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Unit 1: Introduction to Research

Learning Objectives

1. What is research? Discuss the importance of research in developing knowledge and solving problems solving across various disciplines.
2. Distinguish between basic, applied, qualitative and quantitative forms of research research.
3. Explain objectivity, reliability and validity in scientific research.
4. Distinguish between research methods and methodology and their significance in conducting systematic investigations.
5. Describe the research process from problem identification through reporting and assessment results.
6. Identify ethical issues related to research, among them informed consent, confidentiality, and responsible data handling.
7. Develop research questions and hypotheses, Comprehend the importance of research questions and In shaping a study (steps 6 & 7) guiding an investigation study.
8. Explain literature review in theoretical framework building and studies finding research gaps.

Content

1.0 Introductory Caselet

1.1 Meaning of Research

1.2 Types of Research

1.3 Research Process

1.4 Features of Good Research

1.5 Summary

1.6 Key Terms

1.7 Descriptive Questions

1.8 References

1.9 Case Study

1.0 Introductory Caselet

“The Curious Case of Avenlea”

Near the sea, in the tiny town of Avenlea farmers live simple lives on small farms. In recent years, however, the town has grappled with Drink in the Nature of This Mysterious Desert Town Cersei Lannister was Septon Gregor on ‘Game of Thrones’: The Once-There crowd-sources theories for major events such as 404 (season 4 episode 4).

began to decline rapidly. Farmers were alarmed, as bees were needed to pollinate the crops. Some blamed climate

change, while others wondered if new pesticides were to blame, and still others chalked it up as a natural cycle.

Perplexed at such is conflicting testimonys, the Town council of Avenlea, resolved to find out the true cause. But

as opposed to hearsay or supposition, they wanted good evidence. So, they brought in a

In one corner sat a bunch of university students from a nearby research institute.

Those students did not jump to conclusions. First, they carefully delineated the problem: “What is causing the

honing of honeybees at Avenlea?” They were stepping on studies of bee behavior, pesticide

impact, and climate trends. From there, they went into the field — collecting samples, talking to farmers,

watching weather, and looking at numbers.

They worked in a methodical way: coming up with hypotheses, gathering and using data and making

conclusions. What they found was that a combination of pesticide overuse and local plant biodiversity were key causes of the drop. Avenlea altered its cultivation to the Bankes and Yolo sCas on the basis of these findings

policies and started to revegetate with indigenous plants. Two years the bee population started to come back.

Critical Thinking Question

Why did Avenlea’s council need to take an evidence-based approach rather than simply going by

beliefs, and what might have they risked if they acted without evidence?

1.1 Meaning of Research

1.1.1 Definitions and Purpose

Definitions of Research

Research is a complex and varied concept that has not been universally defined and described the same way by all scholars or institutions.

reflect their fields of application. Here are several established definitions:

11 • Clifford Woody: He defined research as "a process of steps used getting information upon which to make decisions.

verifying the solution. And it's not just a matter of collecting data: It emphasizes critical evaluation, synthesis,

and confirmation.

• Oxford Dictionary: "The systematic investigation into and study of materials and sources in order

to find the facts and draw new conclusions."

• Kerlinger (1986): Research is: "the systematic, controlled, empirical and critical investigation of theoretical..personal nature." 1.2 Importance of business research • Business research creates a framework to effectively manage people in the organization and motivates workerson the interest ofbusiness by concept formulation based on available scientific data.

application of speculative principles concerning the supposed uniformity of nature."

• UNESCO: Research is defined as "any creative systematic activity undertaken in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this knowledge to devise new applications."

knowledge reservoir, in which knowledge of man, culture and society are presented and used

to devise new applications."

These definitions point to a few of the essential aspects of research:

- It is rational and structured.
- It uses empirical methods.
- Its purpose is the discovery of new knowledge or solution to problems.

Purpose of Research

To solve this issue, research can fulfil multiple functions according to the discipline and problem. The main

purposes include:

Exploration:

- o Appropriate when the researcher pursues a new topic or problem that has not yet been clearly addressed, but with an established theoretical framework and/or in have used before as they learning.

defined.

- o Aids in the identification of variables, the formation of hypotheses and conceptual clarification.

- o Example: Studying the effect of AI on rural education systems.

Description:

- o Systematically attends to accurately represent patterns of people, events and situations.

- o Requires legwork and number-crunching.

- o Example: A survey of the population impacted by a new healthcare policy.

Explanation:

- o Reasons why something is the case.

- o Sometimes means checking to see if one variable relates to another.

- o Example: What kinds of teaching methods work better than others to help students do well in school.

Prediction:

- o Predicts future by using patterns and history.

- o Example: Forecasting trends in the economy on the bases of inflation and employment.

Control:

- o Research may also seek to develop mechanisms of controlling or manipulating the variables in buttonWithType: extrusionEditedtogroupsto establish cause-and-effect relationships.

achieve desired outcomes.

- o Example: The prevention of the disease through vaccination research.

Problem Solving:

o An applied research addresses specific real-world problems – for example, how you can improve crop yield.

reducing employee turnover.

1.1.2 Business vs Academic Research

Work is done in various fields like corporate and education. Though both types follow systematic techniques, they vary in objectives, extent and methods.

Business Research

Business research is that use of the scientific method to solve the problems and decision making in business. It is thus a systematic and intensive process directed towards a more clear understanding of the causes of business success and failure.

gathering data and generating information to make decisions. It tends to prioritize profit, efficiency and

sales trends, customer habits, and product evolution.

Examples:

- Market studies to identify consumers needs
- New product feasibility analysis
- Competitor analysis
- Employee satisfaction surveys

Features:

- Goal-oriented and practical
- Usually time-sensitive
- Implicates interested parties as managers, investors, and customers
- May use tools such as SWOT, forecasting or cost benefit analysis
- Best solution for company.

Value in business:

- Supports strategic planning
- Reduces risk in decision-making
- Enhances customer satisfaction and loyalty

- Drives innovation and competitiveness

Academic Research

Institutional (or) scholarly, This is caused by scholars and researchers via academic research, such as universities, to make theoretical developments.

It is published in a peer-reviewed journal and adds to the body of teaching or research.

Examples:

- A study on the sociolinguistic profile of a community
- A research journal article on new mathematical models

A randomized evaluation of psychological theories applied to behavior

Features:

- Conceptual or theoretical-based distung orientierte und empirische Beiträge mit bezugswis- dert Theorie oder Konzept.
- Operationalizes frameworks and methodologies in structured ways
- Peer-reviewed and publicly disseminated
- Often long-term and exploratory

Value in academia:

- Enhances comprehension of concepts, theories and systems.
- Prepares teaching aids and plans educational material
- Gives kids practice in critical thinking and the scientific method

Some distinctions between business research and academic research are:

Criteria

Business Research

Solve

specific

business

Academic Research

Primary

Purpose

Generate or expand theoretical knowledge

problems

Application

Practical, real-time

Theoretical, long-term

Time Frame

Short to medium

Long-term

Audience

Business leaders, managers

Evaluation

Scholars, students, educators

As measured by cites Contributed peer 4.341 (his-uni) coverage in current source:.

review

Source of funding Private companies, stakeholders Academic institutes, grants for research

1.1.3 Applied vs Basic Research

Research is also classified in terms of its purpose or utilized by the end result into applied and basic (or pure) research.

Applied Research

Applied research is problem-solving in nature and addresses practical questions by means of scientific procedures.

It is frequently commissioned by governments, corporations or industries to examine a burning question.

Characteristics:

- Problem-solving in nature
- Results and data driven
- Often interdisciplinary
- Practical application of theories

Examples:

- Measuring the efficiency of a newly synthesized drug

"ç Writing software to manage live traffic

- Evaluating the effectiveness of alternative educational models in schools

Used by:

- From engineers, business analysts and healthcare practitioners to policymakers

Impact:

- Immediate effect on work productivity, enjoyment of life or service effectiveness

Basic (Pure) Research

Fundamental research is done in order to gain knowledge and has no specific application towards which it is oriented. It lays the

basis for additional practical research and often results in shifts of paradigms in knowledge.

Characteristics:

- Theoretical and exploratory
- Long-term and curiosity-driven
- Not necessarily connected with specific commercial results
- May include abstract or conceptual problems.

Examples:

- Exploring characteristics of sub nuclear particles.
- Investigating the mental abilities of babies

2 • The language of humans and primates

Used by:

- Academics, scientists, research scholars

Impact:

- Contributes to theory and foundational understanding
- Facilitates the development of future technologies and methods

Comparison Table:

Feature

Applied Research

Basic Research

Focus

Specific problem-solving

Theory and knowledge development

Goal

Practical outcomes

Intellectual exploration

Application

Immediate or short-term

Industry, government, NGOs

Long-term or indirect

Funding

Sources

Academic institutions, grants

Audience

Practitioners,

policymakers

managers,

Scholars, researchers

Methodology

Often experimental or mixed

method

May contain theoretical models or pure

experimentation

Result Use

Direct implementation in real

world

Implication for the future studies or models

“Activity”

Research types vary by purpose, data, and time frame. Exploratory, descriptive, and causal research

serve different goals. Qualitative research explores meanings; quantitative analyzes numerical data.

Cross-sectional studies provide snapshots, while longitudinal research tracks change over time.

Understanding these distinctions helps select suitable methods for valid, reliable results.

1.3 Research Process

1.3.1 Stages in the Research Process

The cycle of research generally consists of the following phases:

Problem Identification

- Identifying and defining a clear research question or problem.

This provides the basis for the entire work.

For example: “What are the determinants of employee retention in startups?”

Review of Literature

- A thorough examination of the studies, theories, and findings concerning the SUBJECT_AREA_TER relied upon to determine what is considered adequate for program recognition.

research topic.

- Aids in finding gaps, focusing research questions, and formulating hypotheses.

Formulating Research Objectives and Hypotheses

- Outlining what the research aims to accomplish.
- Hypothesis is a tentative assumption to be tested.

Research Design

- Selecting type of research (exploratory, descriptive or causal), method of study (qualitative or opportune), source of data.

quantitative) and instruments of data collection.

- Sampling methods, time period and data sources planned.

Data Collection

- Data collection by selected instruments-survey, interview, experiment or a random sampling of 376 questions in the nature of the study. It is to be pointed out that data are more often collected for scientific purpose and programme being executed.

observations.

- At this point, ethical aspects such as informed consent and secrecy are needed.

Data Analysis

- Utilizing either statistical, or qualitative methods to analyze data collected.

Helps to test hypotheses, recognize trends and to make inferences.

Interpretation and Discussion

- Making inferences from the analysis.
- Applying results to literature and theories.

Report Writing and Presentation

Organizing these findings into a report or presentation.

- Comprises abstract, introduction, methodology used, results of the study, discussion and references.

Recommendations and Application

- Discussing the research in terms of its practical or theoretical implications.
- Offering solutions or implications for future research.

1.3.2 Iterative Nature of Inquiry

Research is not always continuous progress from point A to B. It frequently implies reflecting on earlier stages according to new needs and interests.

towards new insights, challenges or results. This includes the iterative characteristic of this cyclic process, called

inquiry.

Central Features of Iteration in Research:

- Problem Refinement: Researchers might discover this during a review of the literature or while collecting data.

necessary to redefine the problem.

- Loops: From your measurements and the results obtained during measurement you may need to go back measure again.

of hypotheses.

flexibility in approach enables researchers to tailor tools and methods for the situation at hand.

improve the quality of findings.

Example:

In doing interviews, it may be revealed that other unconsidered variables are at work. This may require

dialling back the research questions or amending the interview guide.

Benefits:

- Validity and depth of study is strengthened
- Facilitates critical thinking and reflexivity • Builds skills in the application of scientific evidence to practice.
- Reflects the complexity and uncertainty of real-world research

1.3.3 Deliverables and Milestones

Researcher deliverables and milestones help delineate, track, and manage that process.

progress, and ensure accountability. These are essential in the planning and implementation of projects.

Deliverables

They are the concrete result, or products, resulting from each stage of the research process.

Examples:

- Research proposal
- Literature review summary

Data collection tools (e.g., questionnaires, interview guides)

- Statistical analysis reports
- Dissertation or final research report
- Presentation slides or posters

Milestones

Milestones are important points or deadlines in a research project, often used to monitor the progress of a project. They help

in measuring the performance and taking stock of what is happening in the research effort.

Examples:

- Approval of research topic
- Proposal submission to ethics committee
- Completion of data collection
- Completion of data analysis
- Draft submission of report
- Final defense or presentation

Role in Research Management:

Allows project tracking and time management

(b) Support for coordination in collaborative research

- Makes it easy to communicate with your supervisor or the stakeholders

1.4 Features of Good Research

1.4.1 Rigor and Validity

Rigor

Rigor relates to the amount of rigor used in collecting and analyzing data. It makes sure the research is methodologically sound and findings are obtained rationally and/antlr57999-118641LANGUAGE_3 reasonably. systematically.

Aspects of Rigor:

- Carefully defined research questions
- Proper use of methodology
- Controlled bias and error
- Standardisation of data collection and analysis.

Example:

A well-designed study utilizes a validated questionnaire, and ensures adequate sampling and establishment.

statistical analysis with appropriate tools.

Benefits:

- Increase trustworthiness of the results
- To avoid false or illusory messages
- To guide attention away from the superficial or deceptive

Validity

Validity refers to the degree of truth to measurements and inferences.

Types of Validity:

Internal Validity:

- o Extent to which the effect is caused by the independent variable and not other factors.
- o Crucial in experimental designs.

External Validity:

- o Generalizability beyond the study sample or setting.

Construct Validity:

- o The extent to which a test or instrument measures its intended content.

Content Validity:

- o How comprehensively the instrument samples construct content.

Example:

second, if a survey is designed to measure job satisfaction it has to do so in reality and not by socioeconomic status or location.

1.4.2 Reliability and Replicability

Reliability

Reliability is related to the consistency of a measuring instrument or research method. A reliable tool

yields the same result when applied under uniform conditions.

Types of Reliability:

Test-retest reliability: stability over time

- Inter-rater reliability: Agreement between two or more observers/raters
- Internal consistency: Measures of internal consistency within a measurement tool (e.g., Cronbach's alpha)

Example:

If a psychological scale is applied to a group of the same people on two different occasions and gives similar results,

it is considered reliable.

Replicability

Replicability means that another researcher using the exact same methods and procedures should be able to (re)create,

reproduce the same results.

Importance:

- Confirms findings
- No risk of fraud or bias interpretations
- Water resistant (proof) prevents loss/ damage to previously recorded measurements.
- Establishes trust in the known science

Example:

A scientific experiment that appears in a journal should have the capability of being replicated by other scientists with access to the same theories.

protocol.

Challenges:

- Replicability is not feasible in qualitative research, but transparency and documentation assist to preserve.

trustworthiness.

1.4.3 Ethical Soundness and Relevance

Ethical Soundness

Research must be approached with respect for the rights, dignity and safety of participants.

of participants and society.

Core Ethical Principles:

- Consent: All informed participants should be aware of what they are getting into, the risks as well as what the purpose is.

research.

- Confidentiality/privacy: personal data require protection and anonymization.

- Participation voluntary: No enticement or pressure to participate.
- Non-Maleficence: Physical and psychological (psychosocial, including social) harm is to be avoided.
- Honesty and transparency: no data fabrication, falsification or plagiarism.

Ethical Oversight:

Institutional Review Boards (IRBs) or Ethics Committees consider and approve research projects.

in order to comply with ethical standards.

Example:

Studies in human subjects must have received prior ethical approval and be apprised to the guidelines.

Relevance

Relevance is the practical or theoretical importance of a study. Good research should add to the body of knowledge, or address a real-world challenge.

Criteria for Relevance:

- Responds to contemporary or significant need
- Fills a gap in literature
- Implications for practice, policy or further research

Example:

The research on the digital divide in rural online education is timely and socially useful.

Knowledge Check 1

Choose the correct option:

1. Which of the following ensures accuracy in measuring what the research intends to measure?

- a) Reliability
- b) Validity
- c) Replicability
- d) Ethics

2. What does reliability in research primarily refer to?

a) Ethical approval

b) Statistical accuracy

c) Consistent results

d) Research impact

3. What is the purpose of informed consent in research?

a) Improve validity

b) Reduce costs

c) Ensure ethical participation

d) Simplify analysis

4. Which feature of good research allows another researcher to reproduce the same results?

a) Rigor

b) Ethics

c) Relevance

d) Replicability

1.5 Summary

Research is an organized inquiry to find out certain things.

solving problems.

⊗ Research may be exploratory, descriptive, explanatory, predictive or problem-solving.

⊗ Types of research include:

o By Purpose: Exploratory, Descriptive, Causal

• By data: o Qualitative vs Quantitative

o By time Cross-sectional vs Longitudinal

7 The research process There is a number of steps in the research process: identify problem, review literature, specify goal,

study design, data collection, analysis, interpretation and reporting.

⊗ Research is an iterative process—researchers may go back and forth between earlier stages to make decisions about questions, tools, or analysis.

♣ Deliverables and milestones are proposals, data tools, interim reports and final products.

submissions help to keep on track and to be organized.

⊞ Characteristics of good research are:

- o Rigor (methodological thoroughness)
- o Validity (accuracy of measurement)
- o Reliability (consistency of results)
- o Reproducibility (whether the results can be repeated)
- o Ethical rigour (respect for the subjects and honesty)
- o Applicability (practical importance or relevance for field of study)

1.6 Key Terms



Research: A planned approach to the collection and analysis of data in order to solve a problem or develop knowledge upon a ...
phenomenon.

Exploratory Research: Research conducted to discover a problem or to gain some preliminary insights of the.
generate ideas.

Descriptive Research: Research, the goal of which is to describe a trait or function of a subject or population.



Causal Research: investigation aimed at determining cause-and-effect relationships between variables.

Qualitative Research: It is a type of research that investigates non-numerical data to learn meanings, aesthetics and their strive.
experiences, or concepts.

  **Quantitative Research: Research that uses numerical data and statistical methods to test hypothetical generalizations.**

hypotheses or measure variables.

Reliability: The degree of consistency or stability in measures obtained across time, and among observers.

  **Validity: A measure of the degree to which a research instrument measures what it is supposed to measure.**

Morally correct research: Research that is carried out with due regard for rights, human dignity, and social obligation responsibility.

Reproducibility: The capability of a scientific study to be replicated and the same results obtained by other researchers.

1.7 Descriptive Questions

Define research. Debate the central reasons for doing research in academic and professional settings contexts.

Distinguish between business research and academic research with examples.

Distinguish between applied and basic research. What are the differences between their aims and results?

Explain the different kinds of research according to purpose: exploratory, descriptive and causal types. Provide examples for each.

1, Compare and contrast QUALITATIVE and QUANTITATIVE research methods in relation to data collection, analyses and quality. outcomes.

Explain the difference between cross-sectional and longitudinal research designs. When would each be appropriate?

Explain the primary steps of research you would anticipate to find. Why should you be doing this? systematically?

What are the characteristics of good research? Discuss the significance of rigor, construct validity, reliability. ethical soundness.

Discuss the recursive aspect of In v - how does flexibility in the process help research Community home page: How does flexibility in the process facilitate concluding more quickly? quality?

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Answers to Knowledge Check

Knowledge Check 1

1. b) Validity

2. c) Consistent results
3. c) Ensure ethical participation
4. d) Replicability

1.9 Case Study: Research in Real-World Event Management

The Role of Hair Stylists and Makeup Artists in Event Planning:

A Case for Research-Driven Coordination

Background

For today's events physical 'look' of the stereotype is necessary for attainment.

thematic harmony and increasing the atmosphere of the event. Hair stylists and makeup artists

significantly influence this aspect. However, while these professionals play a key role in

event workflows is still a crazy hard problem, coordination and event theme suitability and stuff like that.

communication among team members.

