - Reverberant
0.6 s – 2.3 s

Intelligibility Speech

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modelling

experimenting

collaboration

recording

writing

studying

calibrating
Results

Writing
Results

Collaboration

• Lombard effect (speech > 55 dB(A))

• Intelligibility of the background speech

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Well-Being and Vitality in an open-plan study environment

• performance of writing decreases in an absorbing environment with few people

• people prefer a quiet/silent environment

• ‘real’ tasks need to be analyzed in sub-components

• ‘real’ acoustic environments are complex