

Course: Research Method in Software Engineering

WEEK 13- Exams, Quizzes, and Assignments (With Answer)

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WEEK 13- Exams, Quizzes, and Assignments

Contents

1. Multiple Choice
2. True and False
3. Short Answer Questions
4. Assignment

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Description of the Exam

Part I. Time allotted for the exam - 1hour

- The exam is designed to assess the students' knowledge and skills. It consisting of a total of **65 points(65%)** across three different question types:
 1. Multiple Choice Questions: Total: 20 questions, 1 mark each
 2. True or False Questions: Total: 15 questions, 1 mark each
 3. Short Answer Questions: Total: 15 questions, 2 marks each

Part II. It has a Total points of 35%. Two weeks is given to complete the assignment.

- This assignment is designed to assess students' practical skills in literature writing within the field of software engineering studies. The assignment is individual and expected to **complete in two weeks** and the report should be submitted to the instructor .
- Thus, the overall Evaluation is out of 100% i.e., Part I 65% , and Part II 35%

1. Multiple choice

Part I- Choose the correct answer from the given alternatives..... (1 point each)

1. Interpretation of data depend on? a

- a. The researcher's hypotheses and assumptions
- b. The number of data points collected
- c. The time taken to analyze the data
- d. The tools used for data collection

2. The key advantage of empirical research is a

- a. It provides a level of control
- b. It eliminates all variables
- c. It is always qualitative
- d. It requires no planning

1. Multiple choice

...Cont'd

Part I- Choose the correct answer from the given alternatives..... (1 point each)

3. What is the aim of action research in empirical software engineering? **b**
- a. To analyze numerical data
 - b. To experiment through intervention
 - c. To develop a questionnaire
 - d. To evaluate software quality
4. What is deduction in empirical research ? **a**
- a. Enables the researcher to figure out a conclusion out of the experiment
 - b. Conducted to frame a general conclusion from the data gathered through observation.
 - c. An idea trigger for presenting a hypothesis.
 - d. a and c

1. Multiple choice

Part I- Choose the correct answer from the given alternatives..... (1 point each)

5. Research hypotheses are **C**

- a. Formulated prior to a review of the literature
- b. Statements of predicted relationships between variables
- c. B but not A
- d. Both A and B

6. Adopting ethical principles in research means **a**

- a. Avoiding harm to participants
- b. The researcher is anonymous
- c. Deception is only used when necessary
- d. Selected informants give their consent

1. Multiple choice

...Cont'd

Part I- Choose the correct answer from the given alternatives..... (1 point each)

7. A variable that is presumed to cause a change in another variable is called _____

c

a. An intervening variable

b. A dependent variable

c. An independent variable

d. A numerical variable

8. Which of the following can be described as a nominal variable? _____

d

a. Annual income

b. Age

c. Annual sales

d. Geographical location of a firm

1. Multiple choice

...Cont'd

Part I- Choose the correct answer from the given alternatives..... (1 point each)

9. The key defining characteristic of experimental research is

a

a. The independent variable is manipulated

b. Hypotheses are proved

c. A positive correlation exists

d. Samples are large

10. When each member of a population has an equal chance of being selected, this is called

c

a. A snowball sample

b. A stratified sample

c. A random probability sample

d. A non-random sample

1. Multiple choice

...Cont'd

Part I- Choose the correct answer from the given alternatives..... (1 point each)

11. What do we call data that are used for a new study but which were collected by an earlier researcher for a different set of research questions? a

a. Secondary data

b. Field notes

c. Qualitative data

d. Primary data

12. Secondary data can include which of the following? d

a. Government statistics

b. Personal diaries

c. Organizational records

d. All of the above

1. Multiple choice

...Cont'd

Part I- Choose the correct answer from the given alternatives..... (1 point each)

13. The purpose of descriptive statistics is to a

- a. Summarize the characteristics of a data set
- b. Draw conclusions from the data
- c. None of the above
- d. All of the above