Context for Research Application

These problems, as illustrated in the current case, underscore a rationale for systematic, evidence-based efforts to

improve event execution. This is where research comes in identifying problems, experimenting and drafting for policy making cooperative with the implementation of trade as well.

interventions, and assessing outcomes under real-life conditions.

Problem Statements & Research Approach

Problem 1: Coordination Challenges

Coordinating a team of hair and makeup artists is like herding cats, so scheduling conflicts, talent that varies from one date to another may be expected.

service quality, and delays.

- Research Question: What role can scheduling systems play to better coordinate multi-vendor

beauty teams during large-scale events?

- Recommended Type of Research: Mixed-method (Surveys with event managers + 3-5 in-depth semi-structured interviews with each sample) 20. Risk and safety factors for venues, events, and festivals operating within the night-time economy.

interviews with stylists)

- Effects/Insight: The existence of a time slot centralized scheduling system greatly reduces conflicts and improves service flow.

Problem 2: Theme Misalignment

Unrelated styling to the theme of the event creates a lack of visual consistency.

- Research Question: What communication strategies achieve visual alignment among event

themes and beauty services?

- Recommended Research Method: Qualitative case study through documentation of events and staff

interviews

Solution Identified: Specific theme guidelines and color palettes Through the implementation of specific theme.

consistency across services.

Problem 3: Communication Gaps

Poor communication results in unmet client expectations and implementation slowdowns.

- Research Question: What are the mechanisms that promote real-time communication among event

managers and styling teams?

- Methodology: Action research combined with the use of messaging tools and pre-event briefings

- Result: Designating a sole point of contact and reliance on electronic communication platforms

streamlines updates and task delegation.

Application of Research Principles

The present case demonstrates that the following research principles can be successfully applied:

- Problem definition
- Data collection and analysis
- Evidence-based decision-making

could be used for proactive and simultaneously quality-enhancing work in the field of event-based media communication.

management.

Discussion Questions

How does the development of research profile inefficiencies that we assume exist in event planning?

What kind of data is the most suitable to help understanding how to improve team coordination?

How does research contribute to the satisfaction of clients within service industries?

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Unit 2 Research Problem Identification

Learning Objectives

1. Define a research problem and show its importance in the general research activity?
2. Distinguish between research TOPICS, problems and questions giving examples?
3. Derive the criteria for selecting a good research problem which may be feasible, relevant and researchability.
4. Develop focused, clear research questions from preliminary exploration and literature review.
5. Know the origins of research problems, that is theory, observation, social issues and 98 political interest and personal interest.
7. Critique the applicability of a selected research issue within context.
8. When formulating a Research problem: Discriminate between dependent and independent variables Separate the wheat from the chaff as elements of research problem empirical studies.
9. Identify the influence of assumptions, limitations, and operational definitions on definition of the concept boundaries of a research problem.

Content

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2.0 Introductory Caselet

"Framing the Right Research Problem"

Riya, a 21-year-old entrepreneur, created an online teaching platform during the pandemic to make cheap

skill development programmes for rural India. More generally, enrollment was large at first when most started off with a high number of learners and definition_i_rate_0 too!

eager to access new opportunities. But in a few months she began to observe a disturbing pattern—It seemed that

students signed up quickly, but then their attendance and participation in live classes decreased markedly.

Low completion rates, and feedback indicated a major stumbling block for many learners was lack of motivation to engage in parties.

the absence of face-to-face interaction.

Puzzled about the conflicting results, Riya pondered her next move. Was it a question of bad internet

, access, ineffective pedagogy or lack of motivation/ cultural differences in learning behaviour? To

find clarity, she delegated to systematic research. She knew that she had to before going off/drawing her conclusions, I am text block.

and to identify an unambiguous research problem. The analysis of the literature on online learning as well as discussion with

teachers, and collecting student feedback, she defined the problem as: "What mediates faculty

participation in a rural online learning environment?"

Articulating the research problem helped her establish limits, assess feasibility and concentrate on specific outcomes, she says.

factors. Rather than being fuzzy about the issue, Riya now had a trail of investigate to keep her on track toward down- to earthngkap solutions.

evidence-based solutions.

Critical Thinking Question

Why is it important to differentiate between a large topic such as "online learning" and a specific research area?

issue like “influencing factors of student engagement in rural online learning settings”?

2.1 Understanding Research Problems

2.1.1 Characteristics of a Researchable Problem

Researchable problem is a situation which can be investigated in a systematic manner with the help of scientific and other currently available knowledge.

methods. Not all interesting questions are researchable—there are some key prerequisites.

Key Characteristics:

Clarity

- o The task should be well defined with no ambiguity.
- o Example: “How does online learning affect student engagement?”

Feasibility

- o The researcher must have the ability to investigate the .. depths. of the concepts and should also have access time, money (resources) and skills to address such an issue.

problem.

- o It has to be feasible, given the current conditions.

Novelty

- o It should contribute to existing knowledge or fill a void.
- o Repeating or known problems might not be of research interest.

Researchability

- o The issue must be measurable, testable not to mention observable.
- o Theoretical, possibly abstract, philosophical problems unless considered in the context of an theoretical framework may not be appropriate.

Relevance

- o The problem should be important to either an academic, industry or society.
- o It must be solving a problem or filling some theoretical crevasse.

Ethical Viability

- o The issue must be researchable without crossing ethical lines, including consent. privacy, or safety.

2.1.2 Sources: Literature, Practice, Gaps, Theory

Research problems are inspired through intellectual as well as practical stimuli/fs.

Understanding these

sources and allows researchers to ask meaningful and relevant questions.

Literature Review

- Rich set of research problems.
- Making reference to related research gives an opportunity to highlight these unresolved issues or limitations.

A study may lead to the consideration of research in new population or context.

Professional Practice

- Real-world experiences or issues in business, health care, education or other sectors of society.

engineering.

- Example: A business with high turnover rates among employees might inspire a study of job satisfaction.

Gaps in Knowledge

- Emerge when evidence is either inconsistent or inadequate on a particular topic.

These reservations are frequently raised in review articles or discussion sections of academic papers.

Theoretical Frameworks

Unanswered questions or predictions that have not been tested based on currently accepted theories can serve as research problems.

- Sample: Testing a new variable in Maslow's need hierarchy at the workplace of today.

2.1.3 Context and Scope Definition

After the research problem is selected, it should be contextualized and delimited in order to remain focused and Relevant work become useful.

clarity.

Context Definition

- It is the context in which the problem takes place.

- Can include:

- o Location (e.g., rural/urban)

- o Temporal context (e.g. pre- or post-pandemic)
- o Demographic settings (e.g. students, senior citizens, professionals)

Example: Investigating online learning engagement in Indian public universities in the time of pandemic.

Scope Definition

- Discusses the scope or limitations of the study.
- Describes what the policy will cover and not cover.
- Helps avoid unnecessary complexity.

Elements that define scope:

Time period (e.g., dates of 2020 to 2023)

- Population/sample(e.g. Final year Engineering students)

Variables (e.g., only academic achievement, not emotional well-being)

Importance of Scope:

- Maintains focus
- Enhances feasibility
- Aligns objectives with resources

“Activity”

Students will select a real-world issue from their field and identify whether it qualifies as a researchable

problem. They must justify their choice using characteristics such as clarity, feasibility, relevance, and

researchability. Additionally, they will define its context and scope, and identify its source— literature,

practice, gap, or theory.

2.2 Formulating the Problem

2.2.1 Problem Statement and Background

Problem Statement

The problem statement is a succinct explanation of the problem that will be addressed through research.

Bring in the 'Why' It questions the delta – What's happening now vs What could/should be.

Key Features:

- Details the problem(s) • Explains the problem(s) sort 1 or sort 2 • unclear if there was any amount of money.
- Explains the problem and its importance
- Identifies which details are not known or have been misunderstood
- Rationalizes research • Describes the motivation for the study Profile of a leader – embodying faith and learning in scholarship 23.

Example:

"While the internet has exploded with online learning platforms, student engagement is low in distance

education, particularly among rural postsecondary students. The reasons for this lack of engagement have not been comprehensively explored."

Background to the Problem

The second section will present the context and justification of this issue. It briefly outlines:

- Existing literature or evidence
- Theoretical or practical issues
- Observed trends or concerns
- Historical or current relevance

Purpose:

- Assists readers in sizing the problem up and situating it within its context
- Demonstrates that the researcher knows enough about the field

2.2.2 Purpose, Objectives, and Research Questions

Purpose of the Study

8.1 Introduction The purpose statement describes what the study will accomplish. It connects the problem to significance

outcome of the study.

Example:

This study aims to explore the reasons for student engagement in rural online learning environments."

Research Objectives

2.1 Objectives Objectives are concrete steps that the researcher will undertake to achieve the purpose of his study. They may be

divided into:

- General objectives (broad goals)

Specific goals (clear, explicit aims)

Example:

- To measure student participation in rural online courses
- To explore the barriers of active involvement
- To propose solutions to enhance online learning opportunities

Research Questions

The study is directed by research questions. They should be:

- Clear and focused
- Aligned with objectives
- Answerable (being able to be addressed by collection and analysis of data)

Example:

- To what extent are students engaged in rural online learning?

What causes low participation?

- What is the students' attitude towards online learning platforms?

2.2.3 Delimitations and Assumptions

Delimitations

Delimitations The limits established by the researcher that determine what is or what is not to be studied. They are under the

researcher's control, and they specify what will or will not be the domain of the study.

Common Delimitations:

- Physical location (e.g. rural schools in Maharashtra only)

- Time period (you could start with “2021–2022”)
- Population/sample (e.g., noly post graduates)
- Variables examined (e.g., degree of involvement, not academic achievement)

Purpose:

- Focuses and makes the study more manageable

Is clear to the reader

Assumptions

Hypotheses are a set of things the researcher thinks might be true, but which he can't check or verify from within the

study. They are the basis of the investigation.

Examples:

- Respondents will tell the truth when responding to information from surveys.
- The sample is representative of the population.
- You'll be able to use your distance learning platform smoothly regardless of which region you may choose from.

Purpose:

- Acknowledges foundational beliefs
- Establishes interpretation of results responsibilities

2.3 Evaluating Problem Quality

2.3.1 Feasibility and Significance

Feasibility

Feasibility, the research question is whether it is practicable to study a headache problem effectively within the time available,

resources, skills, and data.

Factors to consider:

access to people or data

- Tool, Equipment, or Software accessibility.
- Time constraints (project duration)

- Budget or funding
- Researcher's expertise

Example:

It may be important to study the impact of an education policy in a country halfway around the world, but if access to the data that lets you do it is non-existent and additional resources aren't in reach, then maybe it's not.

limited, conducting the study may not be possible.

Significance

The term significance inter alia Ambiguity: Depends on the "insight" of the research.

Types of significance:

Theoretical Contribution Add to or test existing theory.

- Practical Implication: Assists in resolving real-world problems.
- Policy Relevance: Influences policy decisions or change.

Criteria to evaluate significance:

- Does it fill an existing lacuna or controversy?

Will it help a particular organization or the community?

- Does it complement hot topics in the field?

2.3.2 Ethical and Practical Considerations

Ethical Considerations

Thorough, responsible ethical review of research protects subjects and the integrity of the research enterprise.

Ethical factors:

- Informed consent
- Anonymity and confidentiality
- Prevention of injury (physical, mental, social)!
- Voluntary participation
- No deception or coercion

Example:

A study of trauma survivors must consider the participants' emotional safety and offer supportive resources as appropriate.

Practical Considerations

Aside from morals in one manner than another's taste, the quality of research also may be compromised by some practical considerations. These include:

- logistical planning(e.g. travel, equipment)
- Administrative assistance (ie permissions, access) 3.
- Alignment with other timelines (e.g., semester timelines).
- Inclusion of stakeholders (for example, organizations or institutions)

By not addressing logistical challenges, project delays, data quality issues or unfinished studies may result.

2.3.3 Link to Contribution

The research question needs to be assessed for what contribution it can make to science or society. A high-quality

problem should further the state of knowledge or practice in a meaningful manner.

Types of Contribution:

Academic Contribution

- o Brings about new ideas, concepts etc.
- o Fills a gap in literature
- o Proves or disproves the current models

Practical Contribution

- o Provides real-life problem solving opportunities
- o Makes suggestions on professional practices
- o Enhances policy or decision-making

Methodological Contribution

- o Develops new research tools or methodologies.
- o Adjusts techniques to the setting

Evaluation Questions:

- What new information will this provide?

- Who are the intended beneficiaries of the findings?
- How are the results useful in practice?

Did You Know?

“Did you know that a well-defined research problem must clearly link to a contribution—either by

filling a knowledge gap, offering practical solutions, or improving policy? Research that lacks contribution, even if well-executed, may be overlooked by academic journals, funding agencies, or decision-makers due to limited relevance or impact.”

2.4 Foundations

2.4.1 Theory, Concepts, Constructs, Variables

Theory

A theory is a system of interconnected ideas that explain and/or predict reality.

relationships between variables. Theories help to direct investigations as they give a systematic account of

how things work.

For example: Maslow’s Hierarchy of Needs explains human motivation in five levels.

Concepts

A concept is a way of common thinking or description about behavior. Constructs such as concepts are injected in the fundamental structure of

theories.

Example: Motivation, leadership, satisfaction, anxiety.

I know that concepts are abstract and need to be operationalized for measurement in research.

Constructs

A construct is a term that has been invented, created (constructed) or adopted in a particular field of science or research, and is considered to be an explanatory variable. It is often

not measured but inferred through indicators or scales.

Example: "Job satisfaction" can be measured as a construct by means of questions regarding work environment, income,

and recognition.

Variables

A variable is anything that can be measured or adjusted, and something that you control, which in turn has an affect on the outcome. Measured, classified or It is quantifiable.

manipulated.

Types of Variables:

- Independent Variable (IV) – The cause or input
- Dependent Variable (DV) – The result or outcome
- Dependent Variable (DV): The impact or result
- Controls: Other information held constant
- Confound Elements: Factors involved in an experiment that may contaminate results.

Example: In a research aiming to determine study hours (IV) effects on exam scores, motivation could be one of the control variables.

2.4.2 Operational Definitions

A proposed operative definition of how a concept or construct can be observed or measured within the.

context of a study. It turns its abstract positions into concrete, measurable signs.

Why it's important:

- Ensures clarity and consistency
- Allows replication of research

Aligning measurement with the research objective

Examples:

- Stress can be defined operationally as "a score greater than 25 on the PSS".
- "The average rating on a 5-point satisfaction survey" could be the way to check customer content.

A concept may be operationalized and defined differently in one research study than another.

2.4.3 Conceptual Framework Models

A using a conceptual framework is a visual or written model that depicts the major variables in one's research and.

how they are related. It demonstrates the direction that the investigator anticipates the study to take as a result of theory and previous research.

Features:

- Includes constructs and variables
- Indicates current of relationships (+-/ direction)

Derived from literature or existing models 1.

- Useful for hypothesis generation

Example:

In a research about employee engagement:

- Predictors: Motivation, Training, Supervision
- Dependent Variable: Job performance
- In the model, arrows indicate a causal effect of each IV on the DV

Purpose:

- Assists in developing research questions and hypotheses
- Clarifies the study's scope
- Directs the collection and analysis of data Assist with recovery support plan development.

Knowledge Check 1

Choose the correct option:

1. Which of the following best defines a construct?

- a) Observable trait
- b) Abstract concept for research
- c) Fixed variable
- d) Survey question

2. What is the role of an operational definition in research?

- a) Develop theory
 - b) Visualize data
 - c) Measure a concept
 - d) Collect literature
3. Which variable is affected by the independent variable?
- a) Control variable
 - b) Extraneous variable
 - c) Dependent variable
 - d) Constant
4. What does a conceptual framework show?
- a) Survey layout
 - b) Literature review
 - c) Data analysis steps
 - d) Variable relationships

2.5 Hypotheses

2.5.1 Null and Alternative Hypotheses

Null Hypothesis (H_0)

The null hypothesis is a claim that there is no effect or no correlation. It serves as implemented/used as the 'prior or initial with direct testing through statistical analysis.

Example:

Hypothesis II H_0 : There is no significant difference between the performances of students who learn through online lessons and students who PERFORMANCE OF STUDENTS AND TEACHERS TOWARDS ONLINE LEARNING Platform learn with traditional platform.

in classrooms.

Alternative Hypothesis (H_1 or H_a)

The alternative hypothesis claims that there is some relationship or difference. It reflects the

researcher's actual expectation or prediction.

Example:

H_1 : Online students behave in a different way with respect to classroom students.

Purpose:

Statistical tests seek to reject the null in favor of the alternative.

- The onus of proof is to offer the requisite level of evidence for counter-hypothesis.

2.5.2 Directional vs Non-directional Hypotheses

Directional Hypothesis

A directional hypothesis describes the anticipated direction of the relationship between variables (positive vs.

or negative).

Example:

H_1 : Online students receive higher scores than classroom students.

Use when:

- It can be predicted or justified from the theory or empirical evidence of which you are aware.

Non-directional Hypothesis

A non-directional hypothesis predicts only that a difference or relationship exists, not which of the two groups is different from or related to the other.

direction.

Example:

H_1 : There is a performance DISPARITY between the online and classroom students.

Use when:

- The direction is unknown or unclear on the basis of previous findings.

Did You Know?

“Did you know that a directional hypothesis predicts not just a relationship but also its specific

direction (e.g., increase or decrease), while a non-directional hypothesis simply states that a

relationship exists without specifying how? Choosing the right type depends on the level of existing

evidence and research intent.”

2.5.3 Formulation and Testability

Formulating a Good Hypothesis

A well-formulated hypothesis should be:

- Clear and concise
- Theoretical or previous evidence 6.
- Clear on variables and proposed relationship
- Stated in a testable form

Format (for quantitative research):

“If independent variable X increases, then dependent variable Y will increase/decrease/stay the same.”

same.”

Example:

"If motivation of employees increases, so will the productivity".

Testability

A theory is testable if it can be either proven or disproven by observation. It must be measurable using

available tools and methods.

Non-testable hypothesis:

“Luck is a factor in success” — so vague and immeasurable.

Testable hypothesis:

“Employee performance scores get better after training programs” — measurable and specific.

Importance of Testability:

- Enables empirical investigation
- Allows statistical testing
- Facilitates objectivity and scientific rigor 2.5.7.

2.6 Linking Theory and Hypotheses

2.6.1 Deriving Hypotheses from Theory

What It Means

Theory-Driven Hypotheses: A Generalization from Theory To derive a hypothesis from theory, one begins by observing a logical implication of the prediction that derives from the theory_SIMPLESUMMARY Accurate estimation of outcomes based on well-defined criteria is an important consideration in family business research.

explains. The theory takes the abstract theoretic ideas into testable and measurable propositions.

4.5 Steps to Formulate Hypotheses from Theory:

Know the basic postulates of the theory.

Name the main variables related by the theory.

2.2 Translate relationships into concrete, testable hypotheses.

Express the conjecture such that it can be subject to empirical testing.

Example:

- Theory: Herzberg's Two-Factor Theory (that there are factors that lead to job satisfaction and factors that determine for dissatisfaction in the workplace).
- Hypothesis: Employees who have access to achievement opportunities will report more job satisfaction.

Generating hypotheses from theory advances the scholarship of research and ensures its coherence with theory Powered by Editorial Manager and ProduXion Manager from Aries Systems Correlation or causation? The illustrationproblem in publishingimages308Lastly, as classicaltest theoriescoremodelsrequire

design and theoretical grounding.

2.6.2 Logic and Boundary Conditions

Logic in Hypothesis Development

Logical consistency ensures that hypotheses:

- Follow from theoretical assumptions
- Are internally coherent

Reflect cause and effect relationship (in explanatory research, especially).

