**CSC 322 REVISION 2**

QUESTION ONE

1. **State the key players in a research process and explain the role of each player. (6 marks)**

**1. Principal Investigator (PI):** The lead researcher responsible for designing, conducting, and overseeing the research project.

**2. Research Team:** Comprising various individuals such as co-investigators, research assistants, statisticians, etc., they assist the PI in different aspects of the research.

**3. Funders:** Individuals, organizations, or institutions providing financial support for the research.

**4. Participants or Subjects:** Individuals or groups involved in the study, whose data or responses are collected and analyzed.

**5. Ethics Committee:** Ensures that the research meets ethical standards and protects the rights and welfare of participants.

**6. Peer Reviewers:** Experts in the field who assess the quality and validity of the research before publication.

**7. Research Institutions:** Organizations where the research is conducted, providing resources, facilities, and administrative support.

Roles:

- Principal Investigator: Designs the study, secures funding, oversees data collection and analysis, and ensures adherence to ethical guidelines.

- Research Team: Assists in various tasks such as data collection, analysis, literature review, and manuscript preparation.

- Funders: Provide financial support and may offer guidance on research direction and priorities.

- Participants or Subjects: Provide data or participate in experiments, surveys, or interviews.

- Ethics Committee: Reviews research protocols to ensure ethical standards are maintained.

- Peer Reviewers: Evaluate the quality, rigor, and significance of the research prior to publication.

- Research Institutions: Provide infrastructure, resources, and administrative support to facilitate the research process.

1. **State what a research proposal is and the questions it answers. Explain three functions of a proposal.**

A research proposal is a document that outlines the plan for a research study. It typically answers questions such as:

- What is the research topic?

- What is the research question or hypothesis?

- Why is the research important or significant?

- What methodology will be used to conduct the research?

- What are the expected outcomes or contributions of the research?

Three functions of a research proposal include:

**1. Planning:** It helps researchers plan and organize their study by detailing the research question, objectives, methodology, and timeline.

**2. Communication:** It communicates the research plan to funders, stakeholders, and other interested parties to secure funding, support, or collaboration.

**3. Evaluation:** It serves as a basis for evaluating the feasibility, significance, and ethical implications of the proposed research.

**e) Explain any six primary sources of literature review. (6 marks)**

**1. Peer-reviewed Journals:** Academic journals containing original research articles.

**2. Books:** Scholarly books providing comprehensive coverage of a topic.

**3. Conference Proceedings:** Papers presented at academic conferences.

**4. Theses and Dissertations:** Research conducted by graduate students.

**5. Government Reports:** Publications by government agencies containing research findings and policy recommendations.

**6. Grey Literature:** Unpublished or non-commercially published material such as white papers, working papers, and technical reports.

1. **What is a research problem? State any two main issues that should receive the attention of a researcher in formulating the research problem. Give a suitable example to expound your points. (6 marks)**

A research problem is a statement that identifies the gap or issue in current knowledge that the research aims to address. Two main issues that should receive attention in formulating the research problem are:

**1. Relevance:** The research problem should be significant and relevant to the field of study, addressing a gap in knowledge or providing solutions to real-world problems. For example, a researcher studying the impact of climate change on crop yields addresses a pressing global issue.

**2. Feasibility:** The research problem should be feasible in terms of scope, resources, and methodology. It should be possible to address the problem within the constraints of time, budget, and available data. For instance, a researcher investigating the efficacy of a new medical treatment should consider the availability of suitable study participants and ethical considerations.

**e) The diagram (attached) shows part of the first page of a published research paper. Use APA style to show how this paper shall be in-cited and also referenced under the references section.**

**(6 marks)**

In-text citation:

(Jackson, 2020)

Reference entry:

Jackson, A. B. (2020). Title of the paper. \*Journal Name\*, Volume (Issue), Page numbers.

**SECTION B-ANSWER ANY TWO QUESTIONS IN THIS SECTION QUESTION TWO (20 MARKS)**

1. **Distinguish between descriptive and inferential statistics. Give suitable examples. (5 marks)**

**Descriptive statistics:** Descriptive statistics are used to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. For example, mean, median, mode, range, and standard deviation are descriptive statistics. These statistics organize, summarize, and present data in a meaningful way, allowing researchers to understand the characteristics of the data set without making inferences beyond the data at hand. An example could be calculating the average age of students in a classroom based on their birthdates.

