



LUND
UNIVERSITY

CASE

CENTRE FOR AGEING AND
SUPPORTIVE ENVIRONMENTS

Light, activity and sleep in my daily life: Usability and feasibility of an online intervention in a field study

KIRAN M. GERHARDSSON, MARIAM HASSAN, ÅSA B. TORNBERG AND STEVEN M. SCHMIDT Lund University, Sweden

Conclusions

- The web-based intervention can benefit older adults living in ordinary homes because of the relevant, easy-to-use content.
- Only minor changes to the intervention are needed based on participants' feedback.

Introduction

Research indicates that indoor lighting, exposure to daylight, physical activity and sleep interact to influence functioning, mood and daily rhythm. Hence, strategies are needed to support behaviour change among older adults who often spend more time at home after retirement. The study's objective was to assess the usability and feasibility of a web-based intervention to encourage behaviour change related to light, outdoor activity, sleep, and self-managed modifications in the home. The nine-week intervention is delivered on a digital learning platform, including two physical group meetings. A test kit is in-

cluded in the intervention material. The intervention comprises the following components: education, skills training (e.g. using the test kit and an inventory form), behavioural changes, homework, personal encouragement from the interventionist, and initial face-to-face contact with the interventionist. Grounded in the Information-Motivation-Behavioral Skills Model, the intervention aims to promote wellbeing (e.g., better mood and sleep) and improve lighting and darkness conditions at home. The Technology Acceptance Model was used to evaluate the web-based intervention's usability.