An example: If Theory A states "X causes Y", my hypothesis should not negate that by saying "It's not the case that X causes Y".

effect on Y" unless you are testing a rival theory.

Boundary Conditions

The boundary condition is the range over which one expects a theory or a hypothesis to apply.

They answer:

- When does the theory apply?
- Here, or to who said in?

Example: What you believe to be true about consumer behavior in Western markets, may not apply to developing economies

due to cultural differences.

Importance:

- Prevents overgeneralization
- Directs the sampling and the selection of context

58 • Encourages pragmatic, focused research

2.6.3 Common Pitfalls

Even investigators with some experience may find challenges in the connection between theory and hypotheses. Recognizing

these weaknesses guards for theoretical congruence and valid hypothesis generation.

Common Pitfalls:

Weak or No Theoretical Basis

- o Generating hypotheses without theoretical foundation.
- o Has resulted in piecemeal or stagnant research.

Vague Hypotheses

- o Using vague or imprecise language or self designing terms.
- o Difficult to test and replicate.

Overgeneralization

o Assuming the hypothesis to apply universally without specifying limitations or bounds. conditions.

Circular Reasoning

- o If this hypothesis is true, to say, then the theory motivating it should be also true.
- o Violates logical independence.

Ignoring Alternative Explanations

- o Neglect of alternative hypotheses or variables that may lead to the same effect.

Example: Blaming staff turnover all on salary and not taking any notice of job satisfaction, work-life

balance, or organizational culture.

2.7 Summary

⊗ It is the keystone of the research process and sets pace for other steps.

orientation, extent and aim of the study.

⊗ The problem to be investigated should be research (envisioned, solvable, beyond common-sense) and stated in appropriate questions form ⊗ Two categories of the researchable problems are: ♣ Clear, feasible, significant, ethical and investigatable.

through empirical methods.

Research problems factors ⊗ Literature review ⊗ Practice-based sources ⊗ real-world practice, gap in the knowledge base and

theoretical frameworks.

⊗ Understanding the context and scope of the problem is helpful in focusing the study down and establishing a clearly defined text.

boundaries.

⊗ A well stated problem should contain a problem statement, the background of the problem, the purpose and objectives as well as.

research questions.

⊗ Delimitations are those characteristics that the researcher will not control, and assumptions are truths that the.

underpin the study.

Determining the soundness of a research problem means considering – feasibility, significance, ethical.

rationale, consideration points and theoretical or practical contribution.

Theoretical Foundation of Research A theoretical foundation of research comprises theories, concepts, constructs, and variables that are theoretically related.

via olive definitions and cognitive skeleta.

Hypothesis A hypothesis is a testable statement of a relationship derived from theory; hypotheses can be null or alternative, and either directional or nonortal.

non-directional.

Connecting theory and hypotheses provides face validity, while acknowledging boundary

.

conditions and how not to fall into typical traps, such as invoking a standard that is too vague or too general.

2.8 Key Terms

Problem of the Study: A particular problem or question that a study attempts to explore through rigorous, discipline appropriate scientific methods_ INDIC8ISeleniumDEF_TIME分隔符00c&MDL)NF>@B3bP전)>>6-./././+Critique of Problem and Purpose 2834DESIGN:NSF_Times_PGConventionListDimsconfs1d n 202201449p871Mikhail_N% C2O+P(9NV;082hA01329h737917!A v|12colSEXRank YYD).pjR <"#.

inquiry.

Hypothesis: A Predictable statement about the relationship between two or more variables.

H0 (Null Hypothesis): A null hypothesis is a formal statement that there is no effect or relationship between variables.

Alternative Hypothesis (H₁): A statement that indicates the presence of an effect or relation between

variables.

Directional Hypothesis: A hypothesis that specifies the direction of a relationship between variables.

Non-directional Hypothesis: A hypothesis that asserts the presence of a relationship but does not indicate its

direction.

Operational Definition: A specific definition of how a concept or variable will be measured in a particular study.

Conceptual Framework: A theoretical model that demonstrates the major variables and their supposed interrelationships in.

a study.

Boundary Conditions: The precise circumstances or limits of a theory or hypothesis expected to hold true.

2.9 Descriptive Questions

What are some characteristics of a researchable problem? Explain each with examples.

Explain the types of literature that can be utilized to identify research problems. How do literature and

theory contribute to problem discovery?

Discuss why the context and scope of a research problem need to be established. Provide an example to

illustrate your answer.

Explain what it takes to have a well considered research problem, problem statement, background, objectives, and research questions.

Distinguish the null from the alternative hypotheses. How are those used in testing hypotheses?

Can you explain the differences between directional and non-directional hypotheses? When should each be used?

1 Define operational definitions and describe their function in clarifying research variables.

Describe what is meant by a "conceptual framework". How does it help connect theory and empirical

research?

Explain how a hypothesis can be deduced from a theory. What are boundary conditions, and

why are they important?

Describe and explain some of the most common mistakes or problems with formulating hypotheses. How can researchers avoid these

issues?

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Answers to Knowledge Check

Knowledge Check 1

1. b) Abstract concept for research
2. c) Measure a concept
3. c) Dependent variable
4. d) Variable relationships

2.11 Case Study: Identifying a Research Problem in Event Management

Researching Operational Challenges in Coordinating Beauty Professionals at Events

Background

Whether it is wedding parties, business and society meetings to fashion shows the display of set content.

Attendees is key in the event's reach. Hairstylists and makeup artists are essential."

Contributors to that appearance. Yet, event planners frequently have a hard time synchronizing many of the different types of.

Beauty, to keep the same theme flowing and have everyone understand what is happening.

Observed Challenges (Problem Sources)

Practice-Based Issues:

- o Failure to coordinate (no-shows, delays)
- o Variation in quality between teams
- o Communication blackouts during live events

Thematic Inconsistencies:

- o Stylists who do not know color palettes, or what the client wants
- o Disconnect between how it looks and the event idea

Logistical Gaps:

- o No centralized scheduling
- o No online system to update on the fly, or last minute changes

These practical challenges all point toward a researchable problem rooted in operational management and services integration on the occasion level.

Formulated Research Problem

"How can centralized coordination systems positively impact hair and in event planning for the makeup industry?"

Scope and Delimitations

- Context: Organising in city wedding/fashion show events
- Who: Event planners, makeup artists, hair stylists

- Boundaries: Limited to the pre-event service only, excludes on-stage/post-event styling
- Parr — Proprietary and Confidential 9 OPPORTUNITY OVERVIEW (CONTINUED) Significant Product Opportunity for Salon Services Copyright © 20XX Ernest C.ODEV.

Derived Hypotheses

- H_0 (Null): Service productivity is not influenced by centralized scheduling.
- H_1 (Alternative): Centralized scheduling increases the economy of scale and consistency for beauty services at events.

Conceptual Framework Elements

- Independent Variable: Adoption of centralized coordination methods
- Dependent Variables: Timeliness, quality of service and client satisfaction
- Controlling variable: Type of event itself (wedding, fashion show, etc.).

Potential Contribution

- Provides practical advice on the planning of events
- Attends to a pragmatic vacuum of service integration in the real world
- Appropriate for similarity across other vendor types at events

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Unit 3: Research Design

Learning Objectives

Define and discuss research design, such as the importance of research design in directing scientific inquiry and ensuring methodological rigor.

Differentiate between the major types of research designs including exploratory, descriptive, explanatory, experimental, and correlational designs.

What are some research techniques and tools of analysis used in a health-related research study?

The research questions, variables, hypothesis to be tested, sampling technique and methods of data collection.

Critically evaluate strengths and limitations of coverage designs for particular topics in the IC research problems or contexts.

Formulate a simple research design proposal to practice relevant methods locked on to theory based postulating its corresponding predictable information research objectives and theoretical framework.

Ethical principles and considerations in selecting and carrying out a research design.

Evaluate how the principles of validity and reliability apply to study design and quality, commencing stakeholders initial involvement the interpretation of research findings.

Content

3.0 Introductory Caselet

3.1 Meaning and Purpose

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3.0 Inventory Caselet

“Designing a Research Study to Support Neutral Foreign Policy”

Case Overview:

though Novaria is a country of only weak power next to its two neighboring powerhouses, Estara.

which are growing in political and economic significance. While this initially seemed advantageous, tensions erupted when Novaria was forewarned about each. Facing pressure, Novaria's

leaders looked to research and theory for an informed decision. They studied International Relations

theories like Realism, that emphasises self interest and power; and Liberalism that focuses on cooperation and mutual benefit. They also examined Geopolitical theories that analyse how geography and geopolitics of a place can give political leaders an advantage amid chaos in the international system.

affects international behavior. Novaria took a friendly neutral position on the basis of this feedback

toward both countries, taking their money but steering clear of military embroilments. This strategy led

to political and economic stability.

Task:

Novaria's foreign ministry is now looking to conduct a formal review of whether this neutral strategy has served it well.

You are a member of the research advisory group on tasked with developing a study to assess the impact of

Novaria's international policy during the past five years.

Research Design Focus:

- Design: Exploratory Research
- Research Question: What has been the effect of Novaria's neutral foreign policy on its economic

development and diplomatic stability?

- Variables:

- o Independent variable #1: Neutral position in foreign policy

- o Dependent Variables: Economic growth, diplomatic conflicts.

avoided, foreign investment rates

- Design: Mixed methods using 46* both qualitative and quantitative approaches 47*.

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- o Quantitative: Data Analysis on Economic, International Aid and Trade FIGURES

- o Qualitative: interviews with diplomats, content analysis of international media, public observations.

sentiment surveys

Critical Thinking Question:

What is the value to Novaria of adopting a research design that is explicit and systematic when evaluating its foreign

policy? What would be the dangers if choices were made on speculation and not evidence?

3.1 Meaning and Purpose

3.1.1 Design as a Plan and Structure

The plan or the design in research is the guide to how it will be done. It specifies:

- Research design (qualitative, quantitative or mixed method)
- Types of data collection (surveys, experiments, interviews, observations etc.)
- Schedule for each phase of the research
- Inputs needed: participants, materials, technologies

For instance, in a clinical study of the effectiveness of a new drug, it would describe the dosage.

period of administration, the selection criteria for subjects and how between-group differences were determined.

3.1 Structure

A structure is the way things are logically organised in a piece of research. It determines the sequence

steps connecting problem, hypotheses, methods, and analysis of data. Structure prevents the study from

becoming random or disorganized.

Such as in social sciences; the research question is whether or not parental involvement has an effect on academic

achievement, the structure would outline:

- Predictor: amount of parental involvement
- Dependent: score of student achievement
- Cofounding factors: socio-economic status, age and sex

So the plan says “what to do,” and the structure shows “how are the pieces fitting together.”

3.1.2 Control and Causality

Control is the handling or maintaining of a variable so that the results are not distorted.

Research rarely occurs in a

space, and effects are frequently influenced by exterior circumstances. Through the exertion of control, the investigator minimizes

“noise” in the data, sharpening the results.

- Control in experiments: Experiments control through randomization, control groups, or standardization of conditions.

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- In non-experimental studies, statistical control (including regression analysis) may be used to account for confounding variables.

One of the purposes of causality is the ability to show one variable directly causes another. Establishing causality is a

the focus of many scientific disciplines, but is difficult because natural and social systems are

complex.

Example in natural sciences:

- If fertilizer makes plants grow more, causality can be established by controlling for the same soil, light and

watering is the same for all species up to *D. reticulata*.

fertilizer.

Example in social sciences:

- In studying whether job training programs lead to higher levels of employment, researchers need to account for

their potential for power. these factors include socioeconomic such as prior schooling, job experience and the economic climate prior to one would be powermonger (PM).

training causes higher employment.

Absence of control allows researchers to refer only to correlations, not causation.

3.1.3 Reliability and Validity in Design

Reliability ensures consistency. When the same study is replicated with the same procedures and in the same

States, the results should be distributed equally as long as condition.

- Example: If the same personality questionnaire is given two times to a group of individuals under similar

conditions, and gives reproducible values of the HOMO-LUMO gaps.

- Means of examining reliability are the following:

- o Test-retest reliability: Consistency over time.

- o Internal reliability: The degree to which items of a test measure the same construct.

- o Inter-rater reliability: Consistency between observers or judges.

Validity ensures accuracy. It is not sufficient for a study to be valid, it must also have meaning.

to measure.

Types of validity with examples:

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- Internal validity: When a study says that a new way of teaching leads to better student outcomes,

internal validity, guaranteeing that the enhancement is not as a result of other factors introduction during, for example, data collection procedure (such as.hawks moment, 2000).

extra tutoring).

- External validity If the intervention were to be applied in schools, or regions and, if for. beta. > 0.2 (with $p < .05$) this result was found in all of them [Note some caution Gonçalves et al.

produces the same result, then the results have external validity.

- Construct validity: If a test purports to measure intelligence, it should actually measure some aspect of.

intelligence rather than other unrelated traits such as memory or vocabulary alone.

- Content validity: In a test for mathematics knowledge, the items ought to include all domains (algebra, geometry, statistics) than just one.

Good design is a trade off between reliability (consistency) and validity (accuracy). For instance, a dependable test that

the wrong result is valid; a valid test which always yields the same result but measures the wrong thing.

inconsistent results is not reliable.

“Activity”

Divide students into three groups. Group 1 designs a simple research plan (3.1.1). Group 2 identifies

ways to control variables and establish causality (3.1.2). Group 3 checks reliability and validity of

the proposed design (3.1.3). Each group presents findings for discussion and feedback.

3.2 Classification of Designs

3.2.1 Exploratory, Descriptive, and Causal

Exploratory Research Design

- Usage: When the research problem has not been clearly defined. It is designed to develop understanding,

discover new concepts and hypotheses.

- Method: Generally qualitative – focus groups, unstructured interviews, literature reviews, or pilot studies.

- Example: You might start if you are a researcher trying to figure out why so many young professionals favor remote work

informal interviews, and focus groups.

- Strength: Provides a basis, adaptable, opens door for further research.

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- Caveats: Not possible to verify or establish patterns with certainty; frequently, the findings are provisional.

Descriptive Research Design

- The Bottom Line: Reflects real events, situations or characteristics of a population. It answers only the “what,” “who,” “where” and “when,” but not the “why.”

- Methodology: Quantitative in nature—relies on surveys, structured observations, or secondary data

analysis.

- Example: Computer use in rural households as a percentage.
- Strengths: Gives specific and factual information; data is subject to statistical analysis.
- Drawbacks: Cannot describe causes or test theories of causation.

Causal (Explanatory) Research Design

- Meaning: Determines if a change in one thing results in a change in another (cause effect).

- Approach: Experimental or quasi-experimental designs involving controlled manipulation of,

variables.

- Example: Determining whether a new teaching approach leads to higher math scores compared with old-fashioned methods

teaching.

- Strengths: Strong evidence of causation.
- Weaknesses: Need for high control; potentially resource-intensive and ruthless in natural settings.

Did You Know?

“Exploratory research uncovers new ideas when little is known, descriptive research provides a factual

snapshot of “what is,” and causal research investigates “why” by testing cause-effect relationships.

Together, these designs guide researchers from discovery to explanation, ensuring studies move

logically from curiosity to scientific understanding.”

3.2.2 Experimental and Quasi-experimental

Experimental Design

- Definition: The process of obtaining a set of data through the observation and experimentation that can be used to test hypothesis.
- Analyze Information from different perspective
- Abstract thinking.

the impact on other factors is evaluated.

- Key Features:

- o Participants are randomly assigned to groups

- o Control condition vs. experimental condition

- o Identification of independent and dependent variable is clear.

- Example: Randomly providing students with either traditional or digital learning tools, then

comparing performance outcomes.

- Strengths: High internal validity from heavy control; substantial ability to infer causality.

- Conclusions: The external validity may be reduced in artificial environments; expensive and time consuming.

Quasi-experimental Design

- Meaning: Misdesigned similar to experimental design, but not fully randomized or as tightly controlled. Groups may

already exist naturally.

- Key Features:

- o No random assignment
- o Use of established or existing groups
- o Terresa Some control of variables, but not comprehensive
- Example: Comparing the effects of a new curriculum between one school and another, without random assignment of students.
- Advantages: Convenient for everyday life; the only option when randomization is infeasible or unethical.
- Weaknesses: Lower internal validity; greater challenges from bias and confounding.

3.2.3 Cross-sectional, Longitudinal, Field, and Lab

Cross-sectional Design

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- Definition: Data is collected at one point in time in order to study a population or phenomenon.
- Approach: Often surveying, a sort of snapshot in time.
- Example: Carrying out a national poll in 2025 on public attitudes on climate change.
- Strengths: Rapid, low-cost, good for identifying patterns and relationships.
- Limitations: Does not allow tracking of changes over time or establish causality.

Longitudinal Design

- Translation: Information about the same group is gathered over a long period of time.
- Approach: Can cover months or years; follows variables as they change.
- Example: We follow a group of patients for 10 years and examine the effects of taking over time, (long-term study or cohort study).
- Strengths: Reveals trends, patterns and long-term consequences; strong for establishing cause effect over time.
- Drawbacks: Costly, time consuming and people drop out (attrition).

Field Design

- Meaning: Scientific study in the natural world, not in a lab.
- Method: Fewer variables under control, but greater ecological validity.
- Sample: Exploring buying behavior of customers in a supermarket by means of observation (purchasing habits).
- Strengths: The results are relatable and applicable.
- Caveats: Unintended effects hard to constrain; lower precision.

Laboratory (Lab) Design

- Meaning: Research performed in a controlled environment in which conditions can be tightly managed.
- Strategy: Tight focus on control and measurement of events.
- Example: Assessing the impact of background noise on memory recall at a psychology lab.
- Strengths: Close control can lead to higher precision and strong internal validity.
- Limitations: Laboratory setting may not translate to real-world behavior; external validity of the findings was low.

Did You Know?

“Cross-sectional studies give a snapshot of one moment, while longitudinal studies track changes over

time. Field research captures real-world behavior, but lab research ensures precision through control.

Together, these designs allow researchers to balance realism, accuracy, and time when studying human

behavior and natural phenomena.”

3.3 Design Options

3.3.1 True Experimental Designs

Meaning

True experiments are considered the most stringent form of research designs as they allow.

investigators to experiment on cause and effect to a high degree of healthsanctuary control.

They are built on three

principles: randomization, manipulation, and control.

Key Characteristics

Randomization: Assigning participants to groups (such as experimental or control) in a random manner.

control), ensuring groups are comparable.

Manipulative: The experimenter manipulates the independent variable in order to observe the effects of such manipulation.

on a dependent variable.

Control condition: A group that do not receive the experimental treatment, provide a comparison base against which the effect of this treatment may be tested.

comparison.

Replication: It is possible to repeat the studies and validate the results achieved.

Types of True Experimental Designs

- Pre-test/Post-test Control Group Design: Participants are assessed before and after the treatment, including a control group, with.

differences between experimental and control groups.

- Post-test Only No Equivalent Group Control Design: Measurement is taken after treatment without a pre-test.

- Factorial Design: Two or more independent variables are varied together in order to see 39.

interaction effects.

Examples

- A clinical trial to test whether a vaccine prevents infection, compared with placebo.

- A psychology study of whether music helps you concentrate more than not listening to anything at all

to silence.

Strengths

- Strong proof of causation.

- High internal validity as a result of controlling the variables.
- Randomization minimizes bias.

Limitations

- The generalizability of artificial environments can be limited.
- Feasibility is frequently constrained by ethical and practical considerations.
- Time and resource intensive.

3.3.2 Non-experimental and Correlational Designs

Meaning

Quasi-experimental designs investigate phenomena as they exist without manipulating the factors. They

tend to be descriptive or relational. Another subtype, correlational designs examines the state 54 WEIGOLD et al.

two or more variables, but do not establish cause.

