Roles of Web, mobile and monitoring technologies in personalized management of psychophysiological wellbeing

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Business from technology

Work stress and stress management

- One third of European workers suffer from work-related stress
  - 50-60% of lost working days [Cox et al., 2000]

- Prolonged stress associated with health and mental health problems

- Stress management
  - Improving work environment and organization
  - Personal stress management and recovery skills

- Early intervention improves outcome [Raitasalo et al. 2004]
- Scarce resources for early interventions in healthcare

Computerized interventions

- Support for self-management:
    - Available 24/7, self-paced
    - Personalized
    - Private, anonymous, less stigma
    - Access to professional & peer support

- Different technologies to support varying needs, usage situations, and phases of change process
   - Web, mobile, wearable

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P4Well: Pervasive and personal psychophysiological wellbeing management concept

- Service concept for stress and recovery management
- Psychological interventions supported by technologies

- Psychological interventions:
  - Analyses & choosing behavioural changes
  - Planning & goal setting
  - Freedom to choose the approach: sleep, exercise, mood, etc.
    → Alternative routes to good outcomes

- Technology toolkit of Web, mobile, and wearable technologies
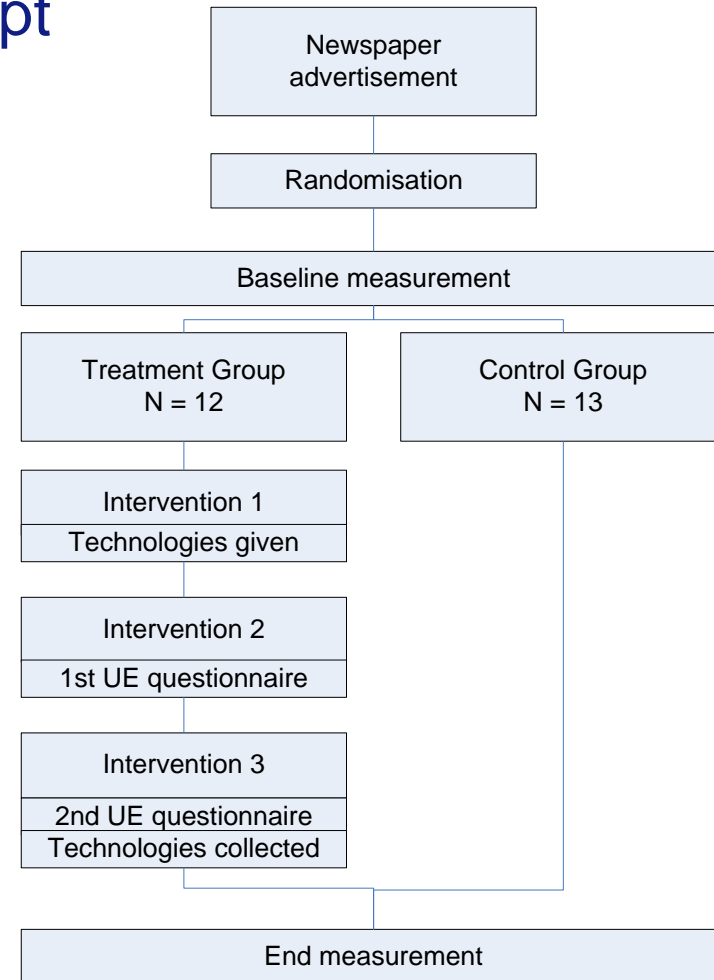 - Personalized selection of technologies