14. Which part of a research report contains details of how the research was planned and conducted? b

- a. Results
- b. Methodology
- c. Introduction
- d. Background

Part I- Choose the correct answer from the given alternatives..... (1 point each)

15. What is a hypothesis in research? a

a. A guess or idea to check if it's true

b. A proven fact

c. A conclusion drawn from data

d. An assumption made before research

16. What should each subproblem in research be? a

a. A completely researchable unit

b. An unimportant detail

c. A vague question

d. A summary of the main problem

1. Multiple choice

...Cont'd

Part I- Choose the correct answer from the given alternatives..... (1 point each)

17. What is the relationship between knowledge-seeking and solution-seeking research?

b

a. They are unrelated

b. Knowledge is needed to design solutions

c. They are the same

d. Solution-seeking research is more important

18. What is one source for identifying a research problem?

a

a. Asking questions about observations

b. Ignoring existing literature

c. Relying solely on personal opinions

d. Focusing only on past research

1. Multiple choice

...Cont'd

Part I- Choose the correct answer from the given alternatives..... (1 point each)

19. What is a characteristic of an effective research problem? **b**

- a. It should be irrelevant
- b. It should adhere to ethical principles
- c. It should be boring
- d. It should not impact stakeholders

20. What principle requires researchers to recognize their duties and contribute their findings for the betterment of society? **b**

- a. Integrity
- b. Fidelity and Responsibility
- c. Objectivity
- d. Professional Competency

2. True and False

For each statement below, indicate whether it is True or False (1 point each)

1. Empirical research methods include both qualitative and quantitative methods.

True

2. Action research doesn't aims to experiment through intervention and use feedback to improve the underlying theory.

False

3. Testing in empirical research need to analyze and validate the data using appropriate statistical methods.

True

4. One of the steps in developing a questionnaire is to check the length of the questionnaire.

True

5. Empirical research does not provide a level of control over the variables under study.

False

2. True and False

...cont'd

For each statement below, indicate whether it is True or Falsecont'd

6. A research problem is defined as simply finding a solution to an existing issue. False

7. Effective research problems should be vague to allow for broad exploration. False

8. One characteristic of an effective research problem is to clearly articulate the goals of the research.

True

9. Knowledge-Seeking research in software engineering does not focus on resolving practical issues.

True

2. True and False

...cont'd

For each statement below, indicate whether it is True or Falsecont'd

10. Open-ended interview questions are a common method in quantitative research. **False**
11. Open-ended interview questions are a common method in quantitative research. **False**
12. An effective research problem should have characteristics such as feasibility and novelty. **True**
13. Knowledge-seeking research aims to create new solution designs without any emphasis on existing knowledge. **False**
14. Research problems can be too large, leading to the necessity of breaking them into subproblems. **True**
15. A literature review only includes studies that are identical to the researcher's topic. **False**

3. Short Answer Questions

Answer the following open ended questions clearly and precisely (2 points each)

1. What is the difference between general objectives and specific objectives in research?

Answer:

- General objectives state what the research expects to achieve overall, while specific objectives break this down into smaller, logically connected parts that address various aspects of the research problem.
- General objectives are usually fewer in number, whereas specific objectives are more numerous as they cover several facets of the research issue.

2. What are non-directional hypotheses and how do they differ from other types of hypotheses?

Answer:

- Non-directional hypotheses ask whether there is a difference or correlation between two variables without specifying the direction of that relationship.
- Unlike directional hypotheses, which predict the nature of the relationship, non-directional hypotheses simply test for the existence of a correlation.

3. Short Answer Questions

....cont'd

Answer the following open ended questions clearly and preciselycont'd

3. What is a null hypothesis and what does it signify in research?

Answer:

- A null hypothesis is a statement that indicates there is no relationship between the independent and dependent variables. It is a negative statement, denoted by 'H0', and serves as a basis for hypothesis testing to determine if the null hypothesis can be rejected.

4. What are descriptive research questions and what is their purpose?

Answer:

- Descriptive research questions aim to provide a detailed and accurate description of a phenomenon, event, or subject. They focus on describing the current state of affairs without attempting to establish cause-and-effect relationships.