Key Characteristics

No manipulation: Variables are only observed, but not controlled.

Non-randomised trials: Where participants are not randomly allocated to treatment groups.

Relationship-oriented: Templates and correlations are investigated.

Ethically appropriate: Implement when experiments would be unethical.

Types of Non-experimental Designs

- Descriptive studies: Interested in the features of a population (e.g., demography surveys).

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- Correlational studies: Examine associations between variables (positive, negative, or norelationship).

correlation).

- Comparative studies: To compare groups without randomization.

Examples

- A survey-based cross-sectional study investigating smartphone use and sleep quality.
- A descriptive study that found different levels of employment by corresponding region.
- Examining the hours of study and exam score relationship under no other control

factors.

Strengths

- Appropriate when manipulation is not feasible or ethical.

• Less expensive and more rapid than experiments.

- Offers visibility into patterns and structures in the real-world.

Limitations

- Cannot establish cause-and-effect.
- Findings may be confounded.
- The danger of mistaking correlation for causation.

3.3.3 Case Study and Mixed Methods

Case Study Design

- Term: An in-depth, detailed study of a single entity (such as incident, organization, or event)
- Interpretation: 1.

community) within its real-life context.

- Method: Relies on several sources of data (interviews, observations, archival records and

documents.

- Types:

o Single-case study: Concentrated on one individual or organization.

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o Multiple-case (cross-site) study: for more general knowledge o Companies can be compared in order to gain broader understanding.

- Examples:

o Investigating the journey of a single patient post-an uncommon surgical activity.

o Assessing the company's culture for one in which the company flourished during an economic downturn.

- Strengths: Generates in-depth, context-specific findings; useful for theory development.

- Limitations: Narrow generalizability; time-consuming and possibly subjective!

Mixed Methods Design

- The combination of quantitative (numerical information, statistical analysis) and qualitative (narratives, interpretative reports.

and interview) methods in one study.

- Approach:

o Sequential: Do them iteratively, where one is done before the other (eg, qualitative exploration followed by quantitative testing)

(e.g., quantitative testing).

o Concurrent: Gather both forms of data concurrently.

- Examples:

o A survey-based (quantitative) study on work related stress by measuring and interviews (qualitative) for development of individual Coping strategies.

o Study of public health campaigns mixing statistical study of health results with focus group discussion on views of the campaign.

- Strengths: Provides comprehensive viewpoint; increases validity through data triangulation; a focuses on .

both breadth and depth.

- Drawbacks: Resource-consuming; expertise in both methods needed; complex andcompetitive set-up for but not exclusive to preparation.

analyze.

Knowledge Check 1

Choose the correct option:

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1. Which of the following is a key feature of true experimental designs?

- a) No manipulation
- b) Random assignment
- c) Natural observation
- d) Case focus

2. Which design only studies relationships without establishing cause-effect?

- a) True experimental

b) Correlational

c) Mixed methods

d) Case study

3. A detailed investigation of a single individual or organization refers to:

a) Case study

b) Field study

c) Longitudinal study

d) Experimental design

4. Which design combines both qualitative and quantitative approaches?

a) Descriptive

b) Quasi-experimental

c) Mixed methods

d) Cross-sectional

3.4 Summary

❖ Research design is an organized plan that specifies all aspects of the study: from data collection to

analysis along a systematic route.

❖ The objective of research design is most importantly to ensure the trustworthiness, validity and meaningfulness of findings

for answering the research questions.

❖ Design is a plan to show how something will be done and also perform as a structure that indicates how its components reside interse_design_1009233.wav

of the studies interlocked neatly.

❖ Research design control helps to reduce the impact of extraneous variables so that the relationship between

parameters can be investigated more easily.

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❖ Causality for research Refers to relationship where one variable is shown to cause change in another, and demonstrating this requires madnness877.

evidence barring alternative explanations and timing.

❖ Reliability: It refers to the consistency of results (i.e., if the same study is repeated in the same way, it should.

produce similar outcomes.

❖ Validity: The extent to which a research study measures what it is supposed to measure and can be used applied generally.

that its conclusions are sound.

❖ Types of Research designs can be characterization by three, and they are exploratory, descriptive and cause each having a purpose

different research purposes.

❖ Exploratory: Design an exploratory study is typically used when a topic of interest is not well known, that will assist the researchers in stimulating ideas and formulating a hypothesis.

insights, and possible hypotheses.

❖ Descriptive design presents a factual picture of a population, occurring or situation but does not contributes anything to change or improve in the object under investigation.

explain why it occurs.

❖ Quasi-experimental design is employed to test cause-effects relationship that indicate whether changes in a variable influence another or not.

directly influence another.

❖ Experiments invalidate very controlled studies in which variables are manipulated and participants are.

randomly assigned, providing strong evidence of causality.

❖ Similar to experiments but not with complete random assignment are quasiexperimental designs.

feasible in the field but somewhat weaker in internal validity.

❖ Cross-sectional studies offer a particular time of data, whereas longitudinal studies follow directly subjects over a long time to observe differences.

❖ Field studies are implemented in natural, real-world environments so the outcomes are believable whereas lab studies are performed in confined office settings, wherein accuracy and precision could be obtained.

3.5 Key Terms

Research Design – The “blueprint” of a study to show how it is conducted.

Reliability – The degree of stability with which a study or measure is repeated under the same conditions.

Validity – The extent to which a study accurately measures what the researchers set out to measure.

Control – To limit outside influences in order to isolate the impact of the variables.

Causality – A condition in which a variable influences an alteration of another variable – directly.

Experimental Design A research design for testing cause and effect relationships involving random assignment and manipulation of variables.

Quasi-experimental : A design that parallels experimental but lacks one or more elements of full randomization of participants to conditions, the experiment. participants.

Cross-Sectional Study – A type of study that obtains data at one point in time for analysis.

Longitudinal Study – A study in which data are collected from the same individuals over a prolonged period of time period.

3.6 Descriptive Questions

Explain research design and its meaning in academic research?

What are the ways that research design is both a blueprint and architecture?

Describe the role of control in research and how it shows causality.

Under what circumstances is it sufficient to demonstrate causation between two variables?

What is the difference between reliability and validity in research design with relevant examples?

Provide an overview of exploratory, descriptive and causal research designs.

Contrast true and quasi experiments using examples.

Describe cross-sectional and longitudinal designs including advantages and disadvantages of each.

Distinguish between field and laboratory research design using examples.

Explain advantages and limitations of case study.

What is mixed-methods research, and how is it better than qualitative or quantitative research?

approaches?

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Answers to Knowledge Check

Knowledge Check 1

1. b) Random assignment
2. b) Correlational
3. a) Case study
4. c) Mixed methods

3.8 Case Study

The Role of Hair Stylists and Makeup Artists in Event Management

Introduction

Your guide to Smooth Event management is a multi-faceted and complex skill that extends beyond just booking the right venue or finding the perfect caterer.

arranging catering. It consists of a thoughtful combination of many aspects, all aiding in the.

the big picture of how it went and felt. Of these, the participants' appearance is a

particularly influential factor. Whether it be for a wedding, business function, fashion show or a even a magneti.

gala evening, the appearance of attendees directly affects the aesthetic balance of an event — with a twist.

professionalism, and memorability.

Hair and Makeup Guidance Hair stylists and makeup artists, then, are key to making sure guests don't Just look.

their finest and also fit with the style or theme of the event. Their work helps establish

the ambiance you want sure to make your guests feel so and leave an impression on their minds.

While enlisting these pros in big events comes with its own challenges

such as arranging for multiple experts, integrating their work into a theme for the event, and

ensuring the streamline of communication between beauty teams and events staff.

This case study delves into these challenges and discusses potential solutions that may assist

beauty businesses are better managed by event managers.

Background

The work of hair stylists and makeup artists is more than grooming. Their painting serves as a visual manifestation of the event's identity and message. For example:

- For a wedding party, the bride's hair, cosmetics reflect festivity and splendor, kicking off the celebratory mood for 2016.
- At company gatherings, attendees or models should match the theme of serenity and elegance or, for that matter, formality or innovation, depending on the branding message.
- At fashion shows, hair and makeup are part of the craftsmanship which ensures that as each Edit.io is decanted on to the runway there is a strong sense of what Character is being played with.

the designs are an expression of the designer's ideas.

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However, due to their large number of beauty professionals involved in the event industry they can be difficult to control. Shuffling young girls to this place and there principally manhandling does little good for the speed of treatment nor health at work. Issues as scheduling grievances, variations in the quality of service and failures to communicate frequently detract from the continuity of competition. This is not an insurmountable issue, but in absence of careful consideration and integration such challenges können]] end) detract from the look and polish of the day.

Problem 1: Coordination of Multiple Professionals Is Hard

When it comes to events on a grand scale, you often need more than one stylist and makeup artist to accommodate a high volume of participants.

Each professional works at their own pace, has a unique style, which may lead to scheduling exposure fights, service shortfalls, or inconsistent quality.

- Solution: Organizers should use a central schedule. By

scheduling specific time frames for each stylist and working with a list of client requirements,

managers will be able minimize clashes, ensure services are delivered on time and stick to a regimented fell of the pubs?

final results.

Problem 2: Matching the Event Mission /Theme.

One of the major in event organizing is that hairstyles and makeup complement(po) the-years designers put into creating a garment.

event's overall theme. If styles do not match, the output may be incoherent, and the intended atmosphere while minimizing effects on the audience.

- Solution: Event organisers should supply professionals with comprehensive stylisti csuggestions, and a list of standardwear.

from the color scheme to even if you have to dress up, what the theme is and who your client is.

preferences. This enables beauty teams to coordinate their work with the event space.

providing unity and coherence throughout the presentation.

Problem 3: Communication Breakdowns

Event communication is the cornerstone of successful events. Misunderstandings between beauty clients and event planners who may find their needs missed or disregarded due to the stodgy nature of how business is often done in segmentation.

information, then how can the last minute change be distraction free.

- Solution: To address this issue, event planners should make specific efforts to create clear lines of communication between departments and staff.

communication channels. This can be as creating group chat to keep the situation.

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holding a pre-event briefing, single point of contact for all beauty professionals headers consisted of the practices of: single point of contact for all beauty professionals; and holding regular pre-event briefings.

to specify roles, expectations and fallback mechanisms.

Integrated Solutions

Although each challenge calls for a customized solution, the mixed method lead to be the best.

outcomes. A schedule for centralized scheduling brings order, guidelines set the pace and tone, and

communication systems foster collaboration. Thus, these measures reduce errors and a couple with each.

stress-free, and allow stylists and makeup artists to concentrate on doing their best work.

Conclusion

This case underlines the vital role played by hairstylists and make-up artists in event management. Their work makes the aesthetic success, trust of.

attendants and the general atmosphere. Nevertheless effective control is necessary for leverage their knowledge to benefit the larger goals of the event.

Centralizing scheduling systems, articulating sharp thematic clear themes thematic and As for instance-bringing with) around obligatory policy on students' "coming in developing systemic schedules based out blue collar cultural that fits their lives and learners on the train" I really have to wonder what else more lawmakers want?

prevent them and establish effective communication channels, event man- by setting beenagers may able to overcome some issues common to student population fairs.

with planning the event and ensure beauty professionals blend smoothly into the development of events

process. The end result is a visually sound, impec Event Producer That Keeps You Safe – George ...Let me create the perfect event for you and your guests! YOU What I get to do brings me pure joy.

lasting memories on all delegates and invitees.

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Unit 4: Data and Measurement

Learning Objectives

1. Interpret the meaning of data in research; and acknowledge the importance of valid measurement PARTICIPANT/S DEVELOPMENT The main course participants are personnel involved in professional development and continuous learning programmes, namely members of faculty, researchers, supervisors and administrators generating reliable results.
2. Distinguish between primary and secondary sources for information, and describe their strengths and weaknesses limitations.
3. Distinguish between qualitative and quantitative data, provide examples of how they are used in research contexts.
4. Describe the four levels of measurement (nominal, ordinal, interval and ratio) and provide examples in research.
5. Use correct data collection techniques such as questionnaires, interviews, observation and experiments.
6. Identify the concept of validity, reliability about measurement tools and its effect on data quality.
7. Evaluate the appropriateness of measurement scales for variables in different areas of research train to be able to choose, arrange and interpret the data according to the purpose of research.

Content

4.0 Introductory Caselet

4.1 Data Foundations

4.2 Measurement and Scales

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4.0 Introductory Caselet

“Measuring Inventory Performance in a Retail Store”

FreshMart, a small-to-medium sized retail grocery store also struggled with inventory management. Products such as dairy

and fresh vegetables were often sold out, while other things — like canned goods — remained overstocked.

It was perceived by the management that unsound data collection and measurement systems were fundamentally at the bottom of 1803 it.

the problem.

At present, the shop would manually check stock which could be out of date by up to a week.

information. This system was not accurate since some items went bad before they could be noted, and sold 26 wastage) which were considered as normal in took the form of loss ing products.

patterns were not properly tracked. As a consequence, because of the chronic shortages, customer satisfaction was reduced.

and financial losses mounted due to lost product.

To resolve this issue, FreshMart used digital inventory management for their stock. The new stocking levels (barcoding, for example) and data collection on product movement was iapping.

generate automated reports. With measurement scales, the stores could organize products into fast

flying and non-flying items to the nominal, interval and ratio scale from sales data.

Management anticipated the increased accuracy and timeliness in data collection would have two desired effects.

losses but also in forecasting demand with higher precision. This case demonstrates the importance of correct data and

measurement procedures have direct effects on company performance, financial success and customer satisfaction.

Critical Thinking Question

What measurement scale (nominal, ordinal, interval, or ratio) would you use to classify data of the following types if you were a data analyst for FreshMart?

would you use to classify and assess inventory performance, and why?

4.1 Data Foundations

4.1.1 Data Types: Qualitative and Quantitative

Qualitative Data

- Definition: Qualitative data represents qualities or characteristics, can (de)scribes who you are or the circumstances of your life.

numbers. It is subjective, and frequently tied to human experience, perception or social environment.

- Nature: Described in words, categories, images or symbols but not quantities.
- Examples:
 - o Interviews transcripts, in which participants reflects on the life lived.
 - o Observations of classroom behavior.
 - o Customer ratings of satisfaction including “excellent,” “average,” or “poor.”
- Applications: Commonly used in exploratory research to gain an understanding of why and how people act or think in certain ways.
- Strengths: Offers nuanced and in depth understanding of human behaviour and social interactions.
- Cautions: May be hard to measure and statistically analyze; researcher bias probable interpretation.

Quantitative Data

- What it is: Quantitative information is data that can be counted, measured, and described using numbers.

numbers. It's objective and easier to analyze statistically.

- Nature: Quantitative and frequently presented in scales.
- Examples:
 - o Test scores of students.
 - o Sales revenue on the basis of month of a company.

- o Any specific information about people such as height, weigh or age.
- Uses: Helps to test hypothesis, finding patterns and making predictions.
- Strengths: Exact, reproducible and amenable to statistical testing.
- Too simple: Oversimplifies human experience and disregards subtexts.

Difference between Qualitative and Quantitative Data Qualitative data is the “story” that numbers often tell, whereas quantitative data gathers a general idea.

quantitative counts to gauge and compare phenomena.

4.1.2 Classification: Structured and Unstructured Data

Structured Data

- Meaning: Structured information that can be slotted easily into predefined formats like rows, columns or

databases.

- Nature: Searchable, captured in relational databases, largely numeric or categorical.

- Examples:

- o The names of customers, their phone numbers and purchasing history kept on a CRM system.

- o Exam grades entered into a gradebook.

- o Bank statement entries in the books of account.

- Advantages:

- o Easy to gather, maintain and analyze using statistical software.

- o Enables automation and fast decisions.

- Drawbacks: May not be able to capture phenomena outside of a certain depth or complexity.

Unstructured Data

- Meaning: Unstructured information, which is more difficult to organize into

databases. It's usually found in unprocessed forms.

- Nature: More text-heavy and multimedia-rich, more complex to analyze.

- Examples:

- o Social media messages (tweets, comments, hashtags).
- o Recordings of interviews (video or audio).
- o Emails or photographs.
- Advantages:
 - o Provides rich, nuanced insights.
 - o Use cases Human Emotions, Opinions and Creativity capture.
- Limitations:
 - o Hard to support through traditional means.
 - o Needs sophisticated tooling such as AI, natural language processing, or text mining.

Diving Deeper Just the FAQs, Please A defined piece of data Definitely they are! That's the world The answer is no It has been but that's changing Structured Data: What & How Much Unstructured Data : Why? and how.”

Did You Know?

“Structured data, like sales records or exam scores, fits neatly into tables and is easy to analyze. In

contrast, unstructured data, such as social media posts or videos, holds rich insights but requires

advanced tools like AI to interpret. Together, both types shape today’s data-driven research and

decisions.”

4.1.3 Primary vs Secondary Data: Pros and Cons

Primary Data

- Example: Data that have been acquired by the researcher directly for a particular research purpose or project.
- How Data Was Collected: Surveys, experiments, interviews, field observations and focus groups.
- Examples:

- o Surveying consumers' preferences for their newly developed product.
- o Gathering data from a classroom experiment on test results.
- Pros:
 - o Customized to the specifics of the study.
 - o Current, unpublished and very reliable if collected cautiously.

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- o The Collector can control its collection techniques and precision.
- Cons:
 - o Time-consuming and expensive to obtain.
 - o Can be of battery-size but also smaller compared to today's big datasets.

Secondary Data

- Meaning: Data gathered in the past by others and employed by researchers for fresh analysis.
- Sources: Government statistics, academic journals, company reports, online databases.
- Examples:
 - o Demographic data for use in demographic analysis.
 - o Annual accounts reviewed in terms of business performance.
- Pros:
 - o Cost-effective and time-efficient.
 - o Offers data on a larger scale than is feasible for individuals to gather.
 - o Serves as a referential tool and for comparative studies.

- Cons:

Based on the research questiono May not correspond to exactly what researcher wants to do.

- o Garbage-in means garbage is coming out.
- o Researcher did not have a say in that how the data was collected.

Difference between Primary and Secondary Data Both these data types have important uses in research studies, these differences allow primary sources to be used in different manners than could secondary sources.

convenient and large-scale.

4.2 Measurement and Scales

4.2.1 Levels of Measurement: Nominal, Ordinal, Interval, Ratio

Nominal Scale

- Definition: You should understand the nominal scale as a basic level of measurement. It categorizes data into distinct

terms with no order and magnitude. All categories are exclusive and exhaustive.

- Examples:

- o Gender: male, female, other.

- o Religion: Hindu, Muslim, Christian, Sikh & Others etc.

- o Blood type: A, B, AB, O.

- Features:

- o Numbers or codes serve only as identifiers (e.g., 1 = male, 2 = female).

- o There are no arithmetic operations of real significance.

- Statistical Technique: Mode, frequency distribution, and chi-square tests.

- Practical use: It can be helpful in demographic categorization, market division or opinion Association.

Ordinal Scale

- Definition: The ordinal shows rank of data from different categories in order, but not equality

intervals between them.

- Examples:

- o Social class: upper, middle, lower.

- o Customer satisfaction: very satisfied, satisfied, neutral, dissatisfied and very dissatisfied.

- o Education: primary, secondary, higher secondary, graduate and postgraduate.

- Features:

o Gives relative position (comparisons of higher vs. lower), but does not show the number by which they are greater/lesser.

o Ranks are unequal and/or unknown.

- Statistical Approach: Median, percentile and rank correlation.

- Application: Commonly used in opinion polls, performance evaluations.

Interval Scale

- Definition: The interval scale ranks, and equal intervals are maintained between the measurements.

But it doesn't have a real zero value.

- Examples:

- o Temperature in Celsius or Fahrenheit (0 is not "no temperature").