Method and materials

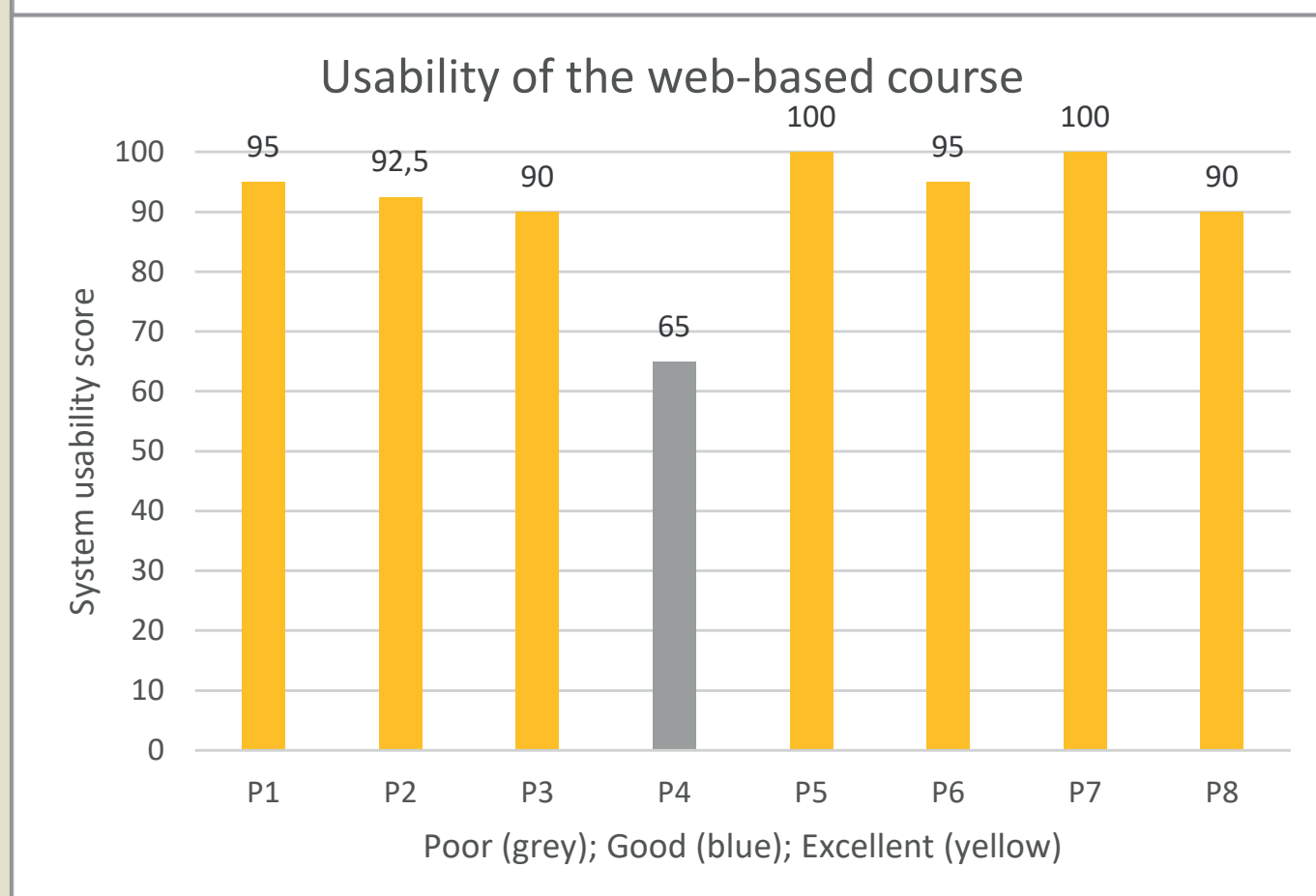
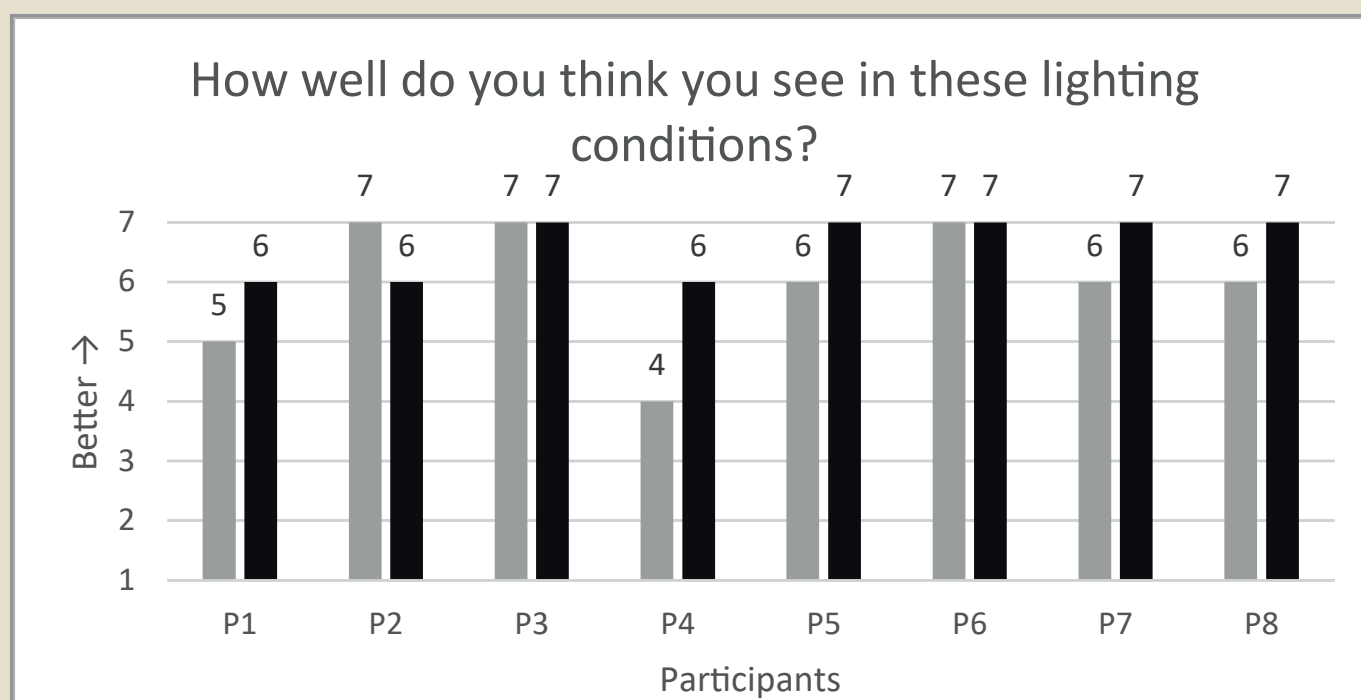
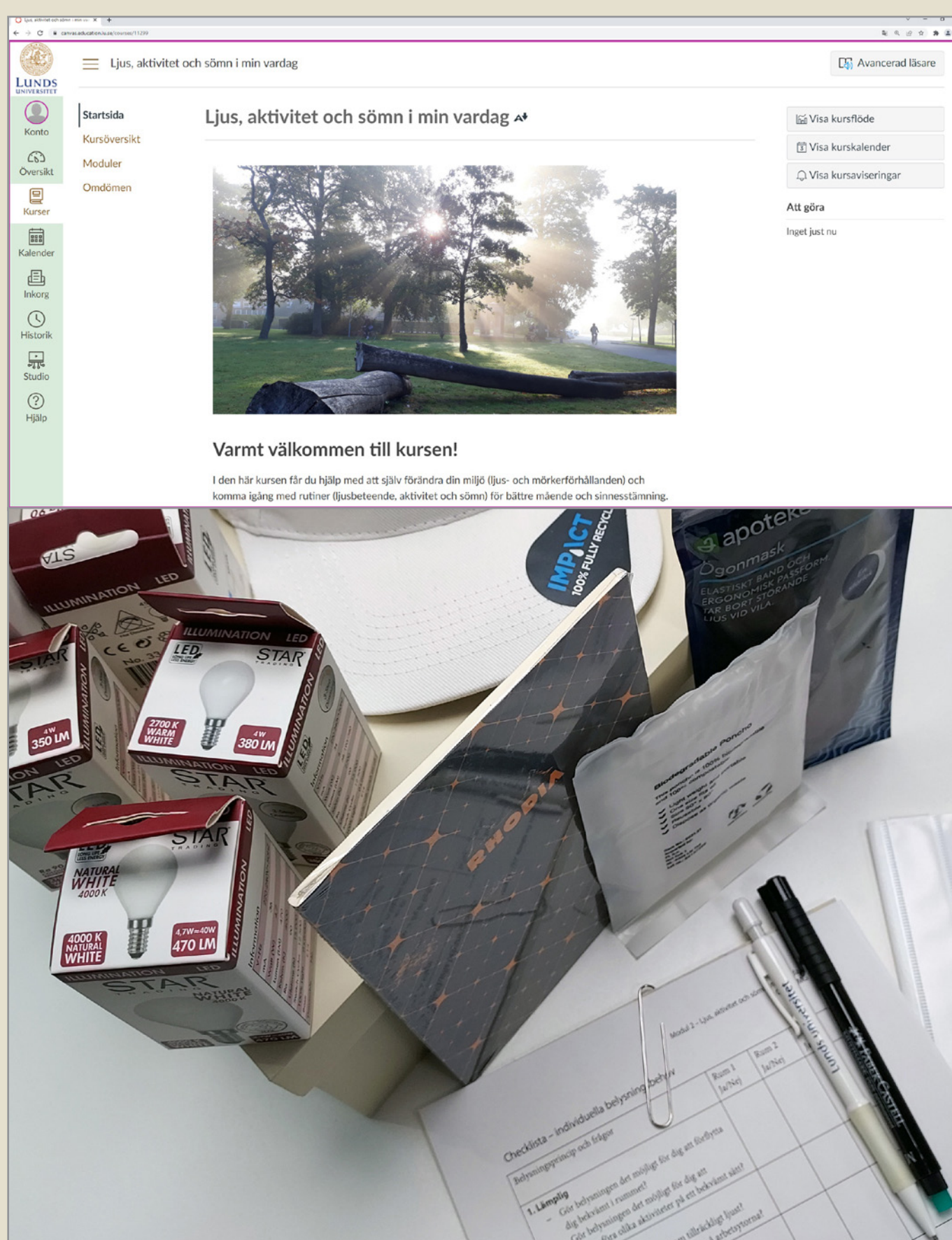
Volunteers were recruited at senior citizen meeting points and through Lund Municipality. Eight healthy women aged 71–84 ($Mdn=75.5$) living in one-person households participated. Data were collected before and after the intervention through observations of environmental features at home, accelerometry, interviews and questionnaires (an adapted version of Swedish Core Affect Scales consisting of two dimensions 'pleasant-

