STUDY MATERIAL

ON

RESEARCH & PUBLICATION ETHICS (20RPE000)

VTU Ph.D Coursework Courses-2020

VVCE
EDUCATION PAR EXCELLENCE

by

MOHAMED ANEES

Assistant Professor

Department of Electronics & Communication

Vidyavardhaka College of Engineering, Mysuru

https://vvce.ac.in/

Disclaimer: *The content of these notes is compiled from various publicly available online sources.*

TABLE OF CONTENTS

1.0 MODULE – 01

1.1 PHILOSOPHY

1.1.1 INTRODUCTION

- The origin of "**Philosophy**" is from two Greek words – "**Philos**" meaning "**love**" and "**sofia**" meaning "**wisdom**". Hence, philosophy means **"love of wisdom"**.
- In a broad sense philosophy is an activity people undertake when they seek to understand fundamental truths about themselves, the world in which they live, and their relationships to the world and each other.
- Philosophy involves asking, answering and arguing.
- In the context of research philosophy refers to a system of beliefs and assumptions about the development of knowledge.
- Authentic definitions from some distinguished philosophers:
    - "Philosophy is the science and criticism of cognition" – Kant.
    - "Philosophy is the science of knowledge" – Fitche.
    - "Philosophy aims at the knowledge of eternal" – Plato.
    - "Philosophy is science of sciences" – Comte.
    - "Philosophy is the science which investigates nature of being as it is in virtue of its own nature" – Aristotle.
- Philosophy is a way of thinking about certain subjects such as ethics, thought, existence, time, meaning and value. That 'way of thinking' involves **4 Rs**: ***responsiveness***, ***reflection***, ***reason*** and ***re-evaluation***.
- .The broad branches of philosophy are:
    - Metaphysics
    - Epistemology
    - Ethics
    - Logic
    - Aesthetics.

1.1.2 NATURE AND CHARACTERISRICS OF PHILOSOPHY

The nature and characteristics of philosophy encompass several key aspects that define its essence and scope:

1. **Systematic Inquiry:** Philosophy involves systematic inquiry into fundamental questions about existence, knowledge, ethics, and other aspects of world and human experience. It seeks to understand the underlying principles and assumptions that shape our understanding of the world.
2. **Critical Thinking:** Philosophers rigorously examine arguments, concepts, and beliefs, questioning assumptions and evaluating evidence to arrive at conclusions.
3. **Interdisciplinary Approach:** Philosophy is inherently interdisciplinary, drawing on insights from various fields such as science, mathematics, literature, and art.
4. **Open-ended Inquiry:** Philosophy is characterized by open-ended inquiry, as it deals with questions that may not have definitive answers. Philosophers engage in ongoing dialogue and debate, exploring different viewpoints and refining their understanding over time.
5. **Reflective Exploration:** Philosophy encourages reflective exploration of abstract and complex ideas. It delves into fundamental concepts such as truth, reality, consciousness, and justice, often challenging conventional wisdom and fostering intellectual curiosity.
6. **Clarity and Precision:** Philosophers strive to express ideas clearly and logically, using precise terminology to avoid ambiguity and confusion.
7. **Clarity and Precision:** Despite dealing with abstract concepts, philosophy emphasizes clarity and precision in language and argumentation. Philosophers strive to express ideas clearly and logically, using precise terminology to avoid ambiguity and confusion.
8. **Clarity and Precision:** Despite dealing with abstract concepts, philosophy emphasizes clarity and precision in language and argumentation. Philosophers strive to express ideas clearly and logically, using precise terminology to avoid ambiguity and confusion.

9. **Clarity and Precision:** Despite dealing with abstract concepts, philosophy emphasizes clarity and precision in language and argumentation. Philosophers strive to express ideas clearly and logically, using precise terminology to avoid ambiguity and confusion.
10. **Philosophizing is the activity of analysis:** Philosophical attitude is reflective and curious, guided by experience and reasoning. Philosophical methods include induction, deduction, analysis, synthesis and dialectical methods. Philosophical activity starts from wonder and curiosity. These activities may be individual as well as social, alone as well as in a group. The real nature of philosophy is intellectual and purely logical.
11. **Clarity and Precision:** Philosophy as we know is the study of wisdom and one who loves this wisdom is called philosopher: Philosopher knows every problem from its root and interprets it through rational basis. Philosophy, the mother of all science, is the foundation and the touchstone of every other subject whether physics, mathematics, technology or like humanities.