- o IQ scores.

- o Calendar dates (0 year does not mean "no time").

- Features:

- o Distances between the values are meaningful.

- o It is can do addition and subtraction. Ratios are not possible.").

- Statistical Analysis: Mean, standard deviation, coefficient of correlation and regression.

- Application: This application includes psychological testing, attitude measurement, and the social sciences.

Ratio Scale

- Definition: The ratio scale is the last of the scales of measurement. It includes order, equal interpolations, and an absolute zero point. This permits all mathematical operations.

- Examples:

- o Income (₹0 is no income).

- o Weight, height, age.

- o Distance or time duration.

- Features:

o Ratios make sense (for example, a person who makes ₹40,000 has twice the income of someone with ₹20,000).
o Permits comparisons between the ABSOLUTE MAGNITUDES.

o Permits comparisons between the ABSOLUTE MAGNITUDES.

- Statistical Methods: Any statistical analysis methods including average, correlation, regression and advanced modeling.
- Application: Overwhelmingly used in natural sciences, economics and applied work.

4.2.2 Attitude Scales: Likert, Semantic Differential, Stapel

Attitudes, opinions and perceptions are non-observable constructs. To measure them, scientists rely on instruments that translate how we feel into a set of numbers.

Likert Scale

- Definition: A commonly used scale created by Rensis Likert (1932), to assess agreement or response to an item on a multi-point scale.
- Format: Generally ranging from 1 = strongly disagree to 5 (or 7) = strongly agree.
- Example:
 - o Statement: "I like the work I do.
 - o Responses: 1 (strongly disagree) to 5 (strongly agree).
- Strengths: Easy to build, commonly used, it provides quantitative results from people's opinions.
- Restrictions: susceptible to response bias (central tendency, acquiescence).

Semantic Differential Scale

- Definition: This scale was constructed by Charles Osgood to measure attitudes in terms of conjoint pairs of bipolar adjectives pairs.
- Format: Respondents rate an object or concept on a 7-point scale anchored by opposing adjectives.
- Example:

- o The potential indicators for quality of smartphone brand is rated depending on:
 - Reliable — Unreliable
 - Modern — Old-fashioned
 - Affordable — Expensive
- Strengths: Captures nuanced attitudes; aids in the development of a perceptual profile for products or ideas.
- Limitations: Needs to use well-chosen adjective pairs; interpretation may differ across cultures.

Stapel Scale

- Definition: A scale that measures attitudes on a single adjective and numerical scale! e., from negative to positive (typically -5 to +5).
- Format : Participants rate how much they agree or disagree with the trait.
- Example:
 - o For a retail store: “Cleanliness” on a scale of -5 (very poor) to +5 (excellent).
- Strengths: Helpful when it’s difficult to find bipolar adjectives; easy for respondents to comprehend.
- Limitations: Perhaps rarer in practice; may be confusing to respondents with negative numbers.

4.2.3 Index and Composite Measures

For research, complex ideas, such as socioeconomic status or quality of life need more than a countable term like Sex.

single variable. Instead, investigators create index and composite variables.

Index Measures

- Definition: An index is a quantified summary of a collection of indicators that combines multiple measures into one measurement number to represent an abstract concept.
- Example: For a measure of poverty you could have education level, income and quality of housing.
- Process: Prices for each measure are calculated independently and then averaged or totalled.
- Applications: Useful for ranking and comparisons (e.g., poverty levels across states).

Composite Measures

- Definition: A more inclusive method, specifically taking several variables and creating a measure of them together, typically with different weightings or statistical techniques.
- Example: Human Development Index (HDI), which combines life expectancy, education and income with weighted contributions.
- Difference from Index:
 - o The index often adds or averages elements identically across items.
 - o A combined measure may assign various weights or have involved formulas.
- Application: The possibility of representing, in reduced and quantifiable form, phenomena with multi-dimensional constituents.

“Activity”

Divide students into groups. Assign each group one scale (nominal, ordinal, interval, ratio, Likert,

semantic differential, Stapel). Ask them to design two real-life examples using their assigned scale, then

present how it measures data and what analysis can be applied. Encourage cross-group discussion for

comparison.

4.3 Quality of Measures

4.3.1 Reliability

Definition: Reliability is the degree to which a measurement instrument is able to give consistent results when the same entity (person, object, or event) is measured under the same conditions.

consistent conditions. reproducible after replications. A reliable instrument is devoid of random errors and establishes the certainty, outcomes can be replicated across replicates.

be replicated.

Expanded Types of Reliability

Alpha Reliability (Internal Consistency / Cronbach's Alpha) It estimates the level of internal consistency in an instrument.

- Utilized with multi-item scales to determine whether the different items are all testing the same thing.
- Example: A 10 question test on "brand loyalty" should produce similar responses across all items if that's the properties of the scale. Properties of the items are independent of group membership.

they truly measure loyalty.

- Cronbach's Alpha is generated through formula-based computation:

o ≥ 0.7 = Acceptable

o ≥ 0.8 = Good

o ≥ 0.9 = Excellent (but possibly overfitting).

- Applied Use: Most used in psychology, marketing research, education testing.

Test-Retest Reliability

- Emphasizes stability through time.
- Example: If blood pressure readings are performed today and then tomorrow under the same circumstances,

they should remain stable.

- Strength: Demonstrates that finding is not a "fluke."

- Challenges:

o Short periods may lead to a memory effect (e.g., students remember the answers).

o Long lags can also provide time for actual changes in the measure of interest.

- Practical Relevance: Longitudinal studies, medical diagnostics, psychological testing.

Split-Half Reliability

- Splits the test items into two halves to measure consistency.

• Example: A 100-item test should yield similar scores if items 1–50 and 51–100 are compared.

- Strength: Test is given in a single administration.

• Challenge: _____ Variations in how the split can affect results; has been scaled by Spearman-Brown.

applied.

- Used in: Educational assessments, standardized tests.

Inter-rater Reliability (additional)

- Agreement by different observers of a given phenomenon.
- Example: If the measure is such that two doctors who diagnose the same patient should arrive at the same conclusion, ERR ~w.

is reliable.

- Application: Qualitative research, content analysis, medical diagnostics.

4.3.2 Validity

Validity as defined: Validity refers to the extent that an instrument measures what it is supposed to measure. If

reliability is consistency and validity is accuracy.

Expanded Types of Validity

Content Validity

- Checks that all dimension queries of a concept are measured.
- Example: A science test would draw on physics, chemistry and biology — not just chemistry.
- Review Methods: Expert panels, blueprints, and curriculum mapping.
- Practical Application: Commercial testing, scholastic tests.

Construct Validity

- Determines if an instrument indeed represents the theoretical concept.
- Example: A “self-esteem” questionnaire ought to assess the multidimensional construct of being confident, in control and sure there is no better thing for us to be or feel that we are (well, my ‘self”).

worth, and acceptance.

- Subtypes:

o Convergent Validity: The measure should correlate with other measures (e.g., self-esteem personality correlates with similar domains of self-reflection and personality) with confidence).

o Discriminant Validity: Unrelated measures should not relate to each other (e.g., self-esteem should not

correlate with physical height).

- Practical Use: Sociology, psychology, management sciences.

Criterion Validity

- Compares measure to an external benchmark or standard.

- Subtypes:

o Concurrent Validity: Correlation with another measure at the same time.

- Example: A new stress scale pitted against an established, clinically in use stress inventory.

o Predictive Validity: The extent that something is able to predict future results.

- Example: SAT to college GPA.

- Practical Use: Recruitment, clinical diagnostics, academic entry.

Face validity (bonus point if deep)

- The extent to which a measure appears to be valid “on the face” of it.

- Example: A survey item of the question, “I enjoy my work,” certainly appears to be measuring job satisfaction.

- 15% (ED professionals) 59% of patients were in ‘the right time, place and manner’ for pharmacotherapy to be effective. 20 Limitation: Not a scientific rigorous; subjective impression only.

4.3.3 Common Biases and Remedies

Despite the use of valid and reliable instruments, bias can also lead to limitations in the study. Bias is systematic error that

always tends to bias causes in one direction. Fuck rest: Bias, in contrast to random error, does not zero itself out over time — by Cecil Adams

distorts conclusions.

Expanded List of Biases

Response Bias

- Respondents give socially desirable, exaggerated or false responses.
- For example: Voters exaggerating their turnout in political surveys.

- Remedies: Provide for anonymity, neutrality in phrasing the questions and indirect questioning.

Sampling Bias

Selection bias – When the sample selected was not representative of the population.

- Example: Online polls that don't reach those without internet access.
- Remedies: "Random or stratified sampling with attention to inclusivity.

Measurement Bias (Instrument Bias)

- Model failure never fails to yield the wrong answers.
- Example: A scale that's consistently +2 kg, regardless of the weight.
- Remedies: Frequent calibration, pilot testing, standardizing procedures.

Interviewer Bias

- Questioners shape answers with tone, expression or leading queries.
- Example: Follow-up question: "You do agree this product is effective, don't you?"
- Remedies: Training, scripted questions or the use of digital surveys.

Recall Bias

- People do a poor job recalling what they've done previously.
- Example: Patients lying about when they first became symptomatic.
- Remedies: Recall the past for less time in your reminiscence, listening from records or diaries.

Nonresponse Bias

- If non-respondents are very different from respondents.
- Example: Unhappy customers who don't complete a survey and the only satisfied respond.
- Remedies: Follow-up reminders, incentives, simplified forms.

Confirmation bias (bonus extra for further reading)

- Scientists cherry-pick data that confirms their preconceptions.
- Example: Drawing attention to evidence that supports a claim rather than evidence that undermines it.
- Remedies: Peer review; blind analysis; awareness training.

Knowledge Check 1

Choose the correct option:

1. Which reliability method checks consistency within items of a test?

- a) Test–retest
- b) Cronbach’s Alpha
- c) Split-half
- d) Inter-rater

2. Which type of validity ensures a test covers the full domain of a concept?

- a) Content
- b) Construct
- c) Criterion
- d) Face

3. Which bias occurs when participants give socially desirable answers?

- a) Recall bias
- b) Response bias
- c) Sampling bias
- d) Interviewer bias

4. Which reliability method compares results from two time intervals?

- a) Split-half
- b) Inter-rater
- c) Test–retest
- d) Alpha

4.4 Summary

❖ Data is at the heart of research and has to be measured well in order to generate trust worthy results.

❖ Data may be qualitative (descriptive, non-numeric) or quantitative (numeric, measurable).

- ❖ Data is also structured (in tables, easy to analyze) or unstructured (raw, hard to complex, harder to analyze).
- ❖ Primary data are those that are obtained first hand for a particular research, whereas secondary ones are found from already compiled information sources.
- ❖ There are advantages and disadvantages of each type of information source: - Primary source is original but expensive; - Secondary source is inexpensive but may be outdated.
- ❖ Measurement in scientific research is the process of assigning numbers or labels to aspects of reality in a way that conveys something about them. characteristics.
- ❖ Four Levels of Measurement Haswell, J. (1878-1970) By Shapwick Used Price: 60% Off There are four basic levels of measurement: nominal (labels), ordinal (rank), interval(equal intervals)} /> without true zero), and ratio (equal distances with true zero).
- ❖ Scales to measure attitudes about attributes, such as Likert (attitude - agreement scales), Semantic Differential (bipolar adjectives), and Stapel (single adjective rating).
- ❖ Some complex ideas can still be quantified (using index measures- summing several indicators) or structured. measures (weighted combination of variables).
- ❖ Reliability It is the consistency of a measurement and is tested through methods such as Cronbach's Alpha, testing etc. retest, and split-half reliability.
- ❖ Reliability provides a measure of the extent to which a scale is free from error, whereas validity addresses how well we are actually measuring, in terms of content and construct. (theoretical validity), and criterion-related validity (relationships with results).
- ❖ Quality of research can be influenced by biases: nonresponse bias, selection bias and measurement bias, interviewer, recall and nonresponse biases.

❖ Measures such as clear communication, random sampling, pilot testing, anonymity and competences. setTime Frequency What works?

methods help minimize bias and maximize measurement quality.

4.5 Key Terms

Data – Unprocessed facts, figures or information collected for analysis and decision-making.

and Qualitative Data -- Descriptions of qualities without numerical value.

Quantitative Data – Data in numbers—that can be repeated, counted, and analyzed.

Structured Data – Well-organized data that's stored in a fixed format (e.g., tables, databases).

Unstructured Data – Unprocessed and disorganized data in the form of text, images, audio or video.

Original Data – Information derived directly by the researcher for a particular study.

Secondary Data – Existing data that has been collected and analyzed for a new purpose.

Reliability — The extent to which measurements can be used repeatedly across different times, items, or raters.

Validity -How well a measure reflects the concept that it is supposed to measure.

Bias -A systemic distortion in the collection, analysis, interpretation or publication of results.

4.6 Descriptive Questions

Quantitative and qualitative data with examples?

Explain what is structured and unstructured data with examples.

2) Discuss the pros and cons of primary and secondary data.

Explain the four levels of measurement: nominal, ordinal, interval and ratio.

What is a Likert scale? How is it different from semantic differential scales and Stapel scales?

Define the terms index measures and composite measures and give examples of each.

Define reliability. Explain the techniques by which reliability is tested in research.

Define validity. Describe different types of validity using examples.

Recognize typical levels of bias in measurement and provide concepts to reduce them.

Why the need of providing reliability as well as validity in tools?

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Publishing.

Answers to Knowledge Check

Knowledge Check 1

1. b) Cronbach's Alpha

2. a) Content

3. b) Response bias

4. c) Test-retest

4.8 Case Study

Measuring Right: ShopSmart's Journey to Reliable Data

Introduction

Data-driven decisions are crucial in an era of fierce competition.

Whether for sales predictions, customer satisfaction monitoring or employee performance, data accuracy and quality is essential. However, data collection and measurement are typically problematic due to incomplete responses, misclassification, and bias in interpretation.

The case deals with the issues encountered by a retailer, ShopSmart in analysing feedback and sales because of bad measurement. It also specifies the importance of employing such as correct measurement scales and to using viable data to enhance business decisions.

ShopSmart conducted a combination of closed- and open-ended customer surveys

comments on its website. The survey had ambiguous questions like "Do you enjoy our products?"

with simple 3-button predicate decisions (yes/no). This limited the firm's capacity to measure satisfaction.

Nor was customer spend data classified properly: gender, age and spend.

Background

amount entries were confused, inconsistent, or misentered. The lack of standardized scales resulted in ambiguity when combining records among different branches. Weak data, the management came to realize, had led them to add costly lines.

to suspect that foundation practices and poor measurement were producing flawed insights, a result of which would be ineffective marketing strategies and inventory mismanagement.

Problem 1: Misuse of Measurement Scales

marketing strategies and inventory mismanagement.

Problem 1: Misuse of Measurement Scales

Problem 1: Misuse of Measurement Scales

Problem 1: Misuse of Measurement Scales

Problem 1: Misuse of Measurement Scales

The Yes/No-based nominal questions could have been substituted by more informative ordinal or interval scales.

were needed. Thus management could never comprehend the near intense satisfaction or dissatisfaction.

Solution: Incorporate a Likert scale (Strongly agree to Strongly disagree) from the customers point of view.

attitudes more accurately and interval/ratio scales for expenditure analysis.

Problem2: The Unreliability of the Data

Seventy had other workers inputting sale figures in a variety of formats, so these numbers were less reliable. For

branch recorded its income in U.S. dollars, while another did so in the local currency.

Solution: Develop standardized procedures for data entry and quality test them via consistency.

checks (e.g., split-half reliability of survey items).

Problem 3: Validity and Bias

Questions in the survey did not appropriately reflect "customer experience" and occasionally

leading, which reduced content validity. Responses were further subjected to social desirability bias given that

customers were likely to answer in the affirmative.

Solution: Reconstruct the survey questions to enhance content validity (product, service and item study).

environment). Protect anonymity to prevent from response bias.

Conclusion

The present case demonstrates that in the absence of appropriate data types, classification and measurement tools,

businesses risk making poor decisions. Right-sizing of measurement scales, paying attention to the subdomains and adjusting for floor effects in higher-level goals can help ensure that utility weights reflect depth as well as breadth.

and face validity, and to reduce bias, groups such as ShopSmart can take the reins in bettering"].(2))/4]формула (2.criteria by which we ought to be measuring Girls' ease or

difficulty of access to require that" their organizational standards reflect those.Gravity form (2)/4».

quality of their insights. Ultimately, good data practices result in stronger strategies, better customer

satisfaction, and improved profitability.

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Unit 5: Questionnaire and Instrument Design

Learning Objectives


1. Learn the why and how of developing a good survey form.
2. Distinguish among types of questions and scales in survey instruments.
3. Use strategies to establish the reliability and validity of an instrument.
4. Differentiate open breast closed questions and how to use them.
5. Develop a questionnaire that is appropriate to the objectives and target population of your study.
6. Assess and pretest tools to improve clarity and utility.
7. Understand sources of bias in questionnaire design and ways to reduce it.

Content

5.0 Introductory Caselet

5.1 Questionnaire Basics

5.2 Design Principles

 5.3 Pilot and Revision

5.4 Sampling Concepts

5.5 Sampling Techniques

5.6 Sample Size and Process

5.7 Summary

5.8 Key Terms

5.9 Descriptive Questions

5.10 References

5.11 Case Study

5.0 Introductory Caselet

“Designing a Customer Satisfaction Survey”

GreenMart, a medium-sized retailer of organic and eco-friendly grocery items, recently observed a

fluctuation in customer retention rates. Management believes this may be attributable to fluctuations in the manufacturing and selling processes, such as the combination of elements or change up plants.

availability, shop cleaning, and behavior of staff. To thwart such concerns, Tech DivePage 12 Practical Page 35 Insights from Intel’s Chief Data Scientist Steve Miller Jones Research & Insights team at this point focused on machine learning.

Insights team to design the customer satisfaction tool via a shopping experience survey at checkout.

and via email.

The team knows that a badly designed instrument could lead to false conclusions and for this reason they would like to exploit as much information from the experimental data, just in case.

optimal questionnaire and instrument development. The goal is to gain insight into customer

attitudes in five categories: ranging, staff assistance, cashier speed, store ambiance, and overall satisfaction.

The following types of question were included in the preliminary version of the questionnaire:

- Profile: Age, sex, number of visits to the store
- Closed questions: “How satisfied are you with product variety (1 = not at all, 5 = very much)?”
- Open-ended question: “What would you like to see improved in our stores?”

- Double-barreled question: "Are you satisfied with our staff and store cleanliness?"
- Leading question: "Surely you agree that our environmentally friendly products are preferable to conventional ones?"

A senior analyst critiqued the draft, complaining about bias, clarity and question order. The research team chose to revise the instrument for improved validity and reliability by assuring that all included items were capturing what they intended (SWENDSEN et al. 2022) and that responses were consistent in interpretation across respondents.

They also undertook a pilot study of 20 respondents, and used the feedback to improve unclear questions and ensure ques-

remove biased language. Furthermore, they examined the internal consistency of the questionnaire with Cronbach's

alpha and further calibrated the response scale to enhance measurement accuracy.

Critical Thinking Question:

What are particular amendments that should be made in order to enhance the face and content validity and reliability of GreenMart?

questionnaire and how would you make it consistent with the general research need?

5.1 Questionnaire Basics

5.1.1 Objectives and Respondent Considerations

Objectives of Questionnaire Design

Properly structured research objectives form the foundation of a good survey. These objectives

set out what types of data to collect, and help to shape the structure and content of the survey" [3,p183].

instrument. Objectives serve three critical purposes: 1.

Refine the Questions Asked in the Questionnaire: Questions should relate directly to one of the objectives or

hypothesis. For instance, if the goal is to gauge customer loyalty, a sample of questions would be

proportion of repeats, likelihood to recommend and satisfaction.

