

training manual



A Five-Day Online Faculty Development Programme

on

“Research Methodology & Scientific Paper Writing”

11th - 15th May 2026

(Online Mode)

Organized By

Internal Quality Assurance Cell (IQAC)



Udayanath (Auto.) College of Science & Technology,
Adaspur, Cuttack, Odisha- 754011



Prof. Augustee Mohanty
President, Governing Body
Udayanath (Autonomous) College of
Science & Technology
Adaspur, Cuttack

MESSAGE

It gives me immense pleasure to extend my warm greetings and best wishes to all participants, academicians, researchers, and resource persons associated with the Five-Day Online Faculty Development Programme on “Research Methodology & Scientific Paper Writing” organised by the Internal Quality Assurance Cell of Udayanath (Autonomous) College of Science & Technology from 11th to 15th May 2026. The theme of this FDP is highly relevant and timely, as it seeks to equip participants with essential knowledge and practical insights into research design, scientific writing, publication ethics. It also brings the importance of plagiarism by creating awareness towards this. Data analysis, and interdisciplinary collaboration will also be major areas of focus. I am confident that the deliberations and interactions with eminent experts from reputed institutions will immensely benefit the participants in enhancing both the quality and impact of their academic and research pursuits.

I congratulate the Principal, IQAC Coordinator, Organising Committee, and all stakeholders for their sincere efforts in organising this significant academic programme. I also convey my best wishes to all participants for a fruitful learning experience, productive academic interaction, and enduring research collaboration. I wish all success for fruitful completion of the Faculty Development Programme.

Augustee Mohanty

Prof. Augustee Mohanty



Dr. Lulumina Dash
Principal
Udayanath (Autonomous) College of
Science & Technology
Adaspur, Cuttack

MESSAGE

It is my immense pleasure to know that a Training Manual is going to be published on Five -Day Online Faculty Development Programme on Research Methodology organized by the Internal Quality Assurance Cell (IQAC) of U. N. (Auto) College of Science and Technology, Adaspur, Cuttack. Research is the foundation of academic excellence and intellectual growth. This Faculty Development Programme is a commendable initiative aimed to enhance the research competency of faculty members, students and promoting a research culture in higher education institution

I sincerely appreciate the efforts of the IQAC, organizing committee, resource persons, and all participants for making the programme meaningful and successful. I am confident that this training manual will serve as a valuable guide and reference for academicians, Research scholars and students in their pursuit of quality research.

With best wishes

Lulumina Dash
Dr. Lulumina Dash



Dr. Hiranmayee Mishra
Administrative Bursar
Udayanath (Autonomous) College of
Science & Technology
Adaspur, Cuttack

MESSAGE

I am delighted to know that our IQAC plans to publish a training manual for the Five-day long Faculty Development Program on “Research Methodology and Scientific Paper Writing”. This not only enhances the knowledge of the participants; this leads to sharpen their Research Objectives by making them more equipped for future as well.

I wish all success of the event and my best wishes to all the stakeholders.

Hiranmayee Mishra
Dr. Hiranmayee Mishra



Mrs. Sujata Mishra
IQAC Coordinator
Udayanath (Autonomous) College of
Science and Technology, Adaspur,
Cuttack

MESSAGE

It gives me immense pleasure to present this Training Manual for the Faculty Development Programme (FDP). Faculty Development Programmes play a vital role in enhancing academic excellence, professional competence, and innovative teaching-learning practices among educators.

This manual has been carefully designed to serve as a comprehensive guide for the participants, resource persons, and coordinators associated with the programme. It outlines the objectives, schedule, guidelines, activities, and expected outcomes of the FDP, thereby ensuring smooth conduct and effective participation.

In the rapidly evolving landscape of higher education, continuous learning and skill enhancement are essential for educators to meet emerging academic and institutional challenges. I am confident that this FDP will provide a valuable platform for knowledge sharing, professional growth, research orientation, and collaborative learning.

I appreciate the sincere efforts of the organizing committee, faculty members, and all stakeholders involved in preparing this manual and conducting the programme successfully. I extend my best wishes to all participants for a fruitful and enriching learning experience.

Sujata Mishra
Mrs. Sujata Mishra

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DAY-1 Foundations of research

DATE: 11.05.2026

T1: Problem Identification & Research Gap

(Articulating research questions, understanding scope, and novelty)

Resource Person: Dr. Ajodhya Gourab Mishra

*Research Assistant (ICSSR Project), Dept. of Business Administration,
Trident Academy of Technology, Bhubaneswar*

RESEARCH METHODOLOGY & SCIENTIFIC PAPER WRITING

Problem Identification & Research Gap

Articulating Research Questions · Understanding Scope · Novelty · Contribution

Presented by:

Dr. Ajodhya Gourab Mishra, Research Assistant (ICSSR Project),
Department of Business Administration, Trident Academy of Technology, Bhubaneswar.

Let us look at the fact

India declared a literacy revolution in the 1980s and 1990s. Census figures showed dramatic improvements.

Then researchers went door to door — and found that millions of people counted as literate could not read a single sentence.

The problem was not the census figure. The problem was the question behind the figure.

What gets measured?

Self-reported literacy, not demonstrated literacy.

Who is studied?

The household head's report of other household members, not the members themselves.

What theory underlies it?

A schooling-as-learning assumption.

Today, we learn to ask better questions — and to find the gap behind the gap.

Session Roadmap

90 minutes · Five movements — building the Golden Thread

1 Problem Identification

What is a research problem? Where do problems come from?

2 Research Gap

Gap-Spotting, Problematization, Types of gaps

3 Research Questions

FINER, types, and the Q→SQ→Objective hierarchy

4 Scope, Novelty & Contribution

Defining boundaries and articulating your contribution

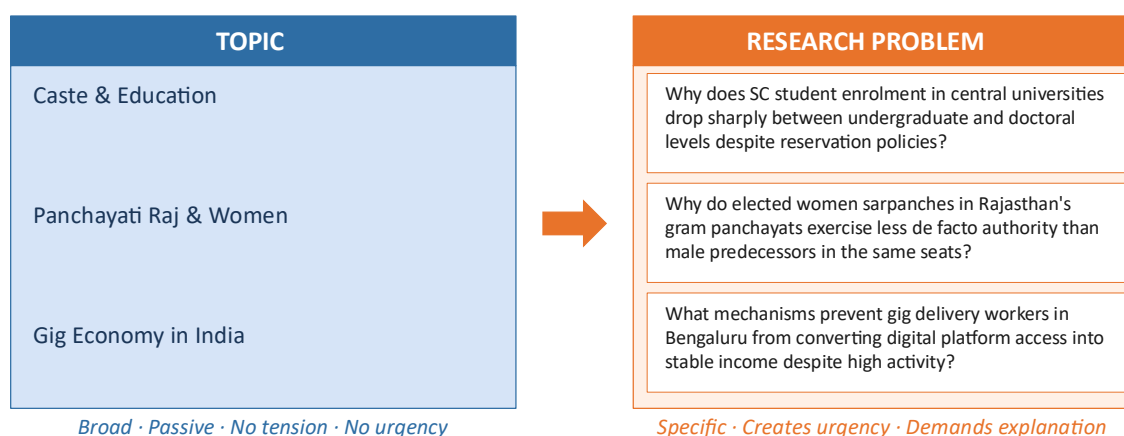
5 Golden Thread & Close

Coherence check + action items

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Topic to Research Problem

Most doctoral candidates/ researchers start with a topic. Then it must be converted into a problem.



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Anatomy of a Research Problem

Four components — each necessary, none sufficient alone

1 Context

The broader social, political, or institutional landscape where the problem is located

e.g. India's reservation system was designed to address caste discrimination in higher education

2 Gap / Tension

The specific discrepancy, paradox, or understudied phenomenon creating urgency

e.g. Despite decades of reservation, SC/ST scholars constitute less than 5% of faculty in IIMs

3 Significance

Why this gap matters — for theory, for practice, or for policy

e.g. Limits evidence base for redesigning ineffective diversity policies in elite institutions

4 Affected Population

Who experiences this problem and who benefits from its resolution

e.g. SC/ST scholars, institutional policymakers, and the broader equity agenda in Indian HE

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Six Sources of Research Problems

Problems arise from multiple entry points — not just the library

 Personal Observation What doesn't add up in your field or professional experience? <i>e.g. Observing that MGNREGS wage payments in Jharkhand arrive months late despite digital banking</i>	 Literature Review Contradictions, gaps in existing studies, untested assumptions <i>e.g. Multiple studies on PM-KISAN find income effect but no study examines political mobilisation effect</i>	 Theoretical Tensions Competing frameworks that predict different outcomes <i>e.g. Modernisation theory vs. Subaltern studies on peasant electoral behaviour in Eastern India</i>
 Policy Failures Gap between programme intent and documented impact <i>e.g. Beti Bachao Beti Padhao reaches media but sex ratio improvement not documented in target districts</i>	 Historical Events Crises that expose hidden social structures <i>e.g. COVID-19 reverse migration exposed structural invisibility of circular migrants in official data</i>	 Technology & Change Digital phenomena outpacing social theory <i>e.g. WhatsApp political messaging in rural UP — no sociological framework predicts its mobilisation patterns</i>

Three Distinct Things — Problem · Gap · Question

Researchers may collapse them. The examiner/ reviewer never will.

WORLD	LITERATURE	STUDY
PROBLEM <i>A condition in the world</i> A specific unresolved tension, paradox, or under-illuminated phenomenon that creates the need for inquiry <i>e.g. Caste-based exclusion persists in India's management schools despite decades of reservation policy.</i>	GAP <i>A condition in the literature</i> Missing, inadequate, insufficient, contradictory, or biased information that limits the field's ability to answer a question <i>e.g. While exclusion is documented, the institutional mechanisms by which elite B-schools reproduce upper-caste networks remain theoretically underspecified.</i>	QUESTION <i>A directive for your study</i> An interrogative formulation of what your specific investigation will find out — directly addressing the gap <i>e.g. How do informal mentorship networks in IIM placements reproduce caste-based advantage despite formal diversity policies?</i>

Chain: World → Literature → Study. If your gap doesn't emerge from your problem, or your question from your gap, the architecture is broken — and your examiner/ reviewer will find it.

Why Does the Gap Exist? — Four Diagnostic Reasons

Robinson, Saldanha & McKoy (2011) · Journal of Clinical Epidemiology

INSUFFICIENT or IMPRECISE INFORMATION Studies exist but samples too small, measurement too crude, or statistical power insufficient <i>e.g. Survey-based studies of electoral clientelism in UP use district-level aggregates — missing village-level variation</i>	BIASED INFORMATION Studies exist but systematic bias invalidates conclusions <i>e.g. Corporate sustainability reports in India are sole data source for many CSR studies — self-report bias endemic</i>
INCONSISTENCY in FINDINGS Studies disagree — no explanation for when each result holds <i>e.g. Five studies on SHG impact on women's autonomy in Andhra Pradesh show opposite results — conditions unstudied</i>	INCORRECT or MISLEADING INFORMATION A foundational study is empirically or logically flawed; subsequent work built on shaky ground <i>e.g. Yadav (1999) "first past the post advantage" claim has methodological flaw — yet cited 800+ times</i>

Gap-Spotting vs. Problematization

Sandberg & Alvesson (2011) — the most important methodological choice you will make

GAP - SPOTTING	PROBLEMATIZATION
What it does: Identifies a hole in the literature and proposes to fill it Three modes: Confusion spotting · Neglect spotting · Application spotting Risk: Reinforces existing theoretical assumptions — incremental output Example: No study on women sarpanches in Rajasthan after 2009 delimitation — so we study them.	What it does: Challenges the assumption underlying why the gap exists Five levels: In-house · Root metaphor · Paradigm · Ideology · Field Potential: Produces research that changes the conversation, not just extends it Example: Ask: why does the literature assume sarpanches act as autonomous agents — when caste-family patriarchs decide their votes?

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The Three Modes of Gap-Spotting

Sandberg & Alvesson (2011a) — the dominant methodology

CONFUSION SPOTTING

— Adjudicate competing explanations

"Theory A predicts X; theory B predicts not-X. We propose to disentangle these competing theories."

Example: Anderson & Reeb (2004) — agency vs stewardship theory in family firms

NEGLECT SPOTTING

— Address what has been overlooked

"While X has been examined extensively, Y has received little attention."

Example: Musson & Tietze (2004) — metonymy in organisational talk has been overlooked

APPLICATION SPOTTING

— Apply a different perspective

"The literature has been largely [prescriptive / functionalist]. We apply a [critical / interpretive] perspective."

Example: Watson (2004) — applies critical theory to HRM literature

⚠ Common to all three: assumptions of the existing literature are reproduced, not interrogated.

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Why Gap-Spotting Dominates

Eight reasons — most are social and political, not intellectual

1

Easy to write, easy to assess

2

Uncontroversial — keeps reviewers happy

3

Fits the cumulative model of science

4

Academia is a crediting economy

5

Universities reward journal-ranking metrics

6

Journal word limits squeeze out problematization

7

Sometimes it genuinely makes sense

8

Problematization is harder

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Problematization — The Alternative

Sandberg & Alvesson (2011b) — *Academy of Management Review*

"An endeavour to know how and to what extent it might be possible to think differently, instead of what is already known."

— Foucault (1985), cited in Alvesson & Sandberg (2011b)

Gap-Spotting asks

What has the literature not yet covered?

Problematization asks

What is the literature taking for granted that it should not be?

Goal: move research from *doxa* (received belief) to *episteme* (warranted knowledge)

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Five Types of Assumptions Open for Problematization

A continuum from local to foundational

1 IN - HOUSE

Held within a school of thought

"Autonomy" is measured by individual decision-making indices.

Problematize: relational autonomy may matter more than individual autonomy.

2 ROOT METAPHOR

Broad images conceptualising the object

Microfinance as "ladder out of poverty".

Problematize: it may also be a debt trap or a market-disciplining mechanism.

3 PARADIGM

Ontological/epistemological commitments

Person and outcome are externally related; effects are measured cross-sectionally.

Problematize: borrowing transforms identity over time — process ontology required.

4 IDEOLOGY

Political, moral, and value-laden commitments

Empowerment is the proper measure of programme success.

Problematize: whose definition of empowerment? Imposed by whom?

5 FIELD

Shared across schools, paradigms, disciplines

Microfinance is a coherent, well-defined object of study.

Problematize: it is a heterogeneous bundle of practices that should be unbundled.

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Six Methodological Principles for Problematization

Alvesson & Sandberg (2011b) — *overlapping, not strictly sequential*

STEP 1

Identify a domain

Choose a manageable body of literature

STEP 2

Articulate assumptions

Use the five-type typology to surface them

STEP 3

Evaluate them

Which are worth challenging?

STEP 4

Develop alternatives

Propose a new conceptual ground

STEP 5

Consider the audience

Politics is part of method

STEP 6

Test for "interesting"

Davis: not obvious, not absurd

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A Continuum, Not a Binary

Locate yourself deliberately

TRACK - BOUND	COMBINED	DISRUPTIVE
<i>Pure gap-spotting</i> Confusion spotting Neglect spotting Application spotting	<i>Mixed approaches</i> Critical confrontation New idea Quasi-problematization	<i>Pure problematization</i> Problematization (genuine assumption challenging)

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The Davis Test — Three Possible Responses

A theory becomes interesting when it challenges some — but not all — assumptions

 "That's obvious!" Confirms the audience's assumptions NOT INTERESTING	 "That's interesting!" Challenges some assumptions; preserves others THE TARGET	 "That's absurd!" Denies all the audience's assumptions NOT CREDIBLE
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Davis, M. S. (1971). *That's interesting! Towards a phenomenology of sociology and a sociology of phenomenology. Philosophy of the Social Sciences*, 1, 309–344.

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Seven Types of Research Gap

Müller-Bloch & Kranz (2015) — a practical bridge to problematization

Knowledge Void	Evaluation Void	Action – Knowledge Conflict	Methodological Gap	Empirical Gap	Theoretical Gap	Population / Contextual
Findings simply don't exist	Findings exist but untested	Practice deviates from research	Methods produce skewed findings	Proposition need verification	Theory should be applied but isn't	Specific group under-represented

A practical sequence: identify the gap type → identify the underlying assumption → choose whether to gap-spot or problematize.

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Articulating the Research Gap

Three-clause formula — what exists, what is missing, why it matters

Gap Formula: "While [existing research has established X], [specific gap Y remains], which matters because [Z]."

WHAT EXISTS	WHAT'S MISSING	WHY IT MATTERS
What the literature has established — fairly and generously acknowledged	The specific gap — unexplored, undertheorised, or contested	The consequence for theory, practice, or policy

"While extensive research has established that social trust influences collective action, the mechanisms by which digital platform interactions build or erode trust within marginalised urban communities in rapidly urbanising South Asian cities remain poorly theorised and empirically understudied, limiting our ability to design inclusive digital civic infrastructure."

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Research Questions — FINER Test & Five Types

Every research question must survive both tests

- F** **Feasible** — Answerable with my time, access, and resources
- I** **Interesting** — Intellectually engaging to scholars in my field
- N** **Novel** — Not already definitively answered in the literature
- E** **Ethical** — Can be investigated without harm to participants
- R** **Relevant** — Advances knowledge, informs practice, or shapes policy

Five Question Types

Descriptive What is?

What are the lived experiences of Adivasi women in Jharkhand Panchayat leadership roles?

Explanatory Why/How?

How does informal mentor network access shape placement outcomes for SC students in IIMs?

Exploratory What forms?

What resistance strategies do gig workers in Bengaluru employ against algorithmic management?

Comparative How different?

How do electoral outcomes in delimitation-affected vs. stable constituencies in UP differ across castes?

Evaluative How effective?

To what extent does MGNREGS improve female decision-making authority in Odisha's SC households?

Main Question → Sub-Questions → Objectives

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Understanding Research Scope

"Defining scope is not weakness — it is intellectual maturity."

 Temporal	2014–2023 — corresponding to smartphone-era gig economy expansion
 Geographic	Three coastal districts of Odisha — maximum variation in climate response
 Thematic	Political dimensions of SHG participation — explicitly not economic empowerment or nutrition outcomes, which are excluded
 Population	Married women aged 18–45 from OBC communities in villages with functional gram sabha records — excludes SC/ST (separate literature)
 Methodological	Qualitative ethnographic — produces contextually rich, theoretically generative knowledge, not statistically generalisable findings

Delimitations are choices you make (what you include/exclude). Limitations are constraints outside your control.

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Forms of Novelty in Research

You do not have to be the first — you have to be the first to do THIS

New Empirical Evidence Original data from an unstudied population, context, or time	New Theory Extending, refining, or synthesising existing frameworks	New Method Applying an innovative or cross-disciplinary approach	New Conceptual Framework Developing or refining concepts that better capture a phenomenon
New Synthesis Bridging literatures that have never conversed	Challenging Received Wisdom Evidence contesting a widely accepted claim	Policy Relevance Actionable knowledge where evidence was lacking	

"This study contributes to knowledge by [type of contribution], because [justification], which [significance for theory / practice / policy]."

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The Golden Thread

Every strong PhD thesis, grant proposal, and journal article has this coherent logical spine



Golden Thread Coherence Check:

1. Does the gap emerge directly from the problem?
2. Does the question directly address the gap?
3. Does the contribution directly answer the question?
4. Do all four elements refer to the same phenomenon, population, and context?

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Thank You!

Your Next Actions

Start With

Write a 2-sentence research problem statement using the four-component formula. Test it on a colleague — does it create urgency?

Continue With

Identify the type of gap in your research (empirical, theoretical, methodological, conceptual, population, temporal) and write your gap statement using the three-clause formula.

Proceed to

Apply the FINER test to your draft research question. Score each criterion 1-5. Revise the weakest dimension.

Before writing

Draft your Golden Thread: Problem (2 sentences) → Gap (2 sentences) → Question (1 sentence) → Contribution (2 sentences). Test all four coherence checks.

Ongoing

Read: Sandberg & Alvesson (2011) in Organization — it will permanently change how you read and write research literature.

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T2: Developing a Robust Hypothesis

(Formulating and testing hypotheses, identifying variables)

Resource Person: Prof. (Dr.) Nibedita Jena

Former Director, State Advisor, Higher Education Department, Government of Odisha

UNDERSTANDING HYPOTHESIS/ MEANING OF HYPOTHESIS

Hypothesis is a tentative, logical, and testable proposition that predicts the relationship between two or more variables. It is not merely a random assumption but a theory-driven and evidence-based statement, logically derived that can be empirically verified.

A strong hypothesis provides direction, focus, and analytical strength to research, whereas a poorly framed hypothesis weakens even a promising study.

Several important functions of a hypothesis in research:

- It gives focus and direction to the study.
- It narrows down the scope of investigation.
- It determines appropriate research methodology.
- It guides data collection and statistical analysis.
- It establishes a connection between theoretical concepts and empirical observations.

Without a hypothesis, research often becomes descriptive rather than analytical. Therefore, formulating a meaningful hypothesis is essential for conducting scientific and inferential research.

Characteristics of a Robust Hypothesis

A major portion of the session was devoted to explaining the essential characteristics of a robust hypothesis. A scientifically strong hypothesis must possess the following qualities:

a. Clarity and Precision

A hypothesis should be simple, clear, understandable, and unambiguous. The researcher must clearly define the relationship between variables.

Example:

Statement- “Technology affects students”

Weak Hypothesis:

“Technology affects students.”

Robust Hypothesis:

“Use of blended learning significantly improves academic engagement among students.”

b. Testability

A hypothesis must be measurable and capable of empirical verification. It should allow the researcher to either accept or reject it based on collected evidence.

c. Conceptual Relevance

The hypothesis should emerge from a thorough literature review, theoretical framework, field observations, or practical problems.

d. Specificity

The variables, population, and expected relationship should be clearly specified.

Weak Statement:

“Social media impacts youth.”

Strong Statement:

“Excessive social media uses reduces academic concentration among students.”

e. Feasibility

The study should be practically achievable considering time, resources, accessibility to participants, and methodological competence.

f. Statistical Compatibility

A good hypothesis should support appropriate statistical analysis such as t-test, correlation, ANOVA, or chi-square analysis.

Types of Hypothesis

The major types of hypotheses commonly used in research:

a. Null Hypothesis (H_0)

The null hypothesis states that there is no significant relationship or difference between variables.

Example:

“There is no significant relationship between study hours and academic performance.”

b. Alternative Hypothesis (H_1)

The alternative hypothesis states that a significant relationship or difference exists between variables.

Example:

“There is a significant relationship between study hours and academic performance.”

c. Directional Hypothesis

A directional hypothesis predicts both the existence and direction of a relationship.

Example:

“Increased workplace stress reduces faculty productivity.”

d. Non-Directional Hypothesis

This type predicts a relationship between variables without specifying direction.

Example:

“There is a relationship between physical activity and stress level.”

d. Research Hypothesis verses Statistical Hypothesis

- Research hypothesis is conceptual and theory-oriented.
- Statistical hypothesis is mathematical and quantitative in nature.

Identification of Variables in Research

Correct identification of variables is essential because they form the foundation of hypothesis testing.

a. Independent Variable

The independent variable is the factor manipulated or controlled by the researcher and acts as the cause or predictor.

Examples:

- Teaching method
- Leadership style
- Working hours

b. Dependent Variable

The dependent variable represents the effect or outcome influenced by the independent variable.

Example:

In the study “Impact of Age on Memory”

- Age = Independent Variable
- Memory = Dependent Variable

c. Control variable

Kept constant during research.

d. Extraneous variable

Unintended factors affecting results.

e. Moderator variable

Influence strength or direction of relationships.

f. Mediator variable

Explain how or why relationships occur.

Scientific Formulating Hypothesis

There are certain steps for formulating hypothesis scientifically: -

Step 1- Identifying research problem

Step-2- Conduct literature review

Step-3- Define variables operationally

Step- 4 – Established expected relationship

Step-5 – Drafting the hypothesis scientifically

Hypothesis Testing and Statistical Analysis

STEP-1 Formulate H_0

STEP-2 Formulate H_1

- Parametric tests such as t-test and ANOVA
- Non-parametric tests such as chi-square
- Significance levels and p-values

Common Errors in Hypothesis Formulation

Researchers should avoid:

- Vague statements
- Unclear wording
- Too many variables
- Lack of literature support
- Non-measurable concepts

- Biased assumptions
- Data manipulation

Role of Technology in Research

Technology helps researchers analyze large datasets and improve accuracy.

- R Programming
- Python
- Excel
- AI-assisted analytics
- Data visualization tools

Research Ethics in Hypothesis Testing

Ethical research builds trust and credibility.

- Honest data collection
- Avoidance of manipulation
- Proper citation
- Informed consent
- Confidentiality

Conclusion

The session provided a comprehensive understanding of hypothesis formulation, hypothesis testing, and the identification of variables in scientific research. It emphasized that quality research depends on clarity of thought, analytical reasoning, conceptual understanding, and methodological rigor. The discussion highlighted the importance of developing robust hypotheses and accurately identifying variables to enhance the credibility, reliability, and scientific value of research. Overall, the session was highly informative and beneficial, offering valuable insights into the foundations of effective and evidence-based academic research.

T3: Choosing Appropriate Methodologies

(Quantitative, Qualitative, and Mixed-Method approaches)

Resource Person: Dr. Manoj Mishra

Librarian, Siksha 'O' Anusandhan University, Bhubaneswar

Choosing Appropriate Methodologies (Quantitative, Qualitative, and Mixed- Method approaches)

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What is Research ?

Research is a process of systematic inquiry which includes collection of data; documentation of critical information; and analysis and interpretation of that data/information, in accordance with suitable methodologies set by specific professional fields and academic disciplines.

DEFINITION OF RESEARCH

Research is defined as the creation of new knowledge and/or the use of existing knowledge in a new and creative way so as to generate new concepts, methodologies and understandings. This could include synthesis and analysis of previous research to the extent that leads to new and creative outcomes.

R = Rational way of thinking

E = Expert and Exhaustive treatment

S = Search and solution

E = Exactness

A = Analysis

R = Relationship of facts

C = Critical observation, Careful planning,
Constructive attitude and Condensed
generalization

H = Honesty and Hard working

Research

there are several major questions that require significant consideration by researchers such as “How to research”? and “What to research”? But central to the researcher’s answers is their perspective on “Why research”?

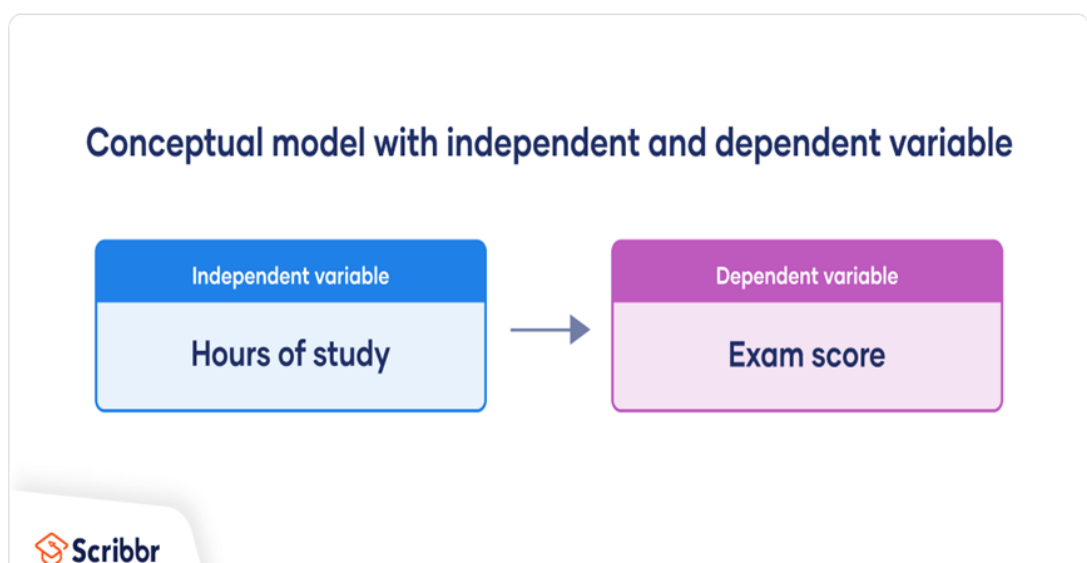
Need & Purpose of Research

The purpose of research is **to find out what is known, what is not and what we can develop further**. In this way, scientists can develop new theories, ideas and products that shape our society and our everyday lives

CONCEPTUAL FRAMEWORK OF RESEARCH AND TERMINOLOGY

- A conceptual framework illustrates what you expect to find through your research. It defines the relevant [variables](#) for your study and maps out how they might relate to each other.
- You should construct a conceptual framework before you begin [collecting data](#). It is often represented in a visual format.
- This article explains how to construct a conceptual framework for an expected cause-and-effect relationship, incorporating relevant variables that might influence that relationship.

- A conceptual framework is a written or visual representation of an expected relationship between variables. Variables are simply the characteristics or properties that you want to study.
- The conceptual framework is generally developed based on a [literature review](#) of existing studies and theories about the topic.



Basic and Applied Research

- **Basic research** is enhance of knowledge with proper collection of data and the purpose of this research is “knowledge explosion”. This activity is not used for commercial purpose. The researchers involve themselves in this research not to invent new things but to examine the existing fact.
- **Applied research** is practical and useful to solve the social problems. The researchers use the scientific methods to solve the practical problems. This research is accepted more in the society to find a path to cure some disease. This research uses various social methods to solve personal problems.

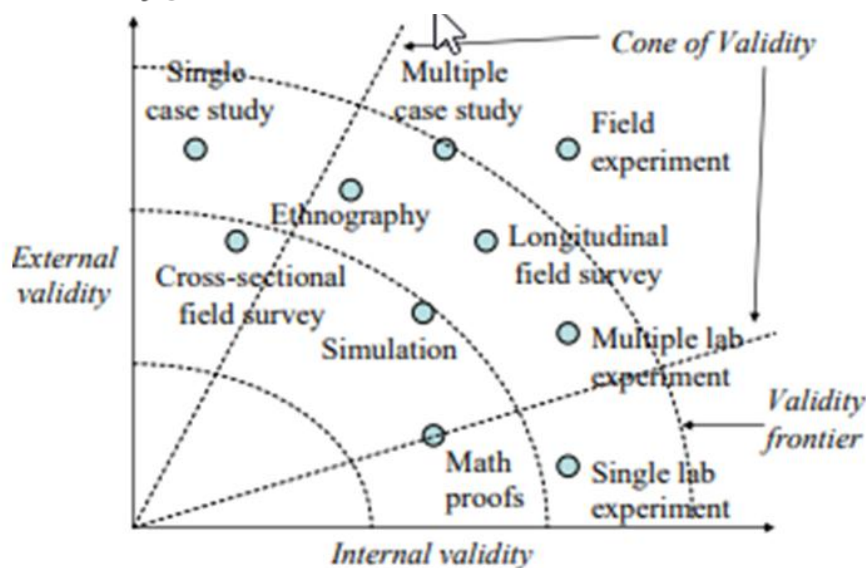
Concepts of Attributes

- **Internal validity**

It examines whether the observed change in a dependent variable is indeed caused by a corresponding change in hypothesized independent variable, and not by variables extraneous to the research context.

External Validity

It generally refers to whether the observed associations can be generalized from the sample to the population (population validity), or to other people, organizations, contexts, or time (ecological validity).

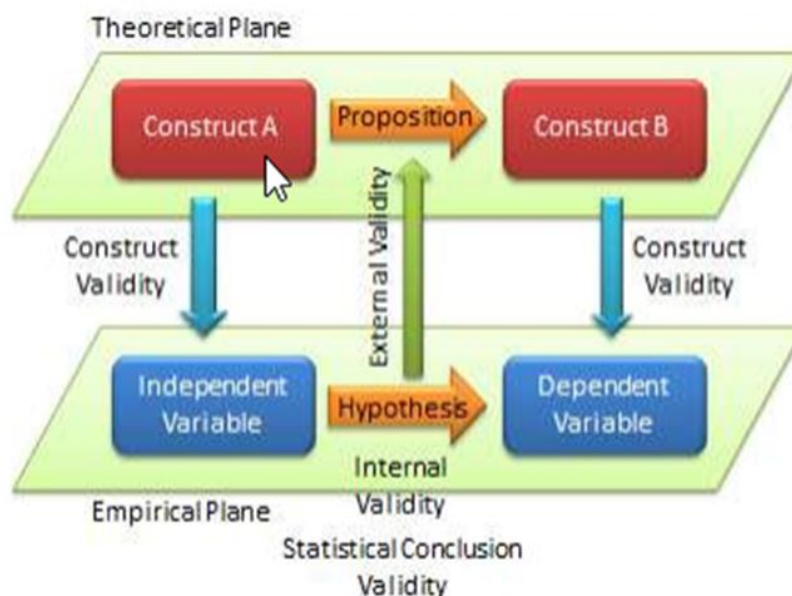


Construct validity

It examines how well a given measurement scale is measuring the theoretical construct that it is expected to measure. Many constructs used in social science research such as empathy, resistance to change, and organizational learning are difficult to define, much less measure.

Statistical conclusion validity

It examines the extent to which conclusions derived using a statistical procedure is valid. For example, it examines whether the right statistical method was used for hypotheses testing, whether the variables used meet the assumptions of that statistical test (such as sample size or distributional requirements), and so forth. Because interpretive research designs do not employ statistical test, statistical conclusion validity is not applicable for such analysis.



Characteristics of modern research

1. **Empirical** – Research is based on direct experience or observation by the researcher.
2. **Logical** – Research is based on valid procedures and principles.
3. **Cyclical** – Research starts with a problem and ends with a problem
4. **Analytical** – Research utilizes proven analytical procedures in gathering data, whether historical, descriptive, experimental and case study.
5. **Critical** – Research exhibits careful and precise judgment.
6. **Methodical** – Research is conducted in a methodical manner without bias using systematic method and procedures.
7. **Replicability** – Research design and procedures are repeated to enable the researcher to arrive at valid and conclusive results.

Methods of Research

Research methods are specific procedures for collecting and analyzing data. Developing your research methods is an integral part of your [research design](#). When planning your methods, there are two key decisions you will make.

1. how you will **collect data**. Your methods depend on what type of data you need to answer your [research question](#):

Qualitative vs. quantitative: Will your data take the form of words or numbers?

Primary vs. secondary: Will you collect original data yourself, or will you use data that has already been collected by someone else?

Descriptive vs. experimental: Will you take measurements of something as it is, or will you perform an experiment?

2. decide how you will **analyze the data**.

For quantitative data, you can use statistical analysis methods to test relationships between variables.

For qualitative data, you can use methods such as thematic analysis to interpret patterns and meanings in the data.

Measurement of Variables

TYPES OF VARIABLES:

Age, Gender, Educational Level, Mother Tongue, Religion, Subject category etc.

These are the examples of qualitative variables

Sampling procedures for survey

Specification of objectives

Definition of population

Preparation of sampling frame

Identification of sampling procedure

Determination of sample size

Selection of sampling units

Simple Random Sampling (SRS)

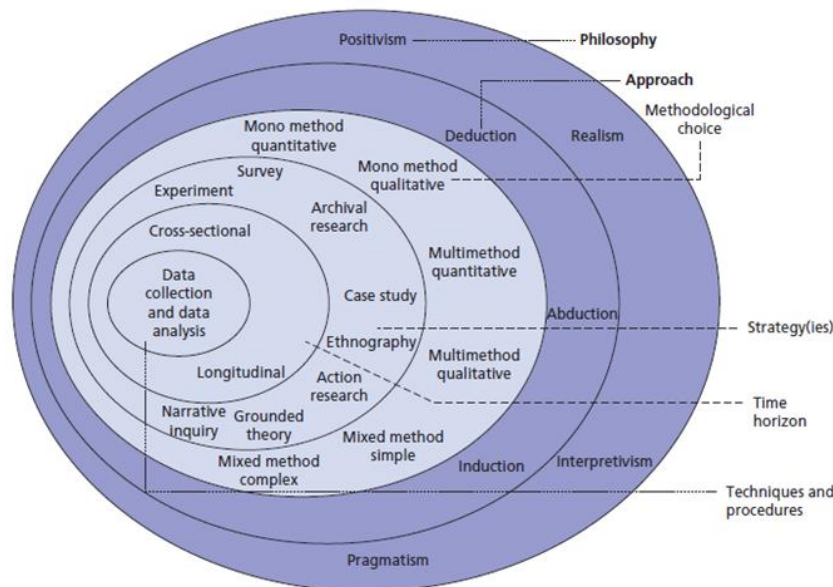
Systematic Random Sampling

Stratified Random Sampling

Multistage Sampling

Judgment Sampling

Choosing appropriate research philosophy



Key Components of Research Philosophy

Ontology: The study of being and reality (e.g., Is reality objective or socially constructed?)

Epistemology: The study of knowledge (e.g., What is considered valid knowledge and how is it acquired?)

Axiology: The role of values and ethics in the research process.

Common Research Philosophies and Methodologies

Positivism (Objectivism): Assumes a single, objective reality independent of the researcher. This approach uses quantitative methods (e.g., experiments, surveys) to test theories, often employing deductive reasoning to produce generalizable results

Interpretivism (Subjectivism): Views reality as socially constructed and subjective. It uses qualitative methods (e.g., interviews, ethnography) to explore, interpret, and understand human experiences in-depth.

Pragmatism: Argues that the research question determines the methods, embracing both objective and subjective views. It often uses a mix of qualitative and quantitative methods to solve practical problems

Choosing the Methodology

1. Align Paradigm to Method:

- a. **Positivism:** Favors quantitative approaches for high external validity.
- b. **Interpretivism:** Favors qualitative approaches for high internal validity and understanding.
- c. **Pragmatism:** Utilizes mixed methods to gain the benefits of both perspectives.

2. Start with the Question:

Methodology should be a consequence of the philosophical stance and the research topic rather than a pre-determined choice.

3. Consider Constraints:

Factors such as time, resources, and ethical considerations also influence the chosen approach

What is quantitative research

- Quantitative research collects numerical data and analyzes it using statistical methods. It measures things—how many, how much, how often, how likely. The goal is to identify patterns, test hypotheses, and produce findings that can be generalized to a larger population.
- Quantitative research answers questions like:
- What percentage of customers are satisfied with our product?
- How does conversion rate differ between two landing page designs?
- Is there a statistically significant relationship between marketing spend and revenue?

When to use quantitative research

Quantitative methods are the stronger choice when the goal is measurement, comparison, or validation. The most common scenarios:

- **Measuring prevalence.** How widespread is a behavior, opinion, or outcome? Quantitative surveys and analytics answer this. "What percentage of users complete onboarding?" is a quantitative question.
- **Testing hypotheses.** You believe that a pricing change will increase conversions. An A/B test—a quantitative method—tells you whether the data supports that belief with statistical confidence.
- **Tracking trends over time.** Net promoter scores, [customer satisfaction](#) indices, monthly revenue—all quantitative metrics that gain value through repeated measurement. The power of quantitative tracking is comparability: this quarter vs. last quarter, this region vs. that region.
- **Benchmarking.** How do you compare to industry standards or competitors? Quantitative benchmarks give you a frame of reference.
- **Making the case internally.** Executives and stakeholders often need numbers before they'll commit resources. "Twelve customers told us onboarding is confusing" is a signal. "43% of new users drop off during step three of onboarding" is a business case.

What is qualitative research

- Qualitative research collects non-numerical data—words, images, observations, stories—and analyzes it by identifying themes, patterns, and meanings. It explores the how and why behind human behavior rather than measuring how much or how often.
- Qualitative research answers questions like:
- Why do customers abandon the checkout process?
- How do new employees experience their first week?
- What does "value for money" actually mean to different customer segments?

When to use qualitative research

Qualitative methods excel when the goal is understanding, discovery, or explanation. Use them in these situations:

- **Exploring unfamiliar territory.** If you're entering a new market, launching a [new product category](#), or trying to understand a customer segment you haven't studied before, qualitative research helps you map the landscape before you know what to measure.
- **Understanding motivation.** Numbers tell you that 30% of customers downgraded last quarter. Interviews tell you why. Maybe the premium features didn't justify the cost, maybe a competitor offered something better, or maybe their budget got cut and it had nothing to do with you.
- **Generating hypotheses.** Before you can test a hypothesis, you need one worth testing. Qualitative research surfaces patterns and ideas that become the hypotheses for future quantitative work.
- **Capturing context.** Behavior doesn't happen in a vacuum. Qualitative methods capture the circumstances, emotions, and social dynamics that shape decisions. An interview might reveal that a customer chose your product not because of any feature but because a trusted colleague recommended it—a factor no survey question would have captured.
- **Designing better questions.** If you're about to run a large-scale survey, preliminary qualitative research helps you write better questions. Interviews reveal the language people use, the dimensions they care about, and the options that should appear in your multiple-choice lists.

How to combine them

Qualitative first, then quantitative

This approach works well when you're studying something new. The qualitative phase ensures your quantitative instrument asks the right questions in the right language. Without it, you risk building a precise survey that measures the wrong things.

Quantitative first, then qualitative

This works well when you already have data but don't understand it. "Our net promoter score dropped 15 points last quarter" is a quantitative finding. "Customers feel the recent redesign made the platform harder to navigate" is the qualitative explanation that makes the number actionable.

Common misunderstandings

Before you start using qualitative and quantitative research, it's worth correcting a few persistent myths:

- **Quantitative is more scientific.**
- **Qualitative is just anecdotes.**
- **You always need both.**
- **Qualitative is easier because there's no math.**
- **Bigger samples are always better**

Quantitative is more scientific

Both approaches can be rigorous or sloppy. A well-designed qualitative study with careful sampling, systematic analysis, and transparent reporting is far more credible than a quantitative survey with leading questions and a convenience sample.

Qualitative is just anecdotes

Qualitative research uses systematic methods—coding frameworks, thematic analysis, inter-rater reliability checks—to move beyond individual stories to defensible patterns. It's not just "I talked to five people and here's what they said."

You always need both

Sometimes one approach is sufficient. If you need to know what percentage of customers prefer option A over option B, a survey answers that fully. If you need to understand how families make college decisions, interviews are the right tool. Not every question requires a mixed-methods study.

Qualitative is easier because there's no math

The absence of statistics doesn't make qualitative research easier—it makes it differently challenging. Analyzing 20 interview transcripts for themes requires disciplined coding, constant comparison, and resistance to cherry-picking quotes that support a predetermined narrative. The lack of a numerical safety net means every analytical judgment needs to be well-reasoned and transparently documented.

Bigger samples are always better

For quantitative research, larger samples do improve precision (up to a point). For qualitative research, there's a concept called "saturation"—the point at which additional interviews or observations stop revealing new themes. In most qualitative studies, saturation occurs somewhere between 12 and 25 participants. Beyond that, you're spending time and money to hear variations of what you've already learned.

Researchers must also bear in mind that “What to research?” may have a major impact on methodological choice, for their philosophical review on the research problem. Researchers should consider that a particular research problem, as the relevant methodology may be inappropriate to the problem at hand. Additionally, the improper matching of methodology to the research problem may produce spurious results, ultimately having a negative impact on the researcher’s professionalism and the authority of research science. We perceive that elasticity in “What to research?” is gained only through an intermediate philosophical position, thereby allowing researchers to match philosophy, methodology, and the research problem.

“Thank You”



DAY-2 Experimental Design

DATE: 12.05.2026

T4: Tools for Quantitative & Qualitative Analysis

(Survey design, sampling techniques, focus groups)

Resource Person: Dr. Shantanu Raj

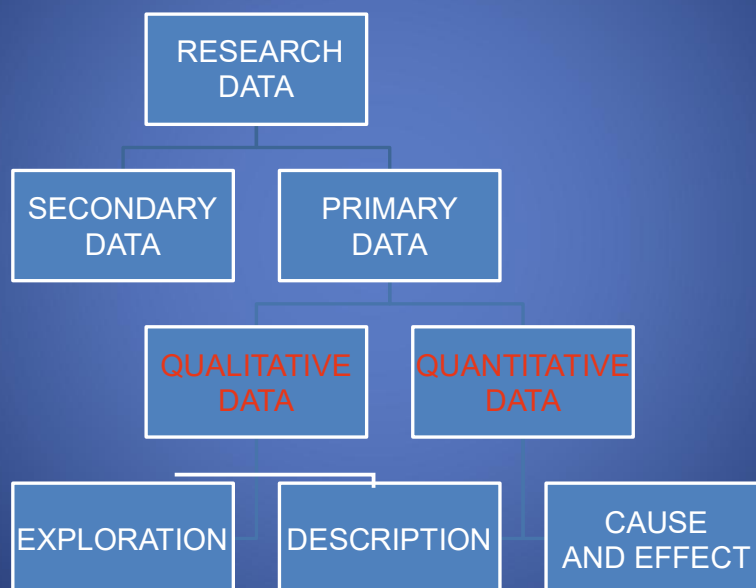
Assistant Professor, Centre for Agribusiness Management, Utkal University, Bhubaneswar

Qualitative Vs Quantitative

Dr. Shantanu Raj

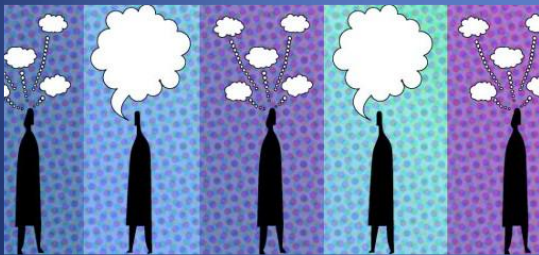
**Assistant Professor, Centre for Agribusiness Management,
Utkal University, Bhubaneswar**

OVERALL FRAMEWORK



KEEP IN MIND THAT ...

- Qualitative research generally deals in words, images and the subjective
- Quantitative research generally deals in numbers, logic and the objective



QUALITATIVE RESEARCH

Agenda

➤ Definition

➤ When to use?

➤ Types

- FOCUS GROUPS
- IN DEPTH INTERVIEW
- PROJECTIVE TECH.

➤ Pros&Cons

- Research used in range of activities from exploratory designs to means of completing explanations
- Qualitative research assumes that people have *meaningful* actions or experiences that can be interpreted



QUALITATIVE RESEARCH

POPULARITY COMES FROM:



- *ECONOMICAL
- *FLEXIBLE
- *OPENS A DOOR TO “WHY, HOW”
- *RICHNESS OF DATA
- *BEST TO START WITH...



