DIT832 Exam Questions - 2024

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I. Question 1

When designing a case study, there are four different types of case studies, depending on the purpose of the research and whether it is knowledge- or solution-focused. Imagine a case study that focuses on a team which may or may not apply a new type of Agile method, Scrumpfy. Briefly describe the four types of case studies. For each type, come up with one research question for the case study described.

Answer: A case study can be either:

1) Exploratory: This type of case study aims to better understand the phenomenon being studied, look for new findings and generate ideas and hypothesis for new research. It facilitates a knowledge-focused research.

Example RQ for the suggested case study: How do the team perceive the effectiveness of the current Agile method being used?

2) Descriptive: This type of case study aims to provide a comprehensive description of a phenomenon or a situation. It facilitates a knowledge-focused research.

Example RQ for the suggested case study: What are the key characteristics and practices of the team with the current Agile methodology being used?

3) Explanatory: This type of case study seeks an explanation of a phenomenon or a situation mostly by investigating casual relationships applicable for the context. It also facilitates a knowledge-focused research.

Example RQ for the suggested case study: What are the main issues with the current Agile method that indicates a need for a new Agile method?

4) Improving: This type of case study focuses on improving a certain aspect of a phenomenon being studied. It facilitates a solution-focused research.

Example RQ for the suggested case study: To what extent would the adoption of the Scrumpfy Agile method lead to improved team productivity and collaboration?

II. Question 2

Design Science and Action Research have several similarities, but also some key differences. Describe the similarities and differences, focusing particularly on what makes these two methods different.

Answer:

III. Question 4

Imagine an experimental setup evaluating the effects of developer experience on program quality. We want to evaluate developers with low experience in programming (< 2 years full time), medium experience (2 to 5 years), and high experience ($>$ 5 years). For such an experiment, what are the independent variables (factors), levels, dependent variables, objects, subjects, and possible parameters (control variables)?

Answer:

IV. Question 5

Some MSR studies are experiments, while others claim to be experiments but do not follow experimental conventions in software engineering. What determines whether an MSR study is or is not an experiment?
The classification of an MSR study as an experiment has to comply with experimental conventions in software engineering. Several factors contribute to determining whether an MSR study qualifies as an experiment. An experiment typically involves manipulating one or more variables to observe their effects on a dependent variable. This manipulation may involve changing parameters related to software development practices or analyzing the impact of certain interventions. Additionally, experimental studies often include a control group that remains unchanged to provide a basis for comparison with the experimental group. Random assignment of participants or software artifacts to experimental conditions is characteristic of experimental design, and studies that employ randomization techniques are more likely to be considered experiments. Furthermore, experiments typically involve formulating hypotheses that are tested using statistical analysis, and studies that explicitly state hypotheses and conduct hypothesis testing are more likely to be classified as experiments. The degree to which researchers manipulate independent variables to observe their effects on dependent variables can influence the classification of an MSR study as an experiment. Lastly, experimental studies often include measures to assess the impact of

interventions or treatments, and the use of outcome measures to evaluate the effects of manipulated variables is characteristic of experimental research. Overall, adherence to experimental conventions, including the presence of experimental design elements such as manipulation of variables, randomization, hypothesis testing, and outcome measurement, determines whether an MSR study qualifies as an experiment. Studies that do not incorporate these elements may still provide valuable insights but may not meet the criteria for classification as experiments in software engineering research.

Answer:

V. Question 6

What is the difference between a literature review, a Systematic Literature Review, and a Systematic Mapping Study?

Answer: The differences between a literature review, a systematic literature review, and a systematic mapping study lie in their methodology, scope, analysis and objectives. While a literature review can vary widely in scope and may involve the researcher's judgment in selecting literature, a systematic literature review follows a rigorous and structured method. It systematically searches, screens, and selects literature based on predefined inclusion and exclusion criteria, while a literature review does not need to. Similarly, a systematic mapping study also involves systematic searching and classification of literature based on predefined criteria, but the focus will be on mapping the research landscape rather than combining individual studies. In terms of analysis, while literature reviews summarize and synthesize relevant literature, a systematic literature review will often include quantitative analysis techniques such as meta-analysis. The primary objective of a literature review is to provide an overview of the current state of knowledge, while a systematic literature review will aim to offer an evidence-based synthesis to inform decision-making and identify areas for future research. On the other hand, a systematic mapping study aims to identify research trends, gaps, and emerging areas of interest to guide future research directions.

VI. Question 7

As part of your planned thesis work, what sort of ethical issues may arise and why? What are you planning to do to mitigate ethical issues?

Answer: In our research we will be conducting MSR, surveys and inteviews. In terms of ethical issues, our focus is mainly in part of the interviews.

In conducting interviews for research, ethical issues may arise concerning informed consent, privacy, voluntary participation, respect for the participants and data handling. To mitigate these concerns, we will obtain informed consent, ensure anonymity and confidentiality, establish boundaries, provide support, employ ethical interview techniques, seek ethics review, and continuously reflect on and monitor ethical considerations throughout the research process. By implementing these strategies, we can conduct the interviews ethically and responsibly, prioritizing the rights and well-being of the participants.

VII. Acknowledgement

The collaborative work of Saif Sayed and Kardo Marof resulted in the answers provided for all six questions. Both authors independently worked on their own answers for each question and then consolidated them into a final result.