UNIVERSITY
OF SKÖVDE

# WRITTEN EXAMINATION

| | |
|---|---|
| Course: | **Research Methodology and Communication** |
| Course code: | **VP761** |
| Credits for written examination: | **4 credits** |
| Date: | 2026-03-24 at 14:15 - 18:30 |
| Examination responsible: | Richard Senington |
| Teachers concerned: | Jörgen Hansson |
| Aid at the exam/appendices: | No aids, tools, or electronic devices are allowed |
| Other: | **Section 1:** Choose and answer at most(!) four out of the six essay questions.<br>**Section 2:** Answer all multiple choice questions in Section I.<br>If you are answering more, the last question(s) overflowing the limit will not be graded. Questions are equally weighted (8 points/question). Answer each question as a short text essay composed of one or more paragraphs, 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. Answer in Swedish or English. Write legibly! |

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

ECTS grading:

| | | |
|---|---|---|
| A: 36-40 | B: 32-35 | C: 28-31 |
| D: 24-27 | E: 20-23 | F: 0-19 |

Examination results should be made public within 18 working days.

Good luck!

UNIVERSITY
OF SKÖVDE

## SECTION 1: ESSAY QUESTIONS (Choose 4 of 6)

(8 points per question)

**Question 1: Experimental Design and Validity**

A technology company wants to introduce a new AI-based code completion tool for its software engineers and wants you to rigorously evaluate its impact on productivity and code quality using an experimental approach.

(a) Design the simplest interpretable experiment to test the tool's effectiveness. In your answer, clearly identify and define the unit of analysis, the treatment condition, the control condition, and the primary outcomes.

(b) Explain the concept of validity in this context. If you measure "productivity" merely by asking engineers if they feel more productive, how might the Dunning-Kruger effect compromise your construct validity? Propose a better way to measure the outcome.

(c) What is the risk of contamination (a threat to internal validity) in this scenario, and how would you mitigate it in your experimental design?

---

**Question 2: Research Ethics and Methodological Dilemmas**

As a researcher, you are bound by ethical guidelines and legal frameworks such as the GDPR, which dictate how you collect, store, and process personal data. Imagine you are planning an observational study to investigate how effectively a development team collaborates during stressful sprint deliveries.

(a) Discuss the ethical implications of conducting covert (hidden) participant observation in this setting. Is it ever justifiable to carry out research where the subjects cannot give informed consent? Reason about the balance between the validity of the research (avoiding the observer effect) and the potential harm or rights violations of the participants.

(b) If you instead decide to use surveys and interviews to collect data on the team's stress levels and collaboration, explain the potential risks regarding data protection, anonymity, and how you would legally and ethically manage the collected data.

---

**Question 3: Design Science Research**

In Design Science Research (DSR), the primary goal is to generate utility by building an artifact to solve a practical problem.

(a) Name and provide real-world examples from the computer science or engineering domain of the four canonical types of artifacts produced in DSR (Constructs, Models, Methods, and Instantiations).

(b) It is crucial to distinguish between "routine system building" and actual Design Science Research. Explain how the scientific results of a DSR project relate to the artifact itself, and what elevates a development project into a scientific contribution.

(c) When evaluating the artifact, one must ensure it is fit for its intended functional goals. Beyond asking users for their subjective satisfaction, describe how a researcher can empirically and technically evaluate an IT artifact.

---

UNIVERSITY
OF SKÖVDE

**Question 4: Generating Research Questions and Originality**

Constructing a strong research problem is arguably the most critical aspect of the research process.

(a) According to Alvesson and Sandberg, researchers often rely on "gap-spotting" (e.g., confusion spotting or neglect spotting) rather than "problematization". Describe what Gap-spotting is and the different modes/variants it has.

(b) Originality in research can take several forms. Describe at four different dimensions of originality and provide an example for each.

---

**Question 5: Case Study Strategy and Generalizability**

Case study research is highly prevalent in information systems and engineering for understanding complex phenomena.