QUALITATIVE RESEARCH

- Identification of a given question; opportunity or information requirements
- Interest in obtaining insights for motivational /social (group) or emotional and attitudinal (individual) factors
- In IR: primary data of events or personalities supporting explanations and argument
- (Cf. In marketing: for new product launch, new service development or repositioning current product)



QUALITATIVE RESEARCH

FOCUS GROUPS

Agenda

- Definition
- When to use?
- Types
 - FOCUS GROUPS
 - IN DEPTH INTERVIEW
 - PROJECTIVE TECH.
- Pros&Cons

Characteristics:

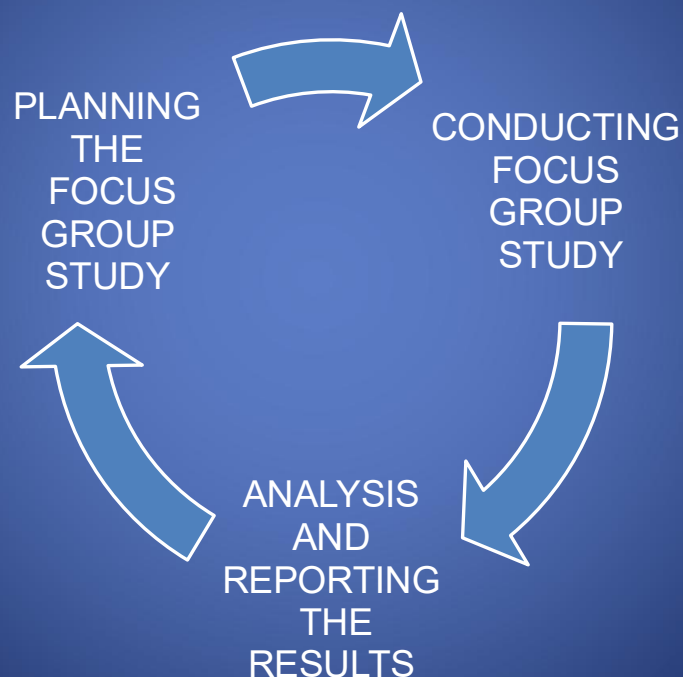
- 6-12 people
- Lead by a trained moderator
- in-depth discussion on 1 particular topic or concept
- Relaxed, informal atmosphere
- 1-3 hour duration

Goal:

- Learn and understand what people say and why?

QUALITATIVE RESEARCH

FOCUS GROUPS



QUALITATIVE RESEARCH

FOCUS GROUPS

ADVANTAGES	DISADVANTAGES
● Synergy ● Spontaneity ● Speed ● Security ● Flexibility ● Inexpensive	● Representativeness ● Misjudgement ● Lack of analysis ● Moderator Subjectivity

QUALITATIVE RESEARCH DESIGN

Qualitative Research:

- Examples
- Case studies on effect of vocational training in Papua
- Ethnographic studies on indigenous populations in Oaxaca, Mexico

Qualitative Research Types:

- Case studies
- Developmental research
- Historical research
- Ethnograph studies

Case Studies:

- Purpose: to do an in depth study
- In brief: Background, current status and/or environmental factors that interact for each group (individual, institution or community)

- **Characteristics of Case Studies:**
 - It gives very detailed information about individuals / group / community
 - It may give a detailed explanation of a complete life cycle or part of it
 - Number of cases studied may be small but the number of variables studied are usually more in-depth (e.g. if compared to a survey)
- **Developmental Research:**
 - Conducted to research on the development of individuals / group / institution / community
 - TWO TYPES: Cross-sectional and Longitudinal
- **Historical Research:**
 - Used to gain information on an event, development and/or previous educational experience
 - Process may involve studying previous situation, checking on current situation, and to predict if the same situation will occur again
 - Conclusion on previous event is done based on collected facts and evidences to answer why and how the event and repercussions occurred
 - Useful to solve questions that involve sensitive issues
 - Important for systematically & objectively collecting and defining facts and evidences

- **Procedure for Historical Research:**
 - Define the problem
 - Specify source of evidence
 - Collect evidence / reference materials
 - Primary source / original (observation or witnesses of events or authentic objects – e.g. artifacts, speech text, records etc.)
 - Secondary source (materials or information collected from primary sources – e.g. paintings, films, news reports, documents)
 - Critique of evidences
 - External critique: confirming if collected sources are genuine and reliable (authenticity of paintings, signatures, chemical analysis etc.)
 - Internal critique: conducted after authenticity of source of information is confirmed – involves evaluation of collected evidences – is it important? Required?
 - Able to explain the researched phenomenon?
 - Prepare the report
- **Ethnographic Research:**
 - In-depth study of natural behaviours in a culture or social group
 - Purpose – to understand relationships between behaviour and culture
 - Example: In education – to understand schooling process (e.g., immigrant children) Involves widespread observations (participant & nonparticipant)
 - Here often starts research without hypothesis – hypothesis is developed in the process of observations, and the researcher explores and test his hypothesis

QUALITATIVE RESEARCH IN-DEPTH INTERVIEW

Agenda

- Definition
- When to use?
- Types
 - FOCUS GROUPS
 - IN DEPTH INTERVIEW
 - PROJECTIVE TECH.
- Pros&Cons

Characteristics:

- A well trained interviewer+interviewee
- Interviewee is exposed to set of probing questions
- Usually face to face
- Interviewer encourages the interviewee to talk more

Goal:

- To collect as much as memory, attitudinal and behavioral data from the subject

QUALITATIVE RESEARCH IN-DEPTH INTERVIEW

Applications:

- Interviews with professionals
- Interviews with witnesses
- When detailed probing is needed
- Discussion of sensitive, confidential issues
- When strong, social norms exist
- Interviews with competitors



QUALITATIVE RESEARCH IN-DEPTH INTERVIEW

ADVANTAGES	DISADVANTAGES
● Concentrated issue - maximum probing ● Free exchange of information ● Easier to arrange ● Best for intimate, sensitive issues ● Flexibility	● Expensive ● Time consuming ● Exhausting for Interviewer ● Interviewer errors ● Respondent bias or reliability

QUALITATIVE RESEARCH PROJECTIVE TECHNIQUE

Agenda

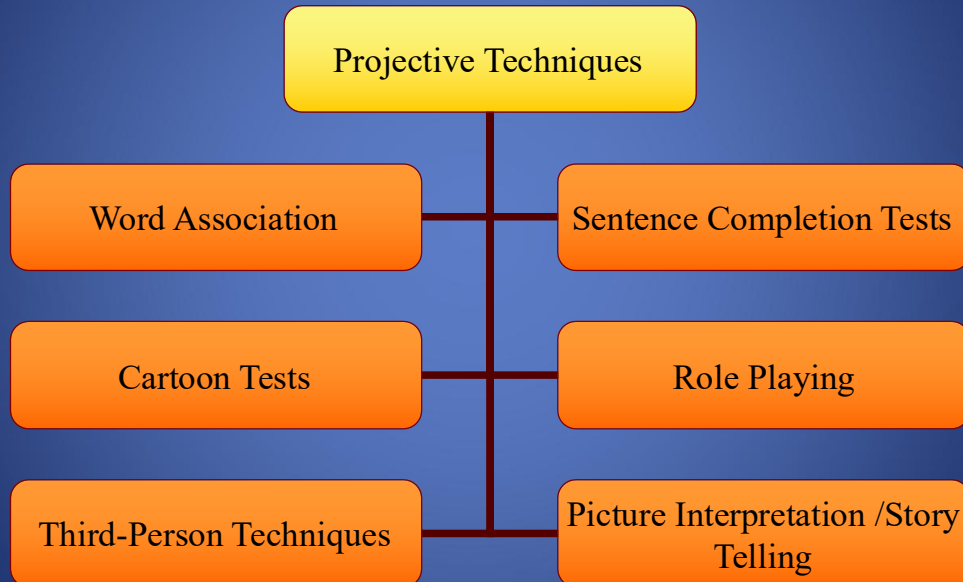
- Definition
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Definition:*

- These are unstructured prompts or stimulus that encourage the respondent to project their underlying motivations, beliefs, attitudes, or feelings onto an ambiguous situation
- They are all indirect techniques that attempt to disguise the purpose of the research

*Source: http://en.wikipedia.org/wiki/Qualitative_marketing_research

QUALITATIVE RESEARCH PROJECTIVE TECHNIQUES

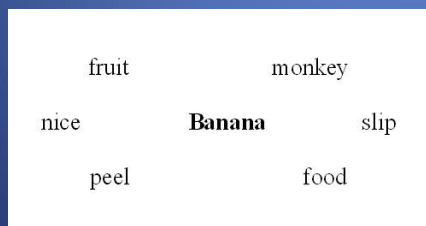


QUALITATIVE RESEARCH PROJECTIVE TECHNIQUES

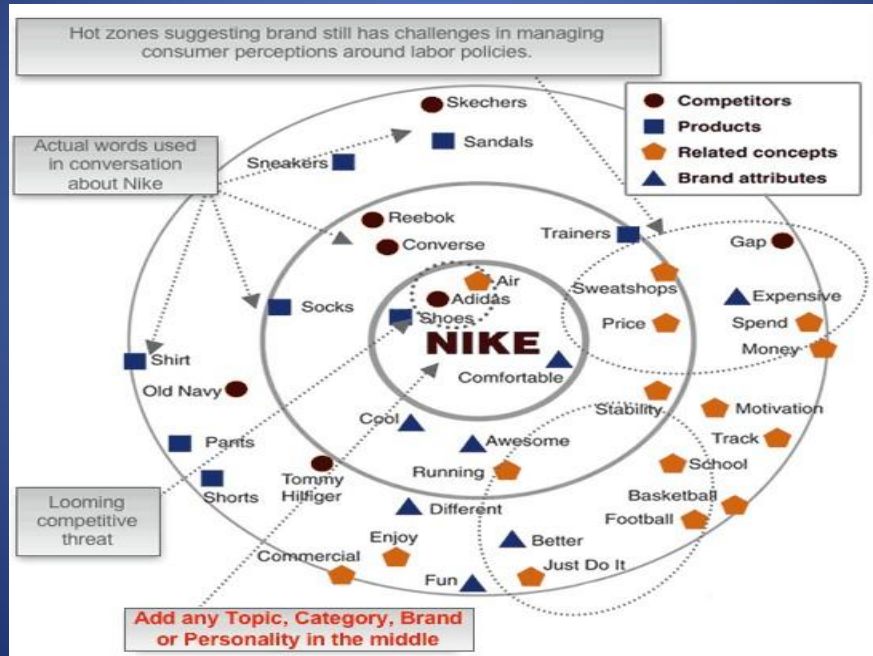
Types:

1. Word Association

Customers are required to show response to the concept they are told within 2-3 sec.



QUALITATIVE RESEARCH PROJECTIVE TECHNIQUES



*Source: <http://www.nielsenbuzzmetrics.com/images/uploaded/NikeBAM.gif>

QUALITATIVE RESEARCH PROJECTIVE TECH.

2. Sentence Completion

Customers are required to complete sentences or stories in their own words

- People who are concerned about ecology ...
- When I think of a city ...
- I drink a Coca-Cola, usually when .
- Starbucks reminds me of...

QUALITATIVE RESEARCH PROJECTIVE TECH.

3. Cartoon Tests

A cartoon illustration of a boy and a girl talking. The boy is holding a game console.

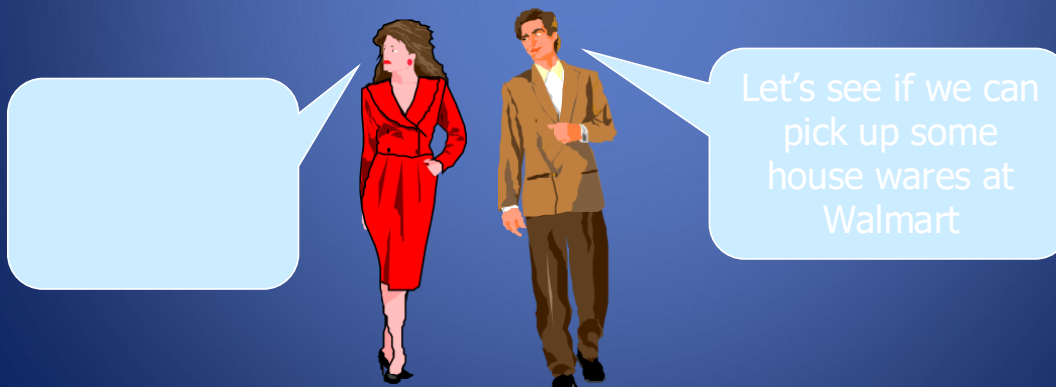
What are these two people saying?
Create your own cartoon by filling in the form below and clicking the CREATE button!

What is the girl saying?

What is the boy saying?

What is your first name?

QUALITATIVE MARKETING - PROJECTIVE TECH.



QUALITATIVE RESEARCH PROJECTIVE TECH.

4. Role Playing

- Respondents are asked to assume the behavior of someone else
- Useful for empathic approaches for conflict resolution

Sales Supervisors are asked to become Sales Representatives, and vice versa.

QUALITATIVE RESEARCH PROJECTIVE TECH.

5. Third Person

Way of learning respondents feelings or opinions by asking them to answer for a third party :

“your neighbour”

“most people”

“typical person”



QUALITATIVE RESEARCH PROJECTIVE TECH.

6. Picture Interpretation

A technique whereby respondents are shown a picture and are asked to tell a story describing it



QUALITATIVE RESEARCH PROJECTIVE TECH.

ADVANTAGES	DISADVANTAGES
● Elicit responses that subjects would be unwilling to give ● Underlying Motivations, Beliefs, Attitudes	● Participation of the respondents ● Skills are required to analyse the responses ● Expensive

QUALITATIVE RESEARCH

Criteria	Focus Groups	Depth Interviews	Projective Techniques
1. Degree of Structure	Relatively high	Relatively medium	Relatively low
2. Probing of individual respondents	Low	High	Medium
3. Moderator bias	Relatively medium	Relatively high	Low to high
4. Interpretation bias	Relatively low	Relatively medium	Relatively high
5. Uncovering subconscious information	Low	Medium to high	High
6. Discovering innovative information	High	Medium	Low
7. Obtaining sensitive information	Low	Medium	High
8. Involve unusual behavior or questioning	No	To a limited extent	Yes
9. Overall usefulness	Highly useful	Useful	Somewhat useful

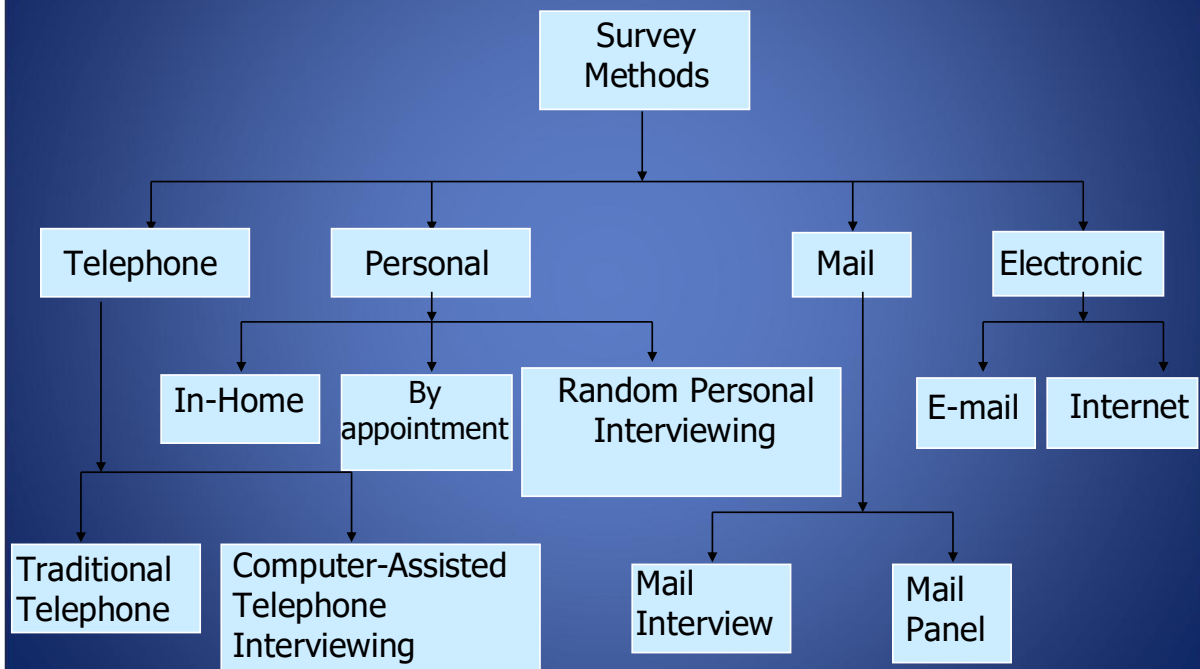
QUANTITATIVE RESEARCH SURVEY

SURVEY METHOD:

- STRUCTURED QUESTIONNAIRE
- GIVEN TO A SAMPLE OF A POPULATION
- DESIGNED TO GAIN SPECIFIC INFORMATION



QUANTITATIVE RESEARCH - SURVEY



QUANTITATIVE RESEARCH - EXPERIMENTATION

EXPERIMENTATION METHOD:

- Scientific investigation in which
 - an investigator manipulates and controls one or more independent variables and
 - observes the dependent variable for variation concomitant to the manipulation of the independent variables*

QUANTITATIVE RESEARCH

ADVANTAGES	DISADVANTAGES
• Specific research problem • Clear independent and dependent variable • High level of reliability • Minimum personal judgement	• Limited outcomes due to structured method • Unability to control the environment • Expensive (large number of respondents)

COMPARISON OF QUALITATIVE-QUANTITATIVE RESEARCH

CHARACTERISTICS	QUALITATIVE	QUANTITATIVE
Research Objectives	Discovery of new ideas, insights and feelings	Validation of facts, estimates, relationships
Type Of Research	Usually exploratory	Descriptive and causal
Type Of Questions	Open-ended, semi-structured, unstructured, probing	Mostly structured

COMPARISON OF QUALITATIVE-QUANTITATIVE RESEARCH contd.

CHARACTERISTICS	QUALITATIVE	QUANTITATIVE
Time Of Execution	Short Time Frames	Usually long time frames
Sample Size	Small	Large
Type Of Analyses	Subjective, Interpretive	Statistical, Descriptive, causal
Researcher Skills	Psychology, Sociology, CB, Social Psychology	Statistics, MR, DSS, Decision Models
Representativeness	Limited	Good

SUMMARY

- Qualitative methods focus on generating exploratory initial/progressive insights into questions and problems
- Depth probing of hidden attitudes, feelings or behaviour

- Focus Groups



- In depth Interviews

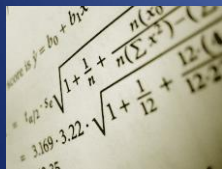


- Projective Techniques

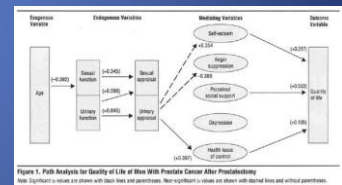


SUMMARY

- Quantitative Research is interested in using formalised, standard structured questioning, whereby response options are pre-determined
- Usually* to be administered to significantly large numbers of people.



Descriptive Causal
(Surveys) (Experimentation)



OVERALL FRAMEWORK



Source: <http://www.informedbusinessdecisions.com/RoadMap400c.jpg>

T5: Ethics in Data Collection

(Data privacy, informed consent, and security in research)

Resource Person: Dr. Anushree Mishra

Professor, Department of Psychology, AIIMS, Bhubaneswar

Abstract

Informed consent in mental health research transcends the mere acquisition of a signature; it is a dynamic, longitudinal relationship. This manual addresses the ethical challenges posed by psychiatric conditions that affect cognitive and volitional stability. It provides a technical framework for assessing decisional capacity using the **MacCAT-CR**, integrates the rights-based approach of the **Mental Healthcare Act (MHCA), 2017**, and navigates the complexities of the **Juvenile Justice system**. Drawing on research from the **All India Institute of Medical Sciences (AIIMS)**, this document serves as a blueprint for ensuring participant autonomy and scientific integrity.

Introduction: The Crisis of the "Standard Model"

The "standard model" of consent treats it as a static event—a bureaucratic box to be checked. In mental health research, this model is insufficient. Participants with fluctuating psychiatric symptoms may sign a form without true **decisional capacity**. This manual advocates for **Dynamic Consent**, where the process is re-evaluated throughout the study's lifecycle to prevent exploitation and uphold the dignity of vulnerable populations.

Theoretical Foundations: The Four Pillars

Decisional capacity is task-specific. Following the Grisso and Appelbaum framework, we recognize four essential components:

Understanding: Grasping facts (risks, benefits, procedures).

Appreciation: Applying those facts to one's own situation (e.g., "This drug might make me dizzy").

Reasoning: Weighing options and consequences logically.

Expression of Choice: Communicating a stable, non-ambivalent decision.

Technical Mastery: Scoring the MacCAT-CR

The MacArthur Competence Assessment Tool for Clinical Research (MacCAT-CR) is the gold standard for clinical assessment.

Understanding (26 points): Covers 13 items. Scores of 0 (no grasp) to 2 (full grasp).

Appreciation (6 points): Focuses on "therapeutic misconception." Does the patient think they are receiving treatment or participating in research?

Reasoning (8 points): Evaluates if the participant can provide a rational reason for their choice.

Expression of Choice (2 points): A measure of the stability of the participant's decision.

The Indian Context: MHCA, 2017

The **Mental Healthcare Act (MHCA), 2017**, shifts the paradigm from "paternalism" to "rights."

- **Presumption of Capacity:** Section 4 mandates that every person is presumed to have capacity unless a clinical assessment proves otherwise.
- **Advance Directives (AD):** Researchers must check if a participant has a registered AD specifying their research preferences.
- **Nominated Representatives (NR):** If capacity is lost, the NR makes decisions based on the participant's previously expressed wishes.

Vulnerability and the Juvenile Justice (JJ) System

Research in the JJ system involves "double vulnerability."

- **Guardian Consent:** Consent is often sought from the **Child Welfare Committee (CWC)** or a state-appointed guardian rather than a parent.
- **Child Assent:** Regardless of legal consent, the child's affirmative agreement (assent) is ethically mandatory. A child's dissent should generally override a guardian's consent in non-therapeutic research.

The AIIMS Legacy: Research Evidence

AIIMS New Delhi has led Indian research into the ethics of capacity.

- **Tool Validation:** AIIMS validated the Hindi-MoCA and other tools, ensuring capacity assessments are linguistically appropriate.
- **Neuromodulation Ethics:** AIIMS research on ECT and rTMS highlights that consent must be "re-verified" before each intervention session to account for post-treatment cognitive effects.

Clinical Module: The Adapted Teach-Back Method

For participants with psychosis, researchers must use the "**Chunk and Check**" method.

- Step 1: Explain the "Purpose" (1 minute).
- Step 2: Ask the participant: "In your own words, why are we doing this study?"
- Step 3: Correct any misconceptions immediately before moving to "Risks."
- **Delusion Check:** If a participant believes the research is a "government conspiracy," their **Appreciation score** is 0, and they cannot proceed.

Case Studies: Ethics in Practice

- Case A: A 17-year-old in a Juvenile home consents to a trial to "impress the judge."
Result: Invalid consent due to coercion.
- Case B: A stable participant with Schizophrenia becomes symptomatic mid-trial.
Result: Suspend participation and consult the Nominated Representative.

Final Researcher Checklist

- Did I check for an Advance Directive?
- Did the participant score sufficiently on the MacCAT-CR?
- Did I use the Teach-Back method for each section?
- Is there any evidence of Therapeutic Misconception?

Briefing Summary for an Ethics Committee

To: Institutional Ethics Committee (IEC) / Institutional Review Board (IRB)

From: Principal Investigator

Date: [Insert Date]

Subject: Ethical Framework for "Beyond the Signature: Navigating Informed Consent in Mental Health Research"

Project Overview

This research framework addresses the heightened ethical threshold required for participants with psychiatric disorders. The protocol moves beyond "static consent" to a "process-oriented model," ensuring that decisional capacity is maintained throughout the study's duration.

Key Ethical Safeguards

- **Decisional Capacity Assessment:** We will utilize the **MacCAT-CR** (MacArthur Competence Assessment Tool) to objectively score Understanding, Appreciation, Reasoning, and Expression of Choice.
- **MHCA 2017 Compliance:** All procedures align with the Mental Healthcare Act, 2017, specifically acknowledging the legal standing of **Advance Directives** and the role of **Nominated Representatives**.
- **Vulnerable Populations (Juvenile Justice):** Research involving minors in the JJ system will require dual oversight: official consent from the **Child Welfare Committee (CWC)** and voluntary **Child Assent**.

Mitigation of Risk

- **Therapeutic Misconception:** To prevent participants from confusing research with treatment, a "Neutral Recruiter" (not the primary clinician) will conduct the consent process.
- **Fluctuating Capacity:** A "Dynamic Consent" approach will be used, involving the **Teach-Back Method** at every major study milestone to verify ongoing comprehension.
- **AIIMS-Standardized Protocols:** Our methodology incorporates validated Indian psychometric standards (e.g., Hindi-MoCA) to ensure cultural and linguistic appropriateness.

Conclusion

The protocol ensures that "informed" is a continuous state, not a one-time event. We request the Committee's approval based on these enhanced protections for participant autonomy and dignity.

Expanded Legal Justification: MHCA 2017 Framework

This section provides a rigorous legal foundation for the proposed protocol, specifically citing the **Mental Healthcare Act (MHCA), 2017**, to justify the study's ethical architecture to the Institutional Ethics Committee (IEC).

Statutory Presumption of Capacity (Section 4)

The protocol adheres to **Section 4** of the MHCA, which mandates a **presumption of capacity**. Unlike previous paternalistic models, the law now requires that every person with mental illness be considered capable of making research decisions unless a formal assessment proves otherwise. Our use of the **MacCAT-CR** serves as the "evidence- based assessment" required to rebut this presumption when necessary, ensuring we do not unfairly exclude participants based on a diagnosis alone.

Mandatory Safeguards for Research (Section 61 s 66)

The study is designed to meet the strict three-fold criteria set by **Section 91** for research involving persons with mental illness:

- **Necessity:** The research goal cannot be achieved by studying persons without mental illness.
- **Proportionality:** The research is intended to promote the mental health of the individual or others with the same condition.
- **Risk Mitigation:** The protocol ensures minimal risk as defined by national standards.

Under **Section 99**, for any participant found to lack capacity, we have established a pathway to obtain **informed consent from the Nominated Representative (NR)**. Furthermore, for incapacitous participants, we will seek the required prior approval from the **State Mental Health Authority (SMHA)** before enrollment, as mandated by the Act.

Integration of Advance Directives (Section 5)

In alignment with **Section 5**, our protocol includes a mandatory screening for **Advance Directives (AD)**. If a potential participant has a registered AD that expresses a preference for or against research participation, that directive will be legally binding and will override any contemporaneous decision made by an NR.

Rights-Based "Least Restrictive" Approach

The Act emphasizes treatment and research in the **least restrictive environment**. Our use of the **Teach-Back method** and visual aids serves as a "supported decision-making" measure, fulfilling the legal obligation to provide all necessary support to help a participant exercise their own capacity before resorting to proxy consent.

Alignment with ICMR Guidelines

The MHCA 2017 mandates that all research must also follow the **National Ethical Guidelines for Biomedical and Health Research** (ICMR, 2017). Our framework integrates these by treating persons with mental illness as a "vulnerable group" requiring special protections, such as additional monitoring and potential compensation for research-related harm.

Beyond the Signature: Navigating the Ethics of Informed Consent and Decisional Capacity in Mental Health Research

A Comprehensive Operational Manual for Researchers and Clinicians

Legal Anchor: The Mental Healthcare Act (MHCA), 2017

The MHCA 2017 mandates a shift from "protection by exclusion" to "protection by inclusion." Researchers must navigate specific sections to remain legally compliant.

- **Section 4: Presumption of Capacity.** Every person with mental illness is presumed to have the capacity to make decisions about their healthcare— including research—unless proven otherwise.
- **Section 5: Advance Directives (AD).** An individual may have a registered directive specifying how they wish to be treated (or not treated) during periods of diminished capacity.
- **Section 14: Nominated Representative (NR).** If a participant loses capacity, an NR is legally empowered to make decisions on their behalf.
- **Section 91: Restrictions on Research.** Research is prohibited unless it cannot be conducted on people without mental illness, provides potential benefit to the group, and poses minimal risk.
- **Section 99: Informed Consent in Research.** Explicitly mandates that consent be obtained after full disclosure of the nature, purpose, and risks of the study.

Decisional Capacity s The Juvenile Justice (JJ) System

Research in the JJ system requires "Dual Consent":

1. **Proxy Consent:** Obtained from the **Child Welfare Committee (CWC)** or a state-appointed guardian.
2. **Affirmative Assent:** Obtained from the juvenile. A clear "no" from a minor should typically override proxy consent in non-therapeutic research.

Technical Framework: MacCAT-CR s AIIMS Validation

Researchers at **AIIMS** have validated tools like the **MacCAT-CR** and the **Hindi-MoCA** to ensure capacity is assessed accurately in the Indian context. Assessment must cover:

- **Understanding:** Facts about the study.
- **Appreciation:** How the study impacts the participant personally.
- **Reasoning:** The logical comparison of participating versus refusing.

Standardized Informed Consent Template (MHCA Compliant)

Project Title: [Insert Study Title]

Principal Investigator: [Insert Name]

Institution: [Insert AIIMS/Hospital Name]

Part I: Information Sheet

- **Nature & Purpose:** Clearly state that this is research, not standard clinical care.
- **Procedures:** Describe exactly what will happen (e.g., blood draws, interviews).
- **Risks & Benefits:** Detail potential side effects and clarify that participation may not result in personal clinical improvement (mitigating therapeutic misconception).
- **Confidentiality:** State how data will be protected.
- **Right to Withdraw:** Explicitly state that consent can be withdrawn at any time without affecting regular treatment.

Part II: Certificate of Consent (The Signature Section)

I. Participant Declaration

I have read/been read the information above. I have had the opportunity to ask questions, and they have been answered to my satisfaction. I consent to participate in this study.

- **Signature of Participant:** _____ **Date:** _____

II. Advance Directive & Nominated Representative (MHCA 2017 Requirement)

- I have a registered **Advance Directive** that I wish the researchers to follow.
- In the event I lose capacity, I nominate **[Name]** as my **Nominated Representative** for this study.

III. Proxy Consent (For Minors/Juvenile Justice or Incapacitated Adults)

I, [Name of NR or CWC Representative], provide consent for [Participant Name] to participate, acting in their best interest.

- **Signature of Representative:**_____ **Date:**_____

IV. Researcher Statement (The "Teach-Back" Verification)

I have explained the study and used the "Teach-Back" method to verify the participant's understanding of the risks and their right to withdraw.

- **Signature of Researcher:**_____ **Date:**_____

END

T6: Effective Writing for Introduction & Review

(The 'Hook,' defining problems, and setting the stage)

Resource Person: Dr. Elina Kanungo

Assistant Professor, Department of Commerce, BJB Autonomous College, Bhubaneswar

e-mail: elinakanungo83@yahoo.co.in

The 'Introduction' in academic writing is a strategic section that invites readers into a discussion by presenting the necessary context for the article/study. It serves as a "road map" of relevant points which will draw the attention of the readers. The strength of an introduction will determine whether readers continue to read or will set the paper aside in favour of more engaging material and analysis. To make the introduction catchy and draw the attention of readers, the opening element/strategy called the 'Hook' is essential. Hooks can be classified as

1. Statistical hook
2. Problem-based hook
3. Conceptual hook
4. Contradictory hook
5. Question-based hook

STRUCTURE OF THE INTRODUCTION



Source: Generated using ChatGPT

The introduction provides essential background information, helping readers understand the research's context and relevance. A well-structured introduction guides readers from a general context to a specific research question, ensuring clarity and coherence (Armağan, 2013; Bahadoran *et al.*, 2018). While writing an introduction, the following points should be kept in mind:

1. Capture Attention (The Hook)- By using any of the hooks mentioned above, try to create interest by presenting a striking fact, problem, or idea related to the research topic.

Provide Context and Background- In this part of the introduction, move from general information to more specific aspects of the research area so that the readers can grasp the foundation on which the study was built. Past research should be summarised to identify the area of the study (Ahlstrom and Wang, 2020).

2. Define the Research Problem- The research problem identifies the issue that the study seeks to address. The problem should be well-defined, highlighting a gap or challenges in the existing knowledge or practice.
3. Establish Significance- Here, the importance or relevance of the research work is to be highlighted. The novelty in the study, the contribution to real-world problems, or the contribution to academic theory is presented.
4. State Objectives / Research Questions- Here, the article needs to present the objectives and research questions that the study aims to achieve.
5. Outline the Structure (Optional)- This part will provide a roadmap of the chapters or sections in the article/thesis, so that it will help the readers to navigate the document and understand the flow of arguments.

Recommendation of tense to be used in the Introduction

Context	Tense
Beginning of the introduction by describing the background/ context	Present Simple
Reflecting on how the problem has been dealt with in the present research	Present Perfect
Present the research question or the hypothesis	Present Simple/ Past Simple

Source: (Bahadoran *et al.*, 2018)

While writing the introduction, researchers should be careful and follow the following dos and don'ts to make it attractive and interesting to readers.

DO's	
Be short, clear, and focused	(Zeiger, 2000)
Frame a precise question by following previous statements	(Zeiger, 2000)
Mention the novelty of the current work	(Zeiger, 2000)
Underscore the importance of the work	(Zeiger, 2000)
Relate the study to the past	(Zeiger, 2000)
Elaborate on the background where the question originated	(Zeiger, 2000)
Include a funnel structure for writing the introduction	(Plaxco, 2010)
DON'T's	
Include more references	(Zeiger, 2000)
Cite out articles that are outdated	(Streiner, 2007)
Omit significant work	(Streiner, 2007)
Include jargon	(Plaxco, 2010)
Present one-sided, biased views of controversial issues	(Streiner, 2007)

Source: (Bahadoran *et al.*, 2018)

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<https://www.ref-n-write.com/blog/introduction-paragraph-examples-and-writing-tips/> last logged on 08.05.2026

<https://gallaudet.edu/student-success/tutorial-center/english-center/writing/guide-to-writing-introductions-and-conclusions/> last logged on 08.05.2026

DAY-3 Anatomy of a Paper

DATE: 13.05.2026

T7: Detailing Methods & Materials

(Reproducibility, precision, and protocol documentation)

Resource Person: Dr. Biswajit Chhatoi

*Assistant Professor, Department of Business Administration, Berhampur University,
Berhampur*

The Blueprint of Precision

Protocols and Reproducibility in Scientific Research



By Biswajit Prasad Chhatoi

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THE LEXICON OF RESEARCH EXECUTION

METHODOLOGY

Focus: WHY (Strategy)

Nature: Theoretical and conceptual; the overarching research philosophy.

Includes: Research paradigms, approaches, and core assumptions.

METHODS

Focus: HOW (Tools)

Nature: Practical and operational; specific techniques for data collection and analysis.

Includes: Surveys, interviews, regression, SEM, EFA.

MATERIALS

Focus: WITH WHAT (Resources)

Nature: Resource-oriented; physical or digital instruments used to execute the methods.

Includes: Datasets, software, measurement scales.

PROTOCOLS

Focus: IN WHAT PROCEDURE (Execution)

Nature: Procedural and replicable; the exact, step-by-step documentation of what was done.

Includes: Sampling steps, administration rules, data treatment.

Integrated Applied Example: The Impact of Financial Literacy on Investment Decisions

Adopting a quantitative positivist methodology.

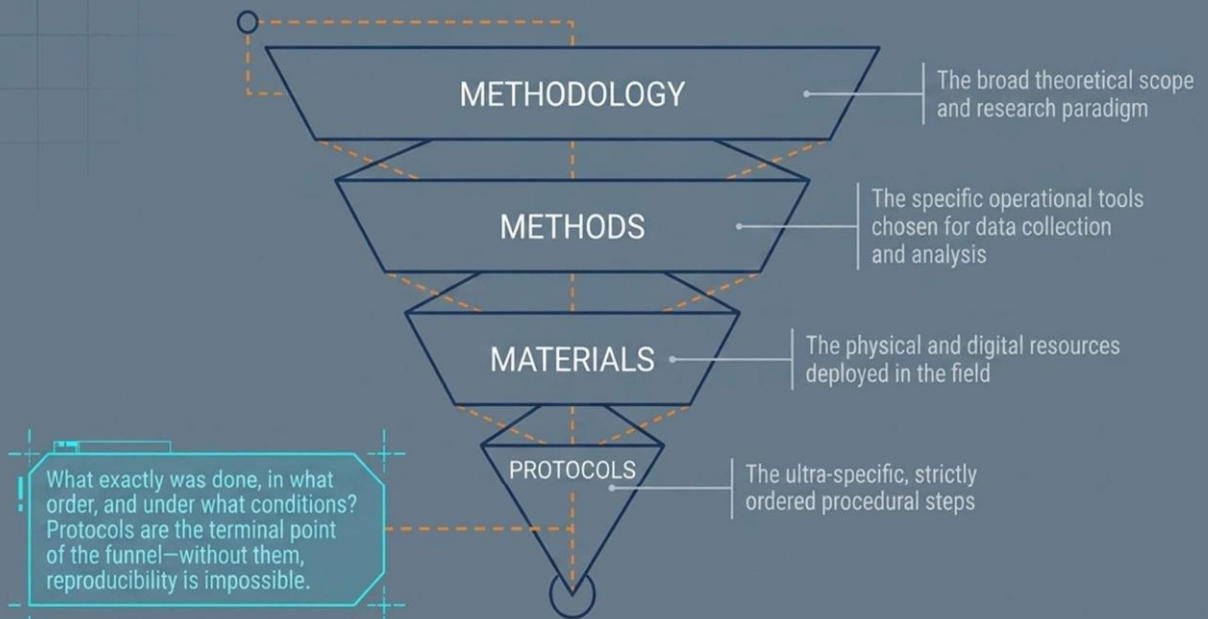
Questionnaire survey and multiple regression in SPSS.

Structured Likert-scale questionnaire, SPSS software, NSE financial awareness scale.

Pilot testing on 30 respondents; incomplete questionnaires removed; missing values treated via mean substitution.

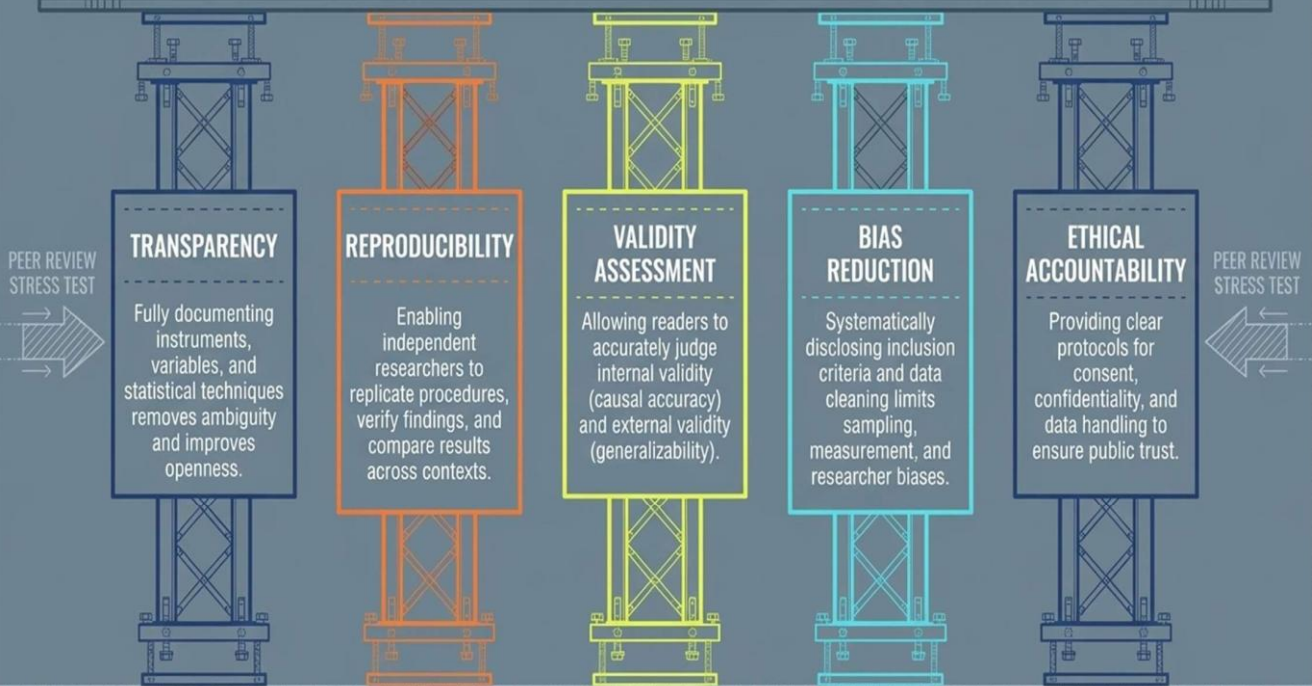
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THE FUNNEL OF PRECISION



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SCIENTIFIC CREDIBILITY & VERIFIED CONCLUSIONS



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DEFINING THE REPLICATION CRISIS

A growing systemic concern that findings in the social sciences—spanning psychology, economics, management, and education—cannot be successfully reproduced when other researchers repeat the study.

This crisis actively threatens the reliability, validity, and credibility of scientific literature.



DIRECT REPLICATION

Repeating the identical study using the exact same procedures, instruments, and conditions.



CONCEPTUAL REPLICATION

Testing the original theory or hypothesis using entirely different methods, samples, or contexts.



COMPUTATIONAL REPLICATION

Reproducing the identical results by re-running the mathematical analysis on the original raw dataset.

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DIAGNOSING STRUCTURAL FRACTURES IN MODERN RESEARCH

SMALL SAMPLE SIZES

Insufficient data points reduce statistical power and increase the likelihood of false-positive findings.

P-HACKING

Selectively testing variables, removing outliers, or running multiple statistical tests until significance appears, artificially inflating Type I error rates.

HARKING

Hypothesizing After Results are Known. Presenting post-hoc explanations as original hypotheses.

POOR METHODOLOGICAL REPORTING

Missing details regarding sampling, data cleaning, or statistical procedures.

LACK OF SHARING

Refusing to grant access to raw data, statistical scripts, or exact research protocols.

PUBLICATION BIAS

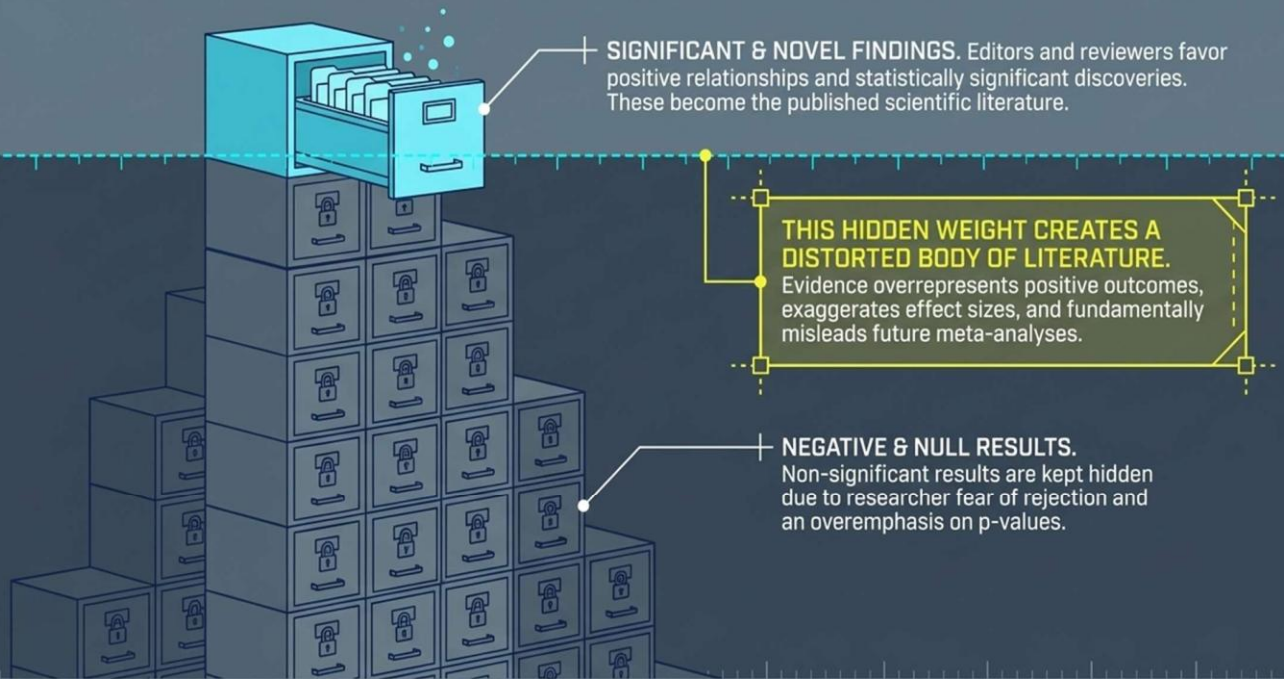
Journal preference for novel, significant, or positive outcomes over robust null findings.