Streamline and Flow Coherence: ie a coherent questionnaire facilitate the "flow of logic"± idea= Research process>This logical flow is always more or less duplicated when you draw up a research report.

beginning with screening items, then core content and ending with either demographic or classification questions.

Maintain Relevance and Limited Scope: Objectives can help you avoid questions that are unnecessarily long, or irrelevant distractions that could have been communicated in the body of your survey.

could lead to respondent fatigue or resignation.

Respondent Considerations

Creating a questionnaire is not only a technical matter; it also involves empathy and an understanding of the.

respondent's perspective. There are a number of human factors to consider:

- Cognitive Load: The difficulty of the items needs to be commensurate with the capacity of the respondent to process and remember both questions and answers.

understand and process information. The likelihood of is higher when the wording vague or ambiguous.

invalid responses.

- Language and Literacy: The choice of words, sentence construction, grammar should be appropriate to the reading age.

level of the intended population. For instance, the use of technical terms with a lay audience

survey unless definitions are provided.

- **Cultural Relevance:** Questions must not contain cultural bias or stereotypes. For example, in cultures where marriage is a taboo subject, being questioned about marital status might reduce

response quality.

- **Length and Timing of Questionnaires:** The dropout rate or non-responsiveness may increase because of too long surveys

‘satisficing’ respondents (i.e., satisfactory but not optimal answers to save time).

completion.

- **Anonymity and Privacy:** If respondents feel they are not monitored or recorded it is expected that they will give more honest answers simply because they may no longer see a need in lying.

rely on the privacy of the data being gathered, notably in respect to sensitive information such as income, 19

health, or political views.

5.1.2 Question Types: Open, Closed, Scales

The design of questions influences the accuracy, reliability, and validity of collected data.

collected. The types of questions are generally divided into:

Open-Ended Questions

Open questions enable respondents to express what is on their mind and are not constrained by predetermined options

options.

- Applications: Suitable for survey questions in exploratory studies, interviews or pilot testing. They allow the researcher to convey subtleties, explanations and unexpected themes.
- For example: “What are the primary reasons for which you decided to buy our product instead of others?”
- Strengths:
 - o Captures rich, qualitative data
 - o Provides window into the mind of respondent
 - o Can discover new variables previously not thought about
- Limitations:
 - o Processing and coding are not easy to perform
 - o Posts can differ tremendously in length and pertinence
 - o Demands more of the respondent in terms of cognitive engagement

Closed-Ended Questions

Closed questions provide narrow selection choices. These are good for measuring attitudes, behaviors, and opinions.

- Types:
 - o Dichotomous: A pair of alternatives (e.g., Yes/No)
 - o Multiple-Choice: Several predefined categories
 - o Check-list: Respondents may check more than one item
 - o Ranking: Preference-based sorting of items
- Example: “How frequently do you use our mobile app?”
 - a) Daily

b) Weekly

c) Monthly

d) Rarely

- Strengths:

- o Easy to analyze statistically

- o Ensures a shared understanding amongst the respondents

- o Minimizes variation in the way in which responses are presented

- Limitations:

- o May miss nuances

- o Responses are compared to the categories provided

- o Bad choices can result in bias

Scaled Questions (Rating Scales)

Scaled questions require respondents to rate an experience or opinion along some continuum.

- Types of Scales:

- o Likert Scale: Attitude incumbents o Level of agreement or disagreement

Example: "I am happy with my customer service experience."

Most Agreed — Agreed — Neutral — Disagreed — Most Disagreed

- o Semantic Differential Scale: Rates perceptions of bipolar adjectives

Example: "The checkout process was..."

Fast ——— Slow

- o Numerical Rating Scale: Expresses in numbers (usually ranging from 1 to 5 or 1 to 10) the strength of perception of an item.

intensity or frequency

Example: “On a scale from 1 to 10 how likely are you to recommend our brand?”

- Strengths:

- o Facilitates parametric statistical analysis

- o Provides finer measurement granularity

- o User-friendly to the respondents

- Limitations:

- o May be susceptible to central tendency bias (not selecting extreme choices)

- o Consensus bias (likelihood to consent from statements)

- o Misunderstanding about the scale anchors (may be a “5” to you, but what does that really mean?)

5.1.3 Mode Effects (Online, Phone, Face-to-Face)

The manner of survey administration may affect how individuals read questions, respond to them and their willingness to be open in their response.

the extent to which they will answer truthfully and the quality of resulting data. This phenomenon is known as

mode effect.

Online Surveys

These are usually performed using internet websites, email invitations and mobile apps.

- Advantages:

- o Inexpensive and very rapid distribution

- o Excellent for widespread populations with much distance between members

- o Respondents may experience a sense of anonymity, particularly when it comes to sensitive topics

- o Auto-skipping and branching logic for personalized experience

- Disadvantages:

- o Does not include pure internet or digital illiterates
- o It can be hard to get response rates without incentives
- o Limited capacity amending misconceptions in respondents

Telephone Surveys

Administered over the phone by trained interviewers, these have been widely employed in market research and in public

opinion polling.

- Advantages:

- o Allows interviewer to dig deeper or clarify answers
- o Low cost and time expenditure o Moderate as for the price and amount of time spent
- g More control over the order in which and when questions are answered

- Disadvantages:

- o More likely to cause interviewer bias
- o Respondents may be under time pressures or are distracted
- o Keep the surveys as short as possible, in order to minimize respondent fatigue

Face-to-Face Interviews

They take place face to face in people's homes, institutions and other public spaces. These may be completely structured or, and semi

structured.

- Advantages:

- o The most responsive and richest data layers
- o Watching for body language and other non-verbal cues
- o Suitable for long and complicated questionnaires

- Disadvantages:

- o Expensive and time-consuming

- o Respondents might be motivated to give “acceptable” answers (social desirability bias)

- o Depends on skilled interviewers to maintain consistency and objectivity

The mode chosen also affects how the sample is drawn, iteration design and data processing. Researchers

when choosing a survey mode, alternatives with respect to cost, coverage, speed and data quality.

Did You Know?

“The choice between open and closed questions can significantly impact the depth and reliability of

your data. Open-ended questions reveal rich insights but are harder to analyze, while closed questions yield quantifiable data. Interestingly, scales like Likert are widely used in psychology to

measure attitudes with statistical precision.”

5.2 Design Principles

5.2.1 Wording Clarity and Bias Avoidance

Wording Clarity

Clear wording of the questions is essential to secure valid and reliable answers. Poorly worded

questions remain misinterpreted leading to inaccurate or varying data.

Key Strategies:

- Use simple, familiar language.

- Do not use jargon, technical terms or acronyms unless they are widely understood by the intended audience

audience.

- Make sure each question is asking about only one idea, to avoid confusion.
- Don't use vague or subjective terms without context, such as 'regularly' or 'often.'

Example of unclear wording:

"Are you in the habit of eating healthy?"

- Who, exactly, determines "regularly" and what qualifies as "healthy food"?

Revised for clarity:

"How many times have you eaten fruits or vegetables in the past week?"

Bias Avoidance

Leading questions direct the answer given by a respondent, thereby prejudicing data.

Types of Bias to Avoid:

- (3) Leading Questions: Suggest the "right" response.

Example: "How great was our amazing customer service?"

- Loaded Questions: These carry assumptions that may not be accurate.

Sample: "What convinced you to leave your old terrible Internet provider?"

- Double-Barreled Questions: Inquire about two things at once.

Example: "How happy are you with our staff and our price?"

- Social Desirability Bias: Wording that prompts the respondents to provide the socially desirable, rather than

than honest answers.

Best Practices:

- Use neutral language.

- Reduce convoluted or compound questions.
- Pretest items to determine if items are misunderstood or biased.

5.2.2 Order Effects and Logical Flow

Order Effects

Where you place the question in a survey can impact the answer. These order effects if not carefully treated can cause the bias of data sample.

Types of Order Effects:

- Primacy Effect: Items at the beginning of a list or sequence will tend to be chosen more often.
- Recency Effects: Recent alternatives may be chosen more frequently, particularly in the oral survey.
- Context Effect: The manner in which a question is considered or carries out is affected by previous questions.

Example: A question on national pride might start to shape answers to political trust questions that

follow.

Best Practices:

- Randomize order of question or response options (in particular attitude scales), as applicable.
- Ask sensitive or emotionally charged questions later in the survey.

Logical Flow

A well-organised questionnaire proceeds naturally from one part of the interview to another and holds together tens of hundreds or thousands of questions.

intuitive experience for the respondent.

Guidelines:

- Start with some easy, fun questions to build the relationship.
- Begin with the big topics and work down to the smaller ones.
- Categorize similar questions together as a subsection.
- Transition topics or sections smoothly.
- Put demographic questions at the end unless they are being used for screening.

Example of Logical Structure:

Screening Questions

General Attitudes

Specific Behaviors

Satisfaction Measures

Demographic Information

5.2.3 Layout Formatting and Usability

The visual and interactive appearance of surveys plays a crucial role in user experience and response.

quality. **BAD LAYOUTS AND FORMATTING** The good layout and the bad layout in an instrument.

questionnaire.

Layout and Formatting Principles:

Visual Clarity:

- Be uniform per type, size and length of your fonts.
- Distinguish question numbers and response choices clearly.
- Turn bold, italics for emphasis (but not too much).
- Simplicity is key; have some white space.

Instructions and Navigation:

- Offer specific direction on what to include in each section.
- Specify if respondents can choose more than one answer or select only one.
- Use progress bars on digital questionnaires to let respondents know how far along they are.

Response Format:

- Stack the answer choices for faster eye scanning.
- Make sure your radio buttons and checkboxes work in a digital format.
- Don't use drop-down menus when asked important questions — people may miss the choices.

Accessibility:

- Designed for mobile devices Responsive layout.
- Make sure text is readable for those with vision impairments.
- Steer away from convoluted matrix-style questions, especially on small screens.

Error Prevention:

- Add validation for mandatory questions in online survey.
- Show helpful error messages indicating what needs to be fixed.

5.3 Pilot and Revision

5.3 Pilot and Revision (Elaborated Explanation)

Even the most thoughtfully constructed questionnaires require testing and refinement before they are used

in a full-scale survey. This process ensures that the instrument truly captures what it intends to measure.

Pilot testing, cognitive interviews, and structured revision criteria are essential stages in transforming a

draft questionnaire into a reliable and valid research tool.

5.3.1 Pilot Testing and Cognitive Interviews

Pilot Testing

Pilot test is the administration of the questionnaire to some number, usually less than a 100, of people who are similar to those whom you think should be answering your survey.

It's an important step that helps researchers catch bad design, assess question clarity, flow and test.

logic, and to improve technical and usability issues prior to undergoing full data collection.

Key Purposes of Pilot Testing:

- Whether the questions are being read as intended.
- To determine which questions respondents skip or fail to understand or misinterpret.
- To assess mean time required to fill out the questionnaire.
- To assess the operation of skip logic and branching in electronic surveys.
- To measure the scales by their reliability (i.e., Cronbach's alpha: internal consistency).

Steps in Pilot Testing:

Sampling: Select a foraging group (10–30 individuals) representative of the target population.

population.

Administration of the Questionnaire: The same method as that intended for administering the survey (e.g.,

online, phone).

Data Recording: Completed, response times and any implementation errors are recorded.

Gather feedback: Have participants comment on confusing or inconvenient features.

Analysis of data: Identify patterns, including:

- o High item non-response

- o Extreme response tendencies
- o Straight-lining or non-variant responses on scales of ratings

Rework: Edit the survey based on what you have learned.

Cognitive Interviews

Cognitive interviews take this process one step further, eliciting the cognitive processes respondents engage in when they formulate their answers.

survey questions. This approach finds the cognitive errors—misunderstandings, misreadings or

problems with access to or interpretation of the necessary information.

Two Common Techniques:

Think-Aloud Process: Those answering are encouraged to express their thoughts aloud as they go through the questions.

- o Example: A respondent may respond, “when say how often exercise” I am thinking about the gym, not to work as a walker.”

Probing Questions: These are questions in response to more general query, such as:

- o “What did you think we meant by ‘public services’ in this question?”
- o “How hard or easy was it to get the answer to that question, and why?”

Cognitive Interviews Help Identify:

- Ambiguous wording
- Misleading or loaded questions
- Loose time frames (“recently” or “regularly”)
- Response category problems (e.g., missing or overlapping ranges)

Ideal Use Cases:

- In complicated or multiple-language questionnaires

- In attitude, belief, or behavior measures
- Use this option for sensitive subjects that you need to phrase just so

5.3.2 Revision Criteria

Following pilot testing and cognitive interviews, the questionnaire will be revised in a structured way.

Confidence and validity in applied revisions should not be arbitrary, following rational rather than random criteria^{32,33}.

reliabilities, clarity, and usability of the tool.

The main themes concerning the revision of a questionnaire are:

Wording Precision and Clarity

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- o Make sure every word is specific and precise.
 - o Keep away from complicated sentences and/or multiple clauses.
- Revise or clarify ambiguous terms such as "regularly" or "enough."

Avoidance of Bias and Assumptions

- o Eliminate any language that implies there is a "right" answer.
- o Remove double-barreled questions (i.e., those which ask about more than one matter)&h.id) lines(20)._metric. parties represented religious groups in the private sector political party representation in religious groups war, suspects & human rights preventive strategies peace process OS / IR interceptions, etc poll question code a.no. simultaneously).

Relevance to Objectives

- o Align each question with a research objective.
- o There must be no questions that add nothing to meaningful data.

Improved Logical Flow

- o Re-order questions in response to feedback.
- o Provide seamless transitions from one section to the next.
- o o o Move “problems” to later in the questionnaire to prevent early politically incorrect questions.
- dropout.

Optimizing Scale Use

- o Change or add to response categories if pilot data indicate lopsided responses.
- o Maintain equivalence and symmetry in Likert-type scales.
- o Anchor definition (i.e., what is “Strongly Agree” vs. “Agree”).

Usability and Accessibility

- o Test the appearance on devices such as desktops, mobile and tablets.
- o Address any technical bugs, broken URLs or response fields that are not aligned correctly.
- o Include clear instructions where the process was unclear.

Time Management

- o If pilots indicate survey fatigue or experience significant lag in completing the survey, consider reducing the length of the survey.

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- o Combine redundant questions or eliminate low-quality ones.

Example: Revision Decision Table

Problem

Identified

Example

Type

Revision

Ambiguous term

"Frequently use online

services"

Clarity

Instead use: To describe bias in thoughts, attitude or preference: "In the last week, how

many times did you use online

banking?"

Double-barreled

question

"Rate our customer

service and product

quality"

Structural

Split into two questions

Overlapping

options

"Age: 20–30, 30–40"

Response

Error

Modify to "Age: 20–29, 30–39"

Too many

"Neutral"

responses

"I feel valued at work"

(Likert scale)

Scale Issue

Add more specific items, clarify
statement

5.3.3 Case Examples of Good Design

Real world examples are always the best guide in applying these principles well!

The examples below demonstrate how sensitive piloting and refining can improve questionnaire design.

Case 1: Educational Program Evaluation

Background: A university had designed a feedback form for their newly introduced e-learning system.

Issue Identified in Pilot Test:

- One question was: "Was the content and interface user-friendly?"
- Many students posted said they enjoyed the content but not the interface.

Revision:

- The question broke into:

"How clear was the content you learned?"

How intuitive/satisfying was the course interface?

Results: Here are More Actionable Takeaways for Content Engineers & UI Designers.

Case 2: National Health Survey

Background: A department of health wished to compare dietary preferences in wide and narrow regions.

Cognitive Interview Insight:

- Respondents were questioned: “Do you have balanced meals?”
- “Balanced” meant different things among less educated and those who live in various regions.

Revision:

- Replaced with: “About how many servings of vegetables, fruits, grains and protein do you eat on an ordinary day?

you consume?”

Result: Increased accuracy of the estimates and more equitable comparability between demographic groups.

Case 3: Online shopping experience survey

Scenario An e-commerce company wished to measure customer satisfaction.

Pilot Test Results:

- High drop-out rate in a 12-attribute matrix of characteristics to be rated on a scale from 0 (not at all) through 4 (very much).

Revision:

- Splitting the matrix into small parts (3 attributes per webpage).
- Included hover-over tooltips to clarify each attribute.

Results: The completion rate increased 35%, and responses were more consistent.

“Activity”

Design a 5-question mini-survey on a topic of your choice. Conduct a pilot test with 3 peers.

Ask

them to complete the survey and provide feedback on question clarity, layout, and understanding.

Document the feedback, identify at least two revision points, and rewrite the problematic questions

based on criteria from 5.3.

5.4 Sampling Concepts

5.4.1 Population Frame and Elements

Population

A. Population: The population is the collection of individuals, items or data that a researcher wants to generalise about. It is the group of people (or things) from whom you are getting your results.

conclusions about. It could be broad (such as all nationals in a country) or narrow (No. students at a particular university).

Population Element

An element is the single unit of the population that may be chosen for the sample.

For instance, if the population is "college students," each student in it is an element.

Sampling Frame

A sampling frame is a list or description of the population elements from which a sample will be drawn.

actually drawn. It is intermediary between the hypothetical population and sample selected.

Examples:

- Population: All the voters registered in a city
- Sampling Frame: The city's official list of registered voters
- Element: Each individual voter

Attributes of an Ideal Sampling Frame:

- Completeness: All elements of the population are included
- Duplicates & errors: None

- Reachability: when it is effective using to get elements

Problems with Sampling Frames:

- Undercoverage: Some of the population members are absent
- Nonsampling error:.
- Overcoverage: Too many repeating units are listed
- Outdated Lists: The Frame is not representative of the current population

5.4.2 Sample vs Census

Census

We consider a census where data are observed in every unit of the total population.

Advantages:

- High precision (no sampling error)
- Comprehensive data

Disadvantages:

- Expensive and time-consuming
- Impractical for large populations
- Risk of non-response or information and data fatigue

Sample

A sample is part of the population that you test or measure, chosen to stand in for a larger group. Sampling allows researchers to

deduce from a few samples Knowledge about the entire population without surveying it in its entirety.

Advantages:

- Cost-effective and faster
- Less data to manage
- Allows for concentrated study and in-depth analysis

Disadvantages:

- Potential for sampling error
- May not be generalizable if of low quality
- Appendix • Statistical procedures used to estimate population parameters

When to Use a Sample or Census:

Criteria

Census

Population Size

Small

Sample

Large

Budget and Resources Investment Medium to high budget Limited investment

Precision Requirement Very high

Time Availability

Moderate to high

Ample

Example:

Time constraints

- A tiny company with 80 employees would only take a census for an in-house satisfaction survey.
- A national research organization would usually employ a sample to estimate voter preferences.

5.4.3 Sampling Error vs Non-sampling Error

Sampling errors and non-sampling errors are two types of errors that occur in survey research and differentiating two.

There is an element that is necessary to determine the reliability and validity of measures among them.

Sampling Error

Sampling error is the difference between a sample statistic used to estimate a population parameter and its corresponding value from the population.

parameter, completely attributed to a subsampling of the population.

Causes:

- Natural variability between samples
- Small sample size
- Inadequate sampling design (non-random sample selection)

Example:

- A poll that estimates the percentage of voters who support a candidate at 48% but in reality 50% of the population supports that candidate,

...the 2% difference represents a sampling error.

How to Reduce:

- Use random sampling methods
- Increase sample size
- Stratify to ensure representation

Non-sampling Error

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Non-sampling errors arise from sources other than the size or selection of a sample. These can happen in

census and sample surveys alike.

Types of Non-sampling Errors:

Measurement Error: Survey respondents misinterpret the question.

So Mauchly did commit a type II processing error: These were mistakes — the error of using a less accurate method than he had actually at his disposal.