(a) Case studies can generally be categorized as exploratory, descriptive, or explanatory. Describe each of these three types and provide a scenario where each would be the most appropriate choice.

(b) Researchers must choose between a single-case design and a multiple-case design. Discuss the strengths and weaknesses of a single-case approach and, also, provide an example of when a single-case design would be methodologically stronger than a multiple-case design.

---

**Question 6: Data Generation and Bias**

Questionnaires and interviews are frequently used to gather primary data, but they are susceptible to various forms of bias.

(a) Identify and define three well-established biases (such as selection bias, confirmation bias, social desirability, or the Dunning-Kruger effect) that could affect the validity of your data in an interview or survey study. Explain how you would mitigate each.

(b) In qualitative interviews, researchers aim for "data saturation". Define data saturation, explain why it is important, and describe how a researcher knows when it has been reached.

---

UNIVERSITY
OF SKÖVDE

## SECTION 2: MULTIPLE-CHOICE QUESTIONS

*Instructions: Choose the single best answer for each question.*

**Question 7.1: Methodological Biases**

In an experiment evaluating a new software engineering training module, the researcher measures "learning" purely by asking the developers to self-report how confident they feel about their coding skills. Which cognitive bias best explains why this self-reported confidence might be a flawed proxy for actual learning, especially among novice developers?

A) The Dunning-Kruger effect
B) Confirmation bias
C) Selection bias
D) Observer-Expectancy bias

**Question 7.2: Ethical Decision-Making Frameworks**

You are planning an observational study that involves covertly monitoring how software developers handle security warnings, meaning they cannot give informed consent. You argue that this is justifiable because the potential societal benefits of improved cybersecurity systems far outweigh the temporary lack of consent from the individual developers. Which ethical decision-making framework primarily aligns with this justification?

A) Deontological ethics
B) Utilitarian approach
C) Virtue ethics
D) Feminist ethics

**Question 7.3: Design Science Research**

In Design Science Research (DSR), researchers produce different types of artefacts to solve problems. Which specific type of artefact is defined as a set of steps, mathematical algorithms, or process stages used to perform tasks and provide guidance on how to solve problems?

A) Constructs
B) Models
C) Methods
D) Instantiations

**Question 7.4: Formulating Research Questions**

A researcher reviews the existing literature and formulates a research question based on the observation that a specific psychological theory has never been tested in the context of virtual reality (VR) training for engineers. According to Alvesson and Sandberg's typology of gap-spotting, which specific mode does this represent?

A) Confusion spotting
B) Problematization
C) Application spotting
D) Neglect spotting

UNIVERSITY
OF SKÖVDE

**Question 7.5: Questionnaire Design**
You are designing a questionnaire to evaluate a newly developed user interface. You ask users to indicate how they feel about the system by placing an 'X' on a line between two opposing descriptive phrases (e.g., "Pace too fast" on one side and "Pace too slow" on the other). What is this specific question format called?

A) Likert scale
B) Semantic differential scale
C) Rank order question
D) Factual closed question

**Question 7.6: Quantitative Analysis and Statistics**
When evaluating quantitative data to see if two variables are associated to a significant level (i.e., not just by chance), which statistical test is explicitly described as working with all kinds of data, including nominal (categorical) data?

A) T-test
B) Chi-square test
C) Pearson's product moment correlation
D) Spearman's rank correlation

**Question 7.7: Case Study Selection**
A researcher chooses to study a specific software company because it is widely considered to be a perfectly standard representation of medium-sized game developers. Findings from this case are expected to be generalizable to the whole class of similar companies. What kind of case selection strategy is this?

A) Extreme instance
B) Unique opportunity
C) Test-bed for theory
D) Typical instance

**Question 7.8: Data Types**
In a questionnaire, respondents are asked to indicate their preferred operating system by selecting 1 for Windows, 2 for macOS, and 3 for Linux. The numbers serve only as labels. What type of quantitative data is this?

A) Ordinal data
B) Interval data
C) Ratio data
D) Nominal data