PRESSURE TO PUBLISH

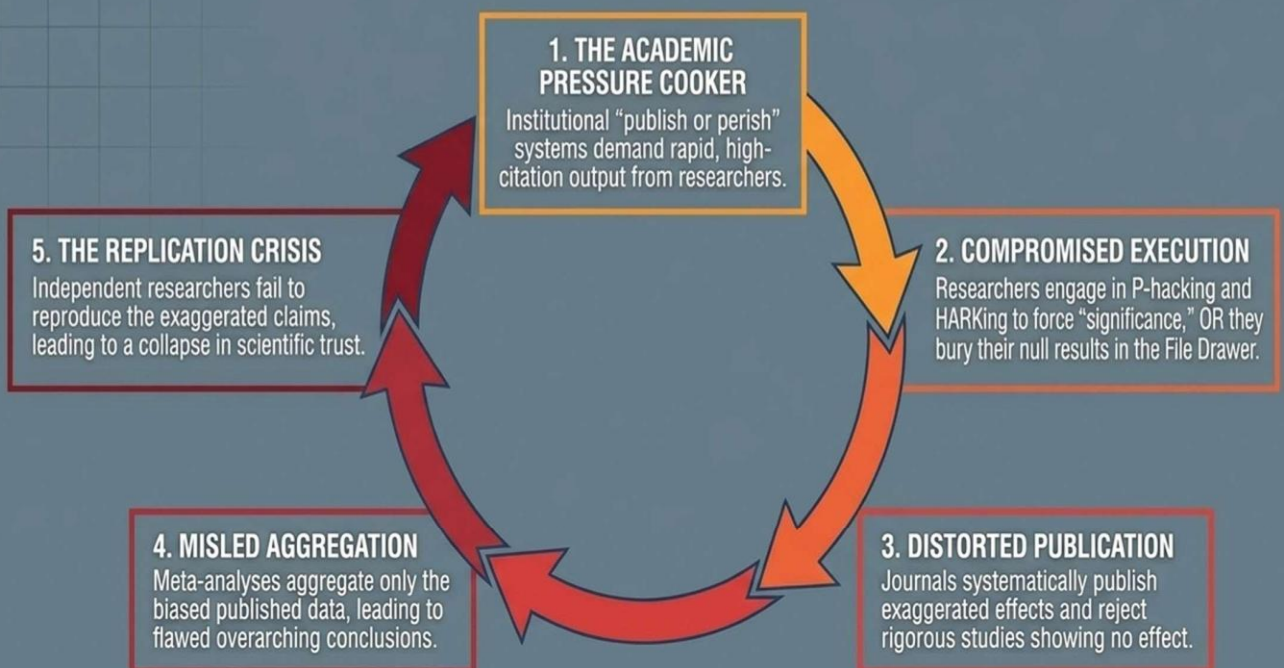
Institutional systems prioritizing publication quantity and speed over rigorous quality.

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THE HIDDEN WEIGHT OF THE FILE DRAWER PROBLEM



THE DOOM LOOP OF PUBLICATION BIAS



THE SYSTEMIC FALLOUT OF UNRELIABLE SCIENCE



REDUCED TRUST

Public and academic confidence in empirical scientific findings steadily declines.



WEAK POLICY DECISIONS

Governments and organizational leadership adopt ineffective programs based on incomplete or exaggerated evidence.



WASTED RESOURCES

Massive amounts of funding, time, and intellectual effort are squandered pursuing inaccurate conclusions.



DAMAGED CREDIBILITY

The foundational legitimacy of entire fields of social science research is actively questioned by the public and peer disciplines.

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REINFORCING THE STRUCTURE VIA OPEN SCIENCE

PROBLEM:
P-HACKING & HARKING

FIX: PRE-REGISTRATION & REGISTERED REPORTS.
Researchers publicly register hypotheses and analysis plans before data collection begins.

PROBLEM:
THE FILE DRAWER

FIX: META-ANALYTICAL CORRECTIONS.
Publishing null results and applying robust statistical detection tools like Funnel plots and Trim-and-fill methods.

PROBLEM:
MISSING PROTOCOLS

FIX: OPEN WORKFLOWS.
Mandating open data, transparent statistical code, and complete methodological documentation.

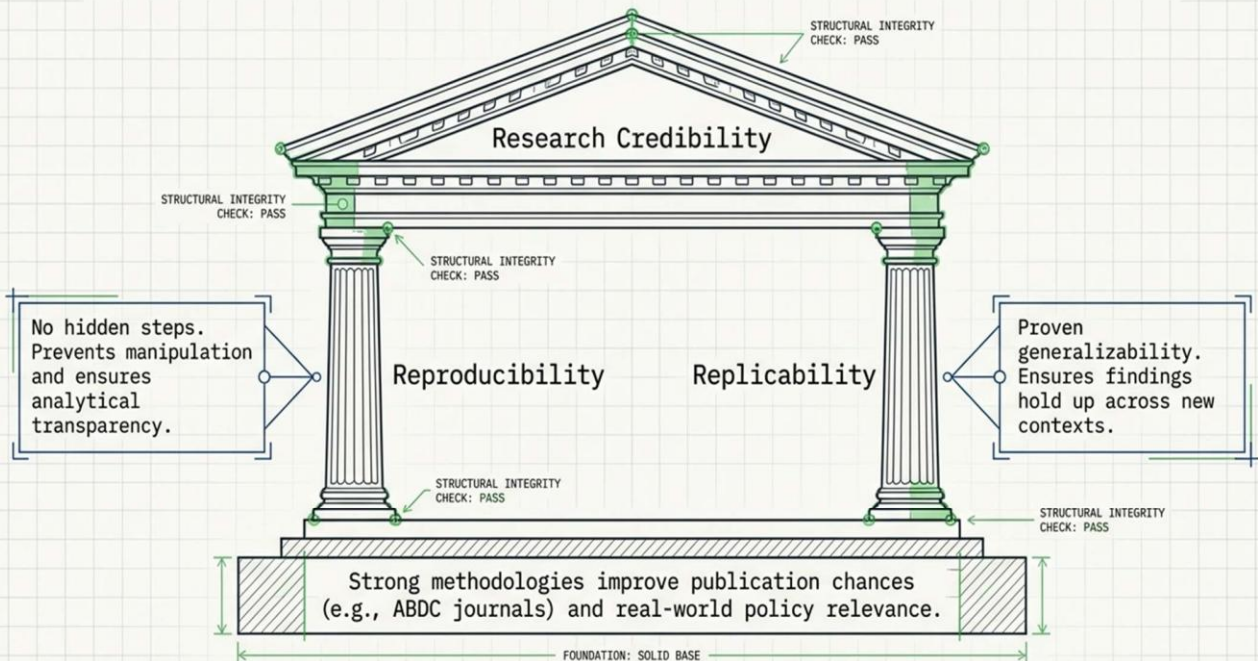
PROBLEM:
SMALL SAMPLES

FIX: REPRESENTATIVE MANDATES.
Enforcing adequate sample sizes to guarantee statistical power and generalizability.

Transparency transforms research from a private claim into a public, verifiable blueprint.

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Trust is engineered through transparent structures



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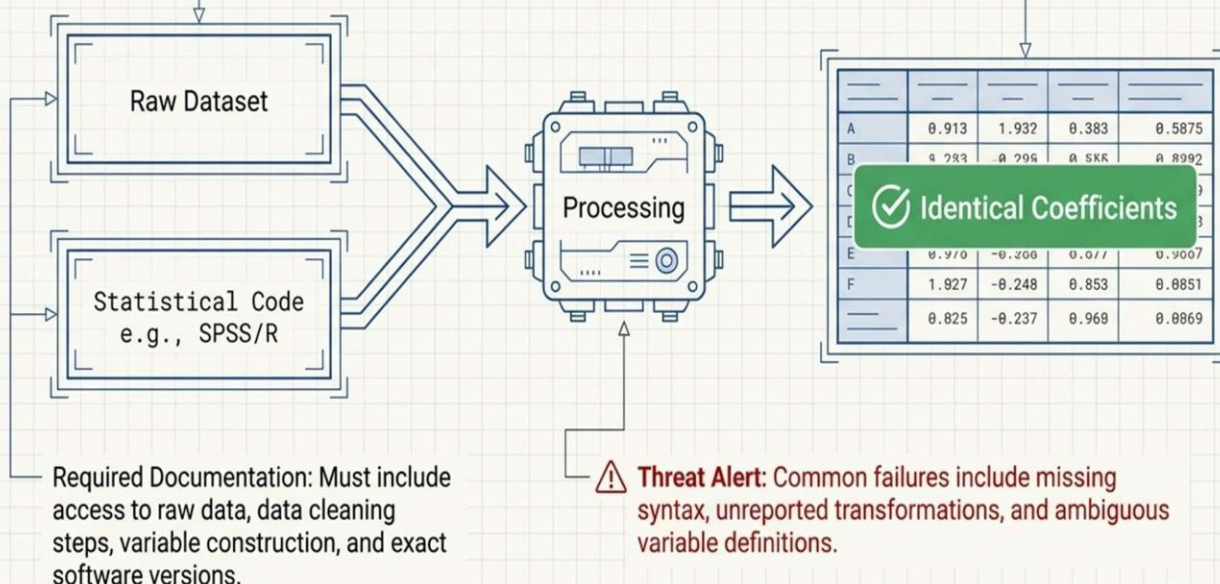
Differentiating the twin layers of credibility

	“Run my file, get my result.”	“Do my study again, see if it holds.”
	Computational Reproducibility	Empirical Replicability
Data	Same data	New data
Goal	Same results	Similar findings
Focus	Transparency of analysis	Robustness of theory
Tools	Code, scripts, datasets	Protocols, instruments
Difficulty	Easier	More challenging

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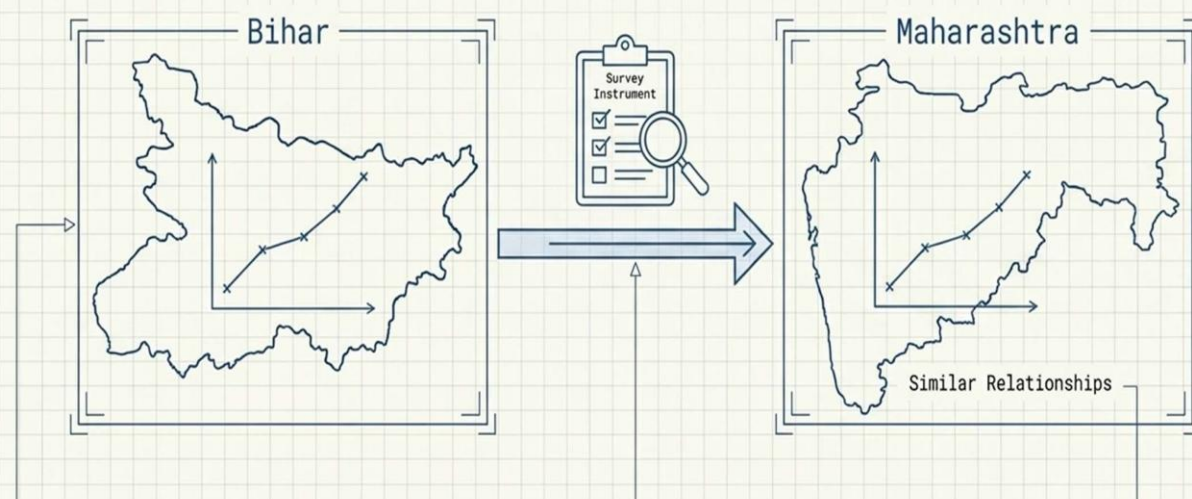
Computational Reproducibility verifies the analysis

Definition: Another researcher obtains the exact same results using the same dataset and procedure.



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Empirical Replicability tests the theory



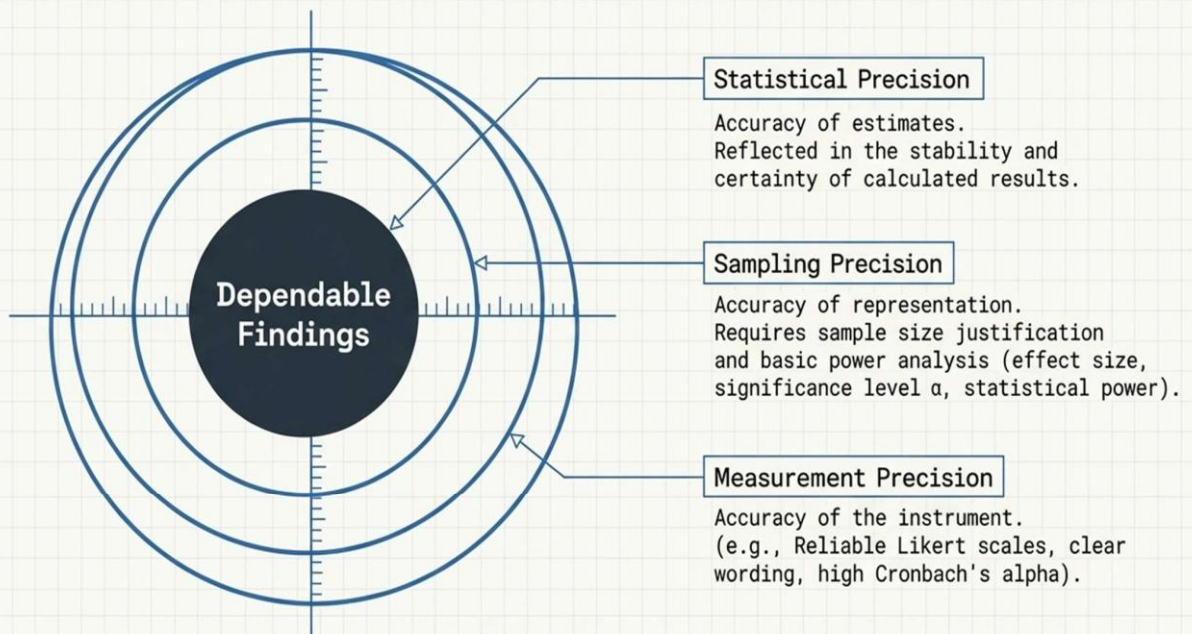
Definition: Another researcher collects new data using the same method and obtains similar findings.

Blueprint Requirements: To achieve this, the original study must perfectly document the sampling method, questionnaire, measurement scales, data collection procedure, and specific context.

Example Application: A study on women's investment behavior must hold true when the identical questionnaire is administered in a new geographical state.

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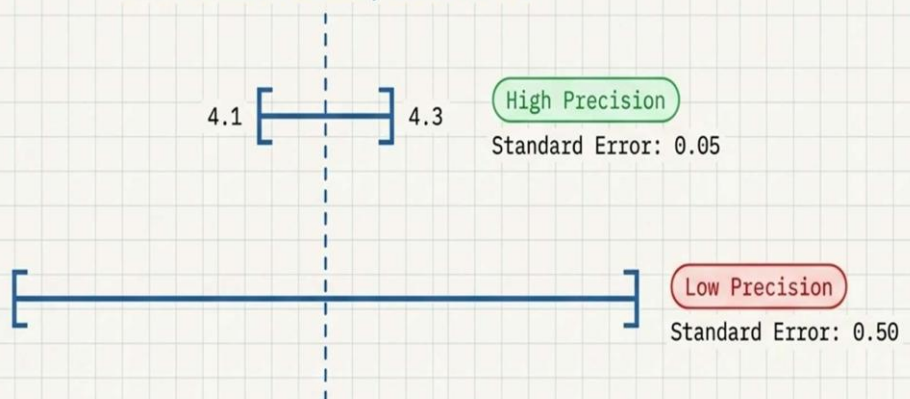
Minimizing random error across three dimensions



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Visualizing statistical certainty

Mean Financial Literacy Score of 4.2



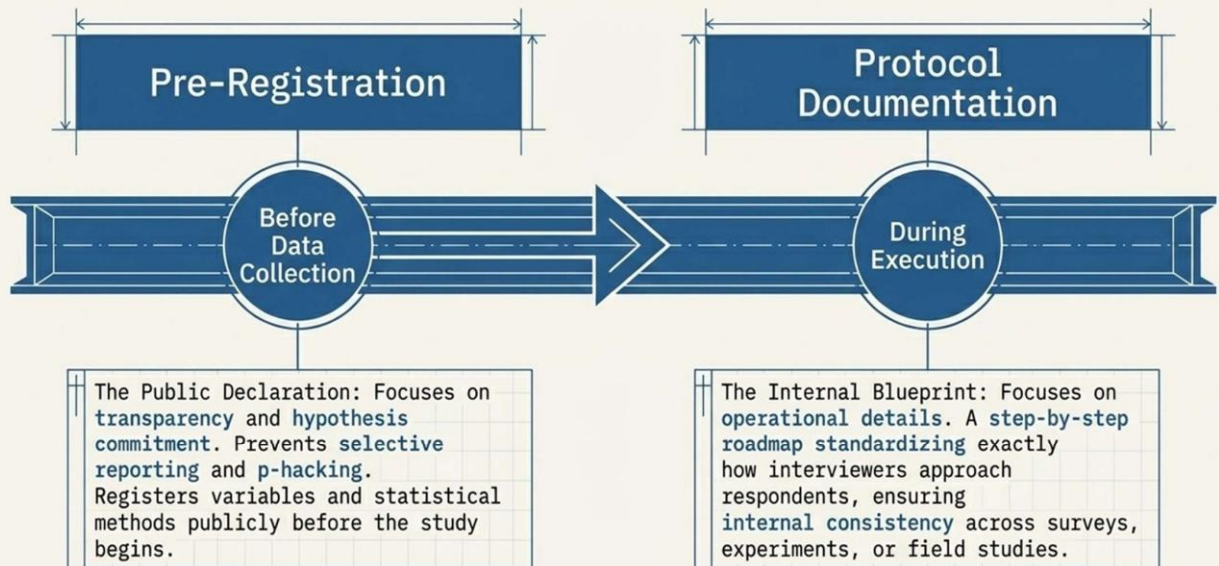
Lab notebook entry

Standard Error (SE) measures expected variance from the true population. Smaller SE = Higher precision.

Confidence Interval (CI) provides the range. A narrow CI (e.g., 4.2 ± 0.10) proves high statistical precision, avoiding unreliable estimates caused by inadequate sample sizes.

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Mapping the operational guide versus the public commitment



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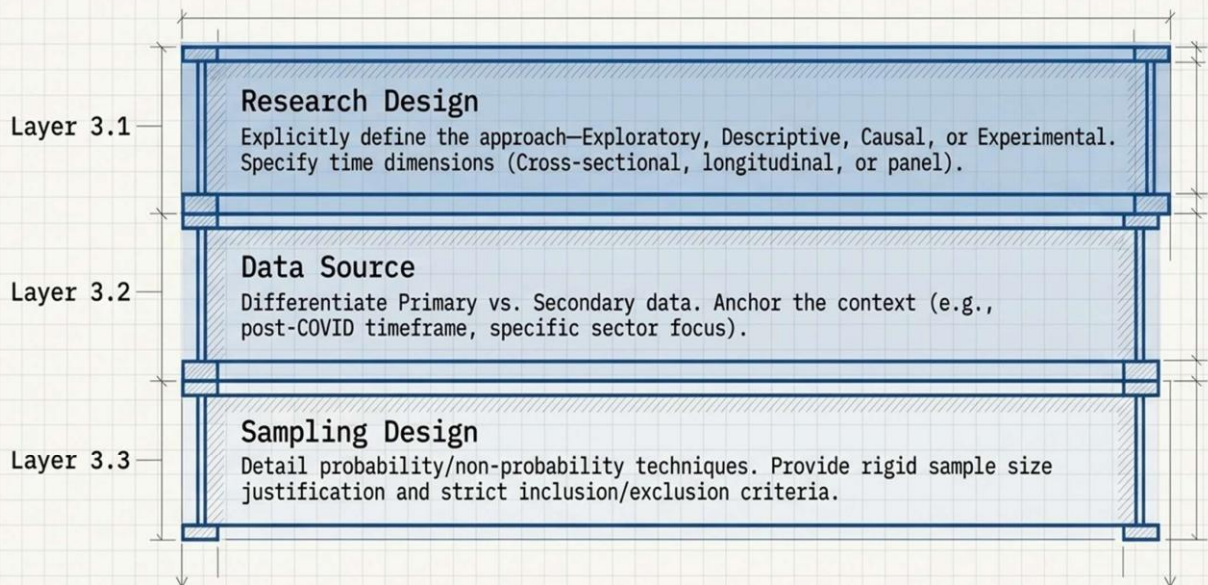
Anatomy of a replicable research protocol

- [] Defined Research Objectives & Hypotheses
- [] Data Source and Access Method
- [] Step-by-Step Sampling Plan
- [] Survey Instrument (Attached Appendix)
- [] Standardized Data Collection Steps
- [] Explicit Data Cleaning Rules
- [] Pre-defined Statistical Analysis Plan

Essential for **reducing interviewer bias** in surveys, **controlling external influences** in experiments, and **standardizing** observations in field studies. Includes a **mandatory Codebook**.

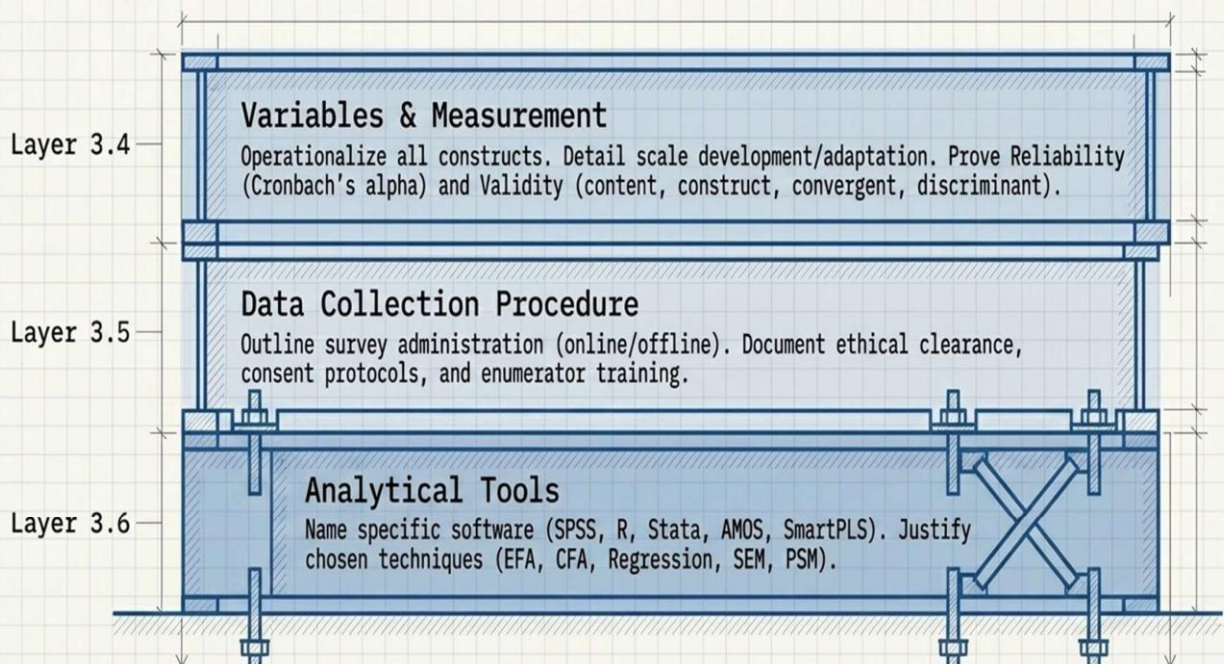
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Structuring the Methods section: The structural base



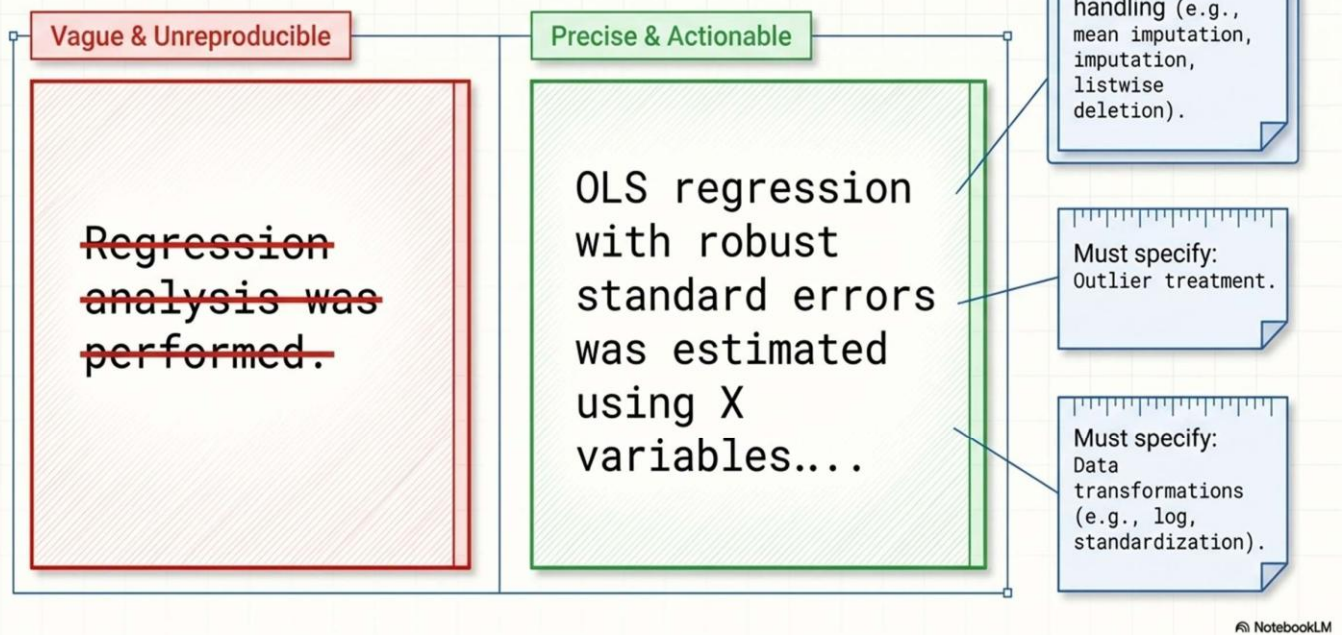
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Structuring the Methods section: Execution and analysis

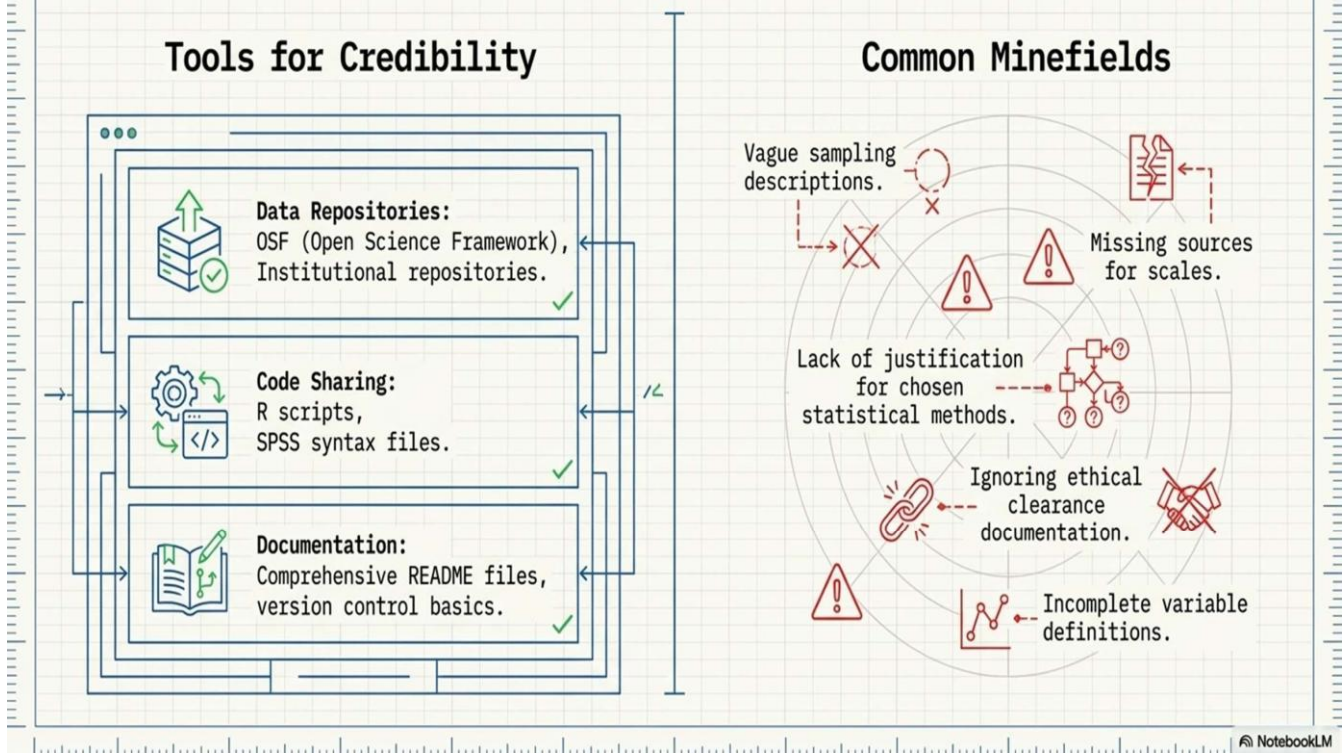


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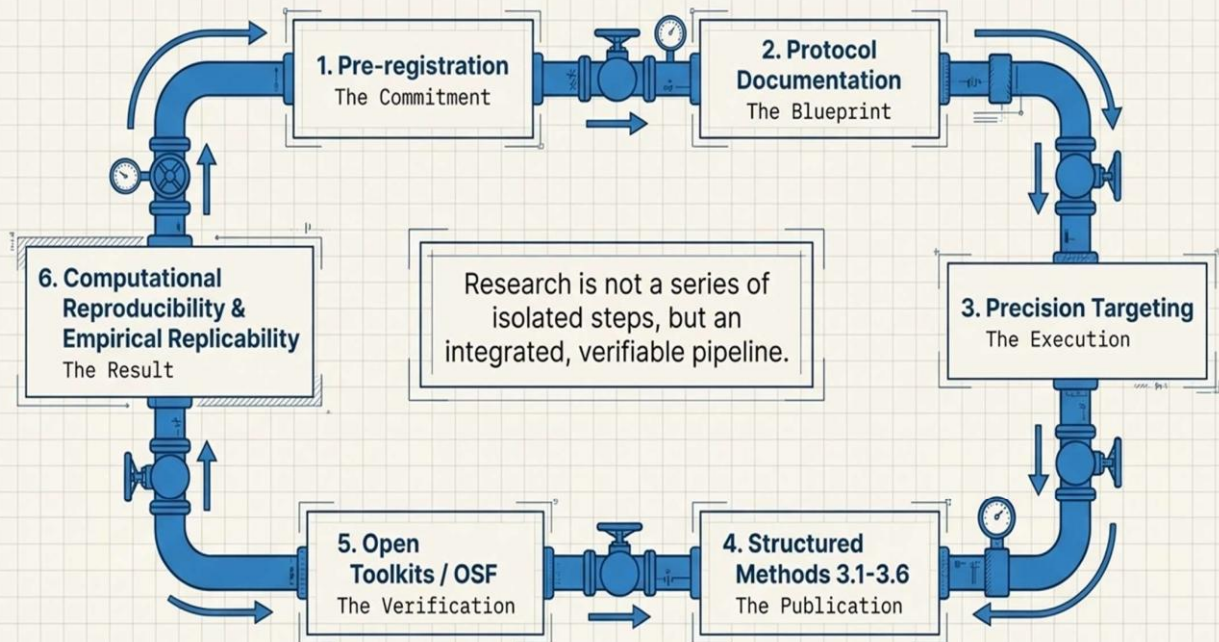
Drafting precise syntax for reproducibility



The modern toolkit versus structural threats



The Credibility Ecosystem



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Engineered for impact

Credibility in social science is not an accident; it is engineered. True research value emerges when findings are not just discovered, but rigorously proven and seamlessly shared.

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T8: Understanding Plagiarism (Types & Severity)

(Accidental vs. intentional, self-plagiarism)

Resource Person: Dr. Jyoti Ranjan Rout*

Associate Professor, School of Biological Sciences, AIPH University, Bhubaneswar

**Email: routjr@aiph.ac.in/ routjr@gmail.com*

Understanding Plagiarism: Types and Severity

Plagiarism is a critical issue in academic and professional writing, representing the unethical practice of presenting someone else's work, ideas, or expressions as one's own without proper acknowledgment. Understanding plagiarism is essential for maintaining integrity, fostering originality, and upholding the standards of scholarship. This discussion explores the various types of plagiarism and the severity associated with each, providing a comprehensive framework for recognizing and addressing this misconduct (Anonymous, 2026).

Types of Plagiarism

Plagiarism occurs in several distinct forms, ranging from copying entire works to subtle misuse of ideas. The most recognized types include global plagiarism, verbatim plagiarism, paraphrasing plagiarism, patchwork plagiarism, and self-plagiarism (Fig. 1). Plagiarism manifests in multiple forms, each varying in intent, complexity, and detectability. Recognizing these types is crucial for both preventing plagiarism and applying appropriate corrective measures (Cheng et al., 2021; (Childers & Bruton, 2015).

a) Direct Plagiarism

Direct plagiarism occurs when a person copies text verbatim from a source without quotation marks or proper citation. This is the most blatant form of plagiarism and is often considered the most severe due to its clear violation of originality and intellectual property rights. Examples include copying paragraphs, sentences, or entire sections from books, articles, or online content.

b) Self-Plagiarism

Self-plagiarism, also known as duplicate publication, involves reusing one's own previously published work without acknowledgment. Although it may seem less harmful since the author is reusing their own material, it misleads readers and publishers by presenting old work as new. This type is common in academic publishing and can lead to ethical concerns regarding originality and transparency.

c) *Mosaic Plagiarism (Patchwriting)*

Mosaic plagiarism, or patchwriting, happens when a writer borrows phrases, ideas, or sentence structures from a source and intersperses them with their own words without proper citation. The text is not copied verbatim but is closely paraphrased, often rearranging or substituting synonyms. This form is deceptive because it disguises the source material as original thought, making it harder to detect.

d) *Accidental Plagiarism*

Accidental plagiarism arises from neglect, misunderstanding, or lack of knowledge about citation rules and academic conventions. Examples include failing to cite sources correctly, misquoting, or paraphrasing too closely without acknowledgment. Despite the lack of intent, accidental plagiarism undermines academic integrity and requires corrective action through education and revision.

e) *Paraphrasing Plagiarism*

Paraphrasing plagiarism involves rewording someone else's ideas or text without proper citation. Unlike mosaic plagiarism, the entire passage is rewritten but retains the original meaning and structure. This type is problematic because it obscures the source's contribution and presents the ideas as the writer's own.

f) *Source-based Plagiarism*

Source-based plagiarism includes fabricating sources, citing nonexistent references, or misrepresenting the content of a source. This form damages the credibility of the work and misleads readers, constituting a serious breach of ethical standards.

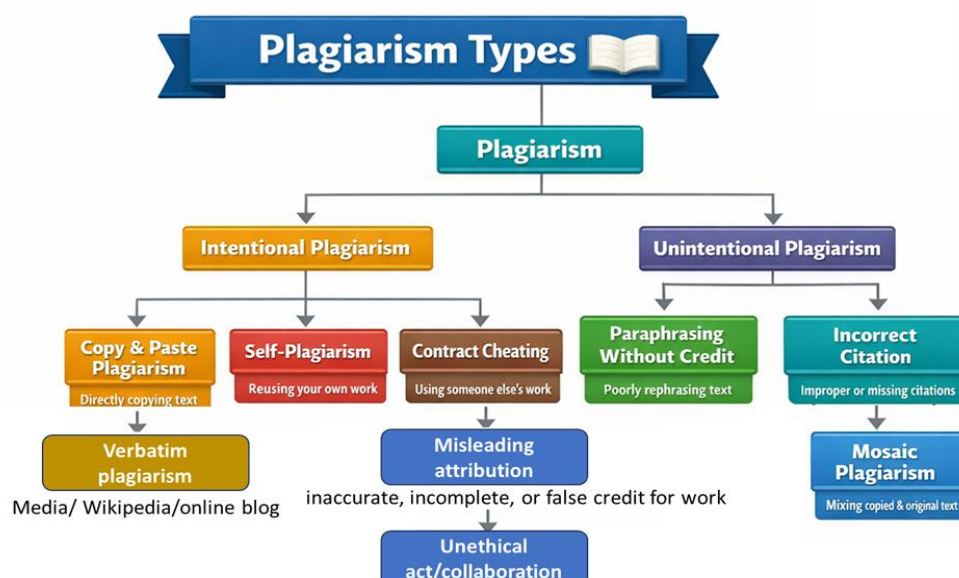


Fig. 1: Schematic representation of types of plagiarism.

Severity of Plagiarism

The severity of plagiarism depends on multiple factors, including the extent of copied material, intent, context, and the impact on the academic or professional community. Understanding these dimensions helps institutions and individuals apply appropriate sanctions and preventative measures (Siddhpura & Siddhpura, 2020; Oyenuga et al., 2026).

i) Extent and Magnitude

The amount of plagiarized content significantly influences severity. Copying a few sentences or an isolated paragraph, while still unethical, is generally less severe than copying entire sections or complete works. Large-scale plagiarism often indicates deliberate misconduct and warrants stricter penalties.

ii) Intentionality

Intent plays a crucial role in assessing severity. Deliberate plagiarism, where the author knowingly presents others' work as their own, is considered a grave offense. In contrast, accidental plagiarism, resulting from ignorance or carelessness, is treated with more leniency but still requires remediation through education and revision.

iii) Contextual Impact

The context in which plagiarism occurs affects its seriousness. For example, plagiarism in high-stakes academic submissions, such as theses or grant proposals, has more severe consequences than in informal assignments. Similarly, plagiarism in published research can damage the reputation of authors, institutions, and journals, leading to retractions and loss of credibility.

iv) Ethical and Legal Implications

Plagiarism not only violates academic ethics but can also breach copyright laws, especially when copyrighted material is used without permission. Legal consequences may include fines, litigation, or professional disciplinary actions, particularly in commercial or professional settings.

v) Repercussions for the Individual

The consequences for individuals found guilty of plagiarism range from academic penalties (such as failing grades or expulsion) to professional sanctions (such as job termination or loss of professional licenses). The severity of repercussions often correlates with the nature and scale of the plagiarism.

The severity of plagiarism is determined by several factors, including the extent of copied material, the author's intent, the context in which it occurs, and its impact on the academic or professional community. Minor cases, such as copying a few sentences without citation, are unethical but generally less severe than large-scale plagiarism involving entire sections or complete works. Intentional plagiarism, where an individual knowingly presents another's work as their own, is considered a grave offense, while accidental plagiarism due to carelessness or lack of awareness is treated with more leniency but still requires correction. The seriousness also depends on context: plagiarism in high-stakes submissions like theses, grant proposals, or published research carries heavier consequences than in routine assignments. Ethical and legal implications further heighten severity, as plagiarism can violate copyright laws and lead to litigation or professional sanctions. For individuals, repercussions range from academic penalties such as failing grades or expulsion to professional consequences like job termination or loss of licenses. Ultimately, the severity of plagiarism correlates with its scale, intent, and impact, making awareness and prevention essential for maintaining integrity in both academic and professional environments (Horbach and Halffman, 2019).

Addressing Plagiarism

Effective management of plagiarism involves a combination of education, detection, and enforcement. Institutions should foster awareness about proper citation practices and the ethical importance of originality. Tools like plagiarism detection software help identify potential issues, while clear policies and consistent enforcement deter misconduct (Mulenga & Shilongo, 2024).

Conclusion

Understanding the types and severity of plagiarism is fundamental to promoting academic integrity and ethical scholarship. By recognizing the various forms—from direct copying to subtle paraphrasing without citation—and appreciating the factors that influence severity, academic and professional communities can better prevent, detect, and address plagiarism. This understanding supports a culture of honesty, respect for intellectual property, and the advancement of genuine knowledge.

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W1: Workshop: Critical Literature Review & Tools

(Using Mendeley/Zotero, structuring a review matrix)

Resource Person: Dr. Priyakashna Mohanty

Assistant Professor and Research Mentor, School of Business and Management, Christ University, Bengaluru

Academic Research Methods

CRITICAL LITERATURE REVIEW & TOOLS

Dr Priyakashna Mohanty

What is a Critical Literature Review?

A critical literature review is a comprehensive, analytical evaluation of existing scholarly research on a specific topic. Unlike a simple summary, it involves critically examining, comparing, and synthesizing sources to identify patterns, gaps, and debates within the field. The reviewer assesses the strengths and weaknesses of methodologies, evaluates the validity of findings, and considers how different studies relate to one another. This process requires deep engagement with the material rather than passive description.

The purpose of a critical literature review is to establish a foundation for your own research by demonstrating your understanding of the field. It helps identify what is already known, what remains contested, and where opportunities for new contributions exist. In academic research, this is essential for justifying your research questions, positioning your work within existing scholarship, and avoiding duplication of effort. A well-crafted review adds value by offering fresh insights and perspectives.

Critical Literature Review & Tools, 2026

Three Phases of Literature Review

01

Planning Phase: Define your research questions, establish inclusion/exclusion criteria, identify relevant databases, and develop a systematic search strategy. Create a timeline and organize your reference management system.

02

Conducting Phase: Execute systematic searches, screen sources for relevance, extract key data and findings, critically evaluate methodology and quality, and synthesize themes across the literature.

03

Writing Phase: Structure your narrative around key themes, integrate sources cohesively, present critical analysis rather than summaries, identify gaps in existing research, and connect findings to your research objectives.

Critical Literature Review & Tools, 2026

Why Critical Analysis Matters

Critical analysis transforms passive reading into active scholarship. It enables researchers to move beyond surface-level understanding and engage deeply with existing knowledge in their field.

01

Identifying Gaps: Critical analysis reveals what has been overlooked or underexplored in existing research. By systematically evaluating literature, researchers discover opportunities for original contributions and areas requiring further investigation.

02

Synthesizing Knowledge: Rather than merely summarizing sources, critical analysis connects ideas across multiple works. This synthesis creates new insights by identifying patterns, contradictions, and relationships between different studies and theories.

03

Building Arguments: Strong academic arguments require evidence-based foundations. Critical analysis helps construct compelling narratives by evaluating source credibility, weighing evidence, and positioning your research within scholarly conversations.

Critical Literature Review & Tools

Types of Literature Reviews

- ✓ **Systematic Review** A rigorous, methodical approach that follows predefined protocols to identify, evaluate, and synthesize all relevant studies on a specific research question.



Narrative Review A comprehensive summary that describes and discusses the state of knowledge on a topic, offering flexibility in scope and interpretation of existing literature.



Scoping Review Maps the key concepts and evidence gaps in a research area, providing a broad overview of available literature without strict quality assessment.



Meta-Analysis A statistical technique that combines quantitative results from multiple studies to derive overall conclusions with greater statistical power.

Morgan Maxwell, 2029

Planning Your Review

Defining Research Questions Start by formulating clear, focused research questions that guide your entire review. Use frameworks like PICO (Population, Intervention, Comparison, Outcome) to structure your inquiry and ensure your questions are specific, measurable, and answerable through existing literature.

Establishing Scope: Determine the boundaries of your review including time periods, geographic regions, publication types, and disciplines to include. A well-defined scope prevents scope creep and ensures your review remains manageable while still being comprehensive enough to address your research questions.

Setting Inclusion Criteria: Develop explicit inclusion and exclusion criteria before beginning your search. Document criteria such as study design, sample characteristics, outcome measures, and language requirements. This systematic approach ensures transparency, reproducibility, and reduces selection bias in your review.

Critical Literature Review & Tools, 2026

Database Tools



Google Scholar: Free, comprehensive academic search engine covering articles, theses, books, and conference papers across all disciplines.



PubMed: Premier biomedical and life sciences database maintained by NIH, essential for medical and health-related research.

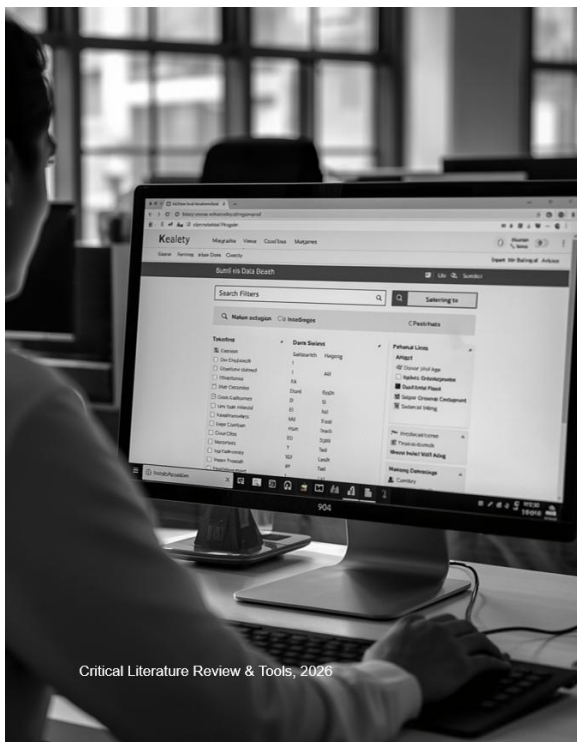


Scopus: Elsevier's abstract and citation database featuring peer-reviewed literature with citation tracking and author metrics.



Web of Science: Multidisciplinary citation index providing access to high-quality journals with powerful citation analysis tools.

Critical Literature Review & Tools, 2029



Critical Literature Review & Tools, 2026

Search Strategies

Effective literature searching requires strategic use of keywords and Boolean operators. Start by identifying core concepts from your research question, then brainstorm synonyms, related terms, and alternative spellings.

Boolean operators (AND, OR, NOT) help refine searches precisely. Use AND to narrow results by combining concepts, OR to broaden by including synonyms, and NOT to exclude irrelevant terms. Truncation symbols (*) capture word variations, while phrase searching with quotation marks finds exact matches. Combine these techniques strategically to balance comprehensiveness with precision in your database searches.

Advanced techniques include field-specific searching (title, abstract, keywords), citation tracking to find related works, and using database thesauri for controlled vocabulary. Document your search strategy for reproducibility and transparency in your review methodology.

Reference Management Tools



Zotero: Free, open-source tool that collects, organizes, and cites research. Browser integration captures sources instantly with one click.



Mendeley: Combines reference management with academic social networking. PDF annotation and cloud storage for seamless collaboration.



EndNote: Industry-standard tool for comprehensive bibliography management. Powerful search and sync across multiple devices.



