UNIVERSITY OF GOTHENBURG

DEPARTMENT OF EDUCATION AND SPECIAL EDUCATION

QRM1808 Analysis of longitudinal data in educational research, 7.5 credits

Analys av longitudinella data i utbildningsvetenskaplig forskning, 7,5 högskolepoäng

Third-cycle level / Forskarnivå

Confirmation

This syllabus was confirmed by the Department of Education and Special Education on 2019-03-29, and is valid from Spring semester 2019.

Responsible Department
Department of Education and Special Education, Faculty of Education

Entry requirements

For admission to the course, the applicant has to be a registered doctoral student in the third cycle or have a doctoral degree. The applicant should also have documented prior knowledge corresponding to the learning goals in the courses QRM1802 Regression analysis for educational Research and QRM 1806 Structural equation modelling for educational research.

Learning outcomes

The main purpose of the course is to give an introduction to techniques for analysis of longitudinal data and how such techniques can be used in educational research. Longitudinal data refers to repeated measurement over time of units of observation such as individuals or groups of individuals. Two main analytical approaches are treated: growth modeling and auto-regressive modeling. The course aims at developing participants' skills to choose and apply appropriate techniques for analyzing longitudinal data, as well as to critically review educational research which presents analyses of longitudinal data. On completion of the course, the student is expected to be able to:

Knowledge and understanding

- Describe use of mixed effects regression models for specifying and estimating individual-level growth models, and their fundamental assumptions and basic principles.
- Describe use of structural equation modeling (SEM) techniques for specifying and

estimating auto-regressive models, and their fundamental assumptions and basic principles.
- Explain the basic concepts of mixed effects regression models, such as the Intraclass Correlation Coefficient (ICC), variance decomposition, cross-level interaction, fixed effect, random effect, centering and standardization.
- Explain the basic concepts of auto-regressive SEM, such as model fit and indicators of fit; standardized and unstandardized parameters; explained variance; direct, indirect and total effects; and effect size

Competence and skills

- Prepare data for growth modeling with the SPSS Mixed Models program.
- Prepare data for auto-regressive modeling with the Mplus (or other SEM) program.
- Specify, estimate and evaluate mixed effects models with the SPSS Mixed Models program.
- Specify, estimate and evaluate SEM models with the Mplus (or other SEM) program.
- Describe, evaluate and interpret modeling results orally and in writing, in accordance with the APA publication standard

Judgement and approach

- Reflect on advantages and disadvantages of the growth modeling and auto-regressive approaches to analysis of longitudinal data.
- Reflect on assumptions and limitations of the techniques for analysis of longitudinal data that may threaten the validity of the obtained results.
- Critically review publications in educational research that make use of growth modeling and auto-regressive approaches to analysis of longitudinal data.
- Reflect on questions of research ethics related to collection and analysis of individual longitudinal data.

Course content

Longitudinal data are necessary for investigating research questions pertaining to individual change over time, such as determinants and consequences of growth. Analysis of such data presents statistical and conceptual challenges. The course presents two major modeling techniques for analyzing longitudinal data: mixed effects regression models and structural equation modeling. The basic principles of the two approaches are presented, covering topics such as model specification, estimation, evaluation, modification and interpretation. Practical use of the techniques is also treated, including data preparation and program handling. Determination of statistical power and needed sample size is also discussed. The course will use the computer software SPSS and Mplus as analytical tools.

Types of instruction

The main part of the course will be carried out on-line. Early in the course there will be three campus days with lectures and hands-on training. After the campus days, the course continues as an on-line course, with lectures, assignments and discussion seminars on Canvas.

Course participants are expected to take responsibility for their own learning, independently and

together with peer students, by reading the course literature and actively participate in seminars and group work, and by performing the practical exercises and complete the tasks that are assigned by the course leader.

Language of instruction
The course is given in English.

English, unless all of the course participants agree on Swedish.

Grades

The grade Pass (G) or Fail (U) is given in this course.

Types of assessment

The course is examined through four assignments which are to be reported successively during the course, along with a final written report, which presents and discusses analyses of longitudinal data. A pass grade for the course requires a pass grade on all assignments.

Course evaluation

A course evaluation will be carried out after the course. The course evaluation will be summarized, and made available to doctoral students. The evaluation will be used as a guide for the future development and planning of the course.

Other information

In order to participate in the course, access to a computer/laptop is needed, along with equipment for online communication (webcam and a headset), and the SPSS and Mplus software (or another SEM program).

The number of participants is limited to 15. Priority will be given to doctoral students within the educational sciences if the number of applicants for the course exceeds the number of places.