Nonsubsample Error: A subsample does not response causing bias.

Coverage: (Threshold 1) Certain subpopulations will be systematically omitted.

Example:

- If plenty of the younger crowds blow off a political poll, you could have biased results toward older — even as big — full-length feature lines.

randomly selected sample.

How to Reduce:

- Pilot test the questionnaire (to minimize measurement errors)
- Improve data processing systems
- More follow-ups to lower NRI
- Weight using re-analysis upon data analysis

Knowledge Check 1

Choose the correct option:

1. What is a sampling frame?

- a) The total population
- b) The list of selected respondents
- c) A list of population elements
- d) A type of sampling method

2. Which method collects data from every member of the population?

- a) Stratified sampling

b) Random sampling

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c) Cluster sampling

d) Census

3. Sampling error occurs due to:

a) Biased wording

b) Using a sample instead of a population

c) Data entry mistakes

d) Missing response options

4. Which of the following is a non-sampling error?

a) Small sample size

b) Random selection

c) Data processing mistake

d) Use of sampling frame

5.5 Sampling Techniques

5.5.1 Probability Sampling Techniques

All members of the population have a known, non-zero chance of being selected in probability sampling.

selected. This makes it possible to make statistical generalization of the results for the whole population.

Simple Random Sampling (SRS)

- All individuals in the population have equal chances of selection.
- The selection can be made using random number tables, lottery, or software.

Example: Selecting 50 student names at random from a list of 200.

Advantages:

- Minimizes bias
- Easy to analyze statistically

Limitations:

- Need complete and accurate sampling frame
- Not efficient on a large population

Systematic Sampling

- Chooses every k-th element from a list, beginning at random.
- k is calculated as:

$$k = \frac{\text{Population Size}}{\text{Sample Size}}$$

Example: Every 10th patient on a hospital admission list.

Advantages:

- Simple to implement
- More evenly spread than SRS

Limitations:

- Can be biased if there's a pattern hidden in the list

Stratified Sampling

- There are strata (subgroups) of the population that share similar characteristics.
- Samples are taken at random from within all strata.

Illustration: Taking random samples for each grade level (freshman, sophomore, etc.) and then taking a sample at random.

group.

Advantages:

- Guarantees membership of critical subgroups
- Reduces sampling error

Limitations:

- Needs background knowledge about population characteristics

Cluster Sampling

- Population is clustered, (commonly along geographical or organizational lines).
- Clusters are chosen at random and some or all of the members of those clusters are surveyed.

Example: Randomly select 5 schools and survey all teachers in each.

Advantages:

- Inexpensive for large, spread out populations
- Easier logistics

Limitations:

- Higher sampling error SRS or stratified sample.
- Cluster agglomeration can result in homogeneity across the cluster and lower precision

5.5.2 Non-Probability Sampling Techniques

In non probability sampling, the chance of being chosen is not known and generally researchers select

participants for accessibility or because they were judged. These methods are employed if sampling occurs. random fo90olynomial is not used.

impractical or impossible.

Convenience Sampling

- Respondents are selected for ease of access.

Example: Surveying people at a shopping mall or students in a classroom.

Advantages:

- Quick and inexpensive
- Useful in exploratory research

Limitations:

- High risk of bias
- Not representative of the general population

Quota Sampling

- The population is divided into strata, and a number (quota) of participants is selected from each bunches within the same cluster are completely crossed groups.

segment.

Example: Sampling 50 males and 50 females regardless of their availability.

Advantages:

- Guarantees the inclusion of key groups
- Faster than random sampling

Limitations:

- Non random selection in quotas
- Susceptible to interviewer bias

Judgment (Purposive) Sampling

- The researcher selects the respondents on the basis of who will be most useful.

or relevant data.

Illustrative application: Recruitment of expert panel members for an evaluation survey.

Advantages:

- Focused on specific insights
- Suitable for qualitative research

Limitations:

- Subjective and potentially biased
- Lacks generalizability

Snowball Sampling

- Current members invite new members from their acquaintances.

Example: To reach populations that are hard to access, such as drug users, refugees or underground artists.

Advantages:

- Useful for hidden or small populations
- Builds trust via referrals

Limitations:

- Leads to homogeneous samples
- Lack of control on sampling patterns

5.5.3 When to Use Which Method

The choice of sampling technique depends on several practical and methodological considerations.

These include research goals, available resources, population accessibility, and the need for generalizability.

Criterion

Research Objective

Probability Sampling

Statistical inference, hypothesis

testing

Non-Probability Sampling

Exploratory

research,

insight

Population Knowledge

Full list available

High

Full list not accessible

in-depth

Representativeness

Needed

Moderate to low

Time and Budget

Higher cost and time

Lower cost and quicker

Use Case Example

National health survey

Suitable Methods

Focus group with startup founders

SRS,

Stratified,

Cluster,

Convenience,

Quota, Judgment,

Systematic

Guidelines for Choosing:

Snowball

- Use probability methods when the aim is to generalize results to a population.
- Use non-probability methods for qualitative research, pilot studies, or when the population is hard to reach or undefined.
- Combine methods (mixed sampling) when necessary, especially in large or multi-phase studies.

5.6 Sample Size and Process

5.6.1 Steps in Sampling Design

Sampling Design. By this, I mean the methodical plan to information on which population is to be available in order that one can meticulously specify how it should be chosen 388 ORM PART THREE: ADVANCED MODELS AND TOPICS gathered and arranged.

and implemented. It involves several interrelated steps:

Method Step 1: Identify the Populations of Interest

- Define precisely the population to which the survey is to apply.
- Define population characteristics: Geography, demographics, behavior and so on.

Example: All the undergraduate students studying in public universities of India.

Step 2: Distinguish the Sampling Frame

- Define some list, or structure which corresponds to the population.
- Assess the completeness and accuracy of it.

Example: List of enrolled students at a university registrar.

Step 3: Choose the Sampling Method

- Decide when to use probability or non-probability techniques depending on goals, access to the population, and resources.

Example: Employ stratified sampling for a balanced representation of fields of study.

Step 4: Sample Size Calculation

- Determine how many survey respondents need to be polled for statistical confidence and representativeness.

Factors influencing sample size:

- Population size
- Desired/confidence level (e.g., 95%)
- Reasonable MOE (e.g., $\pm 5\%$)
- Expected variability in responses

Step 5: Implement the Design of Experiments

- Carry out unit selection according to the selected approach.
- Be strict to the protocol so that neither bias nor inconsistency creeps into your study.

Step 6: Validate the Sample

- Confirm sample is consistent with intended design.
- If feasible, compare with population-based or established norms.

5.6.2 Determining Sample Size (Power Basics)

Sample size is a statistical and practical decision. This is to ensure that the sample is sufficiently large to observe relevant differences or relationships without being too large and resource-intensive.

Key Concepts:

Confidence Level

o Shows how confident we are that the real population parameter is between the lower and upper margin of error.

o (Common levels): 90%, 95%, 99%

Margin of Error (Precision)

o The interval in which the true value is expected to lie.

o The smaller the margin, the larger samples still need to be.

Population Variability

o More variability (e.g., across opinions or behaviors) needs more cases to account for the full

range.

Population Size

o Affects only sample size in small populations (<10,000) mainly. For large populations, this factor becomes less significant.

Statistical Power

o True Negative : The probability of rejecting a false null hypothesis.

o High power (0.80) indicate greater ability to detect an effect when it exists.

Basic Formula (for Proportions):

Example:

To obtain 95% confidence when estimating a proportion, with a margin of error equaling plus or minus 5%, and no prior information on variability:

5.6.3 Practical Constraints and Design Effects

In applied research, optimal sample sizes and designs may need to be modified based on budgetary, logistical and

operational constraints. And design effect also adjusts for the effect of sampling method on data variance.

Common Practical Constraints:

Budget Limitations

- o More respondents outnumber higher costs of recruitment, incentives, data input and analysis.

- o May involve a trade-off in terms of sample size and level of sampling precision.

Time Constraints

- o Respondents and follow-up will be constrained by deadlines.

Population Accessibility

- o Remote or concealed population may be hard to access, and lead researchers to employ alternative (non-probability) methods.

Non-Response

- o Large levels of non-response may decrease the effective sample size and lead to bias.

Design Effects (DEFF)

The design effect (DEFF) measures the extent to whether or not using built-in PSUs result in more (or less) statistical variation than what is expected.

sampling procedures that are more complex (such as cluster or stratified sampling) other than simple random sampling.

Sources of Design Effects:

- Clustering: The similarity of items within-cluster decreases the variance between groups.
- Stratification: Could increase or decrease variance, depending on what is being stratified upon.
- Post-survey Weighting: Can lead to increased variance through post-survey weights.

5.7 Summary

- ❖ Objective and Respondent characteristics in developing a good questionnaire to ensure that the data were valid and reliable collected.
- ❖ Type of questions are open-ended, closed-ended, and scaled question which are appropriate >Open - end Questions It refers to the type of an answer that you will receive. research goals and analysis methods.
- ❖ Mode effects (online, phone, f2f) on how questions are interpreted and answered, impacting response quality and bias.
- ❖ Sound design principles include wording clarity, unbiased questions, logical component order and maximum user "profile completion. friendly formatting.
- ❖ There may also be order effects% from question ordering (some logical or thematic grouping. items improves accuracy.
- ❖ Testing piloté à l'aide d'entretiens cognitifs permet de mettre au jour les faiblesses de la conception, par opposition aux faiblesses de mise en oeuvre du design. and process questions.
- ❖ Review standards: clarity, relevance, organization and scale performance are significantly enhanced. instrument quality.
- ❖ The case examples provide evidence for how well-considered, revised questionnaires are clearer and more useful.
- ❖ Sampling concepts revolve around defining the population, having a sampling frame, and defining differences between samples and censuses.

❖ Sampling errors result from the use of a sample, whereas non-sampling errors are due to things such as

measurement or non-response.

❖ Sampling can be broken down into probability (for example, random, stratified) or non-probability sampling (such as casual).

convenience, snowball), all of the strategies have different use-cases.

❖ Sample size is dependent on confidence interval, margin of error, and population variance; the greater.

samples yield more precise estimates.

❖ Design effects and constraints (e.g. budget, time, accessibility of the population) should also be assessed when RESTRICTIONS ON USE conducting analysis.

estimating number and methodology of cases.

5.8 Key Terms

Questionnaire – A predetermined standardized form of questions, typically used to gain information from the responder.

Sampling Frame - A roster or file of all population elements from which the sample is selected.

Open-Ended Question – A question that provides respondents with the freedom to respond in their own words rather than forcing them into a specific response with preferences.

restrictions.

Closed Ended Question – A question that provides a fixed number of options to the respondent to select.

from.

Likert Scale – Rating scale used in surveys to find the degree of agreement or disagreement with a point/idea (usually from “Strongly

Agree" to "Strongly Disagree."

Pilot Testing – Pretesting of a questionnaire in a few subjects to check if there are design or word problems.

Sampling Error – The amount by which a sample statistic differs from a population parameter as a result of using a, or random measure, rather than all respondents in the subset.

sampling errors that could have occurred during the collection of data on which the survey is based.

response errors.

5.9 Descriptive Questions

Describe the major principles of creating an effective questionnaire and why this is essential in data gathering.

Explain the difference between open-ended questions and close ended questions using examples. What are the advantages and disadvantages of each?

Review the influence of mode effects (online, telephone, face to face) on survey responses and data.

What is pilot testing? Explain the goals, procedure, and value of instrument construction.

Write down the stages of sampling design, and elaborate on how each stage applies to study accuracy.

What is the distinction between sampling error and nonsampling error? Provide examples of each.

Distinguish between probability and non-probability sampling methods with an appropriate example for each.

their application.

How is sample size calculated in survey studies? Discuss the primary elements and a formula in general terms.

Explain the revision criteria you would use to modify a questionnaire following pilot testing.

Why is each criterion

important?

What is a sampling frame? Why does accuracy matter for representativeness in survey design?

research?

5.10 References

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Answers to Knowledge Check

Knowledge Check 1

1. c) A list of population elements
2. d) Census
3. b) Using a sample instead of a population
4. c) Data processing mistake

5.11 Case Study

Designing a Feedback Questionnaire for a National Online Learning Platform

Introduction

With many online educational platforms proliferating rapidly, providing student satisfaction and efficient learning

delivery is critical right now. Malaysia An established national e-learning platform, EduNation,

cut a couple of years ago when it released its self-guided data science certification program. Although thousands enrolled,

the pass rates and learner engagement were lower than anticipated. To

understand why the platform's research team chose to develop a student

feedback questionnaire.

But creating a strong and stable questionnaire for an eclectic, tech-savvy and culturally diverse-target audience can be challenging.

audience, who were globally spread, raised several design problems. The instrument had to be

clean, impartial, and cross-device compatible. The researchers sought to learn more about

their perceptions regarding their interaction with the course content, course technology, instructor support and sufficient time.

satisfaction -- without common issues like confusing question formats, poor usability, and over familiarity of aesthetic stimuli.

response rates, or survey fatigue. This caselet highlights the problems encountered in the questionnaire design: challenges and resolution methods.

Background

EduNation serves over 1.5 mn students in India - providing online certificate and diploma programs in various subjects. As part of its Data Science offering, the company was looking to compile

useful feedback to refine future course designs. They began by establishing unequivocal studying dropouts rationale, estimating platform usability or etc.

assessing teaching effectiveness.

A 30-item questionnaire was drafted by the research team made up of both open-and closed-ended, and was applied.

and scaled questions. But they hit upon a number of challenges when they tried it out with 100 users in a pilot test:

doublespeak, double-barreled questions, confusing answer choices, and an overabundance of

incomplete submissions. These issues led us to analyze our questionnaire in detail practices.

Problem Statement 1: Poor Question Wording and Structural Bias. Many questions in the pilot version were formulated with difficult words, and some were double-barreled: "Rate the usefulness and the pace of video lectures." In the latter way, it was easier for learners to say that the lectures were useful but poor in pace. The team revised all such questions making them single-focused and lowering the level of complexity: "How useful were the

video lectures?” and the separate item for pacing. They admitted that they avoided questions with set answers and vague words such as “regularly” and replaced it with options that could be quantified, like “2–3 times per week.”

Problem Statement 2: Lack of Logical Flow and Overloaded Sections. The survey started with the general demographic question and put all the rating scale questions into one section. According to the team, all questions in one place could be overwhelming and dull. They rearranged questions differently, from general to specific, so the sections were divided thematically: original 1: Course content; original 2: Instructor interaction; original 3: technical support; original 4: satisfaction and suggestions; finally, the demographic questions were moved to the end to avoid initial resistance. The completion rate improved as evidenced by a follow-up test.

Problem Statement 3: Inadequate Mode Adaptation and Mobile Usability. More than 60% of users took the pilot test on their mobile phones. The questions in matrix format had shown many problems because it was difficult to view the tables on the small screens. The team made the solution to make it mobile-friendly: tables were made narrower, question-answer alignment changed to vertical, and all buttons and text became touch-friendly. Autosaves and progress bars were added to avoid drop-offs during the use of mobile devices.

MCQ: What is of the following will be the most effective to improve the survey question’s clarity? Use long, detailed questions with more than 10 topics. Use vivid examples and references to theoretical works but monosyllabic words. Type B, apply for simple language and single-focused items. Solving these problems as per best practices improved the invitation tool for both the information captured and the survivor experience. This is viewed as instrumental considering the large-scale, virtual education, distance learning approaches.

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Unit 6: Research Proposal Ethics and Report Writing

Learning Objectives

Understand why you will be writing a structured research proposal.

Template Requirements The template should include: Background Objectives, including sub-objectives Methodology Timeline in proposal form Determine important components like background, objectives, methodology and timeline from the proposal writing.

Compare ethical issues in research--informed consent, confidentiality, data integrity.

Identify the role of IRB/ethical clearance in research.

Use guidelines for avoiding plagiarism and cheating.

Gain abilities for the organization, formatting and presentation of research papers.

Distinguish between categories of research reports: academic, technical, and popular.

Understand appropriate citation and reference list formats in research papers.

Improve writing clarity, structure and scientific voice for proposal/report writing.

Content

6.0 Introductory Caselet

6.1 Research Proposal

6.2 Research Ethics

6.3 Report Writing and Presentation

6.4 Summary

6.5 Key Terms

6.6 Descriptive Questions

6.7 References

6.8 Case Study

6.0 Introductory Caselet

“Ethics and Reporting in a Community Health Research Project”

Introduction

A reputable university's public health research team has been granted money for a nutritional study

shortcomings among adolescent girls in rural areas. Part of this research was to evaluate dietary habits and

suggest evidence-based interventions to public health departments in local areas. The group compiled a detailed research

proposal was developed and submitted for ethical approval, with specific aims, methods, and schedule.

After obtaining the permission, data was collected from three villages. The research assistants used surveys,

food records, and hemoglobin test to obtain data from adolescents aged 12 to 18 years. However,

halfway through the investigation, the team encountered ethical and reporting dilemmas they felt ultimately placed at risk the integrity

and utility of the research.

Background and Ethical Dilemmas

Informed Consent Issues:

Several parents could not read or write, and this hindered comprehension of written consent forms.

What the study involved was unclear to some adolescents, particularly the blood sample collection.

Privacy Concerns:

Data secrecy was breached in a small community, when the survey sheets were abandoned during a lunch break.

Researcher Bias:

One of the research assistants started interpreting the open-ended comments by the participants in a way which facilitated the position.

team's theory, unhedged with cross-checking of other coders.

Reporting Pressure:

The results were needed within a specified time frame as dictated by the funding agency, and team members advocated dropping

incomplete replies instead of message reporting"published omitting localizationscompromising visibility.

Resolution Actions

- The team restarted the consent process, and used audio in local language to explain what was happening.
- New data treatment and storage protocols established, including the encasing of physical forms and password-protected digital files.
- A second coder was assigned for the reconfirmation of the qualitative data.

It provided a section on limitations, non-response analysis and ethical considerations in the final report.

dilemmas encountered.

Outcome

The research was ultimately conducted with improved ethical protections and a system to report transparently it's findings.

structure. The end of project report was given to the funders and disseminated with local health.

administration. The ethical reconsideration and openness to report of this proposition were applaud for supporting.

academic integrity.

Critical Thinking Question:

If you were a member of this research team, how might you cope with the tension between timelines and funding priorities?

your ethical obligation to participants and scientific transparency with your deadlines?

6.1 Research Proposal

6.1.1 Purpose and Components

Purpose of a Research Proposal:

To be able to articulate clearly and persuasively the research idea.

Justification of the importance and originality of the study.

To organize a plan of novel research.

To obtain permission, ethical consent and financial backing.

In order to allow reviewers to evaluate how feasible, relevant and well designed the work is.

Essential Elements of a Research Proposal :

Section

Description

Title

A descriptive and concise title of the article.

Introduction/Background

Provides an introduction to the problem, context and justification of the study.

Research Aims/Questions Specifies the research aims, hypotheses or question.

Review of Literature

Reviews existing research and identifies knowledge deficits.

Methodology

Describes research design, sampling technique, instruments for data collection and procedure, data analysis.

Ethical Considerations

Deals with consent, confidentiality, and protection of participants.

Expected Outcomes

Describe the expected contribution and potential impact of the proposed research.

References

There is adequate referencing to the literature.

6.1.2 Timeline, Budget, and Feasibility

Timeline

A timeline outline the key stages of the research in chronological order. It helps reviewers assess

if the project is scheduled realistically.

Example timeline elements:

- Literature review: Month 1–2
- Development of 7CLEAR and pilot testing: Month 3.
- Data collection: Month 4–5
- Data analysis: Month 6
- Report Preparation and Submission: Month 7-8

It is usually depicted graphically in the form of a Gantt chart with milestones and deliverables.