RefWorks: Web-based platform ideal for institutional use. Easy import from databases and automatic citation formatting.

Page 9 of 20

Evaluating Sources

01

Assess author credentials, institutional affiliations, and publication venue. Check if the source is peer-reviewed and examine the methodology used. Consider the author's expertise and potential biases in the research.

02

Evaluate how directly the source addresses your research questions. Consider the scope, context, and applicability to your specific topic. Determine if findings can be generalized to your area of study.

03

Consider publication date and whether information remains current. Assess if newer research has superseded the findings. Balance historical significance with the need for up-to-date evidence in your field.

Critical Literature Review & Tools, 2029

Critical Reading Techniques

Master these essential techniques to evaluate scholarly sources effectively and build a strong foundation for your literature review.

01

Analyzing Arguments: Examine the author's thesis, supporting evidence, and logical structure. Identify premises, conclusions, and the reasoning chain connecting them. Question whether claims are substantiated with credible data.

02

Identifying Bias: Look for potential conflicts of interest, funding sources, and author affiliations. Assess language for emotional appeals or loaded terms. Consider what perspectives may be missing or underrepresented in the work.

03

Assessing Methodology: Evaluate research design, sample size, and data collection methods. Check for appropriate statistical analyses and consider limitations acknowledged by the authors.

Critical Literature Review & Tools

Organization Tools



NVivo: Powerful qualitative data analysis software for organizing, coding, and analyzing unstructured data from interviews, surveys, and literature sources.



ATLAS.ti: Comprehensive tool for qualitative research that enables systematic coding, annotation, and visualization of complex literature relationships.



Notion: Flexible workspace for creating databases, notes, and wikis to organize literature reviews with customizable templates and collaboration features.



Obsidian: Knowledge management tool using linked notes and graph visualization to connect ideas and build a personal knowledge base from literature.

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Synthesizing Literature

Thematic Analysis Identify recurring themes, patterns, and ideas across multiple sources. Group related findings into coherent categories to reveal the dominant perspectives and debates within your field. This method helps uncover gaps and areas of consensus in existing research.

Conceptual Frameworks Develop theoretical structures that organize and connect key concepts from your literature. These frameworks provide a lens for interpreting findings, establishing relationships between variables, and guiding your own research methodology and analysis approach.

Literature Mapping: Create visual representations of the scholarly landscape using concept maps, matrices, or network diagrams. Mapping reveals how sources relate to each other chronologically, methodologically, or thematically, helping identify influential works and research trajectories.

Critical Literature Review & Tools, 2026



Critical Literature Review, 2026

Structure

Introduction Begin by establishing the scope and purpose of your review. Define key terms, outline the structure, and state your thesis or research question. Explain the significance of the topic and preview the main themes you will explore.

Body: Organize thematically, chronologically, or methodologically. Group related studies together and analyze patterns, contradictions, and gaps. Use topic sentences to guide readers through each section. Compare and contrast different perspectives, showing how sources relate to each other and your research questions. Maintain critical analysis throughout rather than simply summarizing.

Conclusion: Synthesize the main findings and identify significant gaps in current research. Discuss implications for future studies and explain how your review contributes to the field. End with clear recommendations or directions for further investigation.

Writing Tools



Scrivener A powerful writing software designed for long-form projects, offering organization tools, research management, and flexible outlining features.



Overleaf A collaborative LaTeX editor ideal for academic writing, enabling real-time collaboration and professional formatting for scholarly documents.



Google Docs A cloud-based word processor enabling real-time collaboration, easy sharing, and seamless integration with other Google Workspace tools.



Microsoft Word The industry-standard word processor with advanced formatting, citation tools, and track changes for professional document creation.

Morgan Maxwell, 2029

Common Pitfalls

01

Lack of focus occurs when reviewers try to cover too much ground without a clear research question. This leads to scattered arguments, irrelevant sources, and a review that fails to contribute meaningful insights to the field.

02

Poor synthesis happens when sources are discussed in isolation rather than in conversation with each other. Instead of identifying patterns and connections, the review becomes a list of summaries without analytical depth.

03

Uncritical summarizing accepts all sources at face value without evaluating methodology, bias, or limitations. A strong literature review requires critical assessment of each source's validity and contribution.

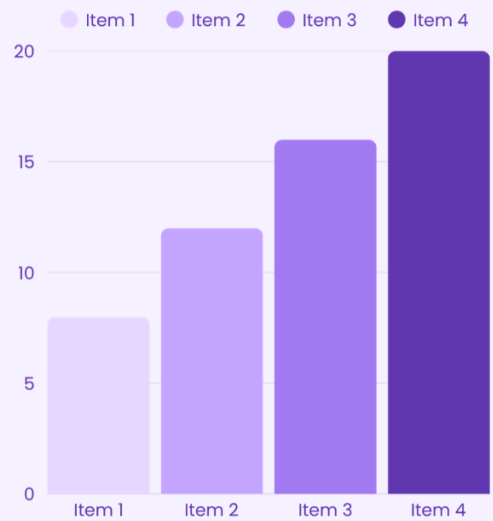
Critical Literature Review & Tools, 2029

Research Trends: The convergence of systematic methodology and artificial intelligence marks a pivotal shift in how scholars conduct literature reviews.

2026

Systematic reviews have seen exponential growth, with a 340% increase in published systematic reviews across academic databases. This methodology has become the gold standard for synthesizing research evidence in literature reviews.

AI-assisted literature analysis tools have transformed the research landscape. Machine learning algorithms now help researchers screen thousands of papers in hours rather than weeks, with tools like ASReview and Rayyan achieving 95% accuracy in relevance screening.



Critical Literature Review & Tools, 2026

AI-Powered Tools



Elicit uses AI to automate research workflows, extract data from papers, summarize findings, and answer questions using academic literature.



Semantic Scholar employs machine learning to surface relevant papers, identify key citations, and provide AI-generated summaries of research.



Connected Papers creates visual graphs showing relationships between papers, helping researchers discover related work and trace research lineages.



Research Rabbit builds personalized collections and recommends papers based on your interests, creating a network of related research discoveries.

Morgan Maxwell, 2029

Conclusion

A successful critical literature review requires systematic planning, rigorous evaluation, and effective synthesis. By combining traditional methods with modern digital tools, researchers can navigate vast bodies of knowledge efficiently while maintaining scholarly rigor and producing meaningful contributions to their field.

Key Takeaways for Effective Literature Reviews

- Start with clear research questions and well-defined scope to guide your search strategy
- Use multiple databases and reference management tools to ensure comprehensive coverage
- Apply critical appraisal frameworks consistently to evaluate source quality and relevance
- Synthesize findings thematically rather than simply summarizing individual sources
- Leverage AI-assisted tools for efficiency while maintaining human judgment for analysis
- Document your methodology transparently for reproducibility and credibility
- Iterate continuously—literature review is an ongoing process, not a one-time task

Critical Literature Review & Tools, 2026

Thank You! Start Your Journey Today

Critical Literature Review & Tools, 2026

DAY-4 Ethics & Integrity

DATE: 14.05.2026

T9: Software for Plagiarism Checking

(Interpreting similarity reports Turnitin/iThenticate)

Resource Person: Prof. (Dr.) Manoranjan Dash

Professor and Associate Dean, Department of Management Sciences, Siksha 'O' Anusandhan University, Bhubaneswar

SOFTWARE FOR PLAGIARISM CHECKING



Manoranjan Dash ,M.Tech,MBA,MPhil,Ph.D

Professor

Faculty of Management Sciences, Siksha O Anusandhan(Deemed to be University)
Bhubaneswar, INDIA

Email: manoranjandash@soa.ac.in
6371562843

The screenshot shows a web browser displaying a Nature journal article. The browser's address bar shows the URL [nature.com/articles/d41586-021-02035-2](https://www.nature.com/articles/d41586-021-02035-2). The Nature logo is prominently displayed at the top of the article page. Below the logo, there are navigation links: "Explore content", "About the journal", "Publish with us", and "Subscribe". The article title is "8% of researchers in Dutch survey have falsified or fabricated data", dated 22 July 2021. The author is Dalmeet Singh Chawla. The article abstract states: "Study of nearly 7,000 scientists also finds that more than half engage in 'questionable research practices'." There are social media sharing icons for Twitter, Facebook, and Email. On the right side of the page, there is a sidebar with partially visible text: "Rela", "Six rea", "Acader", "Thousa", "memb", "Miscor", and "Subj".

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Prominent Cell Biologist Fired After Data Manipulation Investigation

Shawna Williams | Apr 30, 2018

The University of Tokyo confirmed last August that Yoshinori Watanabe tampered with research-related images, and dismissed him in late April.



Kyoto University Finds Stem Cell Researcher Guilty of Data

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TS Kyoto University Finds Stem Cell

the-scientist.com/the-nutshell/kyoto-university-finds-stem-cell-researcher-guilty-of-data-fabrication-30372

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Kyoto University Finds Stem Cell Researcher Guilty of Data Fabrication

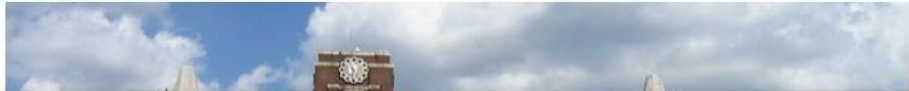
The scientist was a member of a stem cell research team led by Nobel laureate Shinya Yamanaka.



Katarina Zimmer
Jan 24, 2018



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'Fake research' comes under scrutiny

bbc.com/news/science-environment-39357819

Growing pressures

Requests by the BBC under Freedom of Information rules show that at least 300 allegations were reported at 23 of the 24 research-intensive Russell Group universities between 2011 and 2016 among staff and research students.

About a third of allegations of plagiarism, fabrication, piracy and misconduct were upheld. More than 30 research papers had to be retracted.

Commenting, a spokesman for the Russell Group said: "Our universities take research integrity seriously and work continuously to help staff and students maintain high standards of research."

"The UK has a global reputation for the quality of our scientific research. This is not least because our members are rigorous in their approach to research integrity."

Mr Metcalfe said the figures obtained by the BBC demonstrated the importance of the MPs' inquiry, but they had to be put in the context of the overall number of papers published.

"We do need to have accurate figures that are available so we can all have confidence that the research is being conducted properly, and when it's not, there is a system that challenges that," he said.

Universities UK, which represents vice-chancellors of universities, was asked to comment on the data obtained by the BBC, but declined.

Waiting for www.google.com



"Based on these facts, the data in the 2005 Science paper cannot be some error from a simple mistake, but can only be seen as a deliberate fabrication to make it look like 11 stem cell lines using results from just two," the panel said.

Hwang Woo-Suk of damaging the scientific community with his deception, while the South Korean government threatened to pull its funding for his research.

Choi Seong-Sik, vice-minister of science and technology, said it is impossible to recover money already spent for Prof Hwang, a total US\$39.9m (£22.95m) for research and facilities since 1998. But his ministry, which admitted errors in its handling of the professor's projects, will look at stopping other funding and withdrawing the "top scientist" designation.

The university panel said today it found that "the laboratory data for 11 stem cell lines that were reported in the 2005 paper were all data made using two stem cell lines in total".

To create fake DNA results purporting to show a match, Prof Hwang's team split cells from one patient into two test tubes for the analysis - rather than actually match cloned cells to a patient's original cells, the university said.

UNIVERSITY OF KENTUCKY

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University of Kentucky to Fire Professors for Research Misconduct

The institution completed an internal investigation into two professors and a staff researcher for duplicating images and fudging data.

Chia-Yi Hou
Aug 26, 2019

     117

The University of Kentucky will begin the termination process for



Save time
and cells

Grants

A whistleblower claims his former supervisor committed fraud when applying for government funds.



Ashley Yeager
Nov 20, 2018



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Update (March 25): Duke University has agreed to pay \$112.5 million to the federal government to settle a lawsuit related to falsified research data used in grant applications, according to [The Chronicle](#), the school's independent newspaper.

ABOVE: Duke University chapel
© ISTOCK.COM,
RED_MOON_RISE

On December 7, a judge will deliver the terms of a settlement between Duke University and a former employee who blew the whistle on the school's knowledge of another researcher using fraudulent data in applications for millions of dollars of grant money, according to [Science and Retraction Watch](#).

Plagiarism is another form of fraud. It occurs when a proposed publication includes substantial sections from other people's work without any citation or acknowledgement of the original source. For example, Mahesh Visvanathan and Gerald Lushington, of the University of Kansas, published three bioinformatics articles, portions of which had been lifted from another scientists' work (Bavley, 2012).

Alex Caton and Grace Watkins (2017) reported how Monica Crowley, the U.S. President's choice as a security advisor for the National Security Council, plagiarised numerous passages in her Ph.D. dissertation. More than a dozen sections of text were copied with little or no change from other scholarly works without proper attribution.

Duplication of publication

Another issue is the simultaneous submission of the same article to more than one journal. Bruno Frey, an economist at the University of Zurich, Switzerland in 2010–11, co-wrote several papers exploring who survived the Titanic disaster. Four of the articles published in different journals were strikingly similar in content. Once discovered, Frey admitted making a mistake, he and his two co-authors 'wanted to reach the broadest possible audience' and in the process he 'lost track', he said, when asked why he did not cross-reference the articles (Shea, 2011).

Hwang Woo-Suk

- South Korea
- Stem cell research
- Indicted on fraud, embezzlement, and bioethics violations

Andrew Wakefield

- British gastroenterologist
- No Ethics Review Board approval
- Guilty of failure to disclose CoI, medical and scientific misconduct
- The Lancet and British Medical Journal retracted papers

Eric Poehlman

- Obesity scientist
- First scientist to be imprisoned for falsifying information on a grant application
- Plead guilty to falsifying 17 NIH grant applications and fabricating data in 10 of his papers (1992-2000)

Diederik Stapel

- Dutch Psychologist
- Admitted that he had falsified data in some of his publications
- Many/most of his experiments never happened
- 150 publications he co-authored are under review
- 14 of 21 PhD theses that he supervised are in question

Former Delhi University V-C jailed for plagiarism

Published - November 26, 2014 10:14 am IST - NEW DELHI:

VIJETHA S. N

  READ LATER



Former Delhi University Vice-Chancellor Deepak Pental was forced to spend a few hours in Tihar Jail on Tuesday after a lower court in the city remanded him to judicial custody on complaints of plagiarism made by another professor. However, by evening his lawyers were able to get him bail from the Delhi High Court.

Plagiarism Check: Ex NLUO, Present Pondicherry Univ VC Chandra Krishnamurthy Copy Pasted 5 Out of 8 Chapters?

by The Admin
Nov 26, 2014

0 5

What's Inside



o headings were found

According to a [Legally India report](#), former NLUO Cuttack vice chancellor (VC) Dr Chandra Krishnamurthy has been accused by teachers of Pondicherry University – which she heads since 2013 – of plagiarising a book she authored.



- **Chemistry Professor Accused of Plagiarizing More Than 70 Articles**
- University Executive Council of the Sri Venkateswara University banned their chemistry professor accused of plagiarizing not just one or two research papers, but almost seventy of them. Almost all these research papers were published between the years 2004 to 2007. The institution banned the professor from taking any research guidance along with the upcoming examination works.

- **Stanford University Wrote to Late President Apj Abdul Kalam About Prof. Rajput's Plagiarism**

- In the year 2002, in October, Late President APJ Abdul Kalam received a letter from Stanford University . The letter claimed that physicist ; Prof. B S Rajput has blatantly copied from other sources. One of the signatories of this letter was Renata Kalosh .
- She claimed that an entire research paper of hers has been used without her acknowledgment . Stanford was shocked by the fact the person who committed the heinous act was not punished . During this time, Prof. Rajput was the Vice-Chancellor of Kumaon University . However, after the investigation and after the completion of the investigation, Prof. Rajput has to resign from his post.

New Delhi: An investigation by IIT (Indian School of Mines) in Dhanbad to look into allegations of scientific misconduct by two faculty members has been completed, with the report set to be forwarded to the board chairman for further action. While details of the report are yet unknown, *The Hindu* reported that the scientific misconduct appears to be serious.

The investigation began after assistant professor Rashmi Madhuri of the department of applied chemistry and assistant professor Prashant Sharma of the department of applied physics were accused of image duplication in research papers. Since then, 14 papers published by the two professors have been retracted and two others were corrected. The first paper was retracted in February this year, while the latest retractions were towards the end of May.

According to *The Hindu's* R. Prasad, about 25 more papers by the two authors with problematic images have been listed on PubPeer, a website where researchers and users can discuss and review scientific papers. These papers also seem to have used the same duplicated image.

MIT professor accused of co-opting other labs' biotech research

Ram Sasisekharan, PhD, a professor of biological engineering at the Massachusetts Institute of Technology, was accused of plagiarism in a [report](#) published this week in the journal *mAbs*.

New Delhi: The head of virology at the Indian Council of Medical Research (ICMR) has been accused of doing image manipulation and plagiarism in two research papers that they co-authored.

Meanwhile, speaking to the Print on the matter, the researcher has denied the allegations.

One of the two papers was co-authored by the researcher along with JNU researchers.

The first paper, "Epidemiology and molecular typing of *Candida* isolates from burn patients", was in the journal in *Mycopathologia* in 2004. And the second one was a review published in the *International Journal of Biomedical and Advance Research* in 2015.

A Dutch microbiologist and scientific research integrity expert raised the allegations about the paper on Saturday in PubPeer.

PubPeer is a website that is used by academics to post their concerns about peer-reviewed published papers. The same concerns were raised by the microbiologist on the social media platform, Twitter.



INTRODUCTION

- Scientific misconduct is defined as unethical behavior in research that distorts outcomes, including practices such as data fabrication, falsification, and plagiarism, which can lead to misleading and erroneous publications .
- Scientific misconduct is the violation of the standard codes of scholarly conduct and ethical behavior in the publication of professional scientific research . In other words the Scientific misconduct is a Intentional distortion of the research process by fabrication of data, text, hypothesis, or methods from another researcher's manuscript form or publication .

- Fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results is also Scientific misconduct
- “Research misconducts can be divided into 2 major categories; research integrity violations and publication ethics violations” .
- Main research integrity violations include fabrication, falsification, and plagiarism .
- Publications ethics violations include duplicate publication and/or selfplagiarism, and inappropriate authorship .

- *Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results .*

REASONS FOR SCIENTIFIC MISCONDUCT

- Career and funding pressures
- Desire to publish more number of research papers.
- Institutional failures of oversight
- Inadequate training

MAJOR FORMS OF SCIENTIFIC MISCONDUCT

- The major forms of scientific misconduct are operationalized in the ORI's "Policies on Research Misconduct" (ORI, 2009, p. 5):
 - (a) Fabrication is making up data or results and recording or reporting them.
 - (b) Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.
 - (c) Plagiarism is the appropriation of another person's ideas, processes, results, or words without giving appropriate credit.
 - (d) Research misconduct does not include honest error or differences of opinion.

FABRICATION

Fabrication is the construction and/or addition of data, observations, or characterizations that never occurred in the gathering of data or running of experiments. In scientific inquiry and academic research, data fabrication is the intentional misrepresentation of research results. As with other forms of scientific misconduct, it is the intent to deceive that marks fabrication as unethical, and thus different from scientists deceiving themselves. Experimental data can be fabricated by reporting experiments that were never conducted, and accurate data can be manipulated or misrepresented to suit a desired outcome

FABRICATION CASES IN THE NEWS

- Diederik Stapel, a former professor of Social Psychology in the Netherlands, who made up most of his data. Has currently over 58 retracted papers.
- Yoshitaka Fujii, a Japanese researcher with over 180 retractions, 126 of which were “totally fabricated”. Interestingly, only 1 of these is currently listed on PubPeer.
- Yoshihiro Sato, a Japanese bone researcher who passed away in 2017, and was found to have fabricated at least 20 studies.

FALSIFICATION

- Falsification is the changing or omission of research results (data) to support claims, hypotheses, other data, etc. Falsification can include the manipulation of research instrumentation, materials, or processes. In other words falsification is process of manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record.
- The term falsification is applied when research actually took place, but the results have been manipulated, modified, or edited so that the published work no longer accurately reflects the scientific findings.

PLAGIARISM

- Plagiarism means using someone else's work without giving them proper credit. In academic writing, plagiarizing involves using words, ideas, or information from a source without citing it correctly. Plagiarism is the unethical practice of using words or ideas (either planned or accidental) of another author/researcher or your own previous works without proper acknowledgment.
- According to the Merriam -Webster online dictionary, to "plagiarize" means:
 - to steal and pass off (the ideas or words of another) as one's own
 - to use (another's production) without crediting the source
 - to commit literary theft to present as new and original an idea or product derived from an existing source

- All of the following are considered plagiarism:
 - turning in someone else's work as your own
 - copying words or ideas from someone else without giving credit
 - giving incorrect information about the source of a quotation
 - changing words but copying the sentence structure of a source without giving credit
 - copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not.

- Copying & pasting text from websites, or transcribing text from printed material is plagiarism. So is simple translation of text from one language to another.
- • Unacknowledged modification of text is plagiarism (e.g., replacing a few words, by using a thesaurus, or rearranging the text slightly is not original scholarship).
- • Unpermitted or unacknowledged use of videos, photos, slides or images is plagiarism.

DEFINITION OF PLAGIARISM

- Turning in someone else's work as one's own;
- Copying words or ideas from someone else, without giving credit to the original work;
- Failing to put a quotation in quotation marks;
- Giving incorrect information about the source of a quotation;
- Changing words but copying the sentence structure of a source without giving credit to the original work;
- Copying more than 20 words continuously from a source, whether you give credit to the original work or not; and
- Manipulation or misinterpretation of others' work (published or un-published) as her/his own by modifying numerical values in figures, tables and illustrations .

Hwang Woo-Suk • South Korea • Stem cell research • Indicted on fraud, embezzlement, and bioethics violations	Andrew Wakefield • British gastroenterologist • No Ethics Review Board approval • Guilty of failure to disclose CoI, medical and scientific misconduct • The Lancet and British Medical Journal retracted papers
Eric Poehlman • Obesity scientist • First scientist to be imprisoned for falsifying information on a grant application • Plead guilty to falsifying 17 NIH grant applications and fabricating data in 10 of his papers (1992-2000)	Diederik Stapel • Dutch Psychologist • Admitted that he had falsified data in some of his publications • Many/most of his experiments never happened • 150 publications he co-authored are under review • 14 of 21 PhD theses that he supervised are in question

TYPES OF PLAGIARISM

- a) Complete Pl
- b) Source -based Plagiarism
- c) Direct Plagiarism
- d) Self or Auto Plagiarism
- e) Paraphrasing plagiarism
- f) Inaccurate Authorship
- g) Mosaic Plagiarism
- Accidental Plagiarism

FORM OF PLAGIARISM

- Verbatim (word for word) quotation without clear acknowledgement
- ➤ Cutting and pasting
- ➤ Paraphrasing
- ➤ Collusion
- ➤ Inaccurate citation
- ➤ Failure to acknowledge assistance
- ➤ Use of material written by professional agencies or other persons
- ➤ Auto-plagiarism.

- UGC (Promotion of Academic Integrity and Prevention of Plagiarism In Higher Educational Institutions) Regulations, 2018 (Notification)
- Main Objectives
 - ❖ To create awareness
 - ❖ To establish institutional mechanism
 - ❖ To develop systems to detect plagiarism
 - ❖ To set up mechanism to prevent plagiarism and punish

- Content to be checked necessarily under the guidelines of UGC
- 1. Research Papers
- 2. Theses
- 3. Chapter in Books
- 4. Dissertation
- 5. Any other similar work

SIMILARITY CHECKS FOR EXCLUSION FROM PLAGIARISM

- All quoted work reproduced with all necessary permission and/or attribution.
- • All references, bibliography, table of content, preface and acknowledgements.
- • All generic terms, laws, standard symbols and standards equations

LEVELS OF PLAGIARISM

- Level 0: Similarities upto 10%
- Level 1: Similarities above 10% to 40%
- Level 2: Similarities above 40% to 60%
- Level 3: Similarities above 60%

PENALTIES IN CASE OF PLAGIARISM IN SUBMISSION OF THESIS AND DISSERTATIONS

Level 0:	Similarities upto 10%	Minor Similarities, no penalty
Level 1:	Similarities above 10% to 40%	Such student shall be asked to submit a revised script within a stipulated time period not exceeding.
Level 2:	Similarities above 40% to 60%	Such student shall be debarred from submitting a revised script for a period of one year.
Level 3:	Similarities above 60%	Such student registration for that programme shall be cancelled.

CLASSIFICATION

- UGC's new anti-plagiarism policy allows up to 10% content similarity .
- **Level 1:** With content similarity above 10%, the students are expected to withdraw their manuscript and are barred from any sort of publication for a minimum period of 1 year .
- **Level 2:** If the plagiarized content is infected with 40% to 60% content duplicity, then the academicians must be subjected to a denial of one annual increment and barred to publish any work for a minimum period of 2 years
- **Level 3:** When encountered with more than 60% of content similarity with the original sources, withdraw manuscript submitted for publication and shall not be allowed to publish any work for a minimum period of three years with the faculty supervision in-charge denied the right to two successive annual increments and shall not be allowed to be a supervisor to any UG, PG, Master's, M.Phil ., Ph.D. student/scholar for a period of three years .

PENALTIES IN CASE OF PLAGIARISM IN ACADEMIC AND RESEARCH PUBLICATIONS

Level 0:	Similarities upto 10%	Minor Similarities, no penalty
Level 1:	Similarities above 10% to 40%	Shall be asked to withdraw manuscript.
Level 2:	Similarities above 40% to 60%	a) Shall be asked to withdraw manuscript. b) Shall be denied a right to one annual increment c) Shall not be allowed to be a supervisor for a period of two years.
Level 3:	Similarities above 60%	a) Shall be asked to withdraw manuscript. b) Shall be denied a right to two successive annual increment. c) Shall not be allowed to be a supervisor for a period of two years.

UGC RESERVES

- However implemented the regulations, UGC reserves the right to remove difficulty/difficulties in the course of implementations of these Regulations in consultation with the Government of India/ Ministry of Human Resource Development.

PREVENTING PLAGIARISM

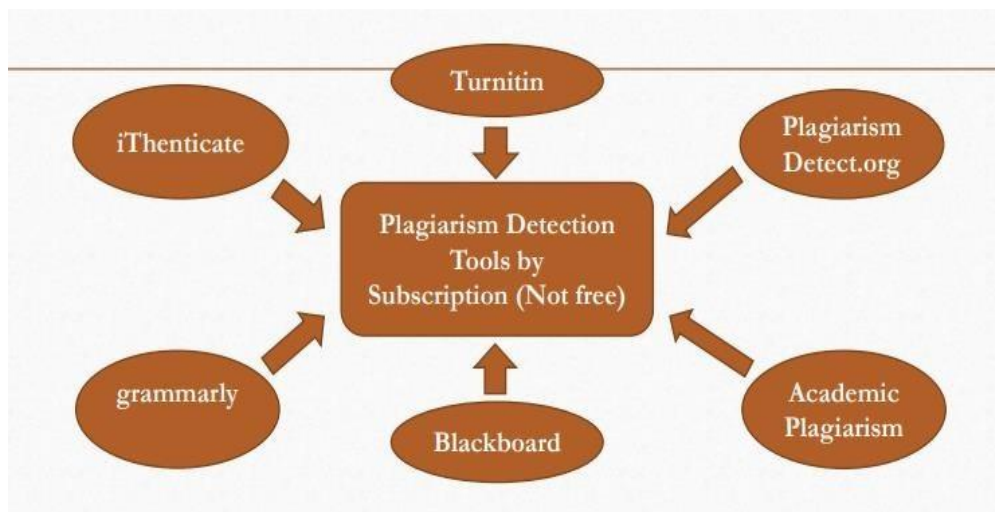
- Consult with teacher
- ☐ Plan Your Paper
- ☐ Take Effective Notes
- ☐ Cite Sources
- ☐ Make it Clear Who Said What
- ☐ Know How to Paraphrase
- ☐ Analyze and Evaluate Your Sources

- Provide proper references wherever is required
- ✓ Provide references even for a Photographs, Diagrams, Pictures, Graphs, and Maps.
- ✓ While paraphrasing make sure you are rearranging/ replacing few words.
- ✓ Once check originality of the content before submitting the document

WHAT IS ANTI-PLAGIARISM SOFTWARE ?

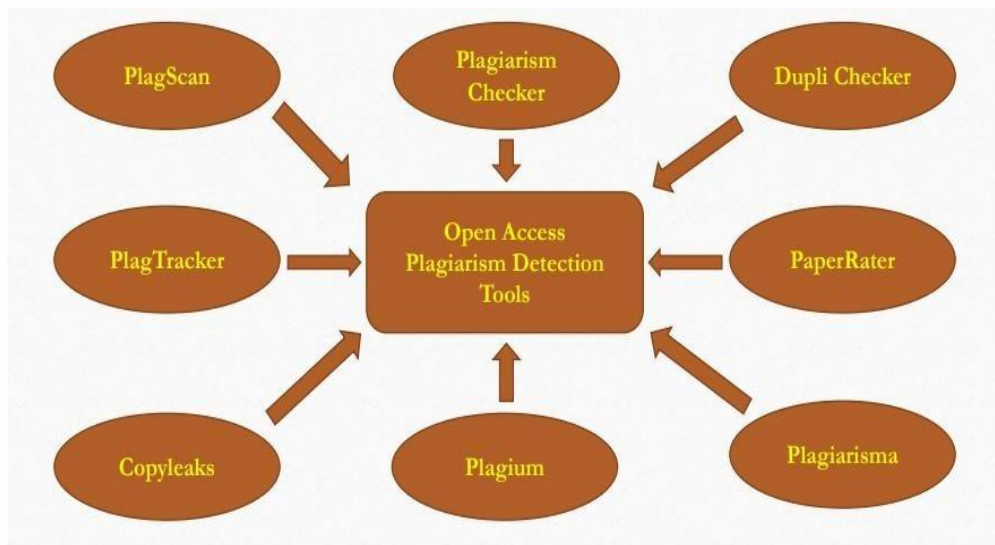
- “Software that searches the Web for duplicate textual content. It may be a stand-alone program installed in the user's computer or a function of a website, such as www.turnitin.com. Universities increasingly use anti-plagiarism software to determine if students have copied someone else's prose, and writers use it to see if others are using their copyrighted work in full or in part” (source: www.pcmag.com) Anti-plagiarism software/tool cannot stop or prevent the plagiarism . Find/detect the sources of contents which are matching

Plagiarism Detection Tools by Subscription



PLAGIARISM DETECTING SOURCES

Plagiarism Tools	Detecting Sources
Turnitin	Vast amounts of web content, previously submitted papers, and subscription-based journals and publications.
iThenticate	Database of over 60 billion web pages, 155 million content items, and 49 million works from 800 scholarly publishers
Blackboard	Internet, ProQuest ABI/Inform database with over 1,100 publication titles and about 2.6 million articles, Global Reference Database of Blackboard
Grammarly	Detect plagiarism from 16 billion web pages and ProQuest's databases.
PlagiarismDetection.org	Contains millions of documents like (books, paper, essays, articles and assignments)



INTRODUCTION TO TURNITIN

- Turnitin is a web-based plagiarism detection software provided by Turnitin.com.
- ❖ Turnitin is a tool to find and indicate the matching contents.
- ❖ Turnitin's plagiarism prevention tool generates originality reports that show how much of a document is original, cited from other sources, or unoriginal.
- ❖ For students to identify their mistakes or weaknesses in citations so as to improve their academic writing skills.
- ❖ Compares with huge collections of e-resources available around the world.
- ❖ Turnitin is used by more than 30 million students at 15,000 institutions in 150 countries.

THE MAJOR DATABASES COVERAGES OF TURNITIN

- Springer
- • EBSCO Host
- • ProQuest
- • Thieme
- • Elsevier
- • PubMed
- • Medline
- • Sage
- • Crossref
- • Oxford University Press
- • De Gruyter
- • Peter Lang
- • UCSanDiego

- Sources (Electronic)
- ▪Internet sources publicly accessible
- ▪Published journals, books, proceedings, etc.
- ▪Student submission in Turnitin Sources which are not covered...
 - Unpublished articles/papers
- ▪In-house repositories
- ▪In-house database

FEATURES OF TURNITIN

- Easy to submit your papers, articles, book chapters, theses, and etc.
- ▪Find and get source of the matching contents.
- ▪Instant receipt of submission.
- ▪Feedback through same interface.
- ▪Useful for checking referencing before submission.

Turnitin differentiates the levels of index

Blue	No matching words
Green	1% - 24% similarity index
Yellow	25% - 49% similarity index
Orange	50% - 74% similarity index
Red	75% - 100% similarity index

TURNITIN - SUBSCRIPTION

- There are four types of subscriptions
- Consortium :A top level account containing a number of institutional accounts for clients with multiple locations which may be geographically separated
- Institution :The institutional or 'single campus' account allows the administrator to create multiple departmental accounts beneath it for purposes of statistical tracking or to allow departmental level administrators to access the service
- Department :This account type can only allow individual instructor accounts to be created as subaccounts .
- Individual :A single user Turnitin account. Only a single instructor profile can be joined to an individual account.

TURNITIN - ACCESS LEVELS

- Administrator can create instructors and download the statistics of usage of the Turnitin account
- Instructor can create classes, assignments, add students, filter settings, and exclude matching sources in the report.
- Student can upload a paper in the assigned class, download originality report, and filter settings.

Turnitin : A complete process

Account Setup	Document Upload	Originality Reports
• Step 1: Get a student Account from "Instructor" • Step 2: Account Setup • Step 3: Account Validation • Step 4: Create your own password • Step 5: Create your secret question and answer • Step 6: Acceptance of User agreement	• Step 1: Login with student account • Step 2: Select "Class" • Step 3: Select "Assignment Submission" • Step 4: Document submission with title Requirements for file upload • Step 5: Confirm the submission • Step 6: Document Upload complete	• Step 1: Select the document submitted • Step 2: Matching overview • Step 3: Filter and settings • Step 4: Matching sources • Step 5: Download originality report • Step 6: Turnitin originality report • Step 7: Text only report

TURNITIN REPOSITORY OPTIONS

- Standard repository :The benefit of submitting papers to the standard paper repository is that student papers submitted to the assignment are checked against other institutions' student submissions . • Institution's paper repository, this means that the assignment will only be checked against other students' submissions within the institution .
- No Repository :Students' papers will not be stored in the Turnitin standard paper repository or the institution's paper repository. • The papers will not be checked for collusion between students No repository of the same or different institutions .

REMOVING OF PAPER FROM THE REPOSITORY OF TURNITIN

- A student submission can be permanently deleted from the Turnitin database so that it can no longer be used as a searchable source. All paper deletion requests must be submitted in writing by the "Turnitin administrator" to "Turnitin Support". The following information can be found in your originality report and if these are provided by the administrator • Class ID • Assignment name • Submission ID Turnitin support send an email to the administrator asking him to confirm the deletion. The paper is then permanently deleted.

REQUIREMENTS FOR FILE UPLOAD

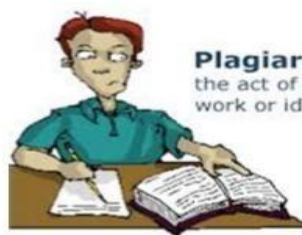
- File must be less than 40 MB
- • Files must have at least 20 words of text
- • The maximum paper length is 400 pages
- • File types allowed: Microsoft Word, Excel, PowerPoint, WordPerfect, PDF, HTML, RTF, OpenOffice, Google Docs, and plain text

- Some of the most widely used plagiarism checking software for research scholars, students, and universities are:
- Turnitin – Most universities use this for thesis and research paper checking. It compares with journals, student papers, and web sources.
- Paperpal – Popular among researchers for journal manuscript checking and academic writing support.
- Grammarly – Good for students and faculty; includes grammar correction plus plagiarism checking.
- Copyleaks – Detects copied and AI-generated content. Useful for institutions and content writers.
- Quetext – Easy to use with free and premium versions.
- Scribbr – Useful for thesis and dissertation checking; integrates Turnitin database.
- Unicheck – Used in LMS platforms like Moodle and Blackboard.
- iThenticate – Commonly used by publishers and journals before publication.

PLAGIARISM

- Appropriation of another person's idea, processes, results or words without giving the appropriate credit

- Perhaps the simplest way to detect plagiarism is using computer-aided software such as **Turnitin**.
- In general, <20% of similarity index is deemed acceptable (Turnitin).



Plagiarism:
the act of presenting another's
work or ideas as your own.

ACTIVITY

Read the following original passage from Oliver Sacks' essay "An Anthropologist on Mars" published in 1995

"The cause of autism has also been a matter of dispute. Its incidence is about one in a thousand, and it occurs throughout the world, its features remarkably consistent even in extremely different cultures."

1 & 2 below are two examples of ways to cite the original passage. Both were tested for plagiarism; which example if any, would you consider to be an example of plagiarism?

Example 1: The cause of the condition autism has been disputed. It occurs in approximately one in a thousand children. It exists in all parts of the world. Its characteristics strikingly similar in vastly differing cultures (Sacks, 1995).

Example 2: In his essay Sacks (1995) indicated some of the known facts about autism, which included that the condition occurred in roughly one out of every thousand children as well as characteristically similar across varying cultures.

A: 1

B: 2

C: Both

D: Neither

Answer is **A**

Example 1: Most of these sentences do little more than substitute one phrase for another. An additional problem with this passage is that the only citation occurs at the very end of the last sentence in the paragraph. The reader might be misled into thinking that the earlier sentences were not also indebted to Sacks' essay.

➤ Illegitimate paraphrase

Example 2: Notice that this passage makes explicit right from the beginning, that the ideas belong to Sacks, expressed in his/her own way.

➤ legitimate paraphrase

Examples of plagiarism include:

- i Reproducing, in whole or part, text/sentences from a report, book, thesis, publication or the internet.
- ii Reproducing one's own previously published data, illustrations, figures, images, or someone else's data, etc.
- iii Taking material from class-notes or downloading material from internet sites, and incorporating it in one's class reports, presentations, manuscripts or thesis without citing the original source.
- iv Self-plagiarism, which constitutes copying verbatim from one's own earlier, published work in a journal or conference proceedings without appropriate citations.

Exactly what does "paraphrase" mean?

It means taking the words of another source and restating them, using your own vocabulary. In this way, you keep the meaning of the original text, but do not copy its exact wording.

Original	Plagiarism	Paraphrasing
Because of their unique perspective, Americans fear globalization less than anyone else, and as a consequence they think about it less than anyone else. When Americans do think about globalization, they think of the global economy as an enlarged version of the American economy. (Source: Thurow, L. (1993). <i>Fortune Favors the Bold</i> (p. 6). New York: Harper Collins.)	According to Lester Thurow (1993) Americans fear globalization less than people from other countries and as a consequence spend less time thinking about it. Indeed, Americans see globalization as an enlarged version of their own economy. Why is this plagiarism? The writer has used Thurow's exact words without enclosing them in quotation marks. S/he has only substituted synonyms here and there. Even though Thurow is credited with a citation, this would be considered plagiarism.	Lester Thurow (1993) maintains that because Americans see globalization simply as a bigger form of their own economy, they are less concerned about it than is the rest of the world. Why is this acceptable? The writer has kept the meaning of the original passage without copying words or structure. Words like <i>globalization</i> and <i>Americans</i> are generic terms (i.e., terms that are commonly used for the concept they illustrate - it is difficult to find synonyms for them). Thus you may use these words without placing them in quotation marks. (Complete Thurow reference appears in bibliography)

What strategies can I use to paraphrase?

- Use synonyms for all words that are not generic. Words like world, food, or science are so basic to our vocabulary that is difficult to find a synonym.
- Change the structure of the sentence.
- Change the voice from active to passive and vice versa.
- Change clauses to phrases and vice versa.
- Change parts of speech.

Original	Acceptable Paraphrase #1	Acceptable Paraphrase #2
Like drought, excess rainfall and flooding can also contribute to epidemics of waterborne infectious diseases, in this case due to poor sanitation resulting from runoff from overwhelmed sewage lines or the contamination of water by livestock. (Source: Shuman, E., M.D. (2010, March 25). Global climate change and infectious diseases. <i>New England Journal of Medicine</i>; 362, 12, 1061-1063. Retrieved from nejm.org at MIT Libraries.)	<u>Used Synonyms</u> An overabundance of rainfall can also be a factor in spreading infectious diseases carried by water, usually as a result of overflowing sewers and pollution from farm animals (Shuman, 2010).	<u>Changed Sentence Structure</u> When there is an overabundance of rainfall, two situations can occur: sewers can overflow and water can become polluted by the presence of livestock, both of which can lead to outbreaks of waterborne diseases (Shuman, 2010).

Original	Acceptable Paraphrase
Current political and economic incentives favor industry and other interest groups at the expense of health: consider the subsidies paid for corn-based agriculture and mass-produced processed foods, the tobacco revenue generated in countries with a government-owned tobacco industry, industrial growth in the face of environmental pollution, and the spread of the sedentary automobile-and-television culture. (Source: Venkat Narayan, K.M., Ali, M.K., and Koplan, J. (2010, September 23). Global noncommunicable diseases – where worlds meet. The New England Journal of Medicine, 363; 13. 1196-1198. Retrieved from nejm.org at MIT Libraries.)	<u>Changed Voice and Changed Parts of Speech</u> Researchers point out that in attempting to implement economic growth, industry is often favored over health: government may subsidize certain forms of agriculture and food production, contribute to tobacco consumption in nations where it owns the industry and otherwise promote growth of industries that pollute. (Venkat Narayan et. al, 2011).

Original	Acceptable Paraphrase: Changed Clause to Phrase
The prevalence and impact of non-communicable diseases continue to grow. Chronic diseases account for 60% of all deaths worldwide, and 80% of these deaths occur in low-or middle-income countries, where the toll is disproportionate during the prime productive years of youth and middle age. (Source: Venkat Narayan, K.M., , Ali, M.K., and Koplan, J. (2010, September 23). Global noncommunicable diseases – where worlds meet. The New England Journal of Medicine, 363; 13. 1196-1198. Retrieved from nejm.org at MIT Libraries.)	The increasing spread of non-communicable diseases can be seen in figures that show these diseases are responsible for 60% of all deaths on the planet, and that in countries where the population is primarily of low or middle income, the impact is greatest, often focusing on those who are young or middle-aged (Venkat Narayan et. al, 2011).

Original	Acceptable Paraphrase #1	Acceptable Paraphrase #2
We do not yet understand all the ways in which brain chemicals are related to emotions and thoughts, but the salient point is that our state of mind has an immediate and direct effect on our state of body. (Source: Siegel, B. (1986). <i>Love, Medicine and Miracles</i> (p. 69). New York: Harper and Row.)	Siegel (1986) writes that although the relationship between brain chemistry and thoughts and feelings is not fully understood, we do know that our psychological state affects our physical state. What did the writer do? • Used synonyms • Changed sentence structure • Changed voice • Cited source Words like <i>brain</i> are generic and do not need to be changed.	Siegel (1986) writes that the relationship between the chemicals in the brain and our thoughts and feelings remains only partially understood. He goes on to say, however, that one thing is clear: our mental state affects our bodily state. What did the writer do? • Used synonyms • Changed the sentence structure (use two sentences instead of one) • Changed voice • Changed parts of speech • Cited source Words like <i>brain</i> and <i>chemicals</i> are generic and do not need to be changed.

Original	Unacceptable Paraphrase #1	Unacceptable Paraphrase #2
We do not yet understand all the ways in which brain chemicals are related to emotions and thoughts, but the salient point is that our state of mind has an immediate and direct effect on our state of body. (Source: Siegel, B. (1986). <i>Love, Medicine and Miracles</i> (p. 69). New York: Harper and Row.)	Siegel (1986) writes that we still do not know all the ways in which brain chemistry is related to emotions and thoughts, but the important point is that our mental state has an immediate and direct effect on our physical state. Why is this unacceptable? • The writer has kept the same exact sentence structure • The writer had only substituted synonyms in certain places; in others the wording is exactly the same as that of the original. • Even though the writer mentions the original source in the introductory phrase, the result is plagiarism.	According to Siegel (1986), our mind affects our body quickly and directly, although we do not yet understand every aspect of how brain chemicals relate to emotions and thoughts. Why is this unacceptable? • Although the writer has changed the structure of the sentence, key phrases have been taken directly from the original. • Even though the writer mentions the original source in the introductory phrase, the result is plagiarism.

Original	Accurate quoting	Plagiarism
Because of their unique perspective, Americans fear globalization less than anyone else, and as a consequence they think about it less than anyone else. When Americans do think about globalization, they think of the global economy as an enlarged version of the American economy. (Source: Thurow, L. (1993). <i>Fortune Favors the Bold</i> (p. 6). New York: Harper Collins.)	Economist Lester Thurow (1993) has asserted that the American reaction to globalization is different from that of the rest of the world in that "American's fear globalization less than anyone else, and as a consequence . . . think about it less than anyone else" (p. 6). Why is this accurate? • The writer has introduced the quotation with his/her own words. • S/he has also named the source in an introduction phrase. • S/he has indicated where exact words of the source begin and end by using quotation marks.	The American view of globalization is unlike that of the rest of the world. Because of their unique perspective, Americans fear globalization less than anyone else, and therefore think about it less than anyone else (Thurow, 1993). Why is this plagiarism? • The writer has identified the source but has <i>not</i> put quotation marks around the words. • Lack of quotation marks allows the reader to think the words are the writer's, not Thurow's.

Avoiding Plagiarism - Quoting

FABRICATION

- Making up data or results and recording and reporting them (<http://ori.hhs.gov>).

Fabricating (making up) or falsifying (manipulating) data and reporting them in thesis and publications.



By Colleen Flaherty // February 15, 2019

The University of Texas at Austin lacks the authority, express or implied, to revoke a former graduate student's Ph.D., a state court determined this week.

The brief judgment by Judge Karin Crump pertains to Suvi Orr, who has been fighting to keep her Ph.D. for years, following allegations of scientific misconduct that led the university to revoke the doctorate.

Orr, now a senior principal scientist at Pfizer, received her doctorate in organic chemistry at Texas in 2008. She saw her dissertation retracted in 2012 over unreliable data. Orr argued then and now that she misread the data and didn't falsify anything.

