DEPARTMENT OF EDUCATION AND SPECIAL EDUCATION

QRM1807   Multilevel modelling in educational research, 7.5 credits

Flernivåmodellering i utbildningsvetenskaplig forskning, 7,5 högskolepoäng

Third-cycle level / Forskarnivå

Confirmation

This syllabus was confirmed by the Department of Education and Special Education on 2018-12-21, 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 in Educational Research, 7,5 credits, and QRM 1806 Structural Equation Modelling for Educational Research, 7,5 credits, or similar.

Learning outcomes

The main purpose of the course is to provide an introduction to multi-level analysis and how different multi-level modelling techniques can be applied to educational science issues. The course also aims at developing the participants' ability to critically review educational research using multi-level modelling techniques. On completion of the course, the student is expected to be able to:

Knowledge and understanding

Describe different applications of the hierarchical linear regression model (HLM) and two-level structural equation modelling techniques (TSEM) and their fundamental assumptions. Understand the basic principles in HLM and TSEM.
Explain the basic concepts used in HLM and TSEM, such as the Intraclass correlation coefficient (ICC), variance decomposition, cross-level interaction, fixed effects, random

effects, centering and standardisation.

Competence and skills

Prepare data and conduct different HLM and TSEM analyses using SPSS or Mplus.
Specify different HLM and TSEM models in order to test hypotheses, and evaluate basic assumptions on which the model is based.
Describe, evaluate and interpret results orally and in writing, in accordance with the publication standards.

Judgement and approach

Reflect on the "pros and cons" in HLM and TSEM methods in comparison to other quantitative approaches.
Reflect on model result, model fit and on problems that may limit the interpretation of HLM and TSEM models.
Critically review scientific publications that have applied HLM and TSEM techniques.
Reflect on applicable questions of research ethics and related decisions.

Course content

Data from educational contexts is typically with a hierarchical structure, where students are nested within classrooms, and classrooms within schools, etc. Analysis of such data presents statistical and conceptual challenges. This course presents two major modelling techniques for analysing hierarchical data; hierarchical linear modelling (HLM) and two-level structural equation modelling. The course will introduce the basic principles of the multilevel modelling and techniques to conduct such analyses. Topics such as model specification, estimation, evaluation, modification and interpretation will be touched upon. Sample size and statistical power for multilevel analysis will be discussed. The course will use computer software SPSS and Mplus as analytical tools.

Types of instruction

The main part of the course will be carried out on-line. During the course, there will be three on-campus days with lectures and hands-on training. After the on-campus days, the course continues as an on-line course, with lectures, assignments and discussion seminars on Canvas (GU's learning platform).

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.

The grading scale comprises the grade Pass (G) or Fail (U).

Types of assessment

The course is examined by various theoretical and practical assignments continuously during the course, and a final written report, in which SEM analyses is applied to educational data. The evaluation and interpretation of the results should be are presented and discussed. A pass grade requires active participation in seminars and workshops, and attendance in all mandatory tasks.

Course evaluation

A course evaluation will be carried out after the course. The course evaluation will be summarised, 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

This is a third-cycle course and a specialised course within the national school of Quantitative Research Methods in education (QRM) for researchers. More information about QRM is available at qrm.gu.se.

Collaborating departments

Department of Education and Special Education, University of Gothenburg in collaboration with Department of Applied Educational Science, Umeå University.

Technical equipment

In order to participate in the course, access to own computer / laptop is needed together with computer accessories for online communication (a headset with headphones and mic, and a webcamera) and the required statistical software (see list of literature).

Participant limitation and priority

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 is exceeding the number of places.