Department of Psychology, Stockholm University
Doctoral Program in Psychology, spring semester 2026

From Digital Interventions 1.0 to 2.0: Development, Optimization and Evaluation Methods (7.5 hp)

Course leader: Dr Olga Perski

Purpose

The purpose of this course is to introduce the foundations of designing, optimizing and evaluating digital interventions in psychology and public health. Students will learn how to select appropriate tools from key intervention development frameworks and measure time-varying psychological processes and outcomes in real-world digital contexts. The course emphasizes practical, hands-on learning – from creating logic models and conducting user-centered design activities to pilot testing interventions "in-the-wild". As the course progresses, students are introduced to cutting-edge approaches for personalizing digital interventions, including trial designs for the development and optimization of slow and fast adapting interventions (e.g., "just-in-time adaptive interventions"). Overall, the course provides a guided entry point into the methods and practices which underpin effective digital interventions.

Prior knowledge

The course assumes familiarity with basic data wrangling and statistical analysis in R and R-Studio.

Learning objectives

To pass the course, the student should be able to:

- Critically select and apply appropriate tools (e.g., logic models) from key intervention development frameworks to diagnose and design for problems in psychology and public health
- Demonstrate ability to collect own data using novel technology-mediated methods and produce descriptive statistics in R/R-Studio
- Compare and contrast methods used to promote user acceptability and engagement
- Explain and differentiate between traditional (1.0) and innovative (2.0) study designs for developing, optimizing and evaluating digital interventions, including the types of research questions each design is suited to address

Course content and activities

The course consists of five half-day workshops. Each workshop starts with a lecture and is followed by a seminar/lab session where students will learn to apply different methods, guided by the course leader.

Workshop 1: Introduction to digital interventions

- Introduction to digital interventions
- Diagnosing the problem using theory and evidence
- Key intervention development frameworks (e.g., the UK Medical Research Council framework for developing and evaluating complex interventions)
- Exercise: Map out processes and outcomes using a logic model

Workshop 2: Measurement of processes and outcomes in a digital world

- Fundamentals of Ecological Momentary Assessment (e.g., sampling schemes, reliability and validity, software implementation)
- Fundamentals of passive sensing (e.g., physiology, gestures, geolocation)
- Exercise: Design and implement an Ecological Momentary Assessment study in m-Path

Workshop 3: User-centered design, acceptability and engagement

- Fundamentals of user-centered design activities with stakeholder groups
- Designing for effectiveness, acceptability and engagement
- Exercise: Map processes to intervention strategies and design features
- User testing and in-the-wild studies
- Exercise: Conduct an in-the-wild study

Workshop 4: Optimization and evaluation designs – from 1.0 to 2.0

- Pilot studies and randomized controlled trials (1.0)
- Natural experiments and interrupted time series analysis (1.0)
- The Multiphase Optimization Strategy (MOST) framework and factorial trials (2.0)
- Exercise: Plan an optimization and/or evaluation study for your intervention

Workshop 5: Personalized and adaptive interventions

- Sequential Multiple Assignment Randomized Trials (SMART) for slowly adapting interventions (2.0)
- Micro-Randomized Trials (MRTs) and control systems engineering for fast adapting interventions, including just-in-time adaptive interventions (JITAIs) (2.0)
- Exercise: Participate in a debate about the benefits and challenges associated with digital interventions in psychology and public health

Examination

Each workshop involves practical exercises and assignments which are predominantly completed during the workshops, with some involving take-home exercises. Students present (in class) or hand in the completed assignments, which are graded with pass/fail. In case of a fail grade, an opportunity

is provided to complement the assignment. To pass the course, students must achieve a passing grade on every assignment.

Attendance is compulsory for all workshops. If a student cannot attend a workshop, they must contact the course leader regarding the completion of an assignment.

Key literature

Skivington, K., Matthews, L., Simpson, S. A., Craig, P., Baird, J., Blazeby, J. M., ... & Moore, L. (2021). A new framework for developing and evaluating complex interventions: update of Medical Research Council guidance. *BMJ*, *374*.

Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., ... & Wood, C. E. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions. *Annals of behavioral medicine*, *46*(1), 81-95.

Fritz, J., Piccirillo, M. L., Cohen, Z. D., Frumkin, M., Kirtley, O., Moeller, J., ... & Bringmann, L. F. (2024). So you want to do ESM? 10 essential topics for implementing the experience-sampling method. *Advances in Methods and Practices in Psychological Science*, *7*(3), 25152459241267912.

Perski, O., & Short, C. E. (2021). Acceptability of digital health interventions: embracing the complexity. *Translational behavioral medicine*, *11*(7), 1473-1480.

Perski, O., Blandford, A., West, R., & Michie, S. (2017). Conceptualising engagement with digital behaviour change interventions: a systematic review using principles from critical interpretive synthesis. *Translational behavioral medicine*, *7*(2), 254-267.

Collins, L. M., Murphy, S. A., & Strecher, V. (2007). The multiphase optimization strategy (MOST) and the sequential multiple assignment randomized trial (SMART): new methods for more potent eHealth interventions. *American journal of preventive medicine*, *32*(5), S112-S118.

Nahum-Shani, I., Smith, S. N., Spring, B. J., Collins, L. M., Witkiewitz, K., Tewari, A., & Murphy, S. A. (2016). Just-in-time adaptive interventions (JITAIs) in mobile health: key components and design principles for ongoing health behavior support. *Annals of behavioral medicine*, 1-17.

Schedule

Time: 13.00 – 16.00 on Tuesdays from April 14th to May 13th.

Place: Seminar room *Smultron* in the Department of Psychology at Stockholm University.