Texas nevertheless tried to revoke her degree twice. Orr sued each time, arguing that she wasn't given the opportunity to defend herself against the misconduct claim and that her former professor is to blame for her situation.



Overview of the Darsee Case

John R. Darsee was a young clinical investigator in cardiology at the Brigham and Women's Hospital (a teaching affiliate of Harvard University) who published many research studies and included faculty members as authors on the work although they had minimal or no direct involvement in the papers that bore their names.

In May of 1981, Darsee's associates and supervisors at Harvard caught him fabricating data. Other investigations led to the conclusion that Darsee fabricated research publications beginning when he was a biology student at Notre Dame, continuing through his medical residency and cardiology fellowship at Emory University, and ending at Harvard. More than 10 primary journal articles and more than 45 abstracts were retracted as a result of the investigations. The Darsee case highlighted the problem of using so-called "gift authors" on papers. Gift authors have little or no contact with the person giving them the authorship, but the presence of the prestigious names may influence an editor to consider a paper for publication.

FALSIFICATION

Manipulating research material, equipment or processes or changing or omitting data or results such that the research is not accurately presented in the research record (<http://ori.hhs.gov>).

FALSIFICATION: AN EXAMPLE

J Biol Chem. 2013 March 15; 288(11): 7549.
doi: [10.1074/jbc.A113.512112](https://doi.org/10.1074/jbc.A113.512112) PMID: PMC3597795

CDP-choline significantly restores phosphatidylcholine levels by differentially affecting phospholipase A₂ and CTP: phosphocholine cytidyltransferase after stroke.

[Rao Muralikrishna Adibhatta](#), [James F. Hatcher](#), [Eric C. Larsen](#), [Xinzhi Chen](#), [Dandan Sun](#), and [Francis H. C. Tsao](#)

[Copyright and License information ►](#)

This retracts the article "CDP-choline significantly restores phosphatidylcholine levels by differentially affecting phospholipase A₂ and CTP: phosphocholine cytidyltransferase after stroke," in volume 281 on page 6718.

VOLUME 281 (2006) PAGES 6718–6725

~~This article has been retracted by the publisher.~~

An investigation by the Office of Research Integrity determined that falsified Western blots were included in Figs. 1B and 2A, and falsified quantification of Western blots was included in Figs. 1B, 2A, and 3A (<https://federalregister.gov/a/2013-01454>).

CONSEQUENCES OF SCIENTIFIC MISCONDUCT

1. Could mean the end to career as a researcher.
 - Grounds for dismissal of tenured faculty
 - Forfeiture of research grants.
 - Blacklisted (e.g. reputable research organizations and universities refuse to hire; funding sources refuse to sponsor research work, journals refuse to consider any articles for publication.)
2. Fabricators may have previously earned academic credentials taken away.

e.g. in 2004, **Jan Hendrik Schön** was stripped of his **doctorate degree** by the University of Konstanz after a committee formed by Bell Labs found him **guilty of fabrication** related to research done during his employment there.

NEWS BLOG

Jan Hendrik Schön loses his PhD

19 Sep 2011 | 12:50 BST | Posted by Richard Van Noorden | Category: Policy

Posted on behalf of Quirin Schiermeier

The University of Konstanz in Germany was correct to withdraw the doctoral degree of disgraced physicist Jan Hendrik Schön, a court in the state of Baden-Württemberg has [ruled](#).

Schön, who was a staff physicist at Lucent Technologies' Bell Labs in New Jersey, is notorious for having perpetrated [a remarkable string of fabrications](#) in the fields of organic and molecular electronics, several of which were published in *Nature* and *Science* between 2000 and 2002.

Last year, Schön had [successfully sued](#) his alma mater for its 2004 [decision](#) to revoke his 1997 PhD thesis (for which there is no suspicion of data fabrication). But in a [14 September judgement](#), the court agreed with Konstanz that later misconduct also showed 'unworthiness' to hold the doctorate. The court added that the judgement could not be appealed.



REDUNDANT PUBLICATION

- Redundant or Duplicate Publication – Duplicate publication is the publication of a manuscript, article or paper that is overlapping substantially with one that is already published, without a clear and visible reference to the previous publication .

Duplicate and Prior Publication

Definition: Publishing the same information (data, results), in part or in whole, in more than one publication.

Best Practice: Publish only original results or declare reuse of material at submission

Why is duplicate publication poor practice? Because:

- ✦ readers trust and expect that primary research manuscripts present only new results
- ✦ it unnecessarily utilizes the peer review resources for review of unoriginal work
- ✦ it distorts the literature (overemphasizes a single finding)

Duplicate Submission

Dr. Miller submits her manuscript to **Journal A**

Undergoes Peer Review

R1 R2 R3

REVISE

Still on Hold

Author submits manuscript to **Journal B**

Undergoes Peer Review

R3 R4 R5

Reviewer reports

Duplicate Publication

MANUSCRIPT

Journal A

Editor A

R1 R2 R3

Accept & Publish

Retraction

Duplicate Submission

Abuse of resources

Duplicate Publication

Reader reports

Journal B

Editor B

R4 R5 R6

Accept & Publish

Duplicate Publication and Meta-Analyses

One of the readings for Activity A described how a meta-analysis of 6 papers was discovered to have analyzed the same data set twice.



DISCUSS

- ✦ How would reuse of data in publications affect meta-analyses?
- ✦ What effect could duplicate publication have on interpreting clinical outcomes?
- ✦ Who could have been affected if the duplicate publication had not been discovered?

Secondary Publications are Only Acceptable if:

- ✦ The reuse of previously published data is scientifically necessary
- ✦ The reuse of previously published data is declared and justified in the cover letter to the editor
- ✦ The reuse of previously published data is described AND REFERENCED within the manuscript, wherever the reuse occurs
- ✦ Permission to republish data is granted from the copyright holder

- Redundant or duplicate publication is publication of a paper that overlaps substantially with one already published. Readers of primary source periodicals deserve to be able to trust that what they are reading is original unless there is a clear statement that the article is being republished by the choice of the author and editor. The bases of this position are international copyright laws, ethical conduct, and cost-effective use of resources

1. Duplicate Submission

- Authors should not submit the same manuscript, in the same or different languages, simultaneously to more than one journal. The rationale for this standard is the potential for disagreement when two (or more) journals claim the right to publish a manuscript that has been submitted simultaneously to more than one journal, and the possibility that two or more journals will unknowingly and unnecessarily undertake the work of peer review, edit the same manuscript, and publish the same article.

2. Duplicate and Prior Publication

- Duplicate publication is publication of a paper that overlaps substantially with one already published, without clear, visible reference to the previous publication. Prior publication may include release of information in the public domain.

- **Duplicate submission / publication** : This refers to the practice of submitting the same study to two journals or publishing more or less the same study in two journals. These submissions/publications can be nearly simultaneous or years later.
- **Redundant publication** (also described as 'salami publishing'): this refers to the situation that one study is split into several parts and submitted to two or more journals. Or the findings have previously been published elsewhere without proper cross-referencing, permission or justification. "Self-plagiarism" is considered a form of redundant publication. It concerns recycling or borrowing content from previous work without citation. This practice is widespread and might be unintentional. Transparency by the author on the use of previously published work usually provides the necessary information to make an assessment on whether it is deliberate or unintentional.

Deception and ethical issues

- Skews the evidence base because readers assume that they are reading 2 different studies^{10,18}
- Misleads the reader that the article contains original information^{10,18}
- Damages journals' reputations¹⁰
- Distorts the purpose of journals as being presenters of new information¹⁰
- Infringes on international copyright law^{5,7,9}

Wasting resources

- Wastes time/resources of journals, editors, reviewers, readers, libraries, and electronic databases^{1,6,7,9,11,17,19}
- Needlessly expands the body of published literature⁹
- Wastes journal space and confuses readers⁷
- Wastes paper pages that could have been used for other articles⁶
- Wastes readers time to find, secure, and read republished material, when they could have spent

EXAMPLE OF PUBLICATION OVERLAP

- *Answering the same question with different datasets*. For example, authors may publish an observational study to understand the effect of nutrients on plant growth and, in a second paper, an experimental study to verify causality of their observations. In another example, authors may use the same experiment in two locations and publish the results from each location separately.
- *Splitting apart data collected in the same system to answer different questions (a.k.a. data fragmentation, salami slicing, piecemeal publication)*. For example, authors may publish the effects of maternal environment on offspring size and number in separate papers. Or authors may run a set of soil samples through a series of tests and then publish each test separately.
- *Augmenting previously published data with a smaller dataset that may not be able to stand on its own (a.k.a. data augmentation, meat extending)*. For example, authors may collect biological data at a few more field sites and present these new data along with the older data in a new paper.

SALAMI PUBLICATION

- Salami publication or segmented publication is a distinct form of redundant publication which is usually characterized by similarity of hypothesis, methodology or results but not text similarity . These aspects of publications are not objectively detected by software applications and therefore present a serious threat to publication ethics .
- Salami publication can be roughly defined as a publication of two or more articles derived from a single study . Articles of such type report on data collected from a single study split into several segments just large enough to gain reasonable results and conclusions, also known as “minimal publishable unit”

EXAMPLE

- **Example 1:** A group of authors presented preliminary results of a pilot study in the form of a short communication in one journal. Two years later, the same group of authors published an article based on a much bigger sample in the same journal. They referred to the short communication published earlier and readily presented their results which supported the hypothesis based on the pilot study. Should this be considered a salami publication?

- **Answer :** This is certainly not a salami publication . Moreover, this is probably the best way to conduct a study . A pilot study can reveal disadvantages of a study design that can be corrected during research conduct and data collection . Cross referencing the previous publication demonstrated the authors' transparency in their intention to present the study results .

- A prospective study comprised of determination of C-reactive protein (CRP), procalcitonin (PCT) and serum amyloid A (SAA) in renal cancer patients. There were two groups, patients with metastatic renal cancer and patients with localized renal cancer. Within a short period of time, two articles with similar titles were published with no cross reference to each other. One article presented the use of CRP and PCT for differentiation of renal cancer stages. The other article assessed the difference of CRP and SAA between patients with metastatic and localized renal cancer. The size of the patient sample with metastatic renal cancer was different in those studies but the sample size of patients with localized renal cancer was the same and with the same demographic characteristics. Articles shared the same three authors. Could these articles be suspected of salami publication?

- **Answer :** This is a typical case of salami publication. Exactly the same data for localized renal cancer subgroup of patients are presented in both manuscripts without appropriate reference to previously published article. In addition, there is no justified reason for splitting the data for tested biochemical markers into two separate manuscripts. However, no accusations can be made before a thorough inspection of articles involved in this case. The corresponding authors of both articles must be contacted and given the chance to make an appropriate explanation.

- A group of authors published the results of a new biomarker used in the evaluation of inflammatory bowel disease therapy. Institute's ethical committee approved the study and all patients gave informed consent to participate in the study. The sample size was small so the authors correctly chose nonparametric statistical tests. The study revealed some interesting results worthy of further follow up. Several years later the same group of authors reported results on the same hypothesis but with a different outcome and with no cross reference to the earlier publication. The studied patient population was much bigger so they used appropriate parametric statistics and in the end gained a different study outcome. Are there any grounds for suspecting salami publication?

- Answer : There are legitimate reasons for suspecting salami publication i.e., the same group of authors published two articles with the same hypothesis. The fact that the authors did not properly reference their previous work sets doubts on their good intention. There is no limitation for publishing a follow up study with a different outcome but basic conditions have to be met: clear statement of the type of the study, explanation of the differences between previous publication and the new one, and appropriate citation of the previous article.

HOW TO AVOID SALAMI PUBLICATION ?

- One conducted study should be reported in one article.
- A second manuscript based on already published data should:
 - properly reference the previously published article;
 - besides citing the original article, clearly declare that it is part of an already published study;
 - emphasize all new knowledge added in the second manuscript;
 - not repeat any of the data presented in the previous article;
 - give a detailed explanation to the journal's editor on all above mentioned points because transparency is crucial.
- Never use the same control group for more than one study. Each control group must be representative to the tested group of a single study.

T10: Selecting the Right Journal (Indexing & Impact)

(Identifying predatory journals, Scopus/WoS metrics)

Resource Person: Dr. Haresh Chandra Mishra

Adjunct Professor and Research Adviser, State Institute of Special Education and Research (SISER), Bhubaneswar

SELECTING THE RIGHT JOURNAL (INDEXING & IMPACT) (IDENTIFYING PREDATORY JOURNALS, SCOPUS/WOS METRICS)

Dr. Haresh Chandra Mishra
Adjunct Professor & Research Advisor,
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Bhubaneswar

Points of Discussion

1. Indexing of Journals
2. Criteria for Indexing of Journals
3. Major Impact Metrics of Indexing
4. Major Indexing Database
5. Criteria for Selecting the Right Journal
6. Identification of Predatory Journals
7. Useful Verification Platform
8. Steps Before Submission

1. INDEXING OF JOURNALS

- ✖ **What is Indexing of Journal:** Journal indexing refers to the process by which academic and research journals are included in recognized databases or indexing services. These databases systematically organize scholarly literature so that researchers, students, academicians, and professionals can easily search, access, and cite research articles. Indexed journals are generally considered more credible, visible, and academically valuable than non-indexed journals.
- ✖ Indexing plays a crucial role in academic and research communication because it enhances the discoverability, accessibility, and impact of research publications. Universities, research institutions, and regulatory bodies often emphasize publications in indexed journals for academic promotions, research evaluation, and funding purposes.
- ✖ **The major objectives of indexing are:**
 - To improve the visibility of research articles.
 - To facilitate easy retrieval of scholarly literature.
 - To maintain standards of academic publishing.
 - To increase citation and research impact.
 - To ensure quality control in scholarly communication.
 - To help researchers identify reliable journals.
 - To support literature review and evidence-based research.

2. CRITERIA FOR JOURNAL INDEXING

Sl. No.	Criteria	Description	Example
1	Peer-Review Process	The journal must follow a proper peer-review system where experts evaluate submitted manuscripts before publication to ensure scientific accuracy and originality.	A psychology journal sends every research article to two subject experts for blind review before acceptance.
2	Editorial Quality	The journal should have a qualified editorial board, clear editorial policies, proper formatting, and professional publication standards.	A journal with professors and researchers from reputed universities serving as editors and reviewers.
3	Publication Ethics	Journals must follow ethical guidelines related to plagiarism, authorship, conflict of interest, and research misconduct.	Use of plagiarism detection software and adherence to Committee on Publication Ethics (COPE) guidelines.
4	Regularity of Publication	Journals should publish issues consistently according to their declared frequency (monthly, quarterly, biannual, etc.).	A quarterly journal releasing four issues every year on schedule without delays.
5	ISSN Registration	The journal must possess a valid International Standard Serial Number (ISSN) for identification and cataloguing.	Print ISSN: 1234-5678 and Online ISSN: 2345-6789 displayed on the journal website.
6	International Diversity of Authors and Editors	Indexing agencies prefer journals having contributors and editorial board members from different countries and institutions.	Editorial board includes scholars from India, USA, UK, Australia, and Canada.

7	Citation Performance	The journal should demonstrate scholarly impact through citations received by its published articles.	Articles published in the journal are frequently cited in Scopus or Web of Science indexed publications.
8	Quality of Published Content	Research articles should be original, relevant, methodologically sound, and academically significant.	Publishing empirical research with proper statistical analysis, references, and scientific methodology.
9	Online Accessibility	Many indexing agencies require journals to maintain a functional website with accessible archives and author guidelines.	A journal website providing PDF access to current and past issues.
10	Abstracting and Metadata Standards	Articles should contain proper titles, abstracts, keywords, DOI numbers, and bibliographic information for easy indexing.	Each article includes DOI, structured abstract, keywords, and APA references.
11	Language Quality	Articles should maintain high linguistic and grammatical standards, usually in English or other internationally accepted academic languages.	Professionally edited manuscripts with clear academic writing style.
12	Digital Archiving and Preservation	Journals should preserve published content through digital archiving systems to ensure long-term accessibility.	Archiving through services like LOCKSS or institutional repositories.

3. MAJOR IMPACT METRICS OF INDEXING JOURNALS

(A) **Impact Factor:** The most widely used journal impact measure developed by Clarivate.

Impact Factor=Citations in Current Year to Articles Published in Previous Two Years/ Total Citable articles published in previous two years

Example

If a journal receives 500 citations in 2025 for articles published during 2023 and 2024, and it published 100 articles during those years: $IF = 500/100 = 5$

(B) **Cite Score:** Cite Score is a journal evaluation metric developed by Elsevier and calculated using data from the Elsevier database. It measures the average number of citations received per document published in a journal over a four-year period. It is widely used to assess the academic influence, visibility, and quality of journals across different disciplines.

Cite Score = Total citations received in previous four years/ Total documents published in 4 years

Example :

No. of Documents	2021	2022	2023	2024	Total
	40	50	60	50	200
In 2025, these documents received 800 citations; Cite score = $800/200 = 4$					

(C) **Quartile Matrix:** Journal quartiles are ranking categories used to measure the relative performance and prestige of academic journals within a specific subject category. Journals are divided into four equal groups (quartiles) based on citation performance and impact indicators. Quartile ranking is commonly provided by: Scopus through SCImago Journal Rank (SJR) Web of Science through Journal Citation Reports (JCR). Quartiles are calculated based on the ranking position of a journal within a subject category. $\text{Quartile Position} = \text{Rank of the Journal} / \text{Total No of Journals} \times 100$

Quartile	Meaning	Position in Subject Category	Quality Level	Example Interpretation
Q1	First Quartile	Top 25% journals	Very High Impact	Leading international journals
Q2	Second Quartile	25%–50%	High Impact	Well-recognized journals
Q3	Third Quartile	50%–75%	Moderate Impact	Average-performing journals
Q4	Fourth Quartile	Bottom 25%	Lower Impact	Emerging or less-cited journals

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Istoriya Journal

<https://www.scopus.com/sources>

4. MAJOR INDEXING DATABASE FOR ACADEMIC JOURNALS WITH HIGH IMPACT FACTOR AND CITATION INDEX

Indexing Database	Managing Organization	Subject Coverage	Type of Content Indexed	Major Metrics/Features	Importance for Researchers	Official Website
Scopus	Elsevier	Multidisciplinary (Science, Social Science, Arts, Humanities, Medicine, Engineering)	Peer-reviewed journals, conference papers, books	CiteScore, SJR, SNIP, Quartile Rankings (Q1–Q4)	Widely used for citation analysis, academic ranking, and institutional evaluation	Scopus
Web of Science	Clarivate	Multidisciplinary	High-quality journals, conference proceedings, books	Journal Impact Factor (JIF), Journal Citation Indicator (JCI), h-index	Considered highly selective and prestigious for research evaluation	Web of Science
PubMed	National Library of Medicine (NLM)	Medicine, Nursing, Life Sciences, Biomedical Sciences	Biomedical journal articles and abstracts	Medical Subject Headings (MeSH), PMID indexing	Essential database for medical and health science research	PubMed
DOAJ	DOAJ	Multidisciplinary Open Access Journals	Peer-reviewed open-access journals	Open-access quality verification	Helps identify credible open-access journals and avoid predatory journals	DOAJ Directory
ERIC	U.S. Department of Education	Education and Educational Research	Journal articles, reports, conference papers, policy papers	ERIC Number (ED/EJ identifiers)	Major database for education research and teaching resources	ERIC Database
PsycINFO	American Psychological Association (APA)	Psychology, Behavioral Sciences, Mental Health	Journal articles, books, dissertations, reports	APA Thesaurus indexing and psychological classification	Important resource for psychology and behavioral science research	PsycINFO

5. CRITERIA FOR SELECTING THE RIGHT JOURNAL

Criteria	Key Points	Importance for Researchers	Example/Consideration
Scope and Relevance	- Match between manuscript topic and journal aims. - Review previously published articles.	Ensures the manuscript fits the journal's academic focus and increases the chance of acceptance.	A psychology paper should be submitted to journals focusing on psychology or behavioral sciences rather than unrelated fields.
Target Audience	- Academic researchers. - Practitioners. - Policymakers. - Interdisciplinary readers.	Helps the research reach the intended readers and maximize impact.	Clinical studies may target healthcare practitioners, while policy studies may target administrators and policymakers.
Indexing Status	- Whether indexed in Scopus or WoS. - Verification through official database websites.	Indexed journals generally have greater credibility, visibility, and citation potential.	Verify indexing through Scopus Sources or Web of Science Master Journal List .
Impact and Reputation	- Quartile ranking. - Citation metrics. - Editorial board quality.	Indicates journal quality, influence, and academic recognition.	Q1 journals usually have higher visibility and stronger citation impact than Q4 journals.
Publication Speed	- Average review timeline. - Publication timeline after acceptance.	Important when research findings need timely dissemination.	Some journals publish within 2–3 months, while others may take more than a year.
Acceptance Rate	Selectivity and competitiveness of the journal.	Helps researchers estimate the likelihood of manuscript acceptance.	Highly reputed journals often have low acceptance rates due to rigorous peer review.
Open Access vs Subscription	- Visibility benefits of open access. - Article Processing Charges (APCs).	Open-access journals increase accessibility and readership, but may involve publication fees.	Authors should check APC amounts and funding availability before submission.
Ethical Standards	- Peer-review transparency. - COPE guidelines adherence.	Ensures academic integrity, ethical publishing practices, and research credibility.	Journals following COPE guidelines are generally considered ethically reliable.

Verification Method	Description	How to Verify	Warning Signs in Predatory Journals	Importance
Check Journal Indexing	Determines whether the journal is included in recognized academic databases.	Verify directly through official databases such as Scopus, Web of Science, Directory of Open Access Journals, and PubMed.	Fake indexing claims, discontinued journals, or indexing in unknown databases.	Indexed journals generally follow quality standards and ethical publishing practices.
Verify ISSN Authenticity	ISSN is the official identification number of a journal.	Check the ISSN through the official ISSN Portal and match it with the journal title.	Missing ISSN, fake ISSN, or ISSN belonging to another journal.	Confirms the journal is officially registered and recognized.
Review Editorial Board Legitimacy	Evaluates whether qualified scholars manage the journal.	Search editors through university websites, ORCID, Google Scholar, or LinkedIn.	Fake editors, missing affiliations, or same editors handling unrelated disciplines.	A genuine editorial board ensures proper academic supervision and peer review.
Examine Peer-Review Timelines	Assesses the quality and duration of manuscript review.	Review the journal's peer-review policy and publication timelines.	Acceptance within a few days, guaranteed publication, or no revision process.	Proper peer review maintains research quality and credibility.
Check Publisher Reputation	Evaluates the trustworthiness and history of the publisher.	Research publisher background, journal portfolio, and author experiences.	Poor website quality, fake addresses, hidden contact details, aggressive solicitation emails.	Reputable publishers maintain ethical and professional publishing standards.
Look for COPE Membership	Checks whether the journal follows publication ethics guidelines.	Verify membership through the official Committee on Publication Ethics member directory.	Fake COPE logo, no ethics statement, or false membership claims.	Indicates commitment to publication ethics, transparency, and integrity.
Check Publication Charges	Examines transparency of article processing charges (APCs).	Read author guidelines and fee structure carefully.	Hidden fees or sudden payment requests after acceptance.	Transparent charges reflect ethical publishing practices.
Assess Website Quality	Reviews professionalism and accuracy of the journal website.	Examine grammar, formatting, contact details, and functionality.	Poor grammar, broken links, copied content, or unprofessional design.	Professional websites reflect credibility and seriousness.
Review Published Articles	Evaluates the quality of previously published research.	Read sample articles for methodology, citations, and language quality.	Poor writing, plagiarism, irrelevant topics, or low-quality content.	High-quality articles indicate rigorous editorial standards.
Check Solicitation Emails	Reviews the nature of invitation emails sent by journals.	Examine whether emails are personalized and relevant to your field.	Spam-like invitations, excessive flattery, or urgent submission requests.	Legitimate journals usually send professional and selective communications.

6. IDENTIFYING PREDATORY JOURNALS

Aspect	Description	Warning Signs of Predatory Journals	How to Verify
Meaning of Predatory Journals	Journals that prioritize profit over academic quality and often charge publication fees without proper peer review or editorial standards.	Promise guaranteed publication and quick acceptance.	Check journal reputation through trusted academic databases.
Peer-Review Process	Genuine journals follow a rigorous peer-review system involving expert reviewers.	Extremely rapid acceptance (within days), vague or absent review process.	Read author guidelines and examine review timelines.
Indexing Claims	Authentic journals are indexed in recognized databases such as Scopus and Web of Science.	Fake indexing logos or misleading claims like "Indexed in International Impact Factor."	Verify directly on official database websites.
ISSN Authenticity	Legitimate journals possess valid ISSN numbers registered officially.	Fake, missing, or duplicated ISSN numbers.	Verify through the official ISSN Portal.
Editorial Board	Reputed journals have recognized scholars with institutional affiliations.	Fake names, unrelated experts, or missing affiliations.	Search editors' profiles on university websites or ORCID .
Publisher Reputation	Established publishers maintain publication ethics and transparency.	Unknown publishers with poor website quality and unclear contact details.	Check publisher history, address, and academic reputation.
Publication Fees (APC)	Genuine journals clearly mention Article Processing Charges (APCs).	Hidden fees or sudden payment requests after acceptance.	Review APC details on the journal website before submission.

Website Quality	Authentic journals maintain professional websites with clear policies.	Poor grammar, spelling mistakes, fake metrics, broken links.	Examine website quality and transparency carefully.
COPE Membership	Ethical journals often follow publication ethics standards of Committee on Publication Ethics (COPE).	No ethics policy or plagiarism guidelines.	Verify membership through the official COPE directory.
Solicitation Emails	Genuine journals rarely send excessive invitations.	Aggressive spam emails requesting urgent submission.	Ignore unsolicited invitations and verify journal legitimacy independently.
Impact Metrics	Legitimate journals use recognized metrics such as CiteScore, Impact Factor, or SJR.	Use fake metrics like “Global Impact Factor” or misleading rankings.	Verify metrics through official indexing agencies.
Publication Regularity	Reliable journals publish issues regularly according to schedule.	Irregular publication frequency or missing archives.	Check previous issues and publication consistency.
Transparency of Policies	Ethical journals clearly explain copyright, plagiarism, and withdrawal policies.	No clear author guidelines or copyright information.	Read journal policies carefully before submission.
Contact Information	Genuine journals provide valid institutional addresses and emails.	Only generic emails (e.g., Gmail/Yahoo) and fake addresses.	Verify address and publisher details online.
Quality of Published Articles	Published papers should show academic rigor and proper formatting.	Poorly written articles with obvious errors and weak references.	Review previously published papers critically.

7. Useful Verification Platforms

Platform	Purpose
Scopus Sources	Verify Scopus indexing
Master Journal List (Web of Science)	Verify WoS indexing
DOAJ	Check ethical open-access journals
COPE	Publication ethics membership

8. Steps Before Submission

1. Read journal aims and scope carefully.
2. Review recently published articles.
3. Follow author guidelines strictly.
4. Check formatting and referencing style.
5. Verify plagiarism percentage.
6. Confirm indexing from official sources.
7. Ensure ethical approval if required.

Conclusion

Selecting the right journal is essential for research visibility and academic growth.

Indexing and impact metrics help evaluate journal quality.

Researchers must critically assess journals before submission.

Awareness of predatory journals protects academic integrity and research credibility.



W2: Workshop: Data Visualization & Result Reporting

(Creating impactful tables and figures using basic tools)

Resource Person: Dr. Bhabani Shankar Mohanty

Assistant Professor, Department of Statistics and Applied Mathematics, School of Mathematics and Computer Sciences, Central University of Tamil Nadu, Tamil Nadu



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DATA VISUALIZATION AND REPORTING RESULTS

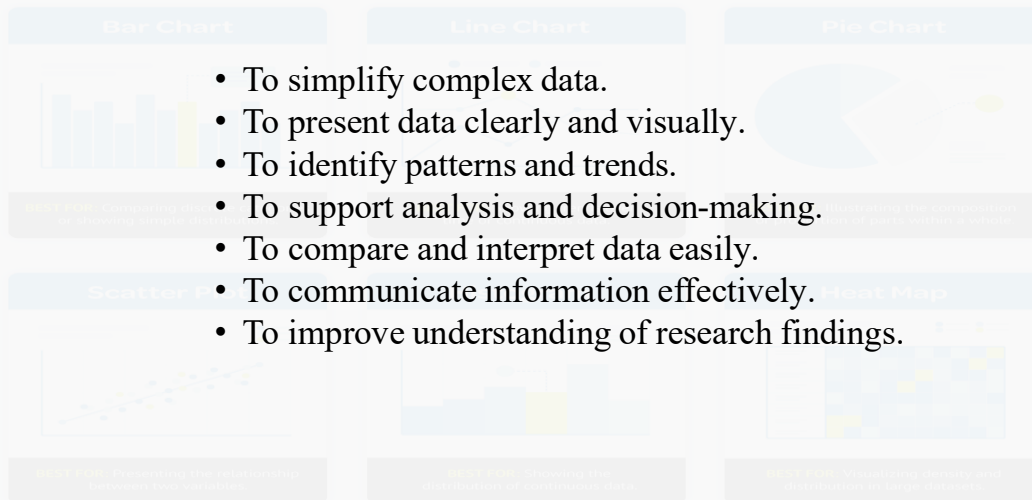
Dr. BHABANI SHANKAR MOHANTY
Assistant Professor
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INTRODUCTION TO DATA VISUALIZATION

- Data visualization is the graphical representation of data and information.
- It presents data using charts, graphs, maps, and dashboards.
- It helps convert complex data into simple and understandable visuals.
- It makes it easier to identify patterns, trends, and relationships in data.
- It improves data analysis, communication, and decision-making.
- Data visualization is widely used in research, business, healthcare, education, and science.
- Popular tools used for visualization include Microsoft Excel, SPSS and RStudio.
- It helps researchers and educators present findings more effectively and clearly.

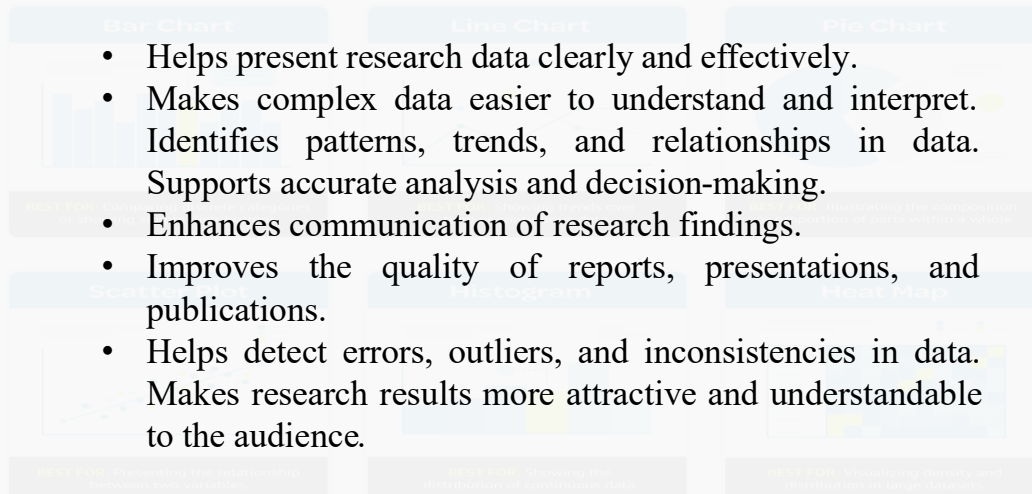
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OBJECTIVES TO DATA VISUALIZATION



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IMPORTANCE IN RESEARCH



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CHARATERISTICS OF GOOD VISUALIZATION

- Clear and easy to understand
- Accurate representation of data
- Simple and well-organized design
- Attractive and visually appealing
- Proper use of colors, labels, and scales
- Highlights important information effectively
- Avoids unnecessary complexity and clutter
- Supports quick interpretation and decision-making

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TYPES OF DATA

- **Qualitative Data** – Descriptive or categorical data
(Example: Gender, Color, Religion)
- **Quantitative Data** – Numerical data
(Example: Age, Height, Income)
- **Time Series Data** - Time-ordered data
(Example: Daily temperature, Monthly sales)
- **Multivariate Data** – Multiple-variable data
(Example: Age, Height, Income)
- **Geographical Data** - Spatial data
(Example: Population map, Rainfall distribution)

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Standard Data Visualization Examples

COMMON VISUALIZATION TOOLS

- EXCEL
- R STUDIO
- SPSS



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Standard Data Visualization Examples

DATA VISUALIZATION BEST PRACTICE

- Keep the design simple and clear
- Choose the correct chart or graph
- Use proper labels and titles
- Avoid too many colors and clutter
- Highlight important information
- Maintain accuracy and consistency
- Use readable fonts and scales
- Make the visualization easy to interpret

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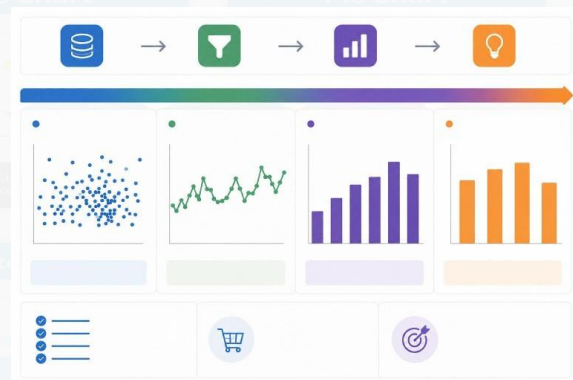
COMMON MISTAKES IN DATA VISUALIZATION

- Using the wrong type of chart
- Overloading visuals with too much information
- Using too many colors or effects
- Missing labels, titles, or legends
- Distorting data with improper scales
- Creating cluttered and confusing designs
- Ignoring audience understanding
- Misrepresenting or exaggerating data

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DIFFERENT TYPES OF GRAPHS

- BAR GRAPH
- LINE GRAPH
- PIE CHART
- SCATTER PLOT
- AREA GRAPH
- BOX PLOT
- BUBBLE CHART
- HEAT MAP
- DONUT CHART
- FUNNEL CHART
- CHOROPLETH MAP



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Standard Data Examples

BAR GRAPH

A bar graph is a chart in which data is represented by horizontal or vertical bars of equal width separated by equal spaces.

Features of a Bar Graph

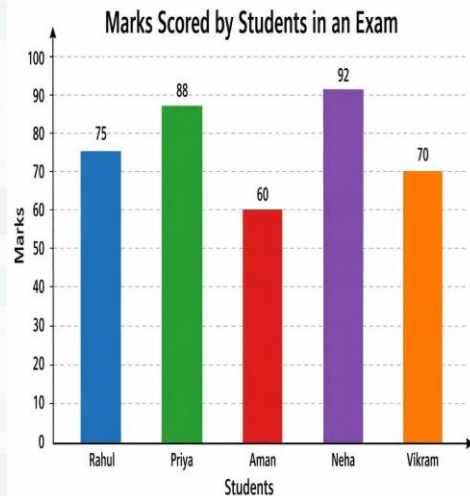
- Bars can be vertical or horizontal.
- Width of all bars is equal.
- Length/height of bars shows the magnitude of data.
- Bars are separated by spaces.
- Used for categorical data comparison.

Types of Bar Graph:

1. Vertical Bar Graph
2. Horizontal Bar Graph
3. Multiple Bar Graph
4. Stacked Bar Graph

Limitations of Bar Graph

- Not suitable for large datasets
- Cannot show continuous data effectively
- Too many bars make the graph confusing



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Standard Data Examples

LINE GRAPH

A line graph is a graphical representation in which data values are plotted on a coordinate system and connected using lines to show continuous change.

Features of a Bar Graph

- Uses points connected by lines
- Shows trends over time
- Displays continuous data
- Easy to compare changes
- Can represent one or more datasets

Uses of Line Graphs

- Weather forecasting
- Stock market analysis
- Population growth studies
- Business sales tracking
- Scientific experiments



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Standard PIE CHART Examples

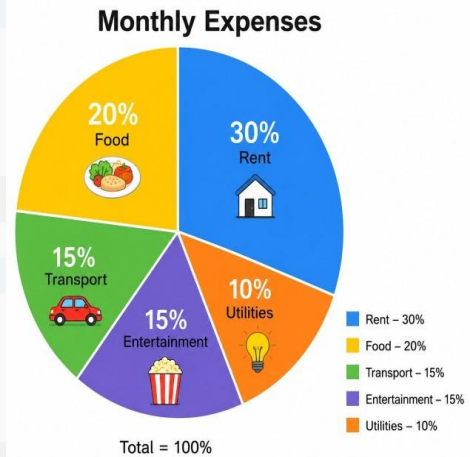
A pie chart is a graphical representation in which a circle is divided into sectors, and each sector represents a percentage or proportion of the total data.

Features of a Pie Chart

- Circular in shape
- Divided into slices or sectors
- Represents parts of a whole
- Easy to compare percentages
- Best for limited categories

Uses of Pie Charts

- Budget analysis
- Market share comparison
- Survey results
- Population distribution
- Business reports



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Standard SCATTER PLOT Examples

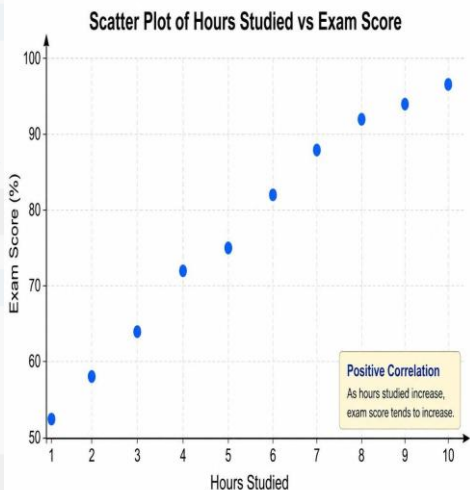
A scatter plot is a graphical representation in which individual data points are plotted on the X-axis and Y-axis to study the relationship or correlation between two variables.

Features of a Scatter Plot

- Uses dots to represent data points
- Shows relationships between variables
- Helps identify trends and correlations
- Useful for continuous numerical data
- Can reveal clusters and outliers

Uses of Scatter Plots

- Statistical analysis
- Correlation studies
- Scientific research
- Business forecasting
- Machine learning and data science



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Standard Data Visualization Examples

AREA GRAPH

An area graph is a graphical representation where data points are connected by lines, and the area under the line is shaded to emphasize the magnitude of values over time.

Features of an Area Graph

- Displays trends over time
- Filled area highlights volume or magnitude
- Useful for continuous data
- Can compare multiple datasets
- Similar to a line graph but visually more impactful

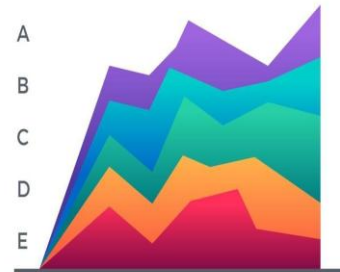
Types of Area Graph:

1. Simple Area Graph
2. Stacked Area Graph

Uses of Area Graphs

- Financial analysis
- Business growth tracking
- Environmental studies
- Population analysis
- Time-series data visualization

AREA CHART



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Standard Data Visualization Examples

BOX PLOT

A box plot is a graphical representation that shows the minimum value, first quartile (Q1), median, third quartile (Q3), and maximum value of a dataset.

Features of a Box Plot

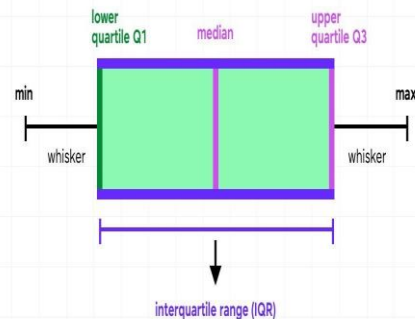
- Displays data distribution clearly
- Shows median and quartiles
- Helps identify outliers
- Useful for comparing datasets
- Summarizes large data efficiently

Uses of Box Plots

- Comparing multiple datasets
- Detecting outliers
- Understanding data spread
- Statistical analysis
- Research and data science



Introduction to data analysis: Box Plot



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Standard **BUBBLE CHART** Examples

A bubble chart is a graphical representation in which data points are shown as bubbles, where:

- The horizontal position represents one variable
- The vertical position represents another variable
- The size of the bubble represents a third variable

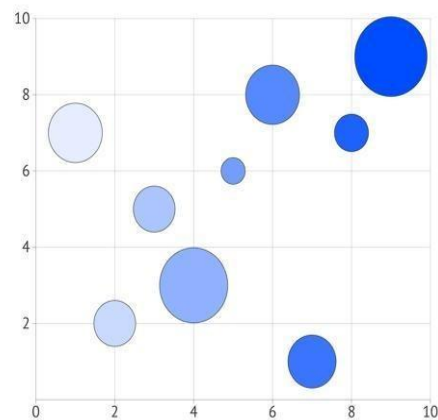
Features of a Bubble Chart

- Uses circles or bubbles to represent data
- Displays relationships among three variables
- Bubble size indicates magnitude
- Useful for comparing multiple data points
- Attractive and easy to interpret visually

Uses of Bubble Charts

- Business analysis
- Financial data comparison
- Population studies
- Scientific research
- Marketing analysis

X Axis color binding



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Standard **HEAT MAP** Examples

A heat map is a data visualization technique in which colors represent the magnitude or intensity of values in a dataset.

Features of a Heat Map

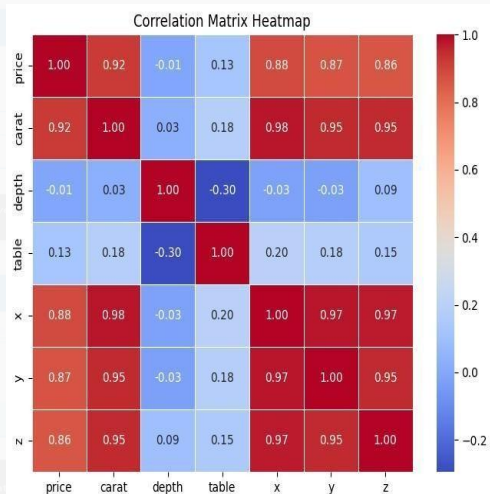
- Uses colors to represent data values
- Darker or brighter colors indicate higher intensity
- Helps identify patterns and trends easily
- Useful for large datasets
- Displays correlations effectively

Types of Area Graph:

1. Correlation Heat Map
2. Geographical Heat Map
3. Activity Heat Map

Uses of Heat Maps

- Data analysis
- Business intelligence
- Website analytics
- Scientific research
- Machine learning and statistics



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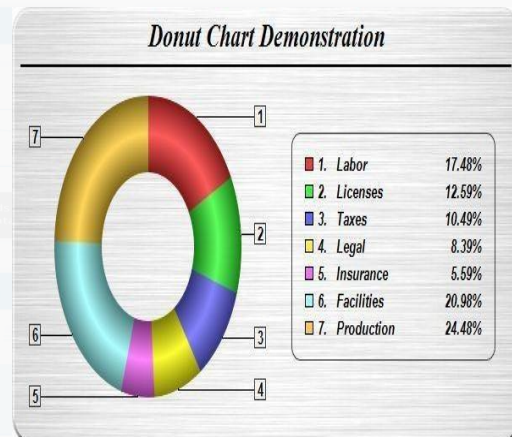
A donut chart is a circular graph divided into sectors, where each sector represents a proportion of the whole, and the center is left blank.

Features of a Donut Chart

- Circular in shape
- Has a hollow center
- Represents parts of a whole
- Uses different colors for categories
- Easy to compare percentages visually

Uses of Donut Charts

- Financial reports
- Business analytics
- Marketing analysis
- Survey and research data
- Dashboard visualization



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A funnel chart is a graphical representation that displays sequential stages of a process and the reduction of data through those stages.

Features of a Funnel Chart

- Funnel-shaped structure
- Represents stages in order
- Width decreases from top to bottom
- Shows conversion or drop-off rates
- Easy to identify process efficiency

Uses of Funnel Charts

- Sales pipeline analysis
- Marketing conversion tracking
- Recruitment process analysis
- Customer journey visualization
- Business performance monitoring



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Standard Data Visualization Examples

CHOROPLETH MAP

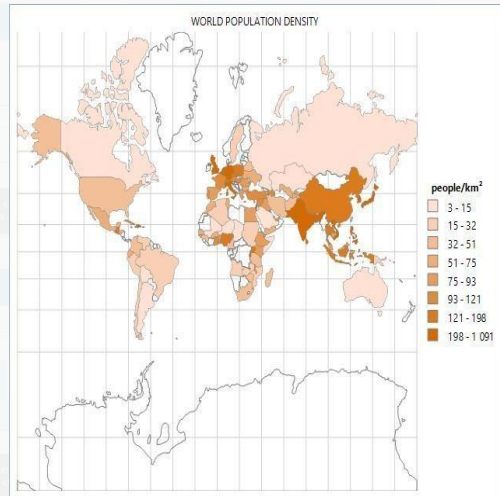
A choropleth map is a map in which areas such as countries, states, or districts are shaded or colored according to statistical data values.

Features of a Choropleth Map

- Uses colors or shades to represent data
- Displays geographical patterns clearly
- Helps compare regions easily
- Suitable for statistical and demographic data
- Darker or brighter colors often indicate higher values

Uses of Choropleth Maps

- Geographic data analysis
- Population studies
- Election result visualization
- Weather and climate studies
- Public health analysis



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Standard Data Visualization Examples

DATA VISUALIZATION USING EXCEL

Bar Chart



Line Chart



Pie Chart



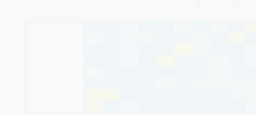
Scatter Plot



Histogram



Heat Map



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Standard Examples

BAR GRAPH IN EXCEL

Step 1: Enter the Data

Open Microsoft Excel and type your data in rows and columns.

Step 2: Select the Data

Click and drag to select the entire dataset including headings.

Step 3: Go to the Insert Tab

On the top menu bar, click the **Insert** tab.

Step 4: Choose Bar Chart

In the **Charts** group, click on **Bar Chart** or **Column Chart**.

