WRITTEN EXAMINATION

Course: **Scientific Methodology and Research Design**

Course code: **IT0950F**

Credits for written examination: 3.0 credits (complementary exam in regard to seminar part)

Date: 2025-08-27 at 08:15 - 12:30

Examination responsible: Yacine Atif

Teachers concerned: Jörgen Hansson

Aid at the exam/appendices: No aids, tools, or electronic devices are allowed

Other: <u>Choose and answer at most(!) four out of the six questions</u>. If you are answering more, the last question(s) overflowing the limit will not be graded. Questions are equally weighted (10 points/question). Answer each question as a "text essay", supplementing your answer with diagrams if desired. Points are awarded for each reasoning/argument/part of the answer that is distinct (not a repetition of a previous part), relevant to the question and justifiable from an informed reading of the course text.

Write <u>legibly</u>!

Instructions
☐ Take a new sheet of paper for each teacher.
☒ Take a new sheet of paper when starting a new question.
☒ Write only on one side of the paper.
☒ Write your name and personal ID No. on all pages you hand in.
☒ Use page numbering. Order your answers in sequential/linear order!
☒ Don´t use a red pen.
☒ Mark answered questions with a cross on the cover sheet.

Failure to follow the above instructions will result in point reductions!

Grade points: 40
Grading: Pass: 20-40 points   Fail: 0-19 points

<u>Examination results should be made public within 18 working days.</u>

Good luck!

Q1: Epistemological and Methodological Foundations

Design science and natural science are often seen as distinct but complementary research paradigms in information systems.
Based on the arguments in March & Smith (1995) and Hevner et al. (2004):

a) Contrast the epistemological assumptions and goals of design science versus natural science in the context of IS research.

b) Discuss how artefacts (constructs, models, methods, instantiations) function as both outputs of and vehicles for knowledge generation in design science.

c) Critically evaluate the role of evaluation in design science research. How does it contribute to theory-building, and how do the two articles differ in emphasis regarding evaluation?

Your answer should demonstrate an understanding of how design knowledge is generated, validated, and generalized, and how these processes differ from traditional explanatory science.

Q2: Comparing Research Question Construction Strategies

Alvesson and Sandberg (2011) contrast "gap-spotting" with "problematization" as strategies for constructing research questions in management and organization studies.

a) Define and contrast the three types of gap-spotting strategies outlined by Alvesson and Sandberg. Why do the authors argue that gap-spotting often leads to theoretical conformity?

b) Define problematization and explain how it differs epistemologically from gap-spotting. What are the core intellectual moves required in a problematization approach?

c) Drawing on examples from any empirical field (e.g., digital platforms, leadership, AI in organizations), propose two alternative research questions: one based on gap-spotting and one based on problematization. Analyze the potential theoretical and practical implications of each.

Your response should demonstrate understanding of the philosophical underpinnings of research question formulation and an ability to apply these ideas creatively and critically.

Q3: Contrasting Case Study Strategies

Case studies can be exploratory, descriptive, or explanatory, and can use single-case or multiple-case designs.

a) Compare the strengths and weaknesses of single-case versus multiple-case approaches in explanatory research.

b) Provide an example of when a single-case design would be methodologically stronger than a multiple-case design, and justify your choice.

c) Explain how case selection strategy impacts validity of the case study.

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Q4: Measurement Error and Data Quality in Survey Design

Choose to answer Part A or Part B.

Part A: Fowler (course book) emphasizes that minimizing measurement error is central to valid survey research.
   a) Define and distinguish among the primary sources of measurement error as presented by Fowler, e.g., question wording, interviewer effects, and respondent interpretation.
   b) Discuss how each of these sources might differentially affect survey data in face-to-face, telephone, and web-based interview modes.

Your answer should include specific examples of question wording strategies, pretesting techniques, and mode comparison logic. Consider how cultural and linguistic variation complicates Fowler's recommendations.

Part B: Fowler discusses the utility of embedded experiments within surveys to assess the effects of question wording and format.

   a) Define the rationale for using survey experiments as a methodological tool within questionnaire design. In what ways do they enhance internal validity?
   b) Identify and discuss at least three types of manipulations commonly tested via survey experiments (e.g., question order, framing, scale type).

Your answer should engage with issues such as cognitive load, social desirability bias, and measurement equivalence across versions. Reference Fowler's arguments about question testing and error reduction.

Q5: The Multidimensional Nature of Validity in Design Science Research

Larsen et al. (2020) argue that the concept of validity in Design Science (DS) research must go beyond traditional empirical evaluation.
   a) Explain how Larsen et al. differentiate between internal validity, external validity, and construct validity in the context of DS research, and contrast this with how these concepts are traditionally understood in natural science research.
   b) Describe the validity framework proposed by the authors. Identify and explain at least four distinct types of validity included in their framework.
   c) Critically assess the value of this framework for improving both the rigor and relevance of DSR contributions. Are there limitations or blind spots in their proposal?

Your answer should reflect a deep understanding of the epistemological and ontological assumptions underlying DSR, and how the proposed framework addresses core challenges in artifact justification and generalization.

Q6: Bias and Validity in Mixed-Methods Research

Mixed-methods research combines qualitative and quantitative components and therefore can be exposed to multiple forms of bias already well-known in research.
   (a) Identify and define three well-established biases covered in the course literature (e.g., from Oates or lecture slides) that could appear in a mixed-methods study.
   (b) For each bias, explain how it might arise in both the qualitative and the quantitative strand of a mixed-methods study.
   (c) Discuss how these biases could affect internal and/or external validity and outline specific strategies for reducing their impact.