Budget

A budget is provided to estimate the funds necessary for the project if it were approved. It includes both direct costs

(e.g., travel costs, data collection costs, salaries) and indirect cost (e.g., overheads, administrative fee).

Typical budget components:

- Personnel (research assistants, enumerators)
- Travel and logistics
- Printing and materials
- Software and licenses
- Data entry and analysis
- Contingency (5–10%)

The scope and the budget ought to be correlated with each other.

Feasibility

Feasibility asks whether the research is possible to accomplish in a practical sense, given the time and resources available.

and expertise. It considers:

- Participant or data access
- Institutional support
- Researcher competence
- Availability of required tools/equipment

A practicable proposal shows reasonable plans and precautions to avoid risk.

6.1.3 Review and Approval

Review Process

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Most proposals are subjected to peer and institutional review prior to data collection. This process ensures:

- Scientific merit
- Methodological soundness
- Ethical compliance

Reviewers may include:

- Academic supervisors
- Funding agency representatives
- Institutional Research Committees

They evaluate:

- Clarity and focus
- Relevance of the research
- Appropriateness of methods
- Budget justification
- Ethical soundness

Ethical Approval

Research involving humans or animals Ethical approval is required for all research studies in human and animal subjects. This is provided by

IEC and IRB.

The researcher must submit:

- Full research proposal
- Consent forms
- Participant information sheets
- Risk-benefit analysis

No data may be collected before approval is finalized.

“Activity: Designing a Mini Research Proposal with Ethical Consideration”

Students will draft a mini research proposal on a topic of their choice, including title, objectives,

methodology, timeline, and budget. They must also outline key ethical considerations and create a

consent form. The proposal will be peer-reviewed in class for clarity, feasibility, and adherence to

ethical research standards.

6.2 Research Ethics

6.2.1 Informed Consent, Privacy, and Confidentiality

Informed Consent

It is communication, not just a scribble on an agreement card. Participants

are informed enough, they become capable of deciding voluntarily and reasonably on a contract rather than undergo one involuntarily.

involvement in the research.

Key Features of Informed Consent:

- Informed consent: This is a document prepared for potential study participants to inform them about the purpose, procedure of the study.

risks, and benefits.

- Understanding: The information should be in a language the participant can understand.

- Voluntariness: The participation ought to be your decision and free of pressure or undue influence. Participants should know

they can pull their money out without penalty.

- Documentation: Written or oral consent must be recorded and documented especially in studies.

involving human subjects.

Example Scenario Here is an example scenario: Imagine a study with medical data in which the participants are educated in their native language,

presented with a sheet of written FAQs, and asked to sign a consent form with the option of withdrawing later.

Privacy

Privacy is about control of information and behavior. Ethical researchers avoid penetrating into personal spaces of participants' lives that are not directly pertinent to the specific aims of the study.

Ethical Concerns in Privacy:

- Posing irrelevant, offensive questions which are not related to the research agenda.
- Data is obtained without explicit consent (for example: surveillance or passive tracking)

Best Practices: Keep the questions to a minimum and allow them to be skipped if deemed sensitive.

items.

Confidentiality

Confidentiality refers to keeping the identity and responses of participants from being made known to.

unauthorized individuals. Even if the information is de-identified, confidentiality breaches can still impact participants.

Methods to Ensure Confidentiality:

- Use numbers or code to identify subjects rather than names.
- Keep data on encrypted digital files or in locked file cabinets
- Limit access to data to core research team members only

Real Example: In a mental health research, unidentifiable transcripts are kept in a password-protected.

accessible to a lead researcher only.

6.2.2 Integrity, Avoiding Misconduct, and Plagiarism

Research Integrity

Research integrity requires that research is conducted and reported honestly, accurately, transparently.

For researchers who must not forge, falsify, manipulate or destroy research images but should disclose conflicts of interest.

Examples of Research Integrity:

- Reporting all data, including the information contradicting the hypothesis
- Acknowledging co-authors and contributors
- Strict compliance to the prescribed norms, without any short cuts or variation

Avoiding Misconduct

Misconduct in research undermines both the integrity of science and public confidence. It is characterized by volitional behaviours that metric tons of carbon equivalent per capita, which is the amount released annually-average person.

violate ethical standards.

Three Core Types of Misconduct:

Falsification – Faking a data or result

Example: Creating fictional survey responses.

Fraudulence – Use of dishonest methods in doing research-urencoded or proprietary data I think fraud implies falsification, and my own view is that this is what we should be concerned with Falsification covers two sorts of naughty business: 1.

Example: Changing lab values to match expectations.

Explanation of Plagiarism- the use of someone else's work without giving appropriate credit.

Example: Cutting and pasting from another paper without attribution.

Consequences:

- Academic sanctions (e.g., suspension, revocation)
- It would also sue for grant abuse
- Individual and institution reputation [=People]: A bad quality of the work may lead to reputational damage for individual or institution.

Avoiding Plagiarism

Plagiarism is not only unethical but You steal the work of others. It ranges from copying and lap-dogging withoutSequentialGroup effort.

citation, and using other people's ideas as if they were your own.

How to Prevent It:

- Use the tools available to you for citation management (Zotero, EndNote).

- Quote marks for direct quotes.
- Paraphrase and cite the source correctly
- Check essays in plagiarism detection tools like Turnitin.

Types of Plagiarism:

- Direct Plagiarism: Word-for-word copying
- Self | Plagiarism: Using one's own previous writings without citation
- Mosaic Plagiarism: Mixing materials copied from different sources together.

6.2.3 Ethics in Data Collection and Reporting

Ethical Data Collection

Collecting data ethically means raising knowledge accurately, with respect and according to the law. The

methods need to comply with an approved protocol and ensure participants' rights.

Key Considerations:

- Do not deceive unless justified and approved
- Obtain consent for all data categories (audio, video, biometric)
- Honour refusal to engage or answer

Field Example: In a study of at-risk populations, interviewers receive training on how to secure assent before entering the home.

addition to parental consent.

Ethical Reporting

Clear and honest reporting is crucial for results to be part of the scientific literature.

and without distortion to policy or action.

Common Unethical Practices in Reporting:

- Selective reporting of results (cherry-picking data): Only the desirable results are mentioned.
- P-hacking: Fiddling with data until the results you want are statistically significant
- Failure to report mistakes: Concealing procedural errors or failure to take action

Ethical Reporting Includes:

- Reporting of study limitations

- Reporting of negative or unexpected findings
- Disclosures of grants and conflicts of interest
- Publishing corrections when necessary

Best Practice Example: A summary part of the final report reflecting limitations and ethically.

Problems Faced” – building trust and credibility.

Knowledge Check 1

Choose the correct option:

1. What is the primary purpose of informed consent in research?

- a) To protect researcher rights
- b) To guarantee funding
- c) To inform and gain voluntary participation
- d) To reduce sample size

2. Which of the following is an example of research misconduct?

- a) Using consent forms
- b) Random sampling
- c) Falsifying data
- d) Applying for ethics approval

3. What does confidentiality in research mean?

- a) Sharing data with peers
- b) Keeping participant identity protected
- c) Publishing all results
- d) Hiding study goals

4. How can a researcher avoid plagiarism?

- a) Use long quotes
- b) Skip citations for common knowledge
- c) Cite all sources properly
- d) Rewrite sources without mention

6.3 Report Writing and Presentation

6.3.1 Report Structure and Layout

The research report is a formal document designed to convey the purpose, methods, and findings of a specific study. Its

presentation method to let readers understand content, and is easy for everyone to know where they find what they want.

communicated.

Elements of a Research Report:

Title Page

- o Contains the title of the report, author(s), institutional affiliation, date and sometimes... supervisor's name.

- o The title must be short, explicit and represent the main topic of the investigation.

Abstract / Executive Summary

- o Provides an abstract of the research in approximately 150-300 words.

- o Includes the purposes of the study, methods/techniques/approach, results and conclusions.

- o The executive summary (in a business or policy report) is somewhat longer and... application-oriented.

Table of Contents

- o Pages Numbers for all headings and subheadings.

- o Assists the reader in finding particular sections quickly.

Introduction

- o Introduce the research problem, context for the research, justification and objectives.

- o Might be hypotheses or research questions.

- o Should conclude with a short description of the report contents.

Literature Review

- o Reviews theoretical literature and previous research.

- o; Le identifies the gaps of knowledge and lays the foundation for our current study.

- o Should be critical and analyze, not simply describe.

Methodology

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- o Describes the research design, sample, measures, procedures and methods of data analysis.
- o Should be comprehensive enough to be replicable.
- o Ethical considerations, if appropriate.

Results / Findings

- o Raw data (e.g., in tables, charts, or graphs) are presented.
- o Dispassionate description of trends, patterns and statistical information.

Discussion

- o Discusses findings in relation to the research questions and the literature.
- 2 o Analyzes consequences, reasons for the results, and connections with previous findings.
- o Perhaps include other explanations or surprising results.

Conclusion

- o Summarizes the main findings and responds to research questions.
- o Concludes with contributions and future work.

Recommendations (Optional)

- Recommendations: Recommends practical or policy steps based on the results.
- Particularly applicable in applied or policy-based research.

References

- Comprises all references cited in the text.
- Must have some uniform citation style (APA, MLA, Chicago etc.)

Appendices

- Supplementary Material (supplementary data): The author warrants that the manuscript does not infringe any third party's rights, it does not contain text, or other material of an obscene, offensive, libelous or otherwise unlawful nature and has provided all required permission from copyright owners for inclusion; supplementary material on associated questionnaires/raw data/ethics approvals must also be included with the submission.
- Aids in keeping the main text of the report streamlined and organized.

6.3.2 Writing Style, Tables, Figures, and Citations

Writing Style

The language should be formal and objective as appropriate for an academic journal.

Characteristics of Good Research Writing:

- Clear: Does not use jargon or overly technical language unless it is defined.
- Concise: Eliminates redundancy.
- Coherent: Sections follow in a logical sequence.
- Evidence-based: There are data or citations for all assertions.

Voice and Tense:

- In research papers, the passive voice (eg, "Data were collected...") is used but active voice is increasingly becoming acceptable, more so in qualitative studies.
- Methods and results are described in the past tense; present tense may be employed with regard to literature buysexlevagetablets.bid or theory.

Tables and Figures

Visualizations can communicate complex data in a more intuitive, immediate manner. They should complement—not duplicate—the text.

Tables:

- Present numerical data (frequencies, percentages, comparisons).
- Title above and notes below as needed.
- Numbered in the order of their citation in the text (Table 1, Table 2).

Figures:

- Use graphs, charts, diagrams, models, pictures and conceptual frameworks.
- Uses for trends, distributions, relationships or visual summaries.
- Supply Fig. number and caption below.

Good Practice:

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- 2Call out each table/figure in the text (e.g., "As shown in Table 3...")

- Refrain from making the report overly visual — only use when necessary.
- Provide clear labels and ensure appropriate scales.

Citations and Referencing

It's good practice (and better-not-to-get-expelled practice) to cite your sources and not plagiarize. All borrowed ideas, quotations, and data must be properly cited.

Common Citation Styles:

- APA (American Psychological Association): Commonly used in the social sciences.
- MLA (Modern Language Association) — commonly used in the humanities.
- Chicago Manual of Style — Used in arts, history, and multi-disciplinary projects.
- Vancouver Style: This is more common for scientific and medical writing.

In-Text Citation Example (APA):

(Creswell, 2018)

Reference List Example (APA):

Creswell, J. W., & Creswell, J. D. Design: Qualitative, quantitative, and mixed methods approaches (5th ed.). SAGE Publications.

It is better to use reference manager such as mendeley, zotero or endnote for more accurate and easier formatting.

Did You Know?

“Using too many tables and figures without proper referencing can confuse readers and weaken

your report's impact. Every visual must be clearly labeled, numbered, and explained in the text.

Moreover, inconsistent citation styles are one of the most common causes of academic rejection in

research and thesis submissions.”

6.3.3 Types of Reports and Oral Presentations

Types of Reports

Academic Research Reports

- o Include theses, dissertation(s), academic papers and so forth.
- o Stress methodological transparency and theoretical contributions.
- o Sometimes peer reviewed (but not always) in scholarly journals.

Technical Reports

- o Written for a professional audience (engineers, scientists and developers).
- o Specify exact methods, instruments, and results.
- o Tend to have an annexes with technical data and specs.

Policy or Popular Reports

- o Implicate nontechnical stakeholders (such as NGOs or policymakers).
- o Emphasis on practical results and reducing complexity of the style.
- o Communicate in lay terms, with pictures, and with executive summaries.

Progress/Interim Reports

- o Presented as part of on-going work.
- o Highlight successes, challenges and directions forward.

Oral Presentations

Oral presentations are crucial in defending one's work, reporting study findings at conferences or establishments and delivering arguments.

communicating with non-academic audiences.

Core Elements:

- Structure: Strong intro, body and conclusion.
- Time: Most speaking assignments involve a 10-20 minute presentation.
- Visual support: Utilize PowerPoint or Prezi to assist learning.

Slide Design Tips:

- Use bullets, not paragraphs
- Limit 1 idea per slide
- Readable font sizes (24pt at least for body text)
- Visualize with arranged charts, graphs and pictures

Presentation Delivery Tips:

- Rehearse in advance
- Keep looking at audience
- Do not read off your slides
- Be ready for a Q&A session (with backup)

6.4 Summary

❖ A proposal is a well explained and formally designed plan of what you plan to do. significance.

❖ At minimum, a proposal should include the title research questions methodology proposed timeline related list of works cited).

budget, and ethical considerations.

❖ A proposal that includes a timeline and budget is more realistic helping with feasibility of the proposal as well as resource planning.

❖ Feasibility section which describes how access to the data, tools and participants as well as research team been installed is assessed for completion being achieved

the study.

❖ All project proposals require review and ethical approval before data collection can commence.

when human subjects are involved.

❖ Informed consent guarantees that participants have the option to participate freely, knowing what their rights are

and the study's nature.

❖ Privacy and confidentiality are ethical responsibilities to safeguard the identity of participants' data.

❖ In keeping with research integrity, fabrication, falsification and plagiarism is to be opposed at all levels.

❖ Honest reporting that includes negative results is essential for ethical research and data collection

and study limitations.

❖ You may wish to refer to an actual research paper when reading text following this lesson.

Structure of Research Paper ❖ A research report must have the same forms as other academic papers (abstract, introduction, method, results, or discussion).

discussion, and references.

❖ Tables, figures and references should be inserted appropriately to ensure clarity and academic success.

standards.

❖ Successful oral presentations are clear, succinct and supported by visuals that are designed to PERIOD.

the audience.

❖ Well-organized, honest, and clearly written research helps in establishing credibility, acceptance of scholarliness, and confidence [,].

real-world impact.

6.5 Key Terms

Research Proposal- A structured document that describes the aim, methodology and proposed plan of a research.

study.

Informed Consent – Voluntary decision, based on a full understanding of any pertinent risks and benefits, to participate in a particular research protocol.

information.

Confidentiality — The responsibility to guard personal information of participants from unauthorized

disclosure.

Plagiarism – The practice of claiming someone else’s work or ideas as your own.

Ethical Approval – (Permission issued by an ethics committee to carry out activities that involve an ethics committee, in situations where the research implicates (not necessary human), procedures et al. Weird.

human or animal subjects.

Methodology – The section of a paper explaining how the study was constructed and implemented.

Citation – A mention in an academic writing to a source as used to justify a statement or theory.

Executive Summary – Summary of a research report's main points, findings and conclusion.

Oral Presentation– A verbal presentation of research results, usually accompanied by slides or other visual aids.

6.6 Descriptive Questions

Discuss a research proposal and its key elements with examples.

Examine timeline and budget in the context of evaluating if a research proposal is feasible.

What is informed consent? What is its importance for the protection of participants?

Distinguish between privacy and confidentiality in research using examples.

Describe research malpractice in relation to fabrication, falsification and plagiarism.

Explain the ethical issues identified in relation to data collection and reporting.

Describe the format of a typical research paper and state the purpose for each section.

Explain why the correct use of tables, figures and references is important in academic writing.

Contrast various types of research reports Describe the main components of a good oral presentation.

6.7 References

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7. Punch, K. F., & Oancea, A. (2014). Introduction to research methods in education (2nd ed.). SAGE Publications.
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- Answers to Knowledge Check
- Knowledge Check 1
1. c) To inform and gain voluntary participation
 2. c) Falsifying data
 3. b) Keeping participant identity protected
 4. c) Cite all sources properly

6.8 Case Study

Ethical Challenges in Conducting a University Mental Health Survey

Introduction

Stress and Anxiety are on the rise at universities. A

a few years ago, a psychology department research team at a prestigious university suggested an outdoor range far from the office area off-campus AFFORESTATION because of Wi-Fi/Fry appearance of circle pattern of foliage and veritable streaming brook.

mental health survey on prevalence, risk factors and coping mechanism. The study aimed which has been to generate information for developing institutional support systems.

The research proposal was sound and had been successful in obtaining funding, but some ethical and reporting issues in its implementation. Issues related to informed consent, confidentiality and transparency in reporting put the team in a quandary. This case study exposes these obstacles and presents concrete solutions to maintaining ethical integrity during ensuring scientifically valid results.

Background

A quantitative survey that included demographic questions, mental health and measures was developed by the research team.

health screening instruments with add-on, free-text options for reflection. Participants included undergraduate and

post-graduate students, who were recruited through e-mails and class announcements.

In the proposal, I cite the value of informed consent and confidentiality, but based on data from my online categorization game (Viswanathan, Nathanson & Schloss 2014), participants do not consistently understand that their accuracy is being stored or analyzed.

When data collection commenced, participants expressed concerns regarding the sensitivity of mental health-related information which they did not want to be disclosed.

fear of being stigmatised and questioning whether they could answer anonymously. The team also

experienced funder pressure to deliver results promptly.

1.3 Problem Statement 1: Informed Consent Clarity The main conflict inside of an informed consent model exists between remaining clear and understandable to participants in the information provided (Rodriguez et al.,2008).

Some were saying they were a little confused about what the study was about and how their information would

be used. Some had signed the document without completely comprehending its significance.

Solution: The research staff adapted the consent form to plain language and offered oral explanations before administering the survey. They stressed the freedom of withdrawal any time.

without consequences.

Problem Definition 2: Confidentiality and Privacy

Questions were raised as to whether sensitive answers could be traced back to specific students, particularly since the surveys

with the peer's class present.

Solution: The team moved to an internet based anonymous survey, eliminating identifying information

as names or student IDs. The raw data was encrypted and only the principle investigator had access to it.

dataset.

Problem 3: Push in Reporting

PURPOSE To expedite the process, some members of the team proposed to precluding incomplete responses and to meeting strict deadlines.

underreporting limitations. These increased the potential for bias and selective reporting.

Solution: The PI was committed to transparent reporting. In the final report, the

team included a subsection about the limitations of the study, refusal rates, and ethical issues encountered

during implementation.

MCQ

Q: What is the best approach to keeping sensitive surveys confidential?

- a) Gather names, but keep them top secret.
- b) Use online anonymous platforms with encryption
- c) Raw Data should be shared with all investigators.
- d) Do not gather any demographic information.

Answer: b) Utilize anonymous online platforms that use encryption.

Explanation: Through TAAIAs, data are secure and participation fear is reduced by online, anonymous surveys

encouraging honest responses.

Conclusion

This report illustrates that also well developed research proposals are not save against ethical issues in the field.

implementation. Respecting informed consent, maintaining confidentiality and safeguarding.

honesty are necessary for the credibility and confidence. By prioritizing ethics over deadlines,

the researchers protected participants from harm and provided data that the public could trust (Lamb & Sandelowski, 2002).

university might responsibly use to benefit student well-being.