Select the desired style (2-D or 3-D)

Step 5: Bar Graph Appears

Excel automatically creates the bar graph from your selected data.

Step 6: Customize the Bar Graph

You can improve the graph by adding:

- **Chart Title**
- **Axis Titles**
- **Colors and Styles**
- **Data Labels**
- **Legend**

To add chart elements:

Click the graph

Press the "+" (**Chart Elements**) button beside the chart

Step 7: Save the File

Click **File** → **Save As**

Choose location and save your Excel workbook.

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Standard Examples

LINE GRAPH IN EXCEL

Step 1: Enter the Data

Open Microsoft Excel and type your data in rows and columns.

Step 2: Select the Data

Click and drag to select the entire dataset including headings.

Step 3: Go to the Insert Tab

On the top menu bar, click the **Insert** tab.

Step 5: Choose Line Chart

In the **Charts** section:

Click **Insert Line or Area Chart**

Select **2-D Line Chart**

Step 6: Line Graph Appears

Excel automatically creates the line graph based on the selected data.

Step 7: Customize the Line Graph

You can improve the graph by adding:

- **Chart Title**
- **Axis Titles**
- **Data Labels**
- **Gridlines**
- **Colors and Styles**

To add chart elements:

Click the graph

Click the "+" (**Chart Elements**) button beside the chart

Step 8: Save the File

Click **File** → **Save As**

Choose location and save the workbook.

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Step 1: Enter the Data

Open Microsoft Excel and type your data in rows and columns.

Step 2: Select the Data

Click and drag to select the entire dataset including headings.

Step 3: Go to the Insert Tab

On the top menu bar, click the **Insert** tab.

Step 5: Choose Pie Chart

In the **Charts** section:

Click **Insert Pie or Doughnut Chart**

Select **2-D Pie Chart**

Step 6: Pie Chart Appears

Excel automatically creates the pie chart based on the selected data.

Step 7: Customize the Pie Chart

You can improve the chart by adding:

- **Chart Title**
- **Data Labels**
- **Percentages**
- **Colors and Styles**
- **Legend**

To add chart elements:

Click the chart

Click the "+" (**Chart Elements**) button beside the chart

Step 8: Save the File

Click **File** → **Save As**

Choose location and save the workbook.

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Step 1: Enter the Data

Open Microsoft Excel and type your data in rows and columns.

Step 2: Select the Data

Click and drag to select the entire dataset including headings.

Step 3: Go to the Insert Tab

On the top menu bar, click the **Insert** tab.

Step 5: Choose Scatter Plot

In the **Charts** section:

Click **Insert Scatter (X, Y) Chart**

Select **Scatter with only Markers**

Step 6: Scatter Plot Appears

Excel automatically creates the scatter plot using the selected data.

Step 7: Customize the Scatter Plot

You can improve the chart by adding:

- **Chart Title**
- **Axis Titles**
- **Gridlines**
- **Trendline**
- **Colors and Marker Styles**

To add chart elements:

Click the chart

Click the "+" (**Chart Elements**) button beside the chart

Step 8: Add a Trendline (Optional)

To show correlation:

Right-click any point

Choose **Add Trendline**

Step 9: Save the File

Click **File** → **Save As**

Choose location and save the workbook

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AREA GRAPH IN EXCEL

Step 1: Open Excel

Open Microsoft Excel on your computer.

Step 2: Enter the Data

Type the data into rows and columns.

Step 3: Select the Data

Highlight the complete dataset including headings.

Step 4: Go to the Insert Tab

On the top menu bar, click the **Insert** tab.

Step 5: Choose Area Chart

In the **Charts** section:

Click **Insert Line or Area Chart**

Select **2-D Area Chart**

Step 6: Area Graph Appears

Excel automatically creates the area graph from the selected data.

Step 7: Customize the Area Graph

You can improve the chart by adding:

Chart Title

Axis Titles

Data Labels

Gridlines

Colors and Styles

To customize:

Click the chart

Use the **Chart Design** and **Format** tabs

Step 8: Add Chart Elements (Optional)

To add labels and titles:

Click the "+" (**Chart Elements**) button beside the chart

Select required elements

Step 9: Save the File

Click **File** → **Save As**

Choose location and save the workbook.

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BOX PLOT IN EXCEL

Step 1: Open Excel

Open Microsoft Excel on your computer.

Step 2: Enter the Data

Type the numerical data into columns.

Step 3: Select the Data

Click and drag to select the numerical data including the heading.

Step 4: Go to the Insert Tab

Click the **Insert** tab from the top menu bar.

Step 5: Choose Box and Whisker Chart

In the **Charts** section:

Click **Insert Statistic Chart**

Select **Box and Whisker**

Step 6: Box Plot Appears

Excel automatically creates the box plot using the selected data.

Step 7: Understand the Box Plot

The graph displays:

Minimum value

First Quartile (Q1)

Median

Third Quartile (Q3)

Maximum value

Outliers (if present)

Step 8: Customize the Box Plot

You can improve the graph by adding:

Chart Title

Axis Labels

Colors and Styles

Gridlines

Step 9: Save the File

Click **File** → **Save As**

Choose location and save the workbook.

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BUBBLE CHART IN EXCEL

Step 1: Open Excel

Open Microsoft Excel on your computer.

Step 2: Enter the Data

A bubble chart requires three sets of values:

X-values

Y-values

Bubble sizes

Step 3: Select the Data

Click and drag to select the complete dataset including headings.

Step 4: Go to the Insert Tab

Click the **Insert** tab from the top menu bar.

Step 5: Choose Bubble Chart

In the **Charts** section:

- Click **Insert Scatter (X, Y) or Bubble Chart**
- Select **Bubble Chart**

Step 7: Customize the Bubble Chart

You can improve the chart by adding:

- **Chart Title**
- **Axis Titles**
- **Data Labels**
- **Colors and Bubble Styles**
- **Gridlines**

Step 8: Add Labels (Optional)

To identify bubbles:

Right-click a bubble

Choose **Add Data Labels**

Step 9: Save the File

Click **File** → **Save As**

Choose location and save the workbook.

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HEAT MAP IN EXCEL

Step 1: Open Excel

Open Microsoft Excel on your computer.

Step 2: Enter the Data

Type the numerical data into rows and columns.

Step 3: Select the Numerical Data

Highlight only the numerical values.

Step 4: Go to the Home Tab

Click the **Home** tab on the top menu bar.

Step 5: Choose Conditional Formatting

- Click **Conditional Formatting**
- Select **Color Scales**

Step 6: Select a Color Scale

Choose a color style.

Example:

Green → High values

Yellow → Medium values

Red → Low values

Excel automatically creates the heat map.

Step 7: Customize the Heat Map

You can modify:

- **Colors**
- **Rules**
- **Cell styles**
- **Fonts**

Step 8: Save the File

Click **File** → **Save As**

Choose location and save the workbook.

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Star **DONUT CHART IN EXCEL** Examples

Step 1: Open Excel

Open Microsoft Excel on your computer.

Step 2: Enter the Data

Type the numerical data into rows and columns.

Step 3: Select the Data

Click and drag to select the complete dataset including headings.

Step 4: Go to the Insert Tab

Click the **Insert** tab from the top menu bar.

Step 5: Choose Donut Chart

In the **Charts** section:

Click **Insert Pie or Doughnut Chart**

Select **Doughnut Chart**

Step 6: Donut Chart Appears

Excel automatically creates the donut chart from the selected data.

Step 7: Customize the Donut Chart

You can improve the chart by adding:

- **Chart Title**
- **Data Labels**
- **Percentages**
- **Colors and Styles**
- **Legend**

Step 8: Adjust Donut Hole Size (Optional)

To change the center hole size:

Right-click the donut chart

Choose **Format Data Series**

Adjust the **Doughnut Hole Size** slider

Step 9: Save the File

Click **File → Save As**

Choose location and save the workbook.

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Star **FUNNEL CHART IN EXCEL** Examples

Step 1: Open Excel

Open Microsoft Excel on your computer.

Step 2: Enter the Data

Enter the stages and corresponding values.

Step 3: Select the Data

Highlight the complete dataset including headings.

Step 4: Go to the Insert Tab

Click the **Insert** tab on the top ribbon.

Step 5: Choose Funnel Chart

In the **Charts** group:

Click **Insert Waterfall, Funnel, Stock,**

Surface or Radar Chart

Select **Funnel Chart**

Step 6: Funnel Chart Appears

Excel automatically creates the funnel chart from the selected data.

Step 7: Customize the Funnel Chart

You can improve the chart by adding:

- **Chart Title**
- **Data Labels**
- **Percentages**
- **Colors and Styles**
- **Legend**

Step 8: Add Data Labels (Optional)

To show values clearly:

Right-click the funnel sections

Select **Add Data Labels**

Step 9: Save the File

Click **File → Save As**

Choose location and save the workbook.

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Standard Data Visualization Examples

FUNNEL CHART IN EXCEL

Step 1: Open Excel

Open Microsoft Excel on your computer.

Step 2: Enter the Data

Enter the stages and corresponding values.

Step 3: Select the Data

Highlight the complete dataset including headings.

Step 4: Go to the Insert Tab

Click the **Insert** tab on the top ribbon.

Step 5: Choose Funnel Chart

In the **Charts** group:

Click **Insert Waterfall, Funnel, Stock, Surface or Radar Chart**
Select **Funnel Chart**

Step 6: Funnel Chart Appears

Excel automatically creates the funnel chart from the selected data.

Step 7: Customize the Funnel Chart

You can improve the chart by adding:

- **Chart Title**
- **Data Labels**
- **Percentages**
- **Colors and Styles**
- **Legend**

Step 8: Add Data Labels (Optional)

To show values clearly:

Right-click the funnel sections

Select **Add Data Labels**

Step 9: Save the File

Click **File** → **Save As**

Choose location and save the workbook.

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DATA VISUALIZATION USING R STUDIO

Dr. BHABANI SHANKAR MOHANTY, ASST. PROFESSOR, CENTRAL UNIVERSITY OF TAMIL NADU

How to Install and Download R Studio ?

Step 1: Download R Software

Before installing RStudio, you must install R.

Download R

Visit the official CRAN website:

[CRAN R Project Download](#)

Choose your operating system:

Windows

macOS

Linux

Step 2: Install R

After downloading:

Open the setup file

Click **Next**

Accept the license agreement

Choose installation location

Click **Install**

Finish installation

Step 3: Download RStudio

Now download [RStudio Desktop](#)

Choose:

RStudio Desktop Free Version

Step 4: Install RStudio

After downloading:

Open the RStudio setup file

Click **Next**

Choose installation location

Click **Install**

Finish setup

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How to Import Data in R?

Dr. BHABANI SHANKAR MOHANTY, ASST. PROFESSOR, CENTRAL UNIVERSITY OF TAMIL NADU

Standard Examples

Importing Data in R

Step 1: Open RStudio

Open RStudio on your computer.

Method 1: Import CSV File in R

Step 2: Prepare the CSV File

Save your dataset as a .csv file.

Step 3: Set Working Directory (Optional)

```
setwd("C:/Users/YourFolder")
```

Step 4: Import the CSV File

```
data <- read.csv("data.csv")
```

Explanation

- read.csv() → imports CSV file
- data → stores dataset

Step 5: View the Data

```
View(data)
```

Method 2: Import Excel File in R

Step 1: Install and Load Package

```
install.packages("readxl")
```

```
library(readxl)
```

Step 2: Import Excel File

```
data <- read_excel("data.xlsx")
```

Step 3: View Data

```
View(data)
```

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Standard Examples

BAR GRAPH IN R STUDIO

Step 1: Open RStudio

Open RStudio on your computer.

Step 2: Create the Data or Insert Data

Enter the category names and corresponding values.

```
# Creating data
```

```
products <- c("A", "B", "C", "D")
```

```
sales <- c(50, 80, 40, 70)
```

Step 3: Plot the Bar Graph

Use the barplot() function.

```
# Creating bar graph
```

```
barplot(sales)
```

Step 4: Add Labels and Title

Improve the graph by adding names and colors.

```
# Bar graph with labels and colors
```

```
barplot(sales,  
        names.arg = products,  
        col = "skyblue",  
        main = "Sales of Products",  
        xlab = "Products",  
        ylab = "Sales")
```

Step 5: Run the Code

Select the code

Click the **Run** button in RStudio

The graph appears in the **Plots** window

Step 6: Save the Graph

To save the graph:

Go to the **Plots** panel

Click **Export**

Choose:

Save as Image

Save as PDF

Complete R Program

```
# Creating data
```

```
products <- c("A", "B", "C",  
             "D")
```

```
sales <- c(50, 80, 40, 70)
```

```
# Plotting bar graph
```

```
barplot(sales,  
        names.arg = products,  
        col = "skyblue",  
        main = "Sales of  
Products",  
        xlab = "Products",  
        ylab = "Sales")
```

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LINE GRAPH IN R STUDIO

Step 1: Open RStudio

Open RStudio on your computer.

Step 2: Create the Data or Insert Data

Enter the data values for the graph.

Creating data

```
months <- c("Jan", "Feb", "Mar", "Apr")
```

```
sales <- c(100, 120, 150, 170)
```

Step 3: Plot the Line Graph

Use the plot() function with type "l".

Simple line graph

```
plot(sales, type = "l")
```

- type = "l" means line graph

Step 4: Add Labels and Title

Customize the graph with labels and colors.

Line graph with labels and color

```
plot(sales,  
     type = "l",  
     col = "blue",  
     lwd = 2,  
     xaxt = "n",  
     main = "Monthly Sales",  
     xlab = "Months",  
     ylab = "Sales")  
axis(1, at = 1:4, labels = months)
```

Step 5: Run the Code

Select the code

Click the **Run** button in RStudio

The graph appears in the **Plots** panel

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LINE GRAPH IN R STUDIO

Step 6: Save the Graph

To save the graph:

Go to the **Plots** panel

Click **Export**

Choose:

Save as Image

Save as PDF

Complete R Program

Creating data

```
months <- c("Jan", "Feb", "Mar", "Apr")
```

```
sales <- c(100, 120, 150, 170)
```

Plotting line graph

```
plot(sales,  
     type = "l",  
     col = "blue",  
     lwd = 2,  
     xaxt = "n",  
     main = "Monthly Sales",  
     xlab = "Months",  
     ylab = "Sales")
```

```
axis(1, at = 1:4, labels = months)
```

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PIE CHART IN R STUDIO

Step 1: Open RStudio

Open RStudio on your computer.

Step 2: Create the Data

Enter the categories and corresponding values.

Creating data

```
categories <- c("Food", "Rent", "Transport",  
"Entertainment")
```

```
expenses <- c(30, 40, 15, 15)
```

Step 3: Plot the Pie Chart

Use the pie() function.

Simple pie chart

```
pie(expenses)
```

Step 4: Add Labels, Colors, and Title

Customize the pie chart for better appearance.

```
# Pie chart with labels and colors  
colors <- c("skyblue", "pink",  
"lightgreen", "orange")
```

```
pie(expenses,  
  labels = categories,  
  col = colors,  
  main = "Monthly Expenses")
```

Step 5: Display Percentages (Optional)

You can also show percentages.

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PIE CHART IN R STUDIO

Adding percentages

```
percent <-
```

```
round(expenses/sum(expenses)*100)
```

```
pie(expenses,
```

```
  labels = paste(categories, percent, "%"),
```

```
  col = colors,
```

```
  main = "Monthly Expenses")
```

Step 7: Save the Graph

To save the graph:

Go to the **Plots** panel

Click **Export**

Choose:

Save as Image

Save as PDF

Complete R Program

Creating data

```
categories <- c("Food", "Rent", "Transport",  
"Entertainment")
```

```
expenses <- c(30, 40, 15, 15)
```

Defining colors

```
colors <- c("skyblue", "pink", "lightgreen",  
"orange")
```

Calculating percentages

```
percent <- round(expenses/sum(expenses)*100)
```

Plotting pie chart

```
pie(expenses,
```

```
  labels = paste(categories, percent, "%"),
```

```
  col = colors,
```

```
  main = "Monthly Expenses")
```

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SCATTER PLOT IN R STUDIO

Step 1: Open RStudio

Open RStudio on your computer.

Step 2: Create the Data

Enter the values for the two variables.

Creating data

```
study_hours <- c(1, 2, 3, 4, 5)
```

```
marks <- c(40, 50, 55, 65, 75)
```

Step 3: Plot the Scatter Plot

Use the plot() function.

Simple scatter plot

```
plot(study_hours, marks)
```

Step 4: Add Labels, Colors, and Title

Customize the pie chart for better appearance.

Scatter plot with labels and color

```
plot(study_hours, marks,
```

```
  main = "Study Hours vs Marks",
```

```
  xlab = "Study Hours",
```

```
  ylab = "Marks",
```

```
  col = "blue",
```

```
  pch = 19)
```

Step 5: Add a Trend Line (Optional)

To show correlation or trend:

Adding regression line

```
abline(lm(marks ~ study_hours), col =
```

```
"red", lwd = 2)
```

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SCATTER PLOT IN R STUDIO

Step 6: Run the Code

Select the code

Click the **Run** button in RStudio

The graph appears in the **Plots** panel

Step 7: Save the Graph

To save the graph:

Go to the **Plots** panel

Click **Export**

Choose:

Save as Image

Save as PDF

Complete R Program

Creating data

```
study_hours <- c(1, 2, 3, 4, 5)
```

```
marks <- c(40, 50, 55, 65, 75)
```

Plotting scatter plot

```
plot(study_hours, marks,
```

```
  main = "Study Hours vs Marks",
```

```
  xlab = "Study Hours",
```

```
  ylab = "Marks",
```

```
  col = "blue",
```

```
  pch = 19)
```

Adding trend line

```
abline(lm(marks ~ study_hours), col = "red", lwd = 2)
```

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Star AREA GRAPH IN R STUDIO es

Step 1: Open RStudio

Open RStudio on your computer.

Step 2: Create the Data

Enter the values for the graph.

Creating data

```
months <- c(1, 2, 3, 4)
```

```
sales <- c(100, 120, 150, 170)
```

Step 3: Plot a Basic Area Graph

Use the plot() function and fill the area using polygon().

Creating area graph

```
plot(months, sales,
```

```
type = "n",
```

```
xlab = "Months",
```

```
ylab = "Sales",
```

```
main = "Monthly Sales Area Graph")
```

```
polygon(c(months, rev(months)),
        c(sales, rep(0, length(sales))),
        col = "skyblue")
```

```
lines(months, sales, lwd = 2)
```

Step 4: Understand the Code

Explanation

plot(..., type="n") → creates empty plot

polygon() → fills the area under the line

col → area color

lines() → draws the line graph

lwd = 2 → line thickness

Step 5: Add Month Labels (Optional)

```
axis(1,
```

```
at = months,
```

```
labels = c("Jan", "Feb", "Mar", "Apr"))
```

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Star AREA GRAPH IN R STUDIO es

Step 6: Run the Code

Select the code

- Click the **Run** button in RStudio
- The graph appears in the **Plots** panel

Step 7: Save the Graph

To save the graph:

Go to the **Plots** panel

Click **Export**

Choose:

Save as Image

Save as PDF

Complete R Program

Creating data

```
months <- c(1, 2, 3, 4)
```

```
sales <- c(100, 120, 150, 170)
```

Creating empty plot

```
plot(months, sales,
```

```
type = "n",
```

```
xlab = "Months",
```

```
ylab = "Sales",
```

```
main = "Monthly Sales Area Graph")
```

Filling area

```
polygon(c(months,
```

```
rev(months)),
```

```
c(sales, rep(0,
```

```
length(sales))),
```

```
col = "skyblue")
```

Drawing line

```
lines(months, sales, lwd = 2)
```

Adding month labels

```
axis(1,
```

```
at = months,
```

```
labels = c("Jan", "Feb", "Mar", "Apr"))
```

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Step 1: Open RStudio

Open RStudio on your computer.

Step 2: Create the Data

Enter the numerical data.

Creating data

```
marks <- c(10, 15, 20, 25, 30, 35, 40)
```

Step 3: Plot a Basic Box Plot

Use the boxplot() function.

Simple box plot

```
boxplot(marks)
```

Step 4: Add Labels, Colors, and Title

Customize the pie chart for better appearance.

Customized box plot

```
boxplot(marks,
```

```
  main = "Distribution of Marks",
```

```
  ylab = "Marks",
```

```
  col = "skyblue",
```

```
  border = "blue")
```

Step 5: Plot Multiple Box Plots (Optional)

Creating multiple datasets

```
classA <- c(10, 15, 20, 25, 30)
```

```
classB <- c(18, 22, 28, 35, 40)
```

Multiple box plots

```
boxplot(classA, classB,
```

```
  names = c("Class A", "Class B"),
```

```
  col = c("skyblue", "pink"),
```

```
  main = "Comparison of Marks")
```

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Step 6: Run the Code

Select the code

Click the **Run** button in RStudio

The graph appears in the **Plots** panel

Step 7: Save the Graph

To save the graph:

Go to the **Plots** panel

Click **Export**

Choose:

Save as Image

Save as PDF

Complete R Program

Creating data

```
marks <- c(10, 15, 20, 25, 30, 35, 40)
```

Plotting box plot

```
boxplot(marks,
```

```
  main = "Distribution of Marks",
```

```
  ylab = "Marks",
```

```
  col = "skyblue",
```

```
  border = "blue")
```

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Step 1 BUBBLE CHART IN R STUDIO

Step 1: Open RStudio

Open RStudio on your computer.

Step 2: Create the Data

A bubble chart requires:

- **X-values**
- **Y-values**
- **Bubble sizes**

Creating data

```
advertising <- c(10, 20, 30, 40)
```

```
sales <- c(40, 50, 65, 80)
```

```
profit <- c(5, 10, 15, 20)
```

Step 3: Plot the Bubble Chart

Use the `symbols()` function.

```
# Bubble chart
```

```
symbols(advertising, sales,
```

```
  circles = profit,
```

```
  inches = 0.3,
```

```
  bg = "skyblue",
```

```
  fg = "blue",
```

```
  main = "Bubble Chart",
```

```
  xlab = "Advertising",
```

```
  ylab = "Sales")
```

Step 5: Add Labels to Bubbles

(Optional)

```
text(advertising, sales,
```

```
  labels = profit,
```

```
  pos = 3)
```

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Step 2 BUBBLE CHART IN R STUDIO

Step 5: Understand the Code Explanation

`symbols()` → creates bubble chart

`circles = profit` → bubble sizes

`inches` → controls bubble scaling

`bg` → bubble fill color

`fg` → bubble border color

`main` → graph title

`xlab` → X-axis label

`ylab` → Y-axis label

Step 6: Run the Code

Select the code

Click the **Run** button in RStudio

The graph appears in the **Plots**

panel

Step 7: Save the Graph

Complete R Program

```
# Creating data
```

```
advertising <- c(10, 20, 30, 40)
```

```
sales <- c(40, 50, 65, 80)
```

```
profit <- c(5, 10, 15, 20)
```

```
# Plotting bubble chart
```

```
symbols(advertising, sales,
```

```
  circles = profit,
```

```
  inches = 0.3,
```

```
  bg = "skyblue",
```

```
  fg = "blue",
```

```
  main = "Bubble Chart",
```

```
  xlab = "Advertising",
```

```
  ylab = "Sales")
```

```
# Adding labels
```

```
text(advertising,
```

```
  sales,
```

```
    labels = profit,
```

```
    pos = 3)
```

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HEAT MAP IN R STUDIO

Step 1: Open RStudio

Open RStudio on your computer.

Step 2: Create the Data Matrix

A heat map requires data in matrix form.

Creating data matrix

```
data <- matrix(c(80, 75, 90,
                 60, 85, 70,
                 95, 88, 92,
                 70, 65, 78),
              nrow = 4,
              byrow = TRUE)
```

Step 3: Add Row and Column Names

Label the rows and columns.

Adding row and column names

```
rownames(data) <- c("A", "B", "C", "D")
colnames(data) <- c("Math", "Science",
                    "English")
```

Step 4: Plot the Heat Map

Use the heatmap() function.

Creating heat map

```
heatmap(data)
```

Step 5: Customize the Heat Map

Add colors and titles.

Customized heat map

```
heatmap(data,
        col = heat.colors(256),
        scale = "none",
        main = "Student Marks Heat Map")
```

Step 6: Use Another Color Scheme (Optional)

Alternative color scheme

```
heatmap(data,
        col = terrain.colors(256),
        scale = "none",
        main = "Heat Map")
```

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HEAT MAP IN R STUDIO

Step 6: Run the Code

Select the code

Click the **Run** button in RStudio

The graph appears in the **Plots** panel

Step 7: Save the Graph

To save the graph:

Go to the **Plots** panel

Click **Export**

Choose:

Save as Image

Save as PDF

Complete R Program

Creating matrix

```
data <- matrix(c(80, 75, 90,
                 60, 85, 70,
                 95, 88, 92,
                 70, 65, 78),
              nrow = 4,
              byrow = TRUE)
```

Adding labels

```
rownames(data) <- c("A", "B",
                    "C", "D")
colnames(data) <- c("Math",
                    "Science", "English")
```

Plotting heat map

```
heatmap(data,
        col =
        heat.colors(256),
        scale = "none",
        main = "Student
        Marks Heat Map")
```

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DONUT CHART IN R STUDIO

Step 1: Open RStudio

Open RStudio on your computer.

Step 2: Install and Load Required Package

A donut chart is commonly created using the plotrix package.

```
# Install package (only once)
install.packages("plotrix")
```

```
# Load package
library(plotrix)
```

Step 3: Create the Data

Enter the categories and values.

```
# Creating data
categories <- c("Food", "Rent", "Transport",
"Entertainment")
values <- c(30, 40, 15, 15)
```

Step 4: Define Colors

Choose colors for the chart.

```
# Defining colors
colors <- c("skyblue", "pink", "lightgreen",
"orange")
```

Step 5: Plot the Donut Chart

Use the pie() function and add a white circle in the center.

```
# Creating pie chart
pie(values,
labels = categories,
col = colors,
main = "Donut Chart")
```

```
# Adding center circle
draw.circle(0, 0, 0.4, col = "white")
```

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DONUT CHART IN R STUDIO

Step 6: Display Percentages (Optional)

```
# Calculating percentages
percent <- round(values/sum(values)*100)
```

Donut chart with percentages

```
pie(values,
labels = paste(categories, percent, "%"),
col = colors,
main = "Donut Chart")
```

```
draw.circle(0, 0, 0.4, col = "white")
```

Step 7: Run the Code

Select the code

Click the **Run** button in RStudio

The graph appears in the **Plots** panel

Step 8: Save the Graph

Complete R Program

```
# Install package
install.packages("plotrix")
```

```
# Load package
library(plotrix)
```

```
# Creating data
categories <- c("Food",
"Rent", "Transport",
"Entertainment")
values <- c(30, 40, 15, 15)
```

```
# Defining colors
colors <- c("skyblue", "pink",
"lightgreen", "orange")
```

```
# Calculating
percentages
percent <-
round(values/sum(valu
es)*100)
# Creating donut chart
pie(values,
labels =
paste(categories,
percent, "%"),
col = colors,
main = "Donut
Chart")
# Adding white circle
draw.circle(0, 0, 0.4,
col = "white")
```

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FUNNEL CHART IN R STUDIO

Step 1: Open RStudio

Open RStudio on your computer.

Step 2: Install and Load Required Package

A funnel chart can be created using the plotrix package.

```
# Install package (only once)
install.packages("plotrix")
```

```
# Load package
library(plotrix)
```

Step 3: Create the Data

Enter the process stages and values.

```
# Creating data
stages <- c("Visitors", "Leads", "Prospects",
"Customers")
values <- c(1000, 700, 400, 150)
```

Step 4: Create a Funnel-Like Chart

Use a horizontal bar plot to represent the funnel.

```
# Scatter plot with labels and color
plot(study_hours, marks,
main = "Study Hours vs Marks",
xlab = "Study Hours",
ylab = "Marks",
col = "blue",
pch = 19)
```

Step 5: Improve Funnel Appearance (Optional)

You can reverse the order for a funnel effect.

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FUNNEL CHART IN R STUDIO

```
# Reversed funnel style
barplot(rev(values),
names.arg = rev(stages),
horiz = TRUE,
col = c("pink", "orange",
"lightgreen", "skyblue"),
main = "Funnel Chart",
xlab = "Count")
```

Step 6: Add Data Labels (Optional)

```
# Storing bar positions
bp <- barplot(values,
names.arg = stages,
horiz = TRUE,
col = "skyblue")
```

```
# Adding labels
text(values, bp,
labels = values,
pos = 4)
```

Step 7: Run the Code

Select the code

Click the **Run** button in RStudio

The graph appears in the **Plots** panel

Step 8: Save the Graph

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FUNNEL CHART IN R STUDIO

Complete R Program

```
# Creating data
stages <- c("Visitors", "Leads", "Prospects",
"Customers")
values <- c(1000, 700, 400, 150)

# Plotting funnel chart
barplot(rev(values),
names.arg = rev(stages),
horiz = TRUE,
col = c("pink", "orange", "lightgreen",
"skyblue"),
main = "Sales Funnel Chart",
xlab = "Number of People")
```

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CHOROPLETH MAP IN R STUDIO

Step 1: Open RStudio

Open RStudio on your computer.

Step 2: Install Required Packages

Install the packages needed for choropleth maps.

Install packages

```
install.packages("maps")
```

```
install.packages("ggplot2")
```

```
install.packages("dplyr")
```

Step 3: Load the Packages

Load packages

```
library(maps)
```

```
library(ggplot2)
```

```
library(dplyr)
```

Step 4: Load Map Data

Loading world map data

```
world_map <- map_data("world")
```

Step 5: Create Data for the Map

Creating sample data

```
data <- data.frame(
region = c("India", "China", "United States",
"Brazil"),
value = c(50, 80, 70, 40)
)
```

Step 6: Merge Map Data with Values

Converting region names to lowercase

```
data$region <- tolower(data$region)
```

Merging datasets

```
map_data <- left_join(world_map, data, by =
"region")
```

Step 7: Plot the Choropleth Map

Use ggplot() to create the map.

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CHOROPLETH MAP IN R STUDIO

```
# Plotting choropleth map
ggplot(map_data,
  aes(long, lat, group = group, fill = value)) +
  geom_polygon(color = "black") +
  coord_fixed(1.3) +
  scale_fill_gradient(low = "lightblue",
    high = "darkblue") +
  labs(title = "Choropleth Map")
```

Step 8: Understand the Code

Explanation

ggplot() → creates the graph
geom_polygon() → draws map regions
fill = value → colors regions based on data
scale_fill_gradient() → sets color intensity
coord_fixed() → maintains map proportions

Step 9: Run the Code

Select the code

Click the **Run** button in RStudio

The graph appears in the **Plots** panel

Step 10: Save the Graph

To save the graph:

Go to the **Plots** panel

Click **Export**

Choose:

Save as Image

Save as PDF

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CHOROPLETH MAP IN R STUDIO

Complete R Program

```
# Installing packages
install.packages("maps")
install.packages("ggplot2")
install.packages("dplyr")
# Loading packages
library(maps)
library(ggplot2)
library(dplyr)
# Loading map data
world_map <- map_data("world")
# Creating sample dataset
data <- data.frame(
  region = c("India", "China", "United States", "Brazil"),
  value = c(50, 80, 70, 40)
)
```

```
# Converting names to lowercase
data$region <- tolower(data$region)

# Merging data
map_data <- left_join(world_map, data, by = "region")

# Plotting choropleth map
ggplot(map_data,
  aes(long, lat, group = group, fill = value)) +
  geom_polygon(color = "black") +
  coord_fixed(1.3) +
  scale_fill_gradient(low = "lightblue",
    high = "darkblue") +
  labs(title = "Choropleth Map")
```

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Standard Data Visualization Examples

Bar Chart



SPSS Example: Comparing discrete categories or showing simple distributions.

Line Chart



Pie Chart



SPSS Example: Highlighting the composition or proportion of parts within a whole.

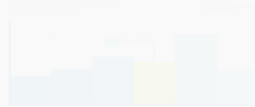
DATA VISUALIZATION USING SPSS

Scatter Plot



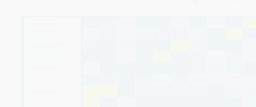
SPSS Example: Presenting the relationship between two variables.

Histogram



SPSS Example: Showing the distribution of continuous data.

Heat Map



SPSS Example: Visualizing density and distribution across categories.

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Standard Data Visualization Examples

Bar Chart



Line Chart



Pie Chart



How to Import Data in SPSS?

Scatter Plot



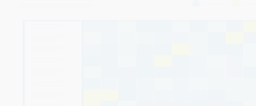
SPSS Example: Presenting the relationship between two variables.

Histogram



SPSS Example: Showing the distribution of continuous data.

Heat Map



SPSS Example: Visualizing density and distribution across categories.

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Standard Examples

Importing Data in SPSS

Step 1: Open SPSS

Open IBM SPSS Statistics.

Method 1: Import Excel File in SPSS

Step 2: Go to Open Data

Click **File**

Select **Open**

Click **Data**

Step 3: Select Excel File

Change file type to:

****Excel (.xls, .xlsx)**

Choose your file

Click **Open**

Step 4: Import the Data

Check:

Read variable names from first row

Click **OK**

Method 2: Import CSV File in SPSS

Step 1: Open Text Import Wizard

Click **File** → **Read Text Data**

Step 2: Select CSV File

Choose the **.csv file**

Click **Open**

Step 3: Follow the Wizard

Select:

Delimited file

Comma separator

Click **Next**

Finish the import process

- **SPSS imports the dataset into Data View.**

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Standard Examples

BAR GRAPH IN SPSS

Step 1: Open SPSS

Open IBM SPSS Statistics on your computer.

Step 2: Enter the Data

In the **Data View** window, enter your data.

Step 3: Define Variable Names

Go to **Variable View** and define:

Variable name

- Type (Numeric/String)

- Labels if needed

Step 4: Open the Graph Menu

From the top menu:

Click **Graphs**

Select **Chart Builder**

Step 5: Choose Bar Chart

In the Chart Builder window:

Select **Bar**

Drag the simple bar chart into the chart preview area

Step 6: Assign Variables

Drag the categorical variable (e.g., Product) to the **X-axis**

Drag the numerical variable (e.g., Sales) to the **Y-axis**

Step 7: Create the Graph

Click **OK**

SPSS generates the bar graph in the **Output Viewer**

Step 8: Edit and

Customize the Graph

Double-click the graph to edit:

Title

Colors

Axis labels

Fonts

Data labels

Step 9: Save the Graph

Right-click the graph

Choose:

Copy

Export

Save as image

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Standard LINE GRAPH IN SPSS Examples

Step 1: Open SPSS

Open IBM SPSS Statistics on your computer.

Step 2: Enter the Data

In the **Data View** window, enter your data.

Step 3: Define Variable Names

Go to **Variable View** and define:
Variable name

- Type (Numeric/String)
- Labels if needed

Step 4: Open the Graph Menu

From the top menu:

Click **Graphs**

Select **Chart Builder**

Step 5: Choose Line Chart

In the Chart Builder window:

Select **Line**

Drag the simple line chart into the preview area

Step 6: Assign Variables

- Drag Month to the **X-axis**
- Drag Sales to the **Y-axis**

Step 7: Create the Graph

Click **OK**

SPSS generates the bar graph in the **Output Viewer**

Step 8: Edit and Customize the Graph

Double-click the graph to edit:

Title

Colors

Axis labels

Fonts

Data labels

Step 9: Save the Graph

Right-click the graph

Choose:

Copy

Export

Save as image

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Standard PIE CHART IN SPSS Examples

Step 1: Open SPSS

Open IBM SPSS Statistics on your computer.

Step 2: Enter the Data

In the **Data View** window, enter your data.

Step 3: Define Variable Names

Go to **Variable View** and define:
Category → String

Expense → Numeric

Step 4: Open Chart Builder

From the top menu:

Click **Graphs**

Select **Chart Builder**

Step 5: Choose Pie Chart

In the Chart Builder window:

Select **Pie/Polar**

Drag the **Pie Chart** into the preview area

Step 6: Assign Variables

- Drag the categorical variable (Category) to the **Slices by** box
- Drag the numerical variable (Expense) to the **Angle** or **Count/Summary** box

Step 7: Create the Graph

Click **OK**

SPSS generates the bar graph in the **Output Viewer**

Step 8: Customize the Pie Chart

Double-click the chart to edit:

- **Colors**
- **Labels**
- **Percentages**
- **Title**
- **Legend**

Step 9: Save the Graph

Right-click the graph

Choose:

Copy

Export

Save as image

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SCATTER PLOT IN SPSS

Step 1: Open SPSS

Open IBM SPSS Statistics on your computer.

Step 2: Enter the Data

In the **Data View** window, enter your data.

Step 3: Define Variable Names

Go to **Variable View** and define:

Study_Hours → Numeric

Marks → Numeric

Step 4: Open Chart Builder

From the top menu:

Click **Graphs**

Select **Chart Builder**

Step 5: Choose Scatter Plot

In the Chart Builder window:

Select **Scatter/Dot**

Drag **Simple Scatter** into the preview area

Step 6: Assign Variables

Drag Study_Hours to the **X-axis**

Drag Marks to the **Y-axis**

Step 7: Create the Graph

Click **OK**

SPSS generates the bar graph in the **Output Viewer**

Step 8: Add a Fit Line (Optional)

To show trend or correlation:

Double-click the graph

Choose:

Double-click the graph
Choose:

Elements → Fit Line at Total

This adds a regression/trend line.

Step 9: Customize the Graph

Step 10: Save the Graph

Right-click the graph

Choose:

Copy

Export

Save as image

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AREA GRAPH IN SPSS

Step 1: Open SPSS

Open IBM SPSS Statistics on your computer.

Step 2: Enter the Data

In the **Data View** window, enter your data.

Step 3: Define Variables

Go to **Variable View** and define:

Month → String

Sales → Numeric

Step 4: Open Chart Builder

From the top menu:

Click **Graphs**

Select **Chart Builder**

Step 5: Choose Area Chart

In the Chart Builder window:

Select **Area/Polar**

Drag the **Simple Area Chart** into the preview area

Step 6: Assign Variables

Drag Month to the **X-axis**

Drag Sales to the **Y-axis**

Step 7: Create the Area Graph

Click **OK**

SPSS generates the bar graph in the **Output Viewer**

Step 8: Customize the Area Graph

Double-click the graph to edit:

- Title
- Axis labels
- Colors
- Fonts
- Gridlines

Step 9: Save the Graph

Right-click the graph

Choose:

Copy

Export

Save as image

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BOX PLOT IN SPSS

Step 1: Open SPSS

Open IBM SPSS Statistics on your computer.

Step 2: Enter the Data

In the **Data View** window, enter the numerical data.

Step 3: Define the Variable

Go to **Variable View** and define:

Marks → Numeric

Step 4: Open Chart Builder

From the top menu:

Click **Graphs**

Select **Chart Builder**

Step 5: Choose Box Plot

In the Chart Builder window:

Select **Box/Dot**

Drag **Simple Boxplot** into the preview area

Step 6: Assign Variables

- Drag the numerical variable (Marks) to the **Y-axis**

If comparing groups:

- Drag a categorical variable to the **X-axis**

Step 7: Create the Box Plot

Click **OK**

SPSS generates the bar graph in the **Output Viewer**

Step 8: Understand the Box Plot

The graph displays:

Minimum value

First Quartile (Q1)

Median

Third Quartile (Q3)

Maximum value

Outliers (if present)

Step 9: Customize the Graph

Double-click the graph to edit:

Title

Colors

Axis labels

Fonts

Gridlines

Step 10: Save the Graph

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BUBBLE CHART IN SPSS

Step 1: Open SPSS

Open IBM SPSS Statistics on your computer.

Step 2: Enter the Data

A bubble chart requires three variables:

X-variable

Y-variable

Bubble size variable

Step 3: Define Variables

Go to **Variable View** and define:

Advertising → Numeric

Sales → Numeric

Profit → Numeric

Step 4: Open Chart Builder

Step 5: Choose Bubble Chart

In the Chart Builder window:

Select **Scatter/Dot**

Drag the **Bubble Chart** into the preview area

Step 6: Assign Variables

Drag Advertising to the **X-axis**

Drag Sales to the **Y-axis**

Drag Profit to the **Set Size** box

Step 7: Create the Bubble Chart

Click **OK**

SPSS generates the bubble chart in the **Output Viewer**

Step 8: Customize the Bubble Chart

Double-click the chart to edit:

- **Bubble colors**

- **Titles**

- **Axis labels**

- **Bubble sizes**

- **Fonts and gridlines**

Step 9: Save the Graph

Right-click the graph

Choose:

Copy

Export

Save as image

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Step 1: Open SPSS

Open IBM SPSS Statistics on your computer.

Step 2: Enter the Data

In the **Data View** window, enter your data.

Step 3: Define Variables

Go to **Variable View** and define:

Student → String

Math → Numeric

Science → Numeric

English → Numeric

Step 4: Restructure Data (If Needed)

Heat maps usually require data in stacked format.

Step 5: Open Chart Builder

From the top menu:

Click **Graphs**

Select **Chart Builder**

Step 6: Choose Heat Map

In the Chart Builder window:

Select **Heat Map**

Drag the heat map template into the preview area

Step 7: Assign Variables

Drag Student to the **X-axis**

Drag Subject to the **Y-axis**

Drag Marks to the

Color/Intensity box

Step 8: Create the Heat Map**Click OK**

SPSS generates the heat map in the **Output Viewer**. Different colors represent different intensity values.

Step 9: Customize the Heat Map

Double-click the graph to edit:

- **Color schemes**
- **Titles**
- **Labels**
- **Fonts**
- **Gridlines**

Step 10: Save the Graph

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Step 1: Open SPSS

Open IBM SPSS Statistics on your computer.

Step 2: Enter the Data

In the **Data View** window, enter the category names and values.

Step 3: Define Variables

Go to **Variable View** and define:

Category → String

Expense → Numeric

Step 4: Open Chart Builder

From the top menu:

Click **Graphs**

Select **Chart Builder**

Step 5: Choose Pie Chart

In the Chart Builder window:

Select **Pie/Polar**

Drag the **Pie Chart** template into the preview area

Step 6: Assign Variables

Drag Category to the **Slices by** box

Drag Expense to the **Angle or Summary Variable** box

Step 7: Create the Pie Chart

Click **OK**

SPSS generates the pie chart in the **Output Viewer**

Step 8: Convert Pie Chart into Donut Chart

Double-click the pie chart to open the **Chart Editor**.

Then:

Click the pie chart

Go to **Properties**

Increase the **Inner Radius** or **Hole Size**

Step 9: Customize the Donut Chart

You can edit:

- **Colors**
- **Labels**
- **Percentages**
- **Titles**
- **Legends**

Step 10: Save the Graph

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FUNNEL CHART IN SPSS

Step 1: Open SPSS

Open IBM SPSS Statistics on your computer.

Step 2: Enter the Data

In the **Data View** window, enter the funnel stages and values.

First column → stages Second column → numerical values

Step 3: Define Variables

Go to **Variable View** and define:
Stage → String

Count → Numeric

Step 4: Open Chart Builder

From the top menu:

Click **Graphs**

Select **Chart Builder**

Step 5: Choose Bar Chart

SPSS does not have a direct funnel chart option, so use a horizontal bar chart.

In the Chart Builder window:

Select **Bar**

Drag the **Simple Bar Chart** into the preview area

Step 6: Assign Variables

Drag Stage to the **Y-axis**

Drag Count to the **X-axis**

Step 7: Create the Funnel Chart

Click **OK**

SPSS generates the horizontal bar chart in the **Output Viewer**

Step 8: Format the Chart Like a Funnel

Double-click the graph to open the **Chart Editor**.

Then:

- Reduce bar spacing
- Use descending values
- Apply different colors
- Remove unnecessary gridlines

Step 9: Add Data Labels (Optional)

To display values:

Click **Elements**

Select **Show Data Labels**

Step 10: Save the Graph

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CHOROPLETH MAP IN SPSS

Step 1: Open SPSS

Open IBM SPSS Statistics on your computer.

Step 2: Enter Geographic Data

In the **Data View** window, enter the region names and corresponding values.

Step 3: Define Variables

Go to **Variable View** and define:

Country → String

Population → Numeric

Step 4: Open Graphboard Template Chooser

From the top menu:

Click **Graphs**

Select **Graphboard Template Chooser**

Step 5: Choose Map Visualization

In the Graphboard window:

- Select **Map** or **Thematic Map** template
- Choose **Filled Map (Choropleth Map)** if available

Step 6: Assign Variables

Drag the geographic variable (Country) to the

Map Region area

Drag the numerical variable (Population) to the **Color/Value** area

Step 7: Create the Choropleth Map

Click **OK**

SPSS generates the choropleth map in the **Output Viewer**

Different colors represent different data values.

Step 8: Customize the Map

Double-click the map to edit:

- **Color themes**
- **Titles**
- **Labels**
- **Legends**
- **Region styles**

Step 9: Save the Map

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RESULTING REPORT

Reporting results is the process of presenting and explaining the findings of a research study, experiment, survey, or data analysis in a clear, accurate, and organized manner.

It helps readers understand:

- What was studied
- What was found
- What the findings mean

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OBJECTIVES OF RESULTING REPORT

- To communicate research findings clearly
- To summarize important observations
- To support conclusions with evidence
- To help decision-making and future research
- To maintain accuracy and transparency

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COMPONENTS OF RESULTING REPORT

1. Introduction to Results
2. Presentation of Data
3. Description of Findings
4. Statistical Results
5. Interpretation

CHARACTERISTICS OF GOOD RESULT REPORTING

- Clear and concise
- Accurate and unbiased
- Logical and organized
- Supported by tables and graphs
- Easy to understand
- Free from unnecessary details

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COMMON MISTAKES IN REPORTING RESULTS

- Presenting too much raw data
- Misleading graphs or scales
- Lack of clarity negative results
- Overinterpretation of findings
- Not mentioning limitations

IMPORTANCE OF RESULT REPORTING

- Helps communicate research outcomes
- Improves understanding of data
- Supports scientific conclusions
- Assists policymakers and researchers
- Enhances transparency and credibility

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CONCLUSION

Data visualization and reporting of results play a vital role in transforming raw data into meaningful information. Effective visualization helps in simplifying complex data, identifying patterns and trends, and improving understanding and decision-making. Clear and accurate reporting ensures that research findings are communicated effectively to the audience. Therefore, the proper use of charts, graphs, tables, and reports enhances the quality, reliability, and impact of research, business analysis, and academic presentations.