ness' and 'activation', New General Self-Efficacy Scale, Short Computer Anxiety Scale, PROMIS 4-item Sleep Disturbance instrument, Perceived Indoor Lighting Quality consisting of two dimensions 'Strength' and 'Hedonic tone', System Usability Scale). In the analysis of the accelerometry data, two participants' data were excluded due to missing data and because medical surgery affected the behavioural patterns of one participant.

Findings

All participants completed the intervention. Time logged in varied between 25 min and 3 h ($M=1$ h 50 min) per week. Seven participants' system usability scores were between 90 and 100 ('Excellent') out of 100. Seven participants made three to nine changes to their lighting or darkness conditions: replaced bulbs with either 3-step dimming or higher colour temperature LEDs (samples were included in the test kit), adjusted existing spotlights, installed luminaires, rearranged furniture or changed window treatments to allow more daylight

to enter. When interviewed, participants reported overall high satisfaction with what they had learnt. Several participants were particularly satisfied with the modules targeting light. One suggestion to improve the online delivery was to enable participants to add text comments to the weekly evaluation form. Regarding secondary outcomes, preliminary analyses of accelerometry data show that four of six participants had increased their physical activity, and five had increased their total sleep time.



How satisfied are you with what you learned in the course?

A lot. It has been very educational, and I have learned much about myself. I believe I noticed that in the others as well when we talked – that they learned to think in a different way. (P7)



8 healthy adults (aged 71–84) enrolled in the field study, using a pre-test-post-test design

TIME

Week 1–3

Week 4–5

Week 6–9

Week 10

T1 Participants were interviewed, completed questionnaires, wore an actiwatch for 7 days

Light
(online modules + one phys. meeting)

Activity
(online modules + one phys. meeting)

Sleep
(online modules)

T2 Participants were interviewed, completed questionnaires, wore an actiwatch for 7 days

Overview of the behaviour-change intervention 'Light, activity and sleep in my daily life' delivered as a web-based course

Participants learn about ...

- Week 1: ... light (reading, completion of an observer-based environmental assessment of light-related features in the home).
- Week 2: ... electric lighting (reading, practical exercises).
- Week 3: ... daylight (reading, practical exercises).
- Week 4: ... the benefits of daylight exposure and physical activity outdoors. They keep a a one-week activity diary.

Week 5: ... planning and implementing a walking programme. Preparatory work for the subsequent sleep modules: they keep a one-week sleep diary.

Week 6–9: ... environmental cues for setting the body clock, the sleep drive, age-related changes in sleep, the importance of sleep routines, and using sleep restriction techniques.