P4Well technology toolkit
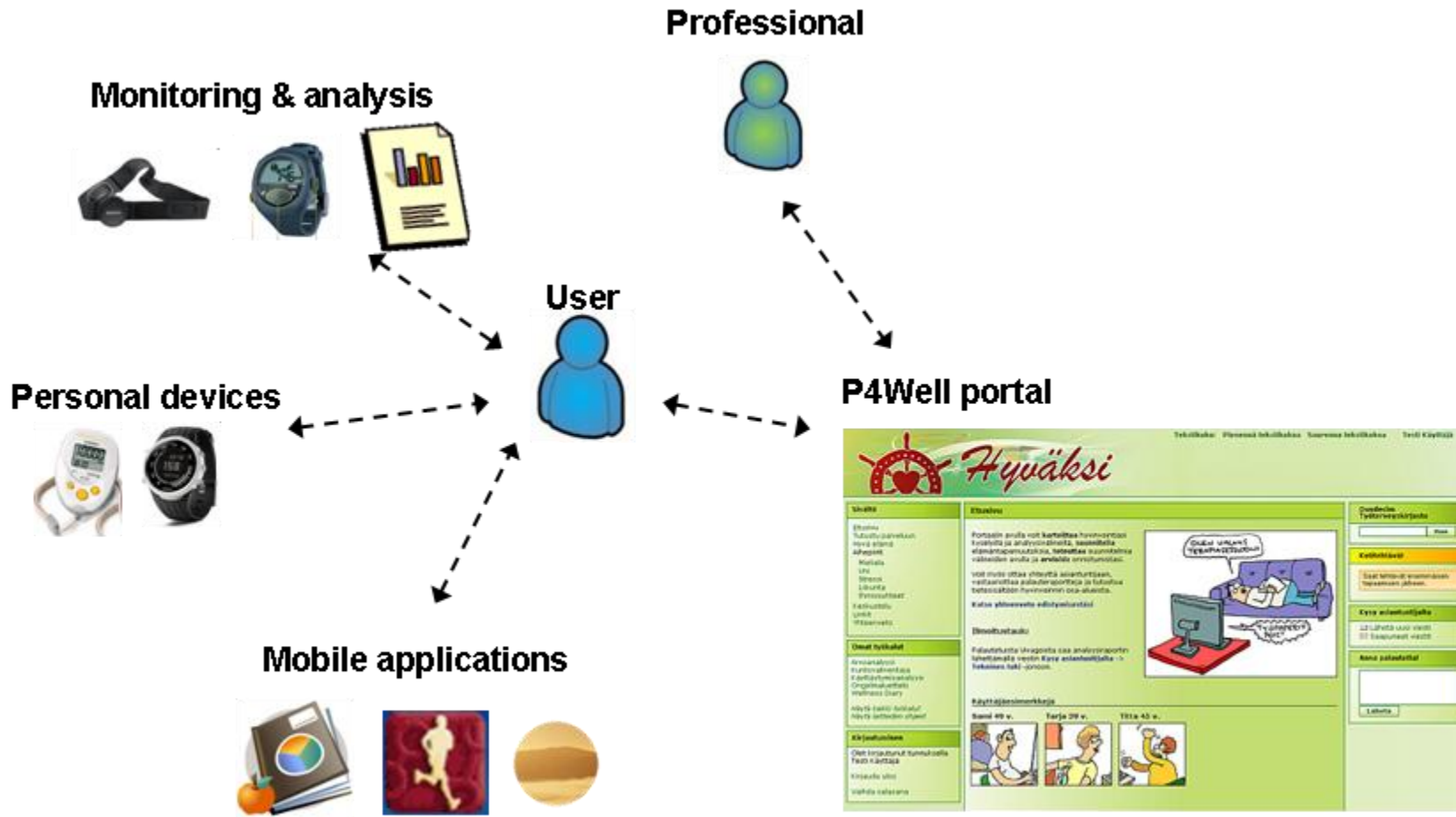
# Evaluation 1: Stress and depression intervention
Validation of the concept

- 25 male subjects, age 45 (28-73) years
  - Randomized into treatment and control condition
  - 2 drop-outs, 1 from each group

- Depression according to Beck Depression Inventory (BDI):
  - Treatment group 14.6 (6-30), 8 subjects with at least minor depression (BDI ≥ 10)
  - Control group 13.3 (2-30), 6 subjects with BDI ≥ 10