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THANKYOU

Dr. BHABANI SHANKAR MOHANTY, ASST. PROFESSOR, CENTRAL UNIVERSITY OF TAMIL NADU

DAY-5 Submission & Review

DATE: 15.05.2026

T11: Writing Cover Letters & Managing Submissions

(The corresponding author's role)

Resource Person: Dr. Abhijit Mohanty

Guest Faculty (Assistant Professor), Department of Business Administration, Utkal University, Vani Vihar, Bhubaneswar

T11: Writing Cover Letters & Managing Submissions

*Dr. Abhijit Mohanty Guest Faculty (Assistant Professor),
Department of Business Administration,
Utkal University, Vani Vihar, Bhubaneswar*

What is a Cover Letter?

- A **cover letter** is a formal document submitted along with a manuscript during journal submission.
- It acts as the first communication between the **corresponding author** and **the journal editor**.
- The cover letter briefly introduces the manuscript, highlights its importance, and explains why the study is suitable for the selected journal.

Objective of writing a Cover Letter

- **Position Your Manuscript Effectively**
- You are trying to show the editor that your paper deserves attention.
 - Why your paper is important?
 - Why it matches the journal's subject area?
 - Why readers of the journal will find it useful?
 - That there are no conflicts of interest or ethical problems?

Objective of writing a Cover Letter

- **Get the Editor Interested in Your Paper**
- Editors receive many manuscripts every day. The cover letter helps create a positive first impression. A good cover letter briefly explains:
 - What the study is about? (Research Paper, Literature Review etc.)
 - What is new in the study (novelty)?
 - Why the findings are useful ?
- Its purpose is to make the editor curious and interested in reading the manuscript further.

Objective of writing a Cover Letter

- **Move Your Paper from “Rejected Without Review” to “Sent Out for Review”**
- Sometimes editors reject papers immediately without sending them to reviewers. This is called: **“Desk rejection”** or **“Rejected without review”**
- A strong cover letter can help avoid this by clearly showing:
 - The paper fits the journal
 - The study is meaningful
 - The manuscript follows academic standards
- If the editor is convinced, the paper is then: **“Sent out for peer review”**

Importance of a Cover Letter

- **The cover letter plays a significant role in academic publishing because it:**
 - Introduces the manuscript to the editor
 - Explains the novelty and contribution of the study
 - Demonstrates the relevance of the paper to the journal scope
 - Confirms ethical compliance and originality (Not copied/ previously published Not simultaneously submitted)
 - Helps editors make initial editorial decisions (Send for peer review/ revisions/ Reject).
- **Remember that the cover letter may be the only thing that the editor reads.**
 - **Give it the same effort you gave your manuscript.**

Why Editors Read Cover Letters

- Editors use the cover letter to quickly understand:
 - What the paper is about?
 - Whether it fits the journal?
 - Whether ethical standards are followed?
 - Whether the manuscript offers a new contribution?

Structure of a cover letter

- Each publisher and journal follows its own prescribed cover **letter template** and **author guidelines**; therefore, manuscripts should be tailored according to the **specific journal's submission requirements**
- **ELSEVIER:** <https://www.elsevier.support/publishing/answer/what-should-be-included-in-a-cover-letter>
- **Taylor & Francis:** <https://authorservices.taylorandfrancis.com/publishing-your-research/making-your-submission/writing-a-journal-article-cover-letter/>

Structure of a cover letter

- Wiley: <https://rmets.onlinelibrary.wiley.com/pb-assets/hub-assets/rmets/hub-wide-ag/CRS-Cover-Letter-Template-1710154948797.docx>
- Springer: <https://share.google/4MzGTUZ3IXpbXQiqq>

Structure of a cover letter (EXAMPLE)

Wiley

[Your Name]
 [Your Affiliation]
 [Your Address]

Header / Author Information

Submission Statement

Editor Salutation

Brief Description

Novelty of the Study, Journal Fit Statement

Corresponding Author Statement

[Date]

Dear [Editor name],

I/We wish to submit an original research article entitled "[title of article]" for consideration by [journal name].
 I/We confirm that this work is original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere.

In this paper, I/we report on / show that _____. This is significant because _____.
 We believe that this manuscript is appropriate for publication by [journal name] because it... [specific reference to the journal's Aims & Scope].

[Please explain in your own words the significance and novelty of the work, the problem that is being addressed, and why the manuscript belongs in this journal. Do not simply insert your abstract into your cover letter! Briefly describe the research you are reporting in your paper, why it is important, and why you think the readership of the journal would be interested in it.]

We have no conflicts of interest to disclose.

Please address all correspondence concerning this manuscript to me at [email address].

Thank you for your consideration of this manuscript.

Sincerely,
 [Your name]

Originality Declaration

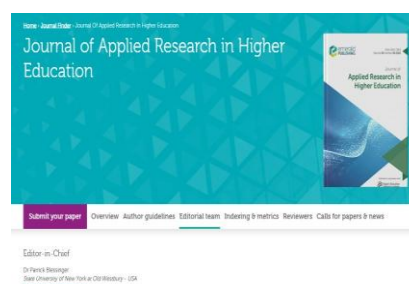
Conflict of Interest Declaration

Signature Block

Structure of a cover letter

- The cover letter should follow a **formal business letter structure** including **editor's name, journal name, date, salutation, body of the letter, and author signature**. A professional format creates a positive first impression on the editor.
 - **The Beginning**
 - Include your contact information
 - Include information about the addressee
 - Name of Editor/Editor-in-Chief, if known
 - Name of journal Editorial Office
 - Standard greeting
 - Dear Dr. Smith:
 - Dear Editor:
 - Avoid **"To whom it may concern"/Informal greetings/**
 - **Leaving the salutation blank**
- If you do not know the name or designation of the editor, then

To
The Editor
[Journal Name]



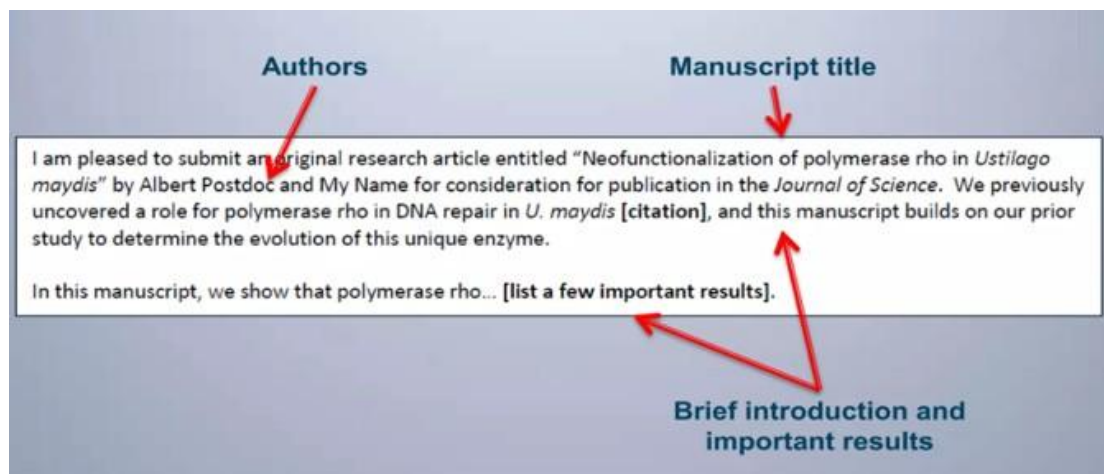
To
The Editor
[Journal Name]



Source: www.slideshare.net

Structure of a cover letter

- **Opening Paragraph**
- Manuscript details
 - Title
 - Authors
 - Type of article (research paper/ review paper/ scale development paper etc.)
- Give a 1- or 2-sentence summary of the paper
 - Definitely mention if this paper builds on a previous paper published in that journal.
 - Mention the main objective of the study



Source: www.slideshare.net

Structure of a cover letter

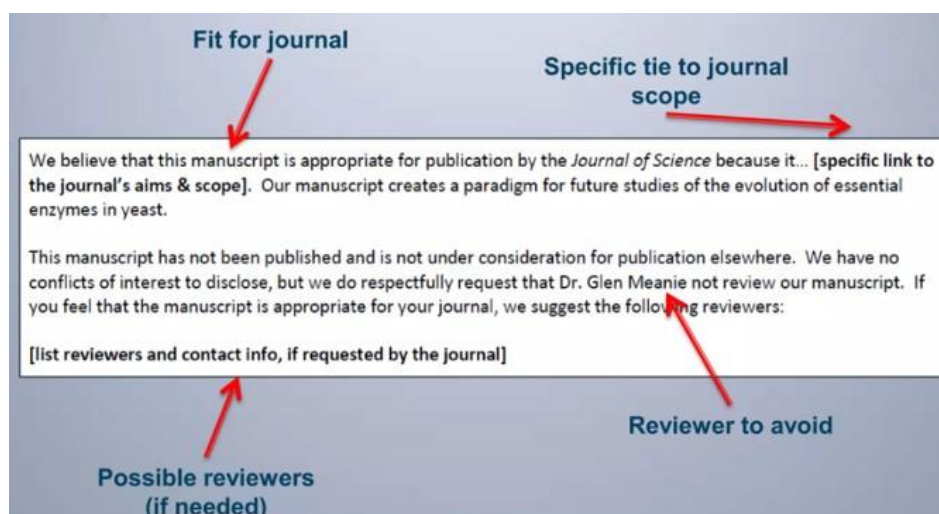
• Second Paragraph

- Continue to describe your key findings/results
 - Write confidently about your findings, but avoid making unrealistic or exaggerated claims.
 - Don't use numbers or statistics unless critical for your conclusions
 - This is your **"elevator pitch"** – a short, convincing synopsis of your work.
- Can combine with first paragraph, depending on its length.
- If you have adopted a specific research method, then discuss it in a Summerside form prior to results. E.g. (Longitudinal, Mix methods etc.)

Structure of a cover letter

• Third Paragraph

- Clearly explain why the manuscript is suitable for the target journal
 - Align the study with the journal's aims and scope
 - Highlight why the journal's readers would benefit from the study
 - Mention the practical, theoretical, or policy relevance of the paper
 - Demonstrate how the study contributes to ongoing discussions in the journal's domain
 - Provide specific reasons for journal fit
 - Conforms to the journal's formatting and submission guidelines

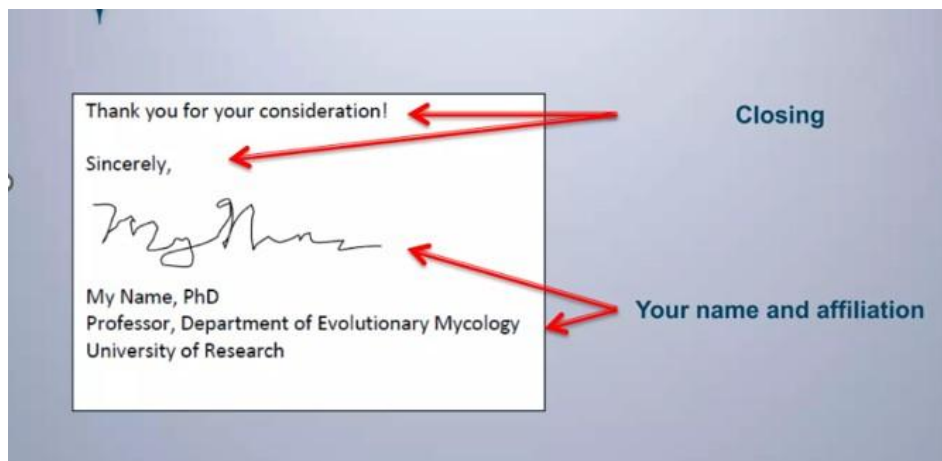


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Structure of a cover letter

• Final Paragraph(s)

- Formalities
 - The manuscript is original
 - The manuscript is not under review elsewhere or published elsewhere
 - There are no conflicts of interest to disclose
- Suggest reviewers, if asked (as per journal criteria)
- Other info:
 - Confirm that all authors have approved the manuscript submission
 - Mention funding support or grant information, if applicable
 - Include ethical approval statement, if relevant
 - Express gratitude to the editor for considering the manuscript
- Politely request consideration for publication



Source: www.slideshare.net

Is it a good cover letter?

Dear Sir/Madam:

I am submitting our paper on coastal wetlands for publication in your journal. Please let me know your decision at your earliest convenience.

Sincerely,
T.H.E. Hotshot, Ph.D.
Gulf State University
thehotshot@gsu.edu

Key information to include in your cover letter

1 Address the editor by their name if you know it.

2 Include your manuscript's title and the name of the journal.

3 State that your paper has not been published or is not under consideration by another journal.

4 Briefly describe your research. Why is it important? Why will readers find it interesting?

5 Declare any conflicts of interest, or confirm there are none.

6 Include contact information for yourself and any co-authors.

Remember: Check the specific requirements of your chosen journal to make sure you include everything you need to.

Tips (Dos and Don'ts)

- **Dos**
- Follow the journal's formatting and submission guidelines carefully
- Keep the cover letter concise, clear, and professional (One page is mostly suggested)
- Draft the letter carefully in MS Word before submission
- Proofread thoroughly for grammar, spelling, and formatting errors
- Highlight important results/conclusions
- Explain why readers of that journal would benefit from those results

Tips (Dos and Don'ts)

- **Don'ts**
- Do not repeat the abstract word-for-word
- Avoid excessive jargon, abbreviations, and technical acronyms
- Do not make unrealistic or exaggerated claims about the study
- Avoid including unnecessary statistics or numerical details
- Do not use generic cover letters for all journals
- Avoid speaking negatively about other researchers or studies
- Do not complain about previous manuscript rejections
- Avoid informal language or unprofessional tone
- Do not ignore ethical declarations and journal requirements
- Avoid lengthy cover letters with irrelevant details

Submitting of a manuscript

Submitting of a manuscript

Before Submission

- Carefully read the journal's aims, scope, and author guidelines
- Ensure the manuscript follows the prescribed formatting style
- Check word limit, referencing style, tables, and figures
- Verify plagiarism and originality of the manuscript (< 10% preferable)
- Ensure all authors approve the final version of the paper
- **Create an ORCID ID.** It is a unique digital identification number assigned to researchers to distinguish them from other authors with similar names.

Submitting of a manuscript

During Online Submission

- Upload all required files correctly
 - Main manuscript
 - Title page
 - Cover letter
 - Supplementary files
- Enter author details carefully (Name, Designation, affiliation, position)
- Check keywords and abstract before final submission

Supplementary File	Description
Title Page	Manuscript title, Author names, Affiliations, ORCID IDs, Corresponding author details (email id)
Ethics Approval	Ethical compliance (Institutional Ethics Committee Approval)
Dataset	Research transparency
Author Contribution Statement/CRedit Author Statement	Conceptualisation, Data collection, Analysis, Writing Supervision, etc.
Questionnaire	Measurement instrument
Similarity Report	Originality check
Statistical Analysis Output	Analysis verification
Graphical Abstract	Visual summary
Tables and Figures	Large tables, Supporting graphs, High-resolution figures
Interview Transcripts	Common in qualitative studies.

Submitting of a manuscript

• After Submission

- Save manuscript ID and submission confirmation email
- Regularly track manuscript status through the journal portal
- Respond professionally and promptly to editorial communication
- Prepare for revision and reviewer comments constructively

Submitting of a manuscript

• Important Advice to Authors

- Avoid submitting the same manuscript to multiple journals simultaneously
- Do not rush the submission process
- Maintain professionalism in all communication with editors and reviewers
- Treat the cover letter and submission documents with equal importance as the manuscript itself
- Do not misuse AI tools or hide AI usage while preparing and submitting the manuscript.

Demo of Submission in Emerald

Emerald Manuscript Submission: Login Step

- Open the Emerald journal submission portal.
- Enter your **User ID / registered email ID**.
- Enter your **password**.
- Click on **Log In** to access your author dashboard.
- If you are a new user, click on **Create an Account**.
- If you forgot your password, click on **Reset Password**.
- You may also log in using **Web of Science™**, if available.
- After login, proceed to the manuscript submission dashboard.

* Type

CHOICE	TYPE	DESCRIPTION
☐	Research Paper	3000-6000 words. Reports original research that advances applied understanding of higher education teaching, learning, leadership, policy, student experience, or institutional practice. Submissions should articulate a clear research purpose, situate the study in relevant scholarship, use an appropriate and transparent design/methodology/approach, and present evidence-based findings.
☐	Development Paper	3000-6000 words. Presents the design, development, implementation, and/or evaluation of an innovation in higher education (e.g., curriculum, assessment, pedagogy, student support, learning technologies, professional development, quality enhancement). Manuscripts should provide sufficient contextual and procedural detail. Claims should be supported with credible evidence and a description of limitations and lessons for adoption or scaling.
☐	Practitioner Paper	Max 2000 words. Bridges research and practice by translating evidence into actionable insight for higher education leaders, educators, designers, and policy makers. Submissions should be grounded in scholarship and credible institutional evidence, clearly describe the practice or policy problem, and explain the reasoning behind recommended actions. Strong practitioner papers avoid being purely opinion-based.
☐	Editorial	Max 3000 words. Provides an editor or guest editor perspective that frames an issue, special issue, or timely debate in higher education. Editorials typically synthesize themes, set an agenda, or highlight implications across included articles. Clearly indicate that the piece is an editorial.
☐	Literature Review	3000-6000 words. Synthesizes and critiques scholarly literature on a clearly defined higher education topic to produce an integrated account of what is known, what remains contested, and what future research and practice should prioritize. Reviews should make the purpose and scope explicit, use a transparent approach to identifying and selecting sources (especially for systematic/scoping reviews), and move beyond summary to analytical synthesis.

Step 1: Type, Title, and Abstract

•Select the appropriate **manuscript type** from the available options:

- Research Paper
- Development Paper
- Practitioner Paper
- Editorial
- Literature Review

*** Title**

Preview 0 out of 250 words

Abstract (limit 250 words)

Please type your structured abstract into the corresponding fields. Your abstract should be no longer than 250 words in all. Each section of the abstract is limited to no more than 100 words.

*** Purpose (limit 100 words)**

*** Design/methodology/approach (limit 100 words)**

*** Findings (limit 100 words)**

*** Originality/value (limit 100 words)**

Step 2: File Upload

- Your article file must not contain any author details or any information that would identify the authors but must include the structured abstract.**
 - Please keep file names short (less than 128 characters)
 - Upload as many files as needed for your manuscript in groups of three or fewer. (Larger files take longer to upload). These files will be combined into a single document for the peer review process.
 - All figures and plates should be submitted in electronic form, of high quality and legible (e.g. formats: .pdf, .ai, .eps, .ppt, .xls). Original figure creation files are preferred. If supplying photographic images set them at a high resolution (300dpi) and at least 10cm wide (e.g. formats: .tif, .jpeg, .bmp)**
 - To designate the order in which your files appear, use the dropdowns in the "order" column below.
 - View your uploaded files by clicking on HTML or PDF. When you are finished, click "Save and Continue" [Read More](#)
- * = Required Fields

Files

0.00 OUT OF 30.00 MB					
ORDER	ACTIONS	FILE	* FILE DESIGNATION	UPLOAD DATE	UPLOADED BY
No files uploaded					
Update Order Remove All Files					

File Upload

SELECTION	FILE DESIGNATION
CRS-Cover Letter-Template.docx Remove	Choose File Designation ...
Select File 2 ...	Choose File Designation ...
Select File 3 ...	Anonymous Article File
	Figure
	Image
	Table
	Supplementary File for Review
	Third Party Copyright Permissions
	Supplementary File Not for Review

- Carefully read the **description and submission requirements** for each article type before selection.
- Check the prescribed **word limit** for the selected manuscript category.
- Enter the **title of the manuscript** in the required field.
- Enter the **abstract** of the manuscript in the designated text box.
- Use the **"Special Characters"** option if the title or abstract contains special symbols or characters.
- Ensure all **mandatory fields** marked with an asterisk (*) are completed.
- Verify that the title and abstract match the final submitted manuscript before proceeding to the next step.

Please select the manuscript category for your paper. These are used to categorise content on Emerald Insight, Emerald's content platform

Select...

- Select...
- Research Article
- Conceptual Paper
- Technical Paper
- Literature Review
- Case Report
- Viewpoint
- General Review
- Impact Article
- Practitioner Paper
- Policy Brief
- Editorial
- Extended Editorial

File Upload

SELECTION	FILE DESIGNATION
CRS-Cover Letter-Template.docx Remove	Figure
	Caption / Legend Special Characters
	Figure 1
	Link text
	Conceptual Model
Daily Financial Report Board Template.docx Remove	Anonymous Article File
CRS-Cover Letter-Template.docx Remove	Table
	Caption / Legend Special Characters
	Table 1
	Link text
	Demographic Profile

Supplementary File for Review:

Questionnaire, Dataset, Interview guide

Third Party Copyright Permissions:

Images or tables from another source

Supplementary File Not for Review: Raw

data, Ethical approval certificate,

Plagiarism report, etc.



Files

0.43 OUT OF 58.58 MB					
ORDER	ACTIONS	FILE	* FILE DESIGNATION	UPLOAD DATE	UPLOADED BY
1	Select	CRS-Cover-Letter-Template.docx 22 KB	Figure	14-May-2026	Abhijit Mohanty
		Caption : Figure 1			
		Link text : Conceptual Model			
2	Select	Daily Financial Report Board Template.docx 111 KB	Anonymous Article File	14-May-2026	Abhijit Mohanty

Update Order Remove All Files

ORDER	ACTIONS	FILE	* FILE DESIGNATION	UPLOAD DATE	UPLOADED BY
1	Select	CRS-Cover-Letter-Template.docx 22 KB	Figure	14-May-2026	Abhijit Mohanty
		Caption : Figure 1			
		Link text : Conceptual Model			
2	Remove	Daily Financial Report Board Template.docx 111 KB	Anonymous Article File	14-May-2026	Abhijit Mohanty

Update Order Remove All Files

Step 3: Keywords

- You must type your own keywords into the boxes below.
- A minimum of two keywords are required and a maximum of six.
- Please type only one keyword in each box.
- Providing your keywords in this electronic format assists us in identifying and assigning appropriate reviewers for your work.

When you are finished, click "Save and Continue." [Read More ...](#)

* = Required Fields

* Keywords

Special Characters

+ Add

KEYWORDS

retail

Remove

skill

Remove

File Upload and Arrangement Step in Emerald Submission

- Upload the required manuscript and supplementary files to the submission system.
- Assign the correct **File Designation** for each uploaded file:
 - Anonymous Article File
 - Figure
 - Table
 - Supplementary File
- Verify that the correct file has been uploaded successfully.
- Check the file name, upload date, and uploaded by details.
- Arrange the files in the correct sequence using the **Order** option.
- Use the **Select** dropdown menu to edit file actions if needed.
- Add captions or link text for figures and images where required.
- Use **Update Order** after rearranging files.
- Remove incorrect or duplicate files using:
 - Remove file option
 - Remove All Files option
- Ensure that the main manuscript is uploaded as:
 - Anonymous Article File** for blind review.
- Recheck all uploaded files before proceeding to the next submission step.

Step 3: Keywords

- Enter relevant **keywords** related to the manuscript topic in the provided boxes.
- Type your own keywords manually.
- Ensure that:
 - Minimum keywords required: **2**
 - Maximum keywords allowed: **6**
- Enter only **one keyword or phrase per box**.
- Click the **"Add"** button after entering each keyword.
- Use the **Special Characters** option if any keyword contains symbols or special characters.
- Choose keywords carefully because they help:
 - Editors identify the research area
 - Journals assign suitable reviewers
 - Improve indexing and discoverability of the paper
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Authors

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ORDER	ACTIONS	AUTHOR	INSTITUTION
1	Select	Mohanty, Abhijit (Corresponding Author)	1. Utkal University, Department of Business Administration Vardh Vihar Bhubaneswar, Odisha, IN 751004 6943960009
		abhijit.mohanty1986@gmail.com	
		0000-0002-4438-1600 ✓	

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- Add all authors associated with the manuscript before final submission.
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- If the author profile is available, the system automatically fills:
 - Name, Institution, Email ID, ORCID ID, Contact details
- Click **"Add to My Authors"** to include the co-author in the manuscript submission.
- If the co-author does not have an account, manually enter:
 - Author name, Institutional affiliation, Email ID, Address and contact information
- Identify the **Corresponding Author** responsible for communication with the journal.
- Arrange the sequence of authors using the **Order** option or drag feature.
- Verify the institutional affiliations and ORCID details carefully.
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- Please read our [Publishing Ethics and Permissions Checks](#) before submitting your paper.
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- The cover letter is optional and will not be seen by this journal reviewers.
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- Answer any remaining questions appropriately.
- When you are finished, click "Save and Continue."

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Cover Letter

Write Cover Letter

800 OF 5000 CHARACTERS

Funding

* Is there funding to report for this submission?

☒ Yes ☐ No

Funders

ACTIONS	FUNDER	GRANT / AWARD NUMBER
No Funders Entered		
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Manuscript Information

* Number of Figures:

* Number of Tables:

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* Has this manuscript been submitted previously?

☐ Yes
☐ No

If yes, what is the manuscript ID of the previous submission?

Confirm the following:

- ☐ * Confirm that the manuscript has been submitted solely to this journal and is not published, in press, or submitted elsewhere.
- ☐ * Confirm that all of the research meets the ethical guidelines of your institution or company, as well as adherence to the legal requirements of the study country.
- ☐ * Confirm that you have prepared a complete text within the anonymous article file. Any identifying information has been included separately in a title page, acknowledgements or supplementary file not for review, to allow anonymous review.

* Are you aware of any potential conflict of interest in the research or with the journal/editorial team handling this submission?

☐ Yes
☐ No

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☐ No

If yes, please provide evidence of the ethics review board clearance. Please ensure you also include a statement about this in your article. If you do not have clearance, please provide the reasons as to why this was not required:

* Confirm that the manuscript has been created by the author(s) and not an AI tool/Large Language Model (LLM). If an AI tool/LLM has been used to develop or generate any portion of the manuscript then this must be clearly flagged in the Methods and Acknowledgements.

* Does this work contain research about an identifiable company/individual/organization? Did the author(s) spend time within the company/organization? Does the work contain internal financial or sensitive information or quotations from named employees?

☐ Yes
☐ No

If yes to any of the above, please upload a completed Consent to Publish form (download from the link at the top of this page) at the file upload step. Emerald is unable to consider work for publication where consent to publish is required but clearance has not been obtained.

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Select...

1. Potential conflict of interest in the research

- **Financial Conflict of Interest.** Example: A pharmaceutical company funds a study evaluating its own medicine.
- **Personal Relationship with Editor or Reviewer**
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- Has editorial responsibilities in the same journal

Answer "No" when: No financial, personal, or professional relationship may influence the research or publication process.

2. Involvement of Human participants OR Animal subjects during data collection or experimentation.

Select **"Yes"** if the study includes:

Human Participants in terms of Surveys/questionnaires, Interviews, Focus group, Experiments involving people, Medical or psychological studies, Consumer behaviour studies, Employee studies, Student-based research

What Happens If You Select **"Yes"**: You may need to provide: **Ethics Review Board Clearance.**

3. AI Disclosure Statement

This section asks authors to confirm that the manuscript is primarily the original work of the authors and not fully generated by AI tools or Large Language Models (LLMs) such as OpenAI's ChatGPT.

It also states that if AI tools were used in any form of the manuscript preparation the usage must be clearly disclosed.

"Generative AI tools like Quillbot were used only for language refinement and paraphrasing assistance. All content was reviewed, verified, and approved by the authors."

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Journal of Applied Research in Higher Education - Manuscript ID JARHE-06-2024-0296.R1 You've submitted your revised manuscript, here is what you can expect next 



Journal of Applied Research in Higher Education <onbehalf@manuscriptcentral.com>

to me

19-Nov-2024

Tue, Nov 19, 2024, 10:23 PM ☆ ☹ ↶ ⋮

Dear Dr. Mohanty,

Your manuscript entitled "Can Faculty Job Satisfaction reduce the turnover intention at Management Institutes of India? Analysing the Mediation effect of organisational Commitment" has been successfully submitted online and is presently being given full consideration for publication in the [Journal of Applied Research in Higher Education](#).

Your manuscript ID is JARHE-06-2024-0296.R1.

Please mention the above manuscript ID in all future correspondence or when calling the office for questions. If there are any changes in your address or e-mail address, please log in to ScholarOne Manuscripts at <https://mc.manuscriptcentral.com/jarhe> and edit your user information as appropriate.

Here is what to expect next:

- Your manuscript will undergo initial screening by the [Journal's](#) Editorial team for suitability for another round of peer review.
- If your screening is successful, your manuscript will progress to peer review where two expert reviewers will once again review your manuscript before the handling Editor or Editor-in-Chief makes a final decision on your manuscript.
- If your manuscript is successful and is accepted, you will have your manuscript returned to you for a period of five days for final checks. Please use this time to check author names, institutional affiliations, and that your title, abstract and keywords are correct. Please also check that you have provided permissions and credit lines for all figures and tables including ones you have created yourself. These should be listed as "Source: Authors own work". If any of the above information is incorrect, it is your responsibility to update account information in ScholarOne and provide the correct affiliations for the manuscript.

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Thank you for submitting your manuscript to the [Journal of Applied Research in Higher Education](#).

Yours sincerely,

[Journal of Applied Research in Higher Education](#) Editorial Office

Thank
you!

Contact Details: abhijitmohanty.1986@gmail.com
Mob: 9439690089 (WhatsApp)

T12: Navigating the Peer-Review Process

(Understanding reviewer feedback and crafting rebuttals)

Resource Person: Mr. Alekha Karadia

*Assistant Librarian, Institute of Chemical Technology Mumbai– Indian Oil Odisha Campus,
Bhubaneswar*

Navigating the Peer-Review Process



Mr. Alekha Karadia

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**Institute of Chemical Technology, Mumbai
– Indian Oil Odisha Campus Bhubaneswar
E- a.karadia@staffiocb.ictmumbai.edu.in**



Five-Day Online Faculty Development Programme on “Research Methodology & Scientific Paper Writing” Date:11th to 15th May 2026

IQAC of Udayanath (Auto.) College of Science and Technology, Adaspur, Cuttack

Navigating peer Review

*A guide to the peer review process, for both
authors and reviewers.*

Introduction



In the field of academic publishing, control over publication quality is essential. The system of peer review is a way to ensure this, as it involves the expert evaluation of every publication.



In your career, you might be led to both submitting articles for publication, and reviewing articles written by academic peers. This guide will cover the tasks of both authors and reviewers, after a presentation of the process of peer review.

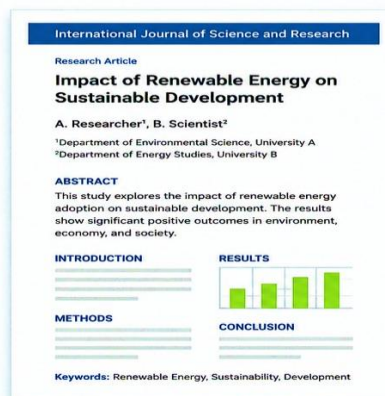
What is Research Publication?

Research publication is the process of communicating and disseminating the findings of a research study to a wider audience through formal written papers.

THE PROCESS OF RESEARCH PUBLICATION



THE PUBLISHED RESEARCH PAPER



WHY IS IT IMPORTANT?

- Shares new knowledge
- Builds credibility for researchers
- Helps in academic and professional growth
- Supports future research and development



Contents

I. The peer review process

- a. Why peer review?
- b. The mechanisms of peer review

II. Authors

- a. Writing your manuscript
- b. Submitting your manuscript
- c. Revising your manuscript

III. Reviewers

- a. Getting started
- b. Receiving a review invitation
- c. Reviewing the manuscript
- d. Writing the review
- e. Recommendation to the editor

Summary and Resources

I. The peer review process

A quick overview and explanation of the peer review process

What is Peer Review?



Peer review is a process that is undertaken by **credible scholarly journals** to ensure the content published is of a **high academic standard**. Journal editors select subject experts who evaluate submitted text for **research rigour** and for its **suitability for publication**.



Another way of thinking about peer review is that it is a process that can **improve the quality** of your work. It is an opportunity for you to see your article through the eyes of experts and peers in the field, and to critically reflect on its content in order to **strengthen it**.

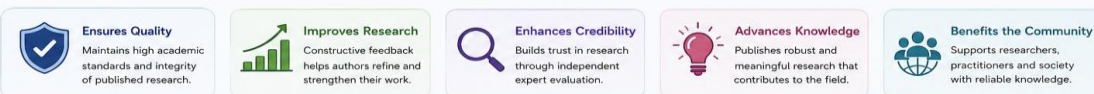


Even Nobel Prize winning papers will be carefully reviewed!

THE PEER REVIEW PROCESS



WHY PEER REVIEW MATTERS



a. Why peer review?

- Improving the quality of the published paper.
- Determining the originality of the manuscript.
- Determining the importance of the findings.
- Detecting fraud.

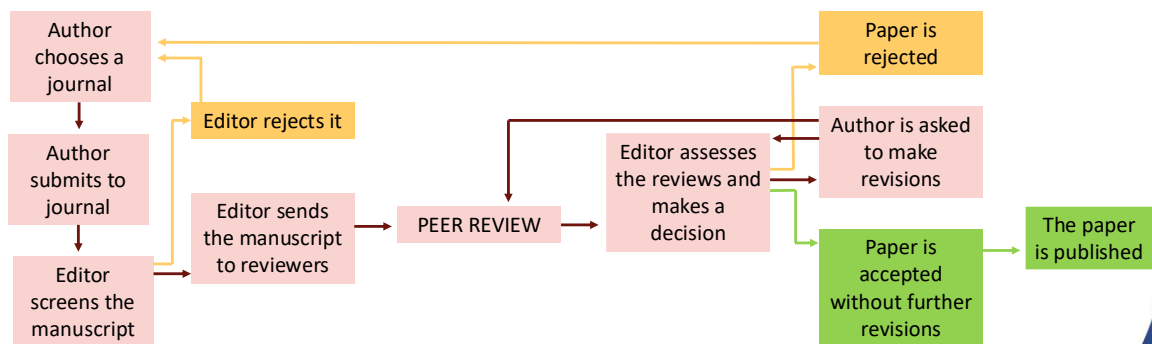
PRIMARY GOALS OF PEER REVIEW



In short: Peer review is a collaborative process that upholds the integrity of research and ensures that only high-quality, meaningful, and reliable work contributes to the body of knowledge.

Navigating the Peer Review Process as an Author

Regardless of the review model, authors can take practical steps to make peer review more productive and less stressful.



b. The mechanisms of peer review



The author submits their manuscript for a first screening from the editor.

The author needs to choose a journal which fits their field of study, and read that journal's guidelines.
Usually, the submission is done electronically.



The manuscript could be rejected by the editor at this stage.

The paper could be rejected if:

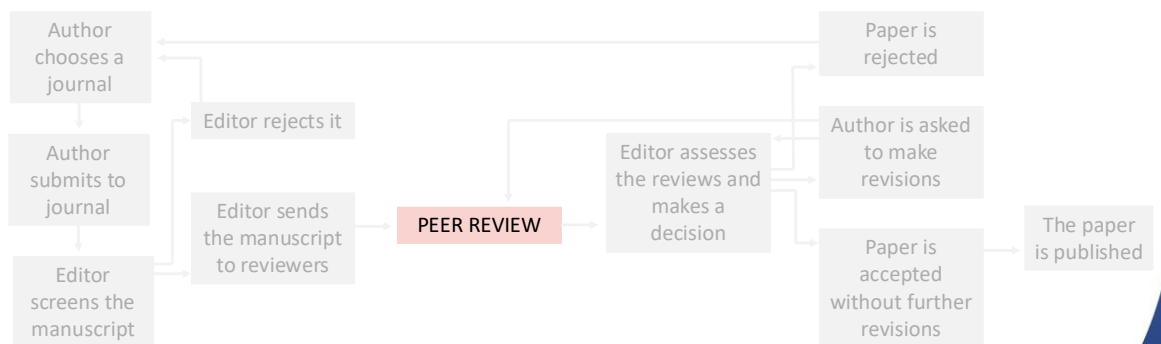
- The topic is not suitable for the journal.
- The author has failed to follow the journal's guidelines.
- The paper is too similar to one that has already been published.

→ The author revises their manuscript and attempts to submit it to a different journal.



After accepting the manuscript, the editor reaches out to reviewers.

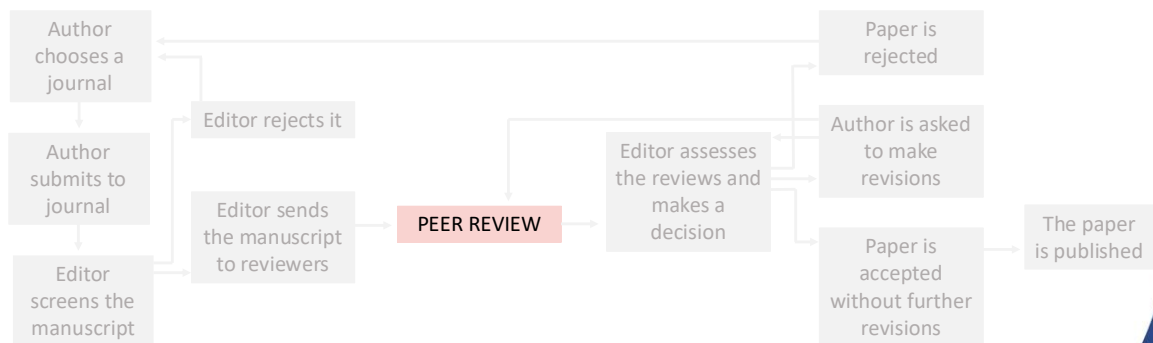
- Journals usually aim for 2 reviewers per paper.
- The editor has a database of reviewers, and finds the ones with expertise in the topic and/or method covered in the paper.
- The reviewers can choose to accept or decline the review offer.
- They are given a few weeks to return the review.



The manuscript is sent to the reviewers.

The reviewing process consists of checking:

- The relevance and novelty of this article in its field.
- Its overall structure and readability.
- Its appropriate use of sources and methodologies.

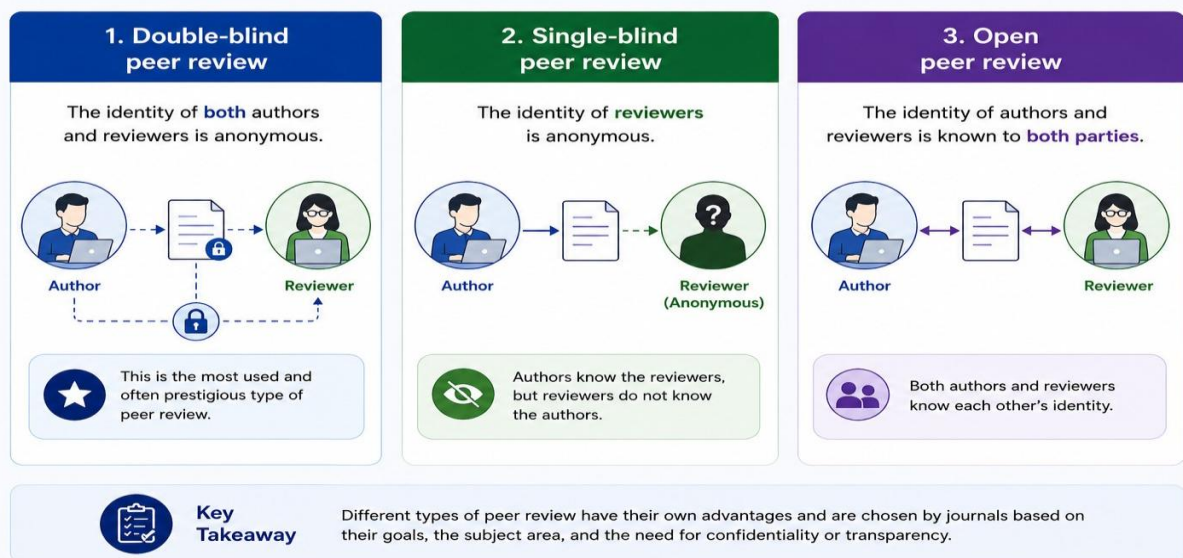


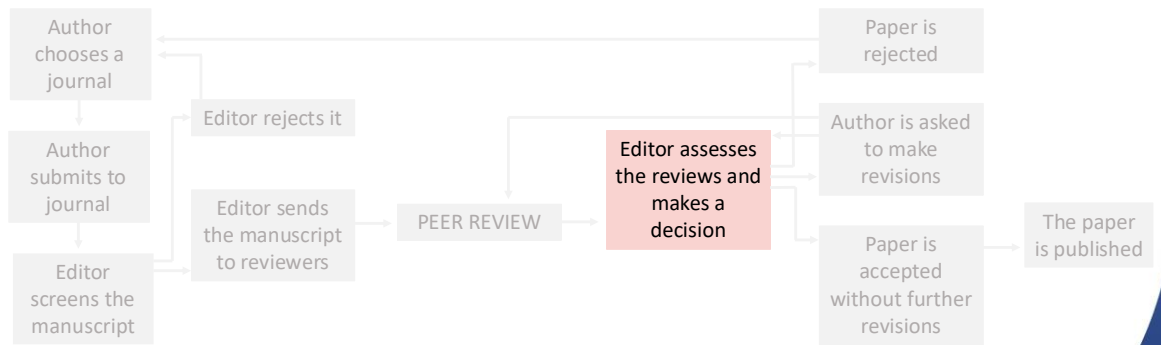
There are different kinds of peer review:

Single blind	The peer reviewers know who the authors are, but the authors do not know who the peer reviewers are.
Double blind	Neither party knows who the others are: the authors do not know who the peer reviewers are and the authors' names are not disclosed to the peer reviewers
Open	Both parties know who the others are: the peer reviewers are given the authors' names and the authors are told the peer reviewers' names when they receive the review comments

Types of Peer Review

Journals can utilise different types of peer review. The **three most common types** are:





The editor makes a decision based on the reviews, and their own evaluation of the paper.

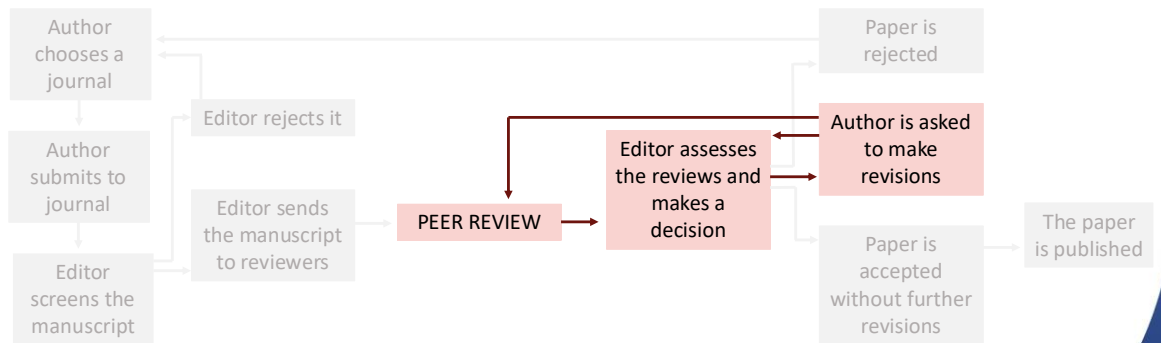
The editor can choose to:

- **REJECT** the manuscript
- **REVISE** with **MAJOR revisions** needed.
- **REVISE** with **MINOR revisions** needed.
- **ACCEPT** with no revisions.



The paper does not pass peer review and is rejected by the editor.

The author receives comments from the reviewers, and should use them to revise the manuscript before submitting it to another journal.

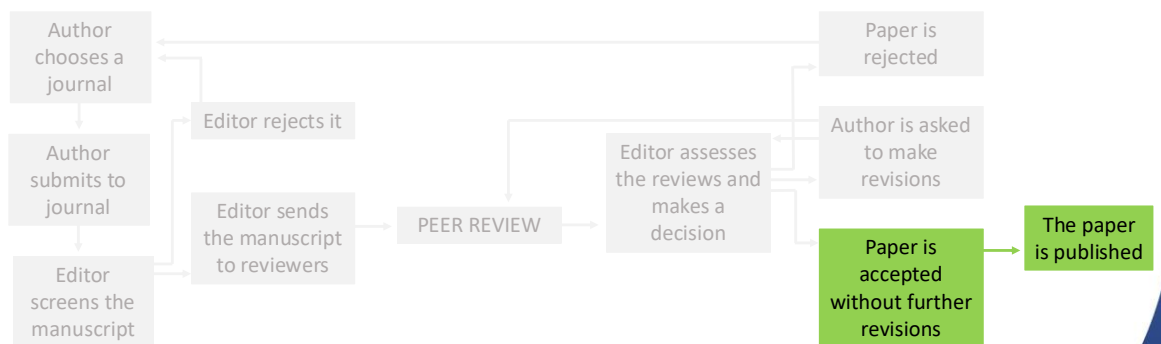


The author is asked to revise the manuscript.

The author bases the revisions on the comments of the reviewers.

If **MAJOR revisions** are needed, the manuscript needs to be checked by the reviewers once again before publication.