3. Short Answer Questions

...cont'd

Answer the following open ended questions clearly and preciselycont'd

5. Why is it important to formulate hypotheses before conducting research?

Answer:

- Formulating hypotheses before conducting research is important because it provides a well-reasoned proposition that can be tested to confirm or disprove in the study. Hypotheses are based on existing theories and knowledge, guiding the research process and helping to clarify the relationships between variables.

6. What are the four key characteristics of good research design?

Answer:

- The four key characteristics of good research design are: 1. Validity, which refers to using correct measuring tools that help evaluate results according to the research objectives. 2. Generalization, meaning the outcome should apply to a population and not just a restricted sample, allowing for similar accuracy across different parts of the population.

3. Short Answer Questions

...cont'd

Answer the following open ended questions clearly and preciselycont'd

7. What is the role of applied research in software engineering?

Answer:

- Applied research in software engineering plays a crucial role by directly addressing the needs and challenges of practitioners.
- It involves systematic investigation and implementation of practical solutions to improve software development processes, tools, and practices, ultimately contributing to the success of software projects.

8. What decisions should be made when creating a research design?

Answer:

- Decide overall research objectives and approach.
- Determine whether to rely on primary or secondary research.
- Decide on sampling methods or criteria for selecting subjects.
- Choose data collection methods and procedures.
- Decide on data analysis methods.

3. Short Answer Questions

...cont'd

Answer the following open ended questions clearly and preciselycont'd

9. What are the advantages of using surveys in research?

Answer:

- Surveys play a prominent role in research as they help collect a vast amount of real-time data efficiently and cost-effectively. They can be conducted quickly and can utilize both quantitative and qualitative methods, making them versatile for various research needs.

10. What is the purpose of experimental research?

Answer:

- The purpose of experimental research is to establish a cause-and-effect relationship by keeping a set of variables constant while measuring the effects of other variables. It is particularly useful when there is insufficient data to support decisions, allowing researchers to discover facts through controlled experiments.

3. Short Answer Questions

...cont'd

Answer the following open ended questions clearly and preciselycont'd

11. What is the main purpose of a research proposal?

Answer:

- A research proposal aims to justify the need for investigating a specific research problem and to present a set of strategies for conducting the proposed research. It helps in obtaining approval or funding by demonstrating the feasibility and significance of the research.

12. How should I start the process of writing a research proposal?

Answer:

- Begin by understanding the specific guidelines and structure required by your institution or funding agency. Clarify any uncertainties and start by asking key preparatory questions to ensure your research is valuable and feasible. Read the instructions carefully before drafting your proposal.

3. Short Answer Questions

...cont'd

Answer the following open ended questions clearly and preciselycont'd

13. What should be included in the introduction of a research proposal?

Answer:

- The introduction should concisely explain the central problem of the study, the relevant field, the methods to analyze the problem, the importance of the study, and its significance to academia and society. It should engage readers and make them understand the purpose and potential impact of the research.

14. What are the three techniques to assign intellectual property rights in software development?

Answer:

- The three techniques to assign intellectual property rights in software development are trademarks, copyrights, and patents. These techniques ensure that a company has exclusive ownership of the content, design, and source code of their software.

15. What ethical considerations should engineers prioritize during the testing phase of software development?

Answer:

- During the testing phase, engineers must thoroughly test the software for reliability, accuracy, and security. They should also consider potential biases that may arise from the algorithms used in the software and take steps to mitigate them.

4. Assignment

- **Objective of the assignment :-** do a literature review on a specific topic in software engineering.
- **Activities need to be accomplished.**
 1. Select a research topic related to software engineering such as software methodologies, Requirement engineering, software testing, or software maintenance, etc.
 2. Review at least 10 latest articles from (2020-2024) year of publications related to the chosen topic.
 3. Summarize the findings, highlight key contributions, and identify gaps in the current research.
 4. Compose a well-structured literature review paper that synthesizes the information, includes proper citations, and follows academic writing standards, (3-5 pages).

End of the Course!

Thank you!