1.1.3 SCOPE OF PHILOSOPHY

- The scope of philosophy is vast and wide. It is an intellectual exercise to know about the basic nature of phenomena which we encounter in our day-to-day life.
- It demands for a method, where we acquire knowledge about subject matter & complete its purpose as well.
- The basic method of philosophy is “Rational Enquiry”, which helps in realization of reality related to various events & circumstances of our life.
- It is concerned with all the ethical, political, psychological, economical, scientific and academic problems of our life, academic areas & society.
- The scope of philosophy can be understood by seeing the branches of philosophy.

1.1.4 PHILOSOPHICAL APPROACHES OR PARADIGMS

1.1.4.1 PRAGMATISM

- Seeking solutions for a problem in the real world through generating useful knowledge.
- More interested in practical outcomes than abstract distinctions.
- Follows reflexive process of inquiry: Initiated by doubt, and a sense that something is wrong which then re-creates a new belief when problem is resolved.
- **Example:**

  Problem Statement: Imagine a school district grappling with the decision of whether to adopt a traditional lecture-based teaching approach or a more interactive, hands-on learning method such as project-based learning.

  Pragmatic Approach: This may include focus on outcomes, trial and errors, adaptation to context and collaborative problem-solving.

1.1.4.2 POSITIVISM

- Positivism asserts that knowledge should be based on empirical observation and scientific methods.
- Blend of empiricism and rationalism.
- **Example:** Evaluating the effectiveness of a new drug.

  From a positivist perspective.

  Empirical Observation: Positivists emphasize the importance of empirical evidence derived from observation and experimentation. In this study, researchers collect quantitative data on blood pressure levels from participants before and after taking the medication.

  Objective Measurement: Researchers use validated instruments and techniques to measure blood pressure accurately, ensuring consistency and reliability in their data collection.

  Quantitative Analysis: Researchers analyze the collected data statistically to determine whether there is a significant difference in blood pressure reduction between the group receiving the new medication and the control group.

  Generalization and Prediction: Positivism aims to establish general laws or principles based on observed regularities in data.

1.1.4.3 REALISM

- Idea that scientifically based theories provide descriptions of the world that are approximately true. Belief is very important.
- Realism is a philosophical approach that asserts the existence of an objective reality independent of human perception.
- In other words, it holds that there is a world "out there" that exists whether we perceive it, and that this world is governed by laws and principles that are discoverable through observation, reason, and empirical investigation.
- **Example:** Scientists studying the Solar system and the motion of planets. The planets, stars, and other celestial bodies exist independently of human observation. The existence and behaviour of the planets are not determined by human consciousness. They follow predictable patterns and laws of physics regardless of whether humans are aware of them.

1.1.4.4 INTERPRETIVISM

Necessary to differentiate social sciences from natural sciences. Human beings and social worlds cannot be studied in the same way as physical phenomena. Qualitative in nature. “Social Action Theory” is prevalent.

Example: Studying cultural practices.

The interpretivist researcher recognizes that the significance of these ceremonies is not fixed or universal but varies among community members based on their individual experiences, beliefs, and cultural backgrounds. The researcher engages in in-depth interviews and participant observation within the community to explore how individuals interpret and make sense of the ceremonies.

1.1.4.5 EMPIRICISM

All hypotheses and theories should be evaluated by a process of observation and experience; emphasizes on evidence-based knowledge. Researchers herein can draw a clear distinction between facts and propositions that have been verified by experience and experiment.

Example: Scientist conducting an experiment to investigate the effect of temperature on the rate of chemical reactions.

The scientist sets up an experiment in a controlled laboratory environment, where they can observe and manipulate variables related to temperature and chemical reactions. They use sensory experience, including sight and touch, to measure temperature and observe changes in the reaction. The scientist verifies their hypotheses by conducting repeated experiments under different conditions and comparing the results.

1.1.4.6 POST – POSITIVISM

Social research using logical reasoning; characterized by use of new tools; Qualitative in nature. Inductive and deductive methods of reasoning are used.

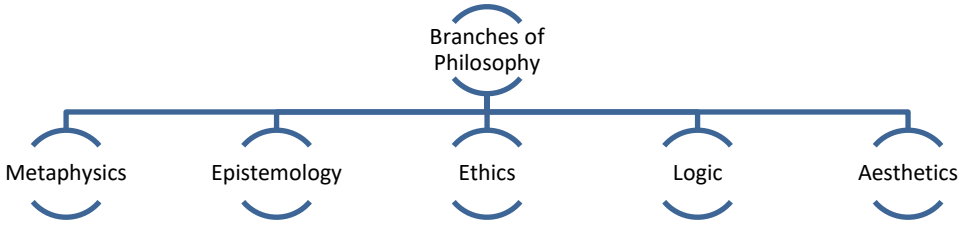
Example: Studying the effectiveness of a public health intervention aimed at reducing smoking rates in a community.