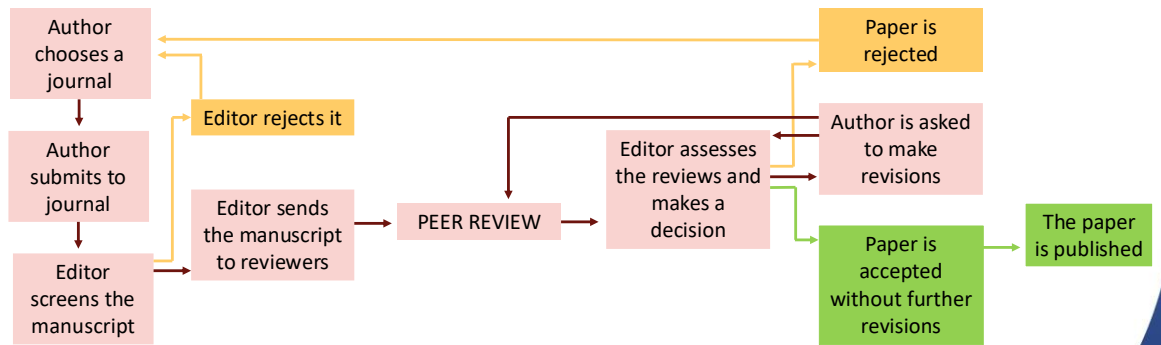
If **MINOR revisions** are needed, the manuscript is only checked by the editor, and not the reviewers.



The paper does not need any more revisions, and is ready to be published!

Sometimes the manuscript does not need any revision at all, but this is rare.

The paper is edited and proofread by the journal, then is published.



How do you fit in this process, both as an author and as a reviewer?

II. Authors

How to successfully submit a manuscript

a. Writing your manuscript

The reviewers will be looking at the structure and clarity of your paper, as well as its use of sources and methodologies. Here are some ideas of what will be evaluated during the peer review process, if you are writing for a **scientific journal**.

Title and abstract	Introduction	Methods	Results	Discussion
✓ Does the title reflect the research question? ✓ Does the abstract accurately describe the research methods and findings?	✓ Is the research question clear? ✓ Why is the research important? ✓ Are the most relevant sources cited?	✓ Are they described clearly enough for others to repeat them? ✓ Are they appropriate for the research question? ✓ Are they ethical?	✓ Are they well-described? ✓ Are they clearly presented? (i.e. are figures and tables readable?) ✓ Are all patterns and correlations accounted for?	✓ Is your interpretation backed up by results? ✓ Have you pointed out the limitations? ✓ Has the question been answered?

a. Writing your manuscript

Here are some ideas of what will be evaluated during the peer review process, if you are writing for a journal in the field of **arts and humanities**.

Title and abstract	Introduction	Argument	Style	Conclusion
✓ Does the title reflect the research question? ✓ Does the abstract accurately summarise the content of the article?	✓ Is the research question clear? ✓ Why is the research important? ✓ Are the most relevant sources cited? ✓ Have you pointed out the limitations of your approach? ✓ Have any theoretical perspectives been explained?	✓ Does it address the question you have set? ✓ Is it well structured? ✓ Have you covered the relevant source material and backed up your claims with evidence?	✓ Is your writing clear and engaging? ✓ Is your use of technical language appropriate for your audience? ✓ Have you followed the journal's style guidelines?	✓ Does it follow from your argument? ✓ Has the question been answered? ✓ Is the significance of your contribution clear? ✓ Can you suggest further work in that area?

b. Submitting your manuscript

Only submit your manuscript to **one journal at the time**.

Only approach other editors if you have been rejected by your first choice of journal.

Before submitting your manuscript, make sure that its aims align with the **focus of the journal**. Editors will not be interested in publishing your work if that is not the case.

Information regarding the focus and aims of a particular journal can be found on its **website**.

Remember to consult and follow the journal's **author guidelines**. They are usually found on their **website**, and cover essential information regarding...

- the article's structure
- the journal's preferred reference style
- instructions for graphical figures and illustration
- instructions for the acknowledgements and biography
- ... and more!

b. Submitting your manuscript

Here are examples of journals' guidelines for authors, from the journals *Nature* and *Past & Present*.



You can find this page [here](#).
The screenshot was taken in Jan 2020.



You can find this page [here](#).
The screenshot was taken in Jan 2020.

c. Revising your manuscript

If your manuscript needs revisions, or if it is rejected, it is important to take into account the **reviewers' comments** on your work. These could include comments about: the methodology, your use of sources, the construction of your argument, the clarity of your tables and illustrations, etc.

Make sure you revise your manuscript according to the reviews before submitting it again.

However, if you disagree with peer reviewers, and feel that it would be appropriate to defend your work, you can get back to the editor to let them know about the situation.

How to Respond to Reviewer Comments Effectively

Responding to reviewer comments is a critical part of the peer review process. Approach the task with professionalism and a commitment to improving your work.

10 KEY TIPS FOR AUTHORS

- 1 READ THE COMMENTS CAREFULLY**

Carefully read and understand each comment provided by the reviewers. Pay attention to both the positive and negative feedback.
- 2 MAINTAIN A POSITIVE ATTITUDE**

It's natural to feel defensive, but remember that reviewers want to help you improve your work. Approach their feedback with an open mind.
- 3 ADDRESS ALL COMMENTS**

Address each comment individually with a clear and specific response. Agree or disagree respectfully and provide a well-reasoned explanation.
- 4 BE TRANSPARENT**

Clearly explain the changes you have made in response to the comments so reviewers and editors can see you have taken their feedback seriously.
- 5 REVISE THOUGHTFULLY**

Ensure your revisions align with the reviewers' comments and improve the overall quality of the work. Be concise, clear and focused.
- 6 SEEK CLARIFICATION**

If any comment or recommendation is unclear, ask for clarification from the editor or reviewer. Clear understanding is essential.
- 7 BE TIMELY**

Respect the journal's deadlines for revisions and responses. Timeliness is crucial in the peer review process.
- 8 BE PROFESSIONAL**

Maintain a professional and respectful tone in all communications. Avoid confrontational language or emotional responses.
- 9 USE A COVER LETTER**

Include a cover letter summarizing the changes made and expressing gratitude for the reviewers' valuable feedback.
- 10 STAY PERSISTENT**

Don't be discouraged by rejection or major revisions. Use the feedback to improve your work and consider other suitable journals.



Remember: Reviewer feedback is an opportunity to strengthen your research. A thoughtful and respectful response not only improves your manuscript but also builds a positive impression with editors and reviewers.



Responses to Reviewer 1 of manuscript TNSRE-2019-00811 "An Improved Performance of Deep Learning Based on Convolution Neural Network to Classify the Hand Motion by Evaluating Hyper Parameter ", Triwiyanto, I Putu Alit Pawana, Mauridhi Hery Purnomo

We have addressed all of your comments, as described in the dialogue below.

No	Comments
1.	Reviewer: The last sentence in discussion is not relevant with the context of the paper, unless the the author describe why it is importance and the relevance with the paper. Please provide two or three sentence to support it. Author: Thank you for the suggestion, we have added some sentences to support the issue. Obviously, EMG signal is affected by some physical parameters such as sweat, motion artifact, and muscle fatigue [43]. Thus, when the part of the human limb performs a repetition motion then the muscle will experience a condition as call as muscle fatigue [44]. Evidently, muscle fatigue influences the EMG characteristics such as amplitude and frequency [44]. Consequently, based on previous research [9], muscle fatigue could influence the performance of the model.

An Improved Performance of Deep Learning Based on Convolution Neural Network to Classify the Hand Motion by Evaluating Hyper Parameter

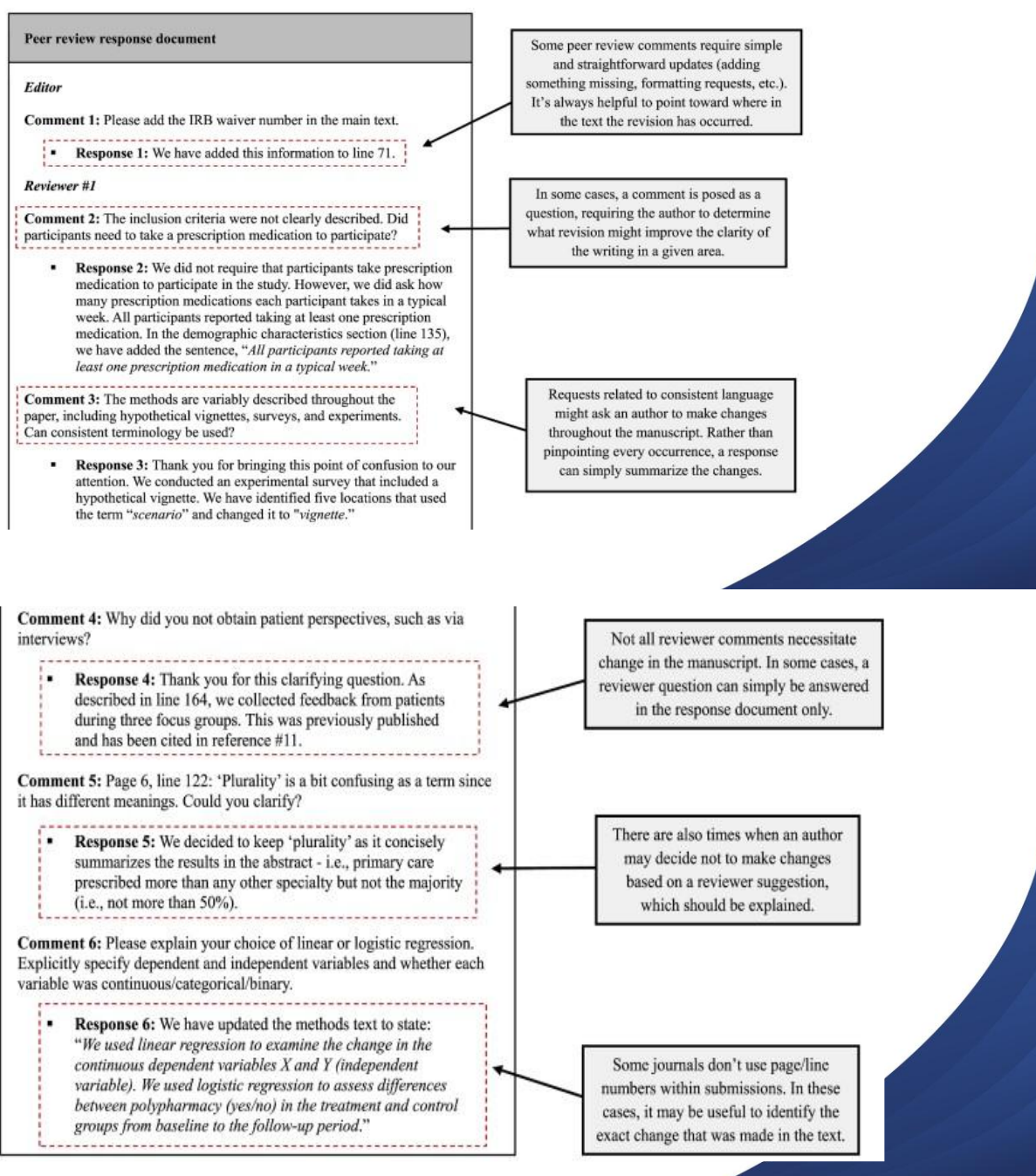
Triwiyanto Triwiyanto, Member, IEEE, I Putu Alit Pawana, and Mauridhi Hery Purnomo, Senior Member IEEE

Abstract—High accuracy in pattern recognition based on electromyography (EMG) contributes to the effectiveness of prosthetics, hand development. ~~This study aims to improve performance and simplify the deep learning pre-processing based on the convolution neural network (CNN) algorithm for classifying the hand motion from two raw EMG signals. The main contribution of this study is the simplicity of pre-processing steps in classifier machine. For instance, the feature extraction process is not required. Furthermore, the performance of the classifier was improved by adjusting the test hyperparameter in deep learning architecture. To validate the performance of deep learning, the public dataset from ten subjects was evaluated. The performance of the proposed method was compared to other conventional machine learning, specifically LDA, SVM, and KNN. The CNN can discriminate the ten hand motion based on raw EMG signal without handcrafts feature extraction. The results of the evaluation showed that CNN outperformed other classifiers. The average accuracy for all motion ranges between 0.77 and 0.93. The statistical t-test between using two-channel (CH1 and CH2) and single-channel (CH2) shows that there is no significant difference~~

electrical engineer prefer to use the EMG signal as a control. A pre-processing stage has to be prepared first before the EMG signal was used as an input of machine learning. A conventional pre-processing consisted of segmentation, feature extraction, and normalization. In this traditional method, studies evaluated the performance of machine learning by exploring several EMG features [3], [4]. Unfortunately, the EMG signal has random and stochastic characteristics in nature [2] [5]. Hence, the characteristics of the EMG signal change and depend on some parameters such as subjects, motion, muscle fatigue, electrode and muscle location [6]–[9]. Previous researchers have reported that a specific feature is suitable for a specific purpose [4] [10], [11]. Therefore, an investigation of the right feature was needed and usually took time to study.

Previous studies have used feature extraction based on the time-domain approach to obtain information related to hand motion. ~~Pratomo et al. proposed the time-domain features such as root mean square (RMS), mean absolute value (MAV), sign~~

Reviewer 1	
Reviewers' comments	Authors' response
Background	
Line 85: delete "appropriate"	Addressed in the manuscript (L91).
Lines 92-97: you could delete these sentences as they do not add anything to lines 84-90 where you explain the context of the wider research	Addressed in the manuscript (L96).
Methods	
Lines 149-50: "Convenience sampling was used in that all rural women who were HMHB clients were able to discuss"	Addressed in the manuscript (L154).
Line 159 "and they had an average"	Addressed in the manuscript (L).
Results	
Line 209 reference Figure 2	Addressed in the manuscript (L).
Line 210 delete "unique" here and everywhere else it appears e.g. line 496, 504 as these are not unique	Addressed throughout the manuscript.
Line 230-235: Suggest you delete this paragraph completely as it does not add.	We agree and have deleted the paragraph.
Line 253: "had to do out of respect for"	Addressed in the manuscript.
Lines 263-277: Suggest you delete these paragraphs and the quote. They do not fit in the current category and Figure 1 will already orientate the reader to expect the subsequent categories without renewing their introduction. You could add a version of Line 273 (eg "This section describes...") to the beginning of the next section.	Thank you for this suggestion. We addressed it in the manuscript.
Line 413-6: Reference to 'silver linings' is confusing - if this is a participant quote it needs more context.	We agree with this comment and changed <i>silver lining</i> to <i>much needed supports</i> as silver lining was not a description used by participating women.
Discussion	
Line 475-486: the discussion of possible reasons why the providers regretted being unable to provide health education is very interesting, but you might want to be more nuanced in how	Thank you for this comment. We edited this paragraph to be more nuanced and add more based on what we learned from providers.



EXAMPLE OF A REBUTTAL LETTER

Manuscript Title: Growth of Open Access Publications in Social Sciences (2004–2023)
Manuscript ID: SS-2026-015

TIPS TO REMEMBER

1

Thank the reviewers

2

Copy each comment exactly

3

Respond clearly and politely

4

State what was changed

5

Mention page and line numbers

6

Be respectful even when disagreeing

Dear Editor and Reviewers,
We sincerely thank the reviewers for their valuable comments. Below, we provide a point-by-point response. All changes in the revised manuscript are highlighted in blue.

1

Reviewer Comment 1:
"The introduction does not clearly explain the research gap."

Response: Thank you for this important suggestion. We have revised the introduction to clearly state the research gap and objectives.

Changes Made:
The final paragraph of the introduction has been rewritten (Page 2, Lines 45–60) to include a clear statement of the research gap and study objectives.

2

Reviewer Comment 2:
"The methodology section needs more details about data collection."

Response: We agree with the reviewer's suggestion. Additional details have been added regarding data selection, inclusion criteria, and analysis methods.

Changes Made:
A new subsection titled "Data Collection and Selection Criteria" has been added (Page 4, Lines 10–25). The database source and filtering process are now clearly explained.

3

Reviewer Comment 3:
"The sample size seems small. Please justify."

Response: Thank you for raising this concern. The sample size was determined based on availability of Scopus-indexed publications within the selected timeframe (2004–2023). We have now included a justification in the manuscript.

Changes Made:
An explanation of sample selection criteria has been added in the Methodology section (Page 5, Lines 30–38).

4

Reviewer Comment 4:
"Figures are unclear."

Response: We appreciate this observation. All figures have been redesigned with higher resolution and clearer labels.

Changes Made:
Revised Figures 2 and 3 have been updated (Pages 8–9). The font size and axis labels have been improved.

✓

Closing Statement:
We believe these revisions have significantly improved the quality and clarity of the manuscript. We sincerely thank the reviewers for their constructive feedback.
Sincerely,
[Author Name]

LEGEND (What each color/icon means)

Reviewer Comment

Your Response

Changes Made

(Page/Line)

Location of Changes

Polite and Respectful Tone

Manuscript Rebuttal Letter

November 26, 2050

Editorial Office
Journal of Climate Change and Sustainability
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Brighton, UK, B64 3ZJ

Dear Dr. Smith and the Editorial Team,

Thank you for the opportunity to revise and resubmit our manuscript entitled "Impacts of Urbanization on Local Climate Patterns: A Longitudinal Study" (Manuscript ID: JCCS-2050-1234). We would like to express our sincere gratitude to the reviewers for their thoughtful and constructive feedback, which has significantly improved the quality of our manuscript. Below, we provide a detailed response to each of the reviewers' comments, with a summary of the revisions we have made. For clarity, we have included the reviewers' comments in bold, followed by our responses in regular text. All changes in the manuscript are indicated in [blue text].

Reviewer 1:
Comment 1: The methodology section does not clearly explain how the urban heat island effect was quantified. Please provide more detail on the specific techniques used.
Response: Thank you for pointing this out. We have expanded the methodology section to provide a more detailed explanation of the techniques used to quantify the urban heat island (UHI) effect. Specifically, we have included information on the satellite data sources used, the temperature measurement protocols, and the statistical models employed. These details can now be found in the revised manuscript on **page 6, lines 15–1**.

General Changes:
In addition to addressing the specific comments, we have made minor editorial revisions throughout the manuscript to improve readability, such as clarifying ambiguous sentences and correcting typographical errors. We have also updated the references section to include newly published works that support our revised analysis.

We believe that the revisions have addressed the reviewers' concerns and have strengthened the manuscript. We are grateful for the reviewers' thoughtful suggestions and are confident that the revised version is now suitable for publication. We look forward to your feedback and hope that the manuscript will meet the expectations of the editorial team and reviewers.

Thank you once again for your time and consideration.

Sincerely,

Dr. [Your Name]
Department of Environmental Science
[Your Company Name]

III. Reviewers

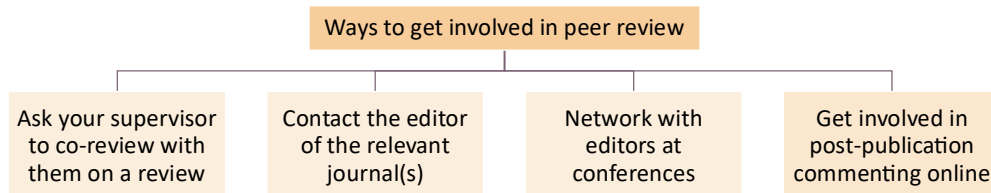
How to efficiently review a manuscript

Page | 215

a. Getting started

Get involved in peer review to:

- Contribute to the academic community.
- Enhance your reputation or career, and distinguish yourself as an expert in your field.
- Stay up-to-date with emerging research in your field.



b. Receiving a review invitation

Are you able to respect the deadline?

The average review takes a few hours to complete.

Do you have the appropriate knowledge and expertise?

The editor is looking for an expert's opinion.

Do you understand the focus of the journal?

The reviewers' guidelines are found on the journal's site, or invitation email.

Are there any conflicts of interest?

Do you work in the same institution as the author, or have collaborated before, etc.

These are important elements to consider before accepting a review invitation.

Tell the editor about any doubts you may have regarding these questions.

- Accept or decline the invitation as **promptly** as you can, so as to not slow down the publication process! When declining, you may **suggest alternative reviewers**, if possible.
- The correspondence about the manuscript should remain **confidential** before, during, and after the peer review process.

c. Reviewing the manuscript

It is essential to read through the whole manuscript **before** writing any review.

You may want to focus on the following aspects of the article:

The topic

- ✓ Is it appropriate for the journal?
- ✓ Does it contribute and add to the knowledge of its academic field?
- ✓ Does it answer a relevant question?

The sources and methodology

- ✓ Has the author used relevant sources?
- ✓ Is the methodology appropriate for the research question?
- ✓ Is the methodology well-described?

The content and structure

- ✓ Are the arguments clear?
- ✓ Do the title and abstract reflect the content of the article?
- ✓ Are the tables/figures/images relevant and clear?
- ✓ Does the evidence support the conclusions?

Do NOT correct **typos or spelling mistakes**! It is time-consuming, and is the task of the journal's copy editors.
You could address spelling problems in one or two sentences in your review.

d. Writing the review

Reviews can be structured in different ways. However, here are some important considerations:

1. Overview

- How do you interpret the points made in the paper?
- How does it contribute to your academic field?
- Main strengths and weaknesses?

2. Major comments

- These are problems that affect the understanding of the paper.
- Be precise! Refer to specific extracts and suggest ways to improve the paper.

3. Minor comments

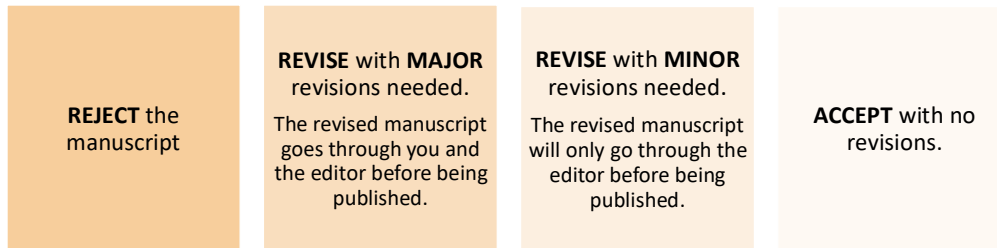
- These can include: confusing sentences, unclear figures, incorrect references, etc.
- Similarly, being precise will facilitate the author's revisions.

Remember that your goal is to help improve the paper, so it is important to keep a **constructive tone**.

You can find more information on this in this [webinar](#) from Zoë Mullan, founding editor of *The Lancet Global Health*, published by Elsevier.

e. Recommendation to the editor

You can recommend one of four choices to the editor:

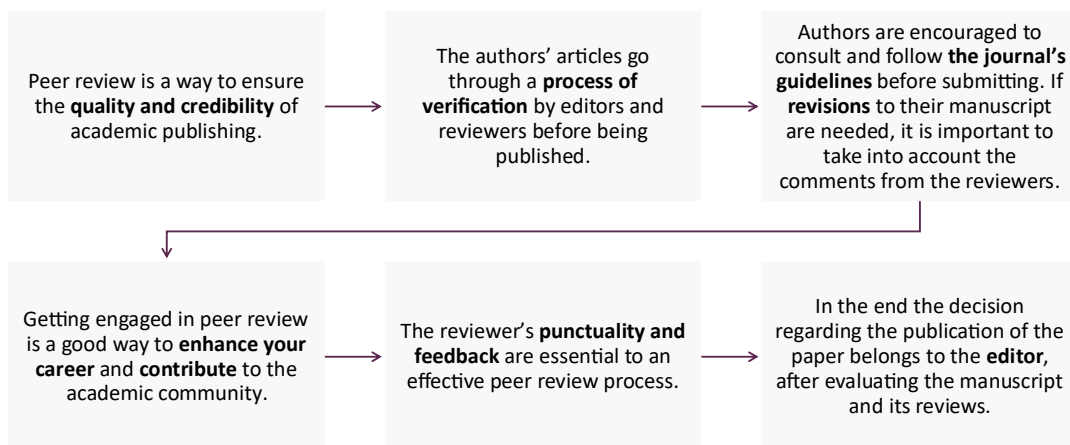


Your recommendation should reflect your comments to the author.

Keep in mind that the editor makes the final decision, and it may not match your recommendation.

Summary and Resources

Summary



Towards 33 codes of practice for reviewers, editors, and authors.

Peer reviewers	Editors	Authors
1  Assess novelty, rigor, and style	1  Promptly process articles	1  Make it easy for editors and reviewers
2  Judge a paper according to its own objectives	2  Provide direction, don't just cut and paste reviews	2  Don't put off revising, get started immediately
3  Embrace interdisciplinarity and avoid disciplinary dogma	3  Identify and seek out any missing perspectives	3  Be respectful to your referees, and editors
4  Avoid territoriality	4  Recognize that controversial papers might be the most innovative	4  Be systematic and complete in your response to reviewers
5  Don't focus on the ability of the manuscript to "surprise" you	5  Be responsive	5  Focus on substance to win over hostile reviewers
6  Aim for short and quicker reviews	6  Respect the peer review process and integrity of reviewer reports	6  Realize you may not be able to agree to every comment
7  Use your judgement, based on the science	7  Avoid mixing reviewer and editorial responsibilities	7  Do not use reviewer comments verbatim in your revised manuscript
8  Respect editorial screens about fit for journal	8  Provide the full, unedited reviewer reports	8  If you are given the chance to revise, take it
9  Be collegiate and constructive with your language	9  Recognize possible bias or conflict of interest	9  Offer to review for the journal
10  Commit to reviewing all revisions.	10  Carefully consider author appeals	10  Diligently meet deadlines
11  Manage a fair reviewer workload	11  Blacklist "bad" reviewers and recognize "good" ones	11 

Resources

- Electv, *Introduction to academic publishing: A guide for researchers*.
- Elsevier's Researcher Academy, *Certified Peer Reviewer Course*. You can take the course here: <https://researcheracademy.elsevier.com/navigating-peer-review/certified-peer-reviewer-course>
- University of Manchester Library, *My Research Essentials: Peer review*. You can take the course here: https://www.escholar.manchester.ac.uk/learning-objects/mre/peer-review/story_html5.html
- Robson, K., Pitt, L., & West, D. C. (2015). Navigating the peer-review process: Reviewers' suggestions for a manuscript: Factors considered before a paper is accepted or rejected for the *Journal of Advertising Research*. *Journal of Advertising Research*, 55(1), 9–17. <https://doi.org/10.2501/JAR-55-1-009-017>
- RMIT University (n.d.) *The peer review process*. Available at: <https://rmit.pressbooks.pub/researchwritingmodules/chapter/the-peer-review-process/>
- IJPS Journal (n.d.) *Navigating the peer review process: Tips for authors*. Available at: <https://www.ijpsjournal.com/blog/Navigating-the-Peer-Review-Process:-Tips-for-Authors>

W3: Workshop: Citation & Bibliography Management

(Avoiding standard, errors, automatic bibliography generation)

Resource Person: Dr. Ajodhya Gourab Mishra

Research Assistant (ICSSR Project), Dept. of Business Administration, Trident Academy of Technology, Bhubaneswar

DAY 5 — CONCLUDING SESSION

RESEARCH METHODOLOGY &
SCIENTIFIC PAPER WRITING

Citation & Bibliography Management

Avoiding Common Errors • Automatic Bibliography Generation
MS Word Citation Manager • Zotero • Mendeley

Presented by:

Dr. Ajodhya Gourab Mishra, Research Assistant (ICSSR Project),
Department of Business Administration, Trident Academy of Technology, Bhubaneswar.

SESSION OVERVIEW

What We Will Cover Today

01 Foundation

What is citation? Origin, purpose & importance

02 Terminology

Citation vs. Reference vs. Bibliography — key distinctions

03 Styles

APA 7, MLA 9, Chicago, Harvard, Vancouver & more

04 Common Errors

Top 10 mistakes researchers make & how to fix them

05 Special Cases

Secondary citations, personal comms, grey literature

06 Power Tools

MS Word, Zotero, Mendeley — practical walkthroughs

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The Origin & History of Citation

From Footnotes to Digital Reference Management

- ~1490s** — Early scholarly footnotes in printed books after Gutenberg press
- 1743** — Samuel Johnson's dictionary — systematic source attribution
- 1920s** — APA publishes first editorial style guide for psychology journals
- 1951** — Science Citation Index by Eugene Garfield — birth of citation analysis
- 1963** — MLA Handbook published — humanities citation standardized
- 2000s** — Digital tools: Zotero (2006), Mendeley (2008) revolutionize management

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MODULE 2: IMPORTANCE

Why Proper Citation Matters

The pillar of academic integrity and scholarly credibility



Academic Integrity

Acknowledges intellectual debt; prevents plagiarism accusations. Santini (2018) notes that improper citation 'blights the quality of a paper'.



Source Verification

Allows readers and reviewers to trace, verify, and build upon cited claims. High error rates make statements unverifiable (Lin et al., 2022).



Scholarly Credibility

Demonstrates literature depth. Reviewers check bibliography age, breadth, and accuracy as quality signals.



Legal Protection

Proper attribution protects against copyright infringement claims in published academic work.



Knowledge Networking

Citations form the web of science — they connect ideas, enable citation analysis, and measure research impact.



Publication Success

Missing critical references = rejection. Reviewers interpret poor referencing as intellectual laziness or inadequate literature review.

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Citation, Reference & Bibliography

Three Terms — Three Distinct Meanings

CITATION	REFERENCE	BIBLIOGRAPHY
An in-text pointer (author-date, number, or footnote) placed immediately after a claim to acknowledge the source.	The full bibliographic details of each source that was cited in the text. Every citation must have a corresponding reference.	A comprehensive list of ALL sources consulted — whether cited in text or not — used in preparing the work.
<i>E.g.: "Zotero and Mendeley are the most preferred tools (Jain et al., 2025)."</i>	<i>E.g.: Jain, D., et al. (2025). Citation management tools... Journal of Library...</i>	<i>Broader than a reference list; includes background reading and general sources</i>
Appears WITHIN the body of the text	Appears at the END of the document	May include UNCITED background sources

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MODULE 3: CITATION STYLES

The Landscape of Citation Styles

Different disciplines, different conventions

APA 7th Ed.	MLA 9th Ed.	Chicago 17th	Harvard
Field: Social & Behavioral Sciences, Education, Psychology <i>Type: Author-Date</i>	Field: Humanities, Literature, Languages <i>Type: Author-Page</i>	Field: History, Arts, some Social Sciences <i>Type: Notes-Bibliography OR Author-Date</i>	Field: Natural Sciences, Social Sciences (UK/Australia) <i>Type: Author-Date</i>
Vancouver	IEEE	ACS	Turabian
Field: Medicine, Biomedical Sciences <i>Type: Numbered</i>	Field: Engineering, Computer Science, Technology <i>Type: Numbered</i>	Field: Chemistry & Chemical Sciences <i>Type: Numbered</i>	Field: Academic Papers & Theses (derivative of Chicago) <i>Type: Notes-Bibliography</i>

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APA 7th Edition: Rules & Real Examples

American Psychological Association — The Most Widely Used Academic Style

IN-TEXT CITATION FORMATS	REFERENCE LIST — REAL EXAMPLES
1 Author: (Smith, 2023)	Journal Article: Jain, D., et al. (2025). Citation management tools, practices and challenges among research scholars. <i>Journal of Library and Information Communication Technology</i> , 14(1), 1–12.
2 Authors: (Smith & Jones, 2023)	Book: American Psychological Association. (2020). <i>Publication manual of the American Psychological Association</i> (7th ed.). APA.
3+ Authors: (Smith et al., 2023)	DOI Article: Ivey, C., & Crum, J. (2018). Choosing the right citation management tool. <i>Journal of the Medical Library Association</i> , 106(3), 399–416. https://doi.org/10.5195/jmla.2018.468
Direct quote: (Smith, 2023, p. 45)	
No author: ("Article Title," 2023)	
No date: (Smith, n.d.)	
Multiple works: (Ahmed, 2011; Jain, 2025)	

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PRACTICAL EXAMPLES: ONE SOURCE, FOUR STYLES

Real Paper — Four Citation Styles

Source: Ivey & Crum (2018) 'Choosing the Right Citation Management Tool'

APA 7th Edition	In-text: (Ivey & Crum, 2018, p. 399) Ivey, C., & Crum, J. (2018). Choosing the right citation management tool: Endnote, Mendeley, Refworks, or Zotero. <i>Journal of the Medical Library Association</i> , 106(3), 399–416. https://doi.org/10.5195/jmla.2018.468
MLA 9th Edition	In-text: (Ivey and Crum 399) Ivey, Chris, and Janet Crum. "Choosing the Right Citation Management Tool: Endnote, Mendeley, Refworks, or Zotero." <i>Journal of the Medical Library Association</i> , vol. 106, no. 3, 2018, pp. 399–416.
Chicago 17th (Author-Date)	In-text: (Ivey and Crum 2018, 399) Ivey, Chris, and Janet Crum. 2018. "Choosing the Right Citation Management Tool." <i>Journal of the Medical Library Association</i> 106 (3): 399–416.
Vancouver (Numbered)	In-text: [1] (superscript in text) 1. Ivey C, Crum J. Choosing the right citation management tool: Endnote, Mendeley, Refworks, or Zotero. <i>J Med Libr Assoc.</i> 2018;106(3):399–416.

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Top 10 Citation Errors Researchers Make

Research-backed: Sheshadri et al. (2025) analyzed 180 citations in LIS theses

01	⚠ Missing volume/issue numbers in journal references ✅ Fix: Always include Vol. X, No. Y	02	⚠ Misspelled author names in reference list ✅ Fix: Cross-check with original source
03	⚠ Inconsistent citation style within same paper ✅ Fix: Pick one style; use a reference manager	04	⚠ Citing without reading the actual source (hearsay citation) ✅ Fix: Always read what you cite
05	⚠ Wrong page numbers in direct quotes ✅ Fix: Record page no. at time of note-taking	06	⚠ Outdated references (>5 years old without justification) ✅ Fix: Include recent works; explain classic use
07	⚠ Missing DOI/URL for online sources ✅ Fix: Always add DOI or stable URL	08	⚠ Hanging indent absent in reference list ✅ Fix: Apply 0.5" hanging indent (APA/MLA/Chicago)
09	⚠ Mismatch between in-text citation & reference list ✅ Fix: Cross-check every citation with reference list	10	⚠ Using 'et al.' incorrectly (too early or too late) ✅ Fix: APA7: use et al. from 1st use for 3+ authors

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MODULE 5: SPECIAL CITATION CASES

Special & Unusual Citation Scenarios

Situations where researchers commonly go wrong

Secondary Citation (Citing a Source You Didn't Read)

When you cite Paper A, but only read Paper B which cited Paper A. Use sparingly — only when original is unavailable.

❌ WRONG: (Garfield, 1955) — if you only read Lin et al. (2022)

✅ RIGHT: (Garfield, 1955, as cited in Lin et al., 2022)

📌 Only the source you read (Lin et al., 2022) appears in your reference list.

AI-Generated Content (ChatGPT, Claude, etc.)

A growing challenge: AI fabricates citations at 42.9–51.8% (Oladokun et al., 2025). Treat AI outputs as personal comms.

❌ WRONG: Citing AI-generated references without verification

✅ RIGHT: Verify ALL AI-suggested references before citing

📌 APA 7: Treat as software. Always verify existence on PubMed/Google Scholar.

Personal Communication (Emails, Interviews, Conversations)

Unpublished, unrecoverable by readers. Cite in -text only — NOT in reference list (APA), or as footnote (Chicago).

❌ WRONG: Adding personal comms to reference list

✅ RIGHT (APA): (J. Smith, personal communication, May 12, 2025)

📌 No reference list entry needed — reader cannot retrieve it.

Grey Literature (Reports, Theses, Preprints, Gov Docs)

Include enough details for retrieval. Use institutional name as author if individual unknown.

❌ WRONG: "WHO Report 2020" — no URL, no report number

✅ RIGHT: World Health Organization. (2020). Report title.

<https://who.int/...>

📌 Always include stable URL or report number for grey literature.

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MS Word Citation Manager — No Installation Needed

Built into every Microsoft Word version since 2007 · References Tab

STEP-BY-STEP: INSERTING CITATIONS IN MS WORD

- 1 Go to References tab → Citations & Bibliography group
- 2 Click 'Style' dropdown → Select APA, MLA, Chicago, etc.
- 3 Click 'Insert Citation' → 'Add New Source'
- 4 Fill in source details (Author, Title, Year, Publisher, etc.)
- 5 Citation appears automatically in your chosen style
- 6 At end: References tab → 'Bibliography' → Insert Bibliography

⚠ LIMITATIONS

- Limited styles (~17) vs. Zotero (9,000+)
- Manual data entry — no auto-import
- No PDF management capability
- No cloud sync across devices
- Good for small papers; limited for thesis/large manuscripts

✓ **BEST FOR: Quick, standalone documents**

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MODULE 6: REFERENCE MANAGEMENT TOOLS

Zotero — The Free, Open-Source Champion

Developed by George Mason University's Roy Rosenzweig Center · Launched 2006

FREE

Forever & Always

9,000+

Citation Styles

Web+App

Browser Integration

Group Libs

Collaboration Feature

⚡ KEY FEATURES

- One-click capture from browser (DOI, ISBN, PubMed)
- Word/Google Docs plugin for instant citations
- Automatic PDF metadata extraction
- Cloud sync + unlimited storage (own servers)
- RIS/BibTeX/CSV import-export
- Group libraries for team collaboration

🔄 TYPICAL ZOTERO WORKFLOW

1. Install Zotero desktop + browser connector
2. Click icon on any journal page → auto-saves
3. Open Word → Zotero tab → Add/Edit Citation
4. Search author/title in floating search bar
5. Insert Bibliography at end with one click
6. Switch styles instantly (APA → MLA in seconds)

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Mendeley — The Researcher's Social Network

Owned by Elsevier · 6M+ researchers worldwide · Launched 2008

Free Basic Plan (2GB)	PDF Annotate Built-in PDF Reader & Notes	Social Academic Networking	Web+App Desktop, Web & Mobile
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 **KEY FEATURES**

- Integrated PDF reader with annotation tools
- Automatic metadata extraction from PDFs
- MS Word & LibreOffice citation plugin
- Public profiles & paper recommendations
- Group folders for team reference sharing
- Mendeley Catalog: 100M+ research papers

 **MENDELEY VS. ZOTERO**

- Mendeley: Better PDF management & annotation
- Zotero: Superior web capture & open-source
- Mendeley: Social features + researcher profiles
- Zotero: Free unlimited storage on own servers
- Mendeley: Requires Elsevier account login
- Both: Equally strong Word plugin integration

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PRACTICAL TIPS: BUILDING A STRONG BIBLIOGRAPHY

Building a Publication-Quality Bibliography

What reviewers and editors actually check

 01 Currency Most references should be within last 5 years (with justified exceptions for seminal works). A preponderance of old refs signals inadequate literature review.	 02 Completeness Every in-text citation MUST have a reference entry and vice versa. One-to-one correspondence is mandatory. Run a final cross-check.	 03 Accuracy Cross-check author names, year, volume, issue, pages against the original. Misspellings = reviewer red flags. Errors in 15% of LIS thesis citations (Sheshadri et al., 2025).
 04 Diversity Avoid over-citing a single author (self-promotion signal). Include diverse sources — primary research, reviews, meta-analyses, international voices.	 05 Relevance Only cite directly relevant sources. Padding bibliography with tangentially related papers is transparent to reviewers and wastes space.	 06 Format Consistency One style throughout. Every comma, period, italics, and hanging indent must be consistent. Use a reference manager to eliminate manual formatting errors.

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References

- Ivey, C., & Crum, J. (2018). Choosing the right citation management tool: Endnote, Mendeley, Refworks, or Zotero. *Journal of the Medical Library Association*, 106(3), 399–416. <https://doi.org/10.5195/jmla.2018.468>
- Jain, D., et al. (2025). Citation management tools, practices and challenges among research scholars. *Journal of Library and Information Communication Technology*, 14(1), 1–15.
- Jin, J. G., et al. (2026). Comparison of reference management software with new artificial intelligence-based tools. *Journal of Educational Evaluation for Health Professions*, 23, Article 5.
- Lin, T.-Y., et al. (2022). How to reduce errors and improve transparency by using more precise citations. *Frontiers in Cardiovascular Medicine*, 9, 847704. <https://doi.org/10.3389/fcvm.2022.847704>
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- Patil, S. S., et al. (2025). Information management: Enhancing research efficiency with reference management software. *Journal of Information Management*, 12(1), 1–12.
- Santini, A. (2018). The importance of referencing. *The Journal of Critical Care Medicine*, 4(1), 3–4.
- Sheshadri, K. N., et al. (2025). An evaluation of APA citation and referencing accuracy in LIS doctoral theses. *International Journal of Research in Library Science*, 11(1), 1–14.

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Thank You So Much!

Useful Resources:

Zotero
www.zotero.org

Mendeley
www.mendeley.com

APA Style Blog
apastyle.apa.org

MLA Core Elements
style.mla.org

"A paper without proper citations is a building without a foundation."

Day 5 of 5 | Research Methodology & Scientific Paper Writing

PROGRAMMEE SCHEDULE
A FIVE-DAY ONLINE FACULTY DEVELOPMENT PROGRAMMEE
ON
RESEARCH METHODOLOGY & SCIENTIFIC PAPER WRITING
11TH to 15TH MAY, 2026
Organized by
IQAC

Udayanath (Auto.) College of Science and Technology, Adaspur, Cuttack

DAY 1: Foundations of research

Time	Programme Details
10.30 A.M.- 11.00 A.M.	Inaugural session
11.00 A.M.- 12.30 P.M.	T1: Problem Identification & Research Gap <i>(Articulating research questions, understanding scope, and novelty)</i> Resource Person: Dr. Ajodhya Gourab Mishra <i>Research Assistant (ICSSR Project), Dept. of Business Administration, Trident Academy of Technology, Bhubaneswar</i>
1.00 P.M.-2.30 P.M.	T2: Developing a Robust Hypothesis <i>(Formulating and testing hypotheses, identifying variables)</i> Resource Person: Prof. (Dr.) Nibedita Jena <i>Former Director, State Advisor, Higher Education Department, Government of Odisha</i>
3.00 P.M.-4.30 P.M.	T3: Choosing Appropriate Methodologies <i>(Quantitative, Qualitative, and Mixed-Method approaches)</i> Resource Person: Dr. Manoj Mishra <i>Librarian, Siksha 'O' Anusandhan University, Bhubaneswar</i>
4.30 P.M.- 5.00P.M.	Assignment-I

DAY 2: Experimental Design

Time	Programme Details
11.00 A.M.-12.30 P.M.	T4: Tools for Quantitative & Qualitative Analysis <i>(Survey design, sampling techniques, focus groups)</i> Resource Person: Dr. Shantanu Raj <i>Assistant Professor, Centre for Agribusiness Management, Utkal University, Bhubaneswar</i>
12.30 P.M.-2.00 P.M.	T5: Ethics in Data Collection <i>(Data privacy, informed consent, and security in research)</i> Resource Person: Dr. Anushree Mishra <i>Professor, Department of Psychology, AIIMS, Bhubaneswar</i>
2.30 P.M.-4.00 P.M.	T6: Effective Writing for Introduction & Review <i>(The 'Hook,' defining problems, and setting the stage)</i> Resource Person: Dr. Elina Kanungo <i>Assistant Professor, Department of Commerce, BJB Autonomous College, Bhubaneswar</i>
4.30 P.M.- 5.00P.M.	Assignment-II

DAY 3: Anatomy of a Paper

Time	Programme Details
10.30 A.M.-12.00 P.M.	T7: Detailing Methods & Materials <i>(Reproducibility, precision, and protocol documentation)</i> Resource Person: Dr. Biswajit Chhatoi <i>Assistant Professor, Department of Business Administration, Berhampur University, Berhampur</i>
12.30 P.M.-2.00 P.M.	T8: Understanding Plagiarism (Types & Severity) <i>(Accidental vs. intentional, self-plagiarism)</i> Resource Person: Dr. Jyoti Ranjan Rout <i>Associate Professor, School of Biological Sciences, AIPH University, Bhubaneswar</i>
2.30 P.M.-4.00 P.M.	W1: Workshop: Critical Literature Review & Tools <i>(Using Mendeley/Zotero, structuring a review matrix)</i> Resource Person: Dr Priyakrushna Mohanty <i>Assistant Professor and Research Mentor, School of Business and Management, Christ University, Bengaluru</i>
4.30 P.M.- 5.00P.M.	Assignment-III

DAY 4: Ethics & Integrity

Time	Programme Details
10.30 A.M.-12.00 P.M.	T9: Software for Plagiarism Checking <i>(Interpreting similarity reports Turnitin/iThenticate)</i> Resource Person: Prof. (Dr.) Manoranjan Dash <i>Professor and Associate Dean, Department of Management Sciences, Siksha 'O' Anusandhan University, Bhubaneswar</i>
12.30 P.M.-2.00 P.M.	T10: Selecting the Right Journal (Indexing & Impact) <i>(Identifying predatory journals, Scopus/WoS metrics)</i> Resource Person: Dr. Haresh Chandra Mishra <i>Adjunct Professor and Research Adviser, State Institute of Special Education and Research (SISER), Bhubaneswar</i>
2.30 P.M.-4.00 P.M.	W2: Workshop: Data Visualization & Result Reporting <i>(Creating impactful tables and figures using basic tools)</i> Resource Person: Dr. Bhabani Shankar Mohanty <i>Assistant Professor, Department of Statistics and Applied Mathematics, School of Mathematics and Computer Sciences, Central University of Tamil Nadu, Tamil Nadu</i>
4.00 P.M.- 4.30P.M.	Assignment-IV

DAY 5: Submission & Review

Time	Programme Details
10.00 A.M.-11.30 A.M.	T11: Writing Cover Letters & Managing Submissions <i>(The corresponding author's role)</i> Resource Person: Dr. Abhijit Mohanty <i>Guest Faculty (Assistant Professor), Department of Business Administration, Utkal University, Vani Vihar, Bhubaneswar</i>
12.00 P.M.-1.30 P.M.	T12: Navigating the Peer-Review Process <i>(Understanding reviewer feedback and crafting rebuttals)</i> Resource Person: Mr. Alekha Karadia <i>Assistant Librarian, Institute of Chemical Technology Mumbai– Indian Oil Odisha Campus, Bhubaneswar</i>
2.00P.M.-3.30P.M.	W3: Workshop: Citation & Bibliography Management <i>(Avoiding standard, errors, automatic bibliography generation)</i> Resource Person: Dr. Ajodhya Gourab Mishra <i>Research Assistant (ICSSR Project), Dept. of Business Administration, Trident Academy of Technology, Bhubaneswar</i>
3.30 P.M.- 4.00P.M.	Assignment-V
4.00 P.M.	Feedback & Valedictory Session