**Inferential statistics:** Inferential statistics are used to make inferences or predictions about a population based on a sample of data taken from the population. They involve using sample data to draw conclusions about a larger population. For example, hypothesis testing, regression analysis, and analysis of variance (ANOVA) are inferential statistics. These statistics allow researchers to generalize about the population from which the sample was drawn. An example could be using survey data from a sample of voters to predict the voting behavior of the entire population in an upcoming election.

1. **List and explain any five basic components of a proposal format. (5 marks)**

**1. Title Page:** Includes the title of the proposal, name of the researcher(s), institutional affiliation, and date of submission.

**2. Abstract:** Provides a brief summary of the proposal, including the research problem, objectives, methodology, and expected outcomes.

**3. Introduction:** Presents the background information, significance of the research, research questions or hypotheses, and an overview of the proposed methodology.

**4. Literature Review:** Reviews relevant literature to establish the theoretical framework, identify gaps in current knowledge, and justify the need for the proposed research.

**5. Methodology:** Describes the research design, data collection methods, sampling techniques, and data analysis procedures.

**c) Use the following abstract of a possible project to answer questions that follow:**

**ABSTRACT**

**"This project involves the design and implementation of a crime map a map based system which maps crimes that take place in Kenya to their locations, and provides information of each crime. The system also provides analytical tools that display statistics about each area crime wise and, also help in predicting crimes that might happen in the future. Moreover, an authorized party, such as the police, will be provided with a separate user interface to have access to more detailed information and functions than the general public users"**

1. **Formulate a possible title, general and specific objectives for the project. (5 marks)**

**Possible title:** "Crime Mapping System for Enhanced Law Enforcement in Kenya"

**General objective:** To design and implement a crime mapping system for tracking and analyzing crime incidents in Kenya.

Specific objectives:

1. To develop a user-friendly interface for mapping crimes to their locations.

2. To incorporate analytical tools for displaying crime statistics by area.

3. To implement predictive modeling for identifying potential future crime hotspots.

**ii. Prepare a realistic budget and time plan for the project. (5 marks)**

Budget:

- Software development: $10,000

- Database management: $5,000

- Server hosting and maintenance: $3,000

- Training and support: $2,000

- Miscellaneous expenses: $2,000

Total budget: $22,000

Time plan:

- Phase 1 (3 months): Requirements gathering and system design

- Phase 2 (6 months): Software development and database implementation

- Phase 3 (2 months): Testing and debugging

- Phase 4 (1 month): User training and system deployment

- Phase 5 (ongoing): Maintenance and support

**QUESTION THREE (20 MARKS)**

1. **Some common research design approaches include survey, case study and experiments. State the circumstances under which you would opt for each of these approaches, (6 marks)**

**Survey:** Surveys are suitable when you want to gather data from a large population to generalize findings. They are useful for collecting quantitative data on attitudes, behaviors, and characteristics. For example, if you want to understand public opinion on a new government policy, a survey would be appropriate.

**Case Study:** Case studies are ideal when you want to explore a specific phenomenon in-depth within its real-life context. They are valuable for generating rich, detailed data and understanding complex issues. For instance, if you want to examine the implementation of a new educational program in a particular school, a case study would be suitable.

**Experiment:** Experiments are appropriate when you want to establish cause-and-effect relationships between variables by manipulating one variable and observing its effect on another variable under controlled conditions. They are useful for testing hypotheses and determining causal relationships. For example, if you want to investigate the effectiveness of a new teaching method on student learning outcomes, an experiment would be necessary.

**b) You are developing a parking management system for Bungoma County to enhance the process of collecting and accounting for parking fees. You recently visited the County**

**Head quarters and conducted several interviews in an effort to understand the kind of system that the client wants,**

1. **From your interviews and the knowledge gained in this class, give a list of possible user requirements that you think would make most sense.**

- User-friendly interface for parking attendants to input data.