A researcher adopts a post-positivist stance and critically reflects on the assumptions underlying their study. They acknowledge that their own background, values, and biases may influence their research questions, methods, and interpretations.

The researcher recognizes that individuals' attitudes and behaviours towards smoking are influenced by subjective factors such as cultural norms, social networks, and individual experiences. They acknowledge that their understanding of these factors may be limited and shaped by their own perspective.

The researcher understands that their findings are not absolute truths but rather probabilistic in nature.

1.1.5 BRANCHES OF PHILOSOPHY



1.1.5.1 METAPHYSICS

- Metaphysics is the branch of philosophy that studies reality, nature of existence, the nature of being and the universe.
- It is an old branch of study which always drives curiosity. Metaphysics is regarded as queen of all sciences.
- There are two approaches related to metaphysics, one that is spiritual or in abstract form and the other which is beyond physical.
- Metaphysics questions the fundamental truths of existence like what the origin of universe is, the evidence of supernatural phenomena, the existence of human beings, concept of god, mind-body relationship, purpose of life etc.
- **Examples:**
  a) **Ontology –** The study of being and existence. Mathematicians debate whether numbers are merely human constructs or if they have an objective existence beyond our minds.
  b) **Cosmology** – The study of the origin, structure, and the evolution of the universe. Cosmologists explore theories related to origin of universe such as big bang theory.
  c) **Mind – body relationships:** Are the mind and body distinct substances, or are they two aspects of the same substance?
  d) **The nature of time –** Is time real, or is it an illusion? Does time have a direction? What is the nature of the present moment?
  e) **The existence of God:** Metaphysical arguments for and against the existence of a divine being or beings.
  f) **The nature of reality:** What is the ultimate nature of reality? Is it material, mental, or something else entirely? Are there multiple realities or dimensions beyond our own?

1.1.5.2 EPISTEMOLOGY

- **Epistemology** is derived from two Greek words "**episteme**" means "**knowledge**" and "**logos**" mean "**study or science of.**" Epistemology is therefore considered as the theory of knowledge.
- **Epistemology** seeks to answer questions such as: what is knowledge? How is knowledge acquired? What are the criteria for knowledge?
- **Epistemology** evaluates the way in which beliefs are formed, evaluated and justified.
- Some of the questions and concepts in epistemology include:
  - **What is knowledge?** – For something to be considered as knowledge, it must be true and justified.
  - **Empiricism vs. Rationalism** – Empiricists argue that knowledge comes from sensory experience while rationalist argue knowledge is derived from reason alone.
  - **Skepticism** – Questions reliability of senses or our reasoning process.
  - **Theories of justification –** epistemologists examine different theories.
    a) Foundationalism - knowledge is based on basic beliefs.
    b) Coherentism – knowledge is based on coherence among beliefs.
    c) Reliabilism – It is based on reliable cognitive process.
  - **Relativism vs. Objectivism –** Epistemologists debate whether knowledge is relative to individuals or cultures (relativism) or whether there are objective standards for knowledge that apply universally (objectivism).
- **Branches of Knowledge:**
  a) Intuitive Knowledge – Intuition, faith, belief etc. constitute the basis of Intuitive Knowledge.
  b) Authoritarian Knowledge – Knowledge attained from the information contained in documentary sources like books, journals, research papers, internet sources etc.
  c) Logical Knowledge – It refers to the application of logical reasoning to create a new knowledge.

d) **Empirical Knowledge –** It refers to the knowledge that is gained from experience.

- **Examples:**

a) **The Colour of Sky –** A person might confidently assert that the sky is blue based on their perceptual experience. This raises questions about the reliability of sensory perception as a source of knowledge (empiricism) and the extent to which we can trust our senses.

b) **Dream Argument** – If we cannot distinguish between dreaming and waking life, then how can we be certain of anything we perceive? This raises questions about the reliability of sensory experience and the criteria for distinguishing between reality and illusion.

c) **The problem of induction** – Imagine a person feeding hen daily morning for one hundred days. The hen might come to justified belief that it will be fed every morning. However, on 101st day, the farmer shows up with a knife instead of food. This highlights the problem of induction: the idea that past experiences cannot guarantee future outcomes.

1.1.5.3 ETHICS

- Ethics is derived from the Greek word "**Ethos**" which means customs, character, usages or habits.
- Ethics is branch of philosophy that deals with questions about what is morally right or wrong, good or bad, just and unjust.
- Right and wrong in human relations are analyzed and determined by ethics.
- It is concerned with discovering the principles that should govern human conduct and with the investigation of normative issues involving value judgment.
- Ethics is concerned with how individuals should behave and how societies ought to be structured to promote moral values and principles.
- Values and ethics are used synonymously but they are different. Values refer to the set of beliefs a particular person has, and he gives preference to these beliefs over the rules practiced by others. On the other hand,

ethics are the set of rules framed by a group or society which acts as a set of guidelines to the people.