- Technology toolkit during intervention period, 9-10 weeks
  - Log data on usage
  - Two user experience questionnaires

Newspaper advertisement

Randomisation

Baseline measurement

Treatment Group
N = 12

Control Group
N = 13

Intervention 1
Technologies given

Intervention 2
1st UE questionnaire

Intervention 3
2nd UE questionnaire
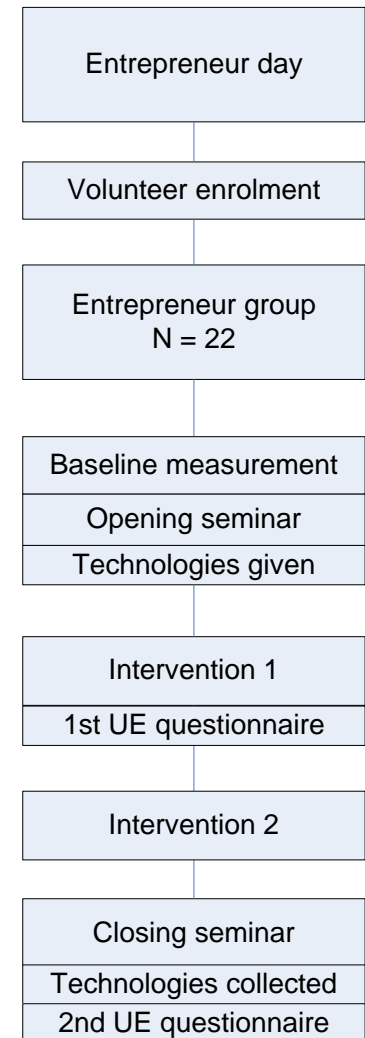Technologies collected

End measurement

Results: Evaluation 1

- Both groups improved in terms of BDI
  - Treatment group: 6.2 (1-13), 1 subject with BDI ≥ 10
  - Control group: 9.3 (1-23), 6 subjects with BDI ≥ 10

- All subjects tried some technology
  - 3 active Web portal users
  - 7 active mobile application users
  - 7 active personal devices users

- Most important components of intervention:
  - Measurements and analyses of sleep, stress and recovery
  - Personal devices: heart rate monitor and pedometer
  - Face-to-face intervention meetings
 - Mobile training coach application

Weekly number of Web and mobile users

7
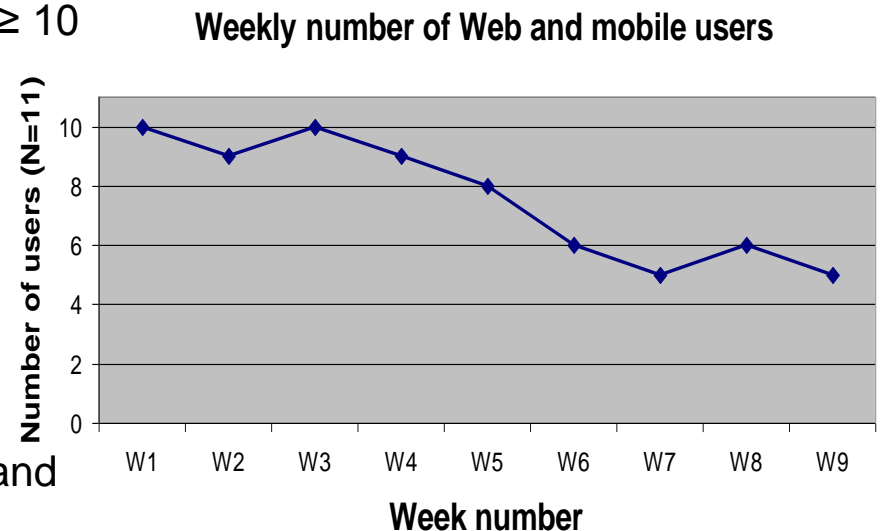
Evaluation 2: Work wellbeing program
Practical pilot in the real world