- Secure payment processing functionality for collecting parking fees.

- Real-time monitoring of parking spaces availability.

- Automated ticket issuance and validation system.

- Comprehensive reporting and analytics capabilities for revenue tracking.

- Integration with existing county systems for seamless data exchange.

- Mobile app compatibility for users to check parking availability and pay fees remotely.

1. **Write a problem statement for the project.**

The inefficient process of collecting and accounting for parking fees in Bungoma County necessitates the development of a comprehensive parking management system to streamline operations, enhance revenue collection, and improve user experience.

1. Describe the methodology that can be used to carry out this project.

**1. Requirements Gathering:** Conduct interviews, surveys, and observations to identify user needs and system requirements.

**2. System Design:** Develop a detailed design plan based on the identified requirements, including user interface design, database structure, and system architecture.

**3. Software Development:** Implement the parking management system according to the design specifications, incorporating features such as payment processing, real-time monitoring, and reporting functionalities.

**4. Testing and Quality Assurance:** Conduct thorough testing to ensure the system functions correctly and meets user requirements, including usability testing, functionality testing, and security testing.

**5. Deployment and Training:** Deploy the system in the county headquarters and provide training to parking attendants and administrators on how to use the system effectively.

**6. Evaluation and Maintenance**: Monitor system performance, gather feedback from users, and make necessary adjustments to improve functionality and address any issues that arise.

**QUESTION FOUR (20 MARKS)**

1. **State any four ethical considerations of a research project report. (4 marks)**

**1. Informed Consent:** Researchers must ensure that participants have given voluntary and informed consent to participate in the study, understanding the purpose, risks, and benefits involved.

**2. Confidentiality:** Researchers should maintain the confidentiality of participant information, ensuring that data is anonymized and stored securely to protect participants' privacy.

**3. Avoidance of Harm:** Researchers should minimize the risk of physical, psychological, or emotional harm to participants, ensuring that research procedures are conducted in an ethical and safe manner.

**4. Conflict of Interest:** Researchers should disclose any potential conflicts of interest that may bias the research findings or compromise the integrity of the study.

1. **List and explain any four types of reports that are presented as an output of a research project. (8 marks)**

**1. Research Article:** A detailed account of the research study, typically published in academic journals, presenting the research question, methodology, results, and conclusions.

**2. Technical Report:** A comprehensive document detailing the technical aspects of the research project, including experimental procedures, data analysis methods, and findings, often prepared for internal use within organizations or research institutions.

**3. Executive Summary:** A concise summary of the research project, highlighting key findings, implications, and recommendations, designed for busy stakeholders who may not have time to read the full report.

**4. Policy Brief:** A brief document that translates research findings into actionable policy recommendations, targeted at policymakers and government officials to inform decision-making.

**c) Discuss the process of carrying out scientific research. (8 marks)**

**1. Formulating Research Questions:** Identify a research topic and formulate clear and specific research questions or hypotheses to address gaps in knowledge or solve problems.

**2. Literature Review:** Review existing literature to understand the current state of knowledge on the research topic, identify relevant theories and methodologies, and inform the design of the study.

**3. Research Design:** Design a research plan, including the selection of appropriate methods and techniques for data collection and analysis, considering factors such as sample size, sampling techniques, and research ethics.

**4. Data Collection:** Collect data using selected methods such as surveys, experiments, observations, or interviews, ensuring that data collection procedures are standardized and consistent.

**5. Data Analysis:** Analyze the collected data using appropriate statistical or qualitative analysis techniques, interpreting the results to draw meaningful conclusions and test hypotheses.

**6. Interpretation and Conclusion:** Interpret the findings in the context of existing literature and theoretical frameworks, drawing conclusions and implications for theory, practice, or policy.

**7. Peer Review and Publication:** Submit the research findings for peer review in academic journals or other appropriate outlets, addressing feedback and revisions as necessary, and disseminate the results to the broader scientific community.

**8. Reflection and Revision:** Reflect on the research process and outcomes, identifying strengths, limitations, and areas for future research, and revise the research design or methodology as needed for continuous improvement.