**Syllabus**

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| **Instructor's name:** | Sabine Meinck |
| **Course title:** | Complex Sampling in Large-Scale Assessments in Education |
| **Course type:** | Workshop  |
| **Number of credit hours per edition:** | 30 x 45 min (workshop) |
| **ECTS** | 3 ECTS |
|  | Workshop:30h |
| **Software to be used:** | SPSS / IDB analyzer |
| **Teaching day schedule preferences:** | *Day 1**3 x 90 min – sessions with 1 x 15 min breaks and 1 x 90 min lunch break**Day 2-4**4 x 90 min – sessions with 2 x 15 min breaks and 1 x 90 min lunch break* |
| **Knowledge** | After this workshop, students will possess **knowledge** regarding:* General concepts of random sampling (randomness, unbiasedness, representativeness),
* Random sampling methods (simple, systematic, multistage, cluster, PPS sampling),
* Purposes and advantages of stratification,
* Technical selection processes,
* Impact of sampling weights and non-response adjustments on parameter estimation and about significance testing
* Variance estimation methods appropriate for complex samples (Jackknife repeated replication, Balanced Repeated Replication),
* Significance testing
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| **Abilities** | After the course students will have the **abilities** to:* Develop precise definitions of target populations,
* Develop sample designs and discuss design features with executing sampling statisticians,
* Select samples with low complexity level,
* Compute selection probabilities, sampling weights, non-response adjustments and sample calibration factors for such samples,
* Determine correct methods of parameter estimation under consideration of specific sample designs,
* Determine correct methods of variance estimation under consideration of specific sample designs,
* Interpret analysis results under the presence of sampling error.
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| **Social competences** | Is able to communicate the knowledge of the workshop in a simple way |
| **Course objectives:** | This workshop will cover the knowledge regarding conceptual and theoretical underpinnings of sample selection methods, sampling weights, and variance estimation for simple and complex samples. It will guide participants on how to develop sample designs, select samples with low complexity level, and compute selection probabilities and sampling weights. It will train participants on how to develop sample designs, select samples with low complexity level, and compute selection probabilities and sampling weights. It will also train participants on how to use freely available software (IEA’s IDB Analyser) to determine correct methods of parameter estimation and variance estimation, as well as to interpret analysis results in the presence of sampling error.During the course, students will develop their **attitudes** related to: * Understand the difference between statistical sampling and various methods of convenience sampling and its impact on analysis,
* Importance of sampling design features for cross-national comparative studies,
* Impact of complex samples on appropriate methods of parameter and standard error estimation,
* Critical thinking when judging the quality of published studies.
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| **Prerequisites:** | Basic knowledge in statistics, SPSS, IDB-AnalyzerThe workshop addresses researchers interested in the logic of statistical sampling and those interested in secondary data analysis with large scale assessment data. Also researchers involved in the implementation of sample surveys will benefit. Participants are expected to have a basic working knowledge of statistics. |
| **Pass requirements:** | Actively participate during presentations in workshopActively participate in hands-on training sessionsPresent results of above listed exercises to the trainer or the colloquium |
| **Recommended reading:** | Cochran, W. G. (1977), Sampling Techniques, 3rd edition, Wiley, New York.Lohr, S. (1999), Sampling: Design and Analysis, Duxbury Press, New York. Statistics Canada (2003), Survey Methods and Practices, Catalogue Number 12-587-XPE, Ottawa. Chapters on sampling, weighting and variance estimation in the Technical Reports of TIMSS, PIRLS, ICCS, PISA |
| **Course plan:** | **Exercise 1** Aim: Development of a sampling design for a particular studyOutcome: Participants formulate an appropriate sampling design for a study with given research question. They specify the selection method and discuss the usefulness of stratification variables as well as considerations for sample sizes.Form: In colloquium/group-work**Exercise 2** Aim: Execution of sample selection Outcome: Participants select a stratified school sample from a given school list using different methods (SRS and PPS). They evaluate the differences between the two samples.Form: Group-work/individually**Exercise 3** Aim: Computation of design weightsOutcome: Participants compute the selection probabilities of samples selected with different methods and the resulting design weights. They evaluate the differences. The exercise builds up on exercise 2.Form: Group-work/individually**Exercise 4** Aim: Computation of non-response adjustment factors and final weightsOutcome: Participants compute non-response adjustments and final weights for the different designs. They evaluate the effects of non-response. The exercise builds up on the previous exercises.Form: Group-work/individually**Exercise 5** Aim: Interpret statistical measures in publications Outcome: Participants are given a published outcome table of an IEA study. They identify and interpret the displayed statistical measures and discuss exceptional countries. Form: In colloquium/group-work**Exercise 6**Aim: Identify the relation between sampling error and sample sizesOutcome: Participants select SRS samples with different sizes, evaluate the variation between selected samples and compare the sampling errors.Form: Group-work/individually**Exercise 7**Aim: Familiarization with JRR and BRROutcome: Participants examine the different variance estimation methods at the hand of an exemplary data file. They compare the different methods and their outcome.Form: Group-work/individually**Exercise 8** Aim: Determining statistically significant differences between groupsOutcome: Participants will compare the means of two different groups. They determine the correct test method and its outcome.Form: Group-work/individually |