- Organized by an occupational pension insurance company and occupational healthcare provider for their customers

- 22 volunteers, 13/9 female/male, age 54 (37-62) years
  - 1 female drop-out

- BDI : 6.3 (0-14), 4 subjects with minor depression (BDI ≥ 10)

- Technologies used during intervention period (9 weeks)
  - Mobile phones borrowed to 11 subjects
  - Log data on usage
  - Two user experience questionnaires

Entrepreneur day

Volunteer enrolment

Entrepreneur group
N = 22

Baseline measurement

Opening seminar

Technologies given

Intervention 1

1st UE questionnaire

Intervention 2

Closing seminar

Technologies collected

2nd UE questionnaire

Results: Evaluation 2

- 14/21 subjects tried Web or mobile applications
  - 3 active portal users
  - 6 active users mobile application users
  - 9 active personal device users

- Most important components of intervention:
  - Face-to-face intervention meetings
  - Measurements and analyses of sleep, stress, and recovery
  - Personal devices: pedometer
  - Mobile applications

Weekly number of Web and mobile users

9
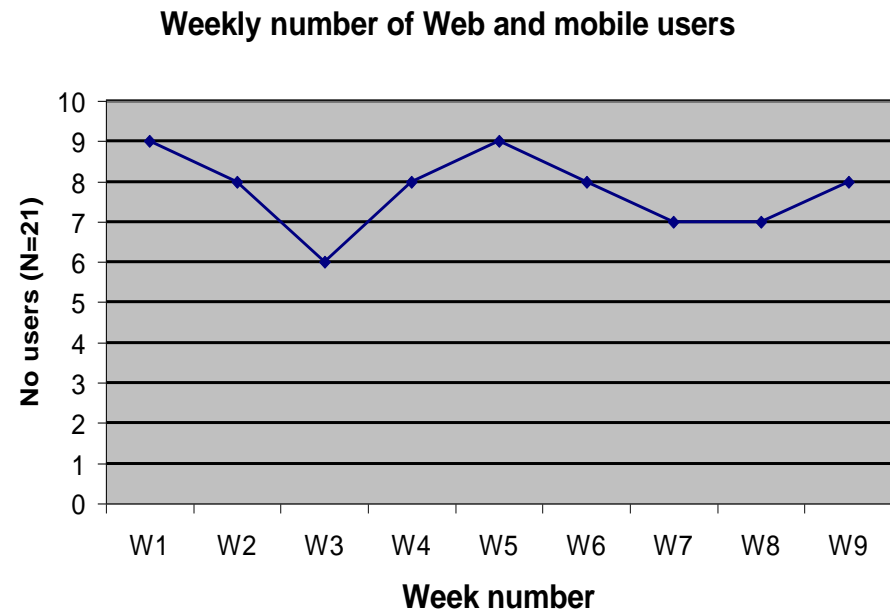
Summary of findings

- Personal contact and feedback highly valued
  - Intervention meetings and personal feedback on measurements

- Most subjects tried some technology, 1/3 – 1/2 were active users

- Mobile and wearable devices most actively used
  - In Evaluation 1: exercise
  - In Evaluation 2: sleep, relaxation and everyday activity

- Only few active Web portal users
  - Portal was fairly unfinished during these studies
  - Perceived as an information source and analysis tool

Conclusions

- One size does not fit all
  - Delicate balance between providing options and burdening the users
    → Profiling could be used to limit the number of options

- Wearable devices and mobile applications most popular and actively used
  - Integration into daily life & constant reminder always present

- Different roles of Web and mobile technologies must be acknowledged
  - Same criteria for assessing usage activity may not be applicable

- The concept was improved according to evaluation results
- Final evaluation ongoing with 45 subjects (22/23 treatment/control)

P4Well partners

VTT creates business from technology

Thank you!

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