- **Aspects of Ethics:**
  a) **Personal Ethics –** The set of rules or principles followed by an individual in his own life.
  b) **Professional Ethics –** the rules or principles that govern the behaviour of an individual in a professional environment. The core values of profession are trustworthiness, respect, responsibility, fairness, decency, accuracy, transparency and kindness.
- **Types of Ethics:**
  a) **Meta Ethics -** It delves into questions such as "What does it mean to say that something is 'good'?" or "Are moral values objective or subjective?".
  b) **Normative Ethics -** Focuses on developing and evaluating ethical theories and principles that guide moral action.
  c) **Descriptive Ethics -** focuses on describing and analysing how people behave morally, rather than prescribing how they should behave. It seeks to understand and document the moral beliefs, values, customs, and practices of individuals and societies without making judgments about their correctness.
  d) **Applied Ethics -** Applied ethics deals with the application of ethical principles to specific real-world issues and dilemmas. This includes fields such as medical ethics , environmental ethics, publication ethics etc.

1.1.5.4 LOGIC

- The term logic is derived from the Greek word "**logos**" which means "**reason**."
- **Logic** is branch of philosophy that deals with the study of "art of reasoning" or "art of thinking."
- This process is extremely complex, characterized by a combination of trial and error, occasionally illuminated by flashes of insight.

- Logicians are not concerned with the ways in which the mind arrives at its conclusions in the process of reasoning; they are concerned only with the correctness of the completed process. The study of the methods and principles used to distinguish correct from incorrect reasoning is the central issue with which logic deals.
- **Types of reasoning**
  a) **Inductive reasoning:** This type of reasoning starts from specific observations and moves to broader generalization and theories. It is also called "bottom-up" approach.
  b) **Deductive reasoning:** This is also called "top-down" approach as it works from general to specific.

1.1.5.5 AESTHETICS

- The term **aesthetic** is derived from a Greek work "**aisthetikos**" which means "**of sense perception**."
- **Aesthetics** is the branch of philosophy that deals with questions about art, beauty, and taste. It explores concepts such as the nature of beauty, the role of art in human experience, and the criteria for evaluating artistic works.
- Here are some key aspects of aesthetics as a branch of philosophy:
  a) **Philosophy of Art:** Aesthetics includes the philosophy of art, which examines fundamental questions about the nature and purpose of artistic expression. This involves exploring topics such as the definition of art, the distinction between art and non-art, and the relationship between artistic creativity and cultural context.
  b) **Theory of Beauty:** Aesthetics investigates the concept of beauty and the criteria for determining what is aesthetically pleasing.
  c) **Art Criticism:** Aesthetics includes the practice of art criticism, which involves analysing and evaluating artistic works. Art critics use aesthetic principles and theories to assess the quality, significance, and meaning of artworks.
  d) **Aesthetics of Everyday Life:** This includes the aesthetics of nature, design, architecture, fashion, and other aspects of human experience.

1.1.5.6 AXIOLOGY

Axiology is a branch of philosophy that deals with the study of values, including both ethics (the study of moral values) and aesthetics (the study of aesthetic values). It explores questions about what is valuable or worth pursuing in life and what criteria we use to make judgments about value. Axiology encompasses two main subfields:

a) Ethics

b) Aesthetics

1.1.5.7 POLITICAL PHILOSOPHY

- Political philosophy is a branch of philosophy that explores fundamental questions about political life, including the nature of political authority, the principles of justice, the legitimacy of government, and the rights and responsibilities of individuals and societies.
- It addresses issues such as the origins of political power, the organization of political institutions, and the goals of political action.
- It explores the concepts of why we need governments, the role played by governments, what are its constituents, amongst others.

1.2 ETHICS

1.2.1 INTRODUCTION

- **Ethics** is derived from the Greek word "**Ethos**" which means customs, character, usages or habits.
- **Ethics** is branch of philosophy that deals with questions about what is morally right or wrong, good or bad, just and unjust.
- Right and wrong in human relations are analyzed and determined by ethics.
- It is concerned with discovering the principles that should govern human conduct and with the investigation of normative issues involving value judgment.
- Ethics is concerned with how individuals should behave and how societies ought to be structured to promote moral values and principles.
- Values and ethics are used synonymously but they are different. Values refer to the set of beliefs a particular person has, and he gives preference to these beliefs over the rules practiced by others. On the other hand, ethics are the set of rules framed by a group or society which acts as a set of guidelines to the people.

1.2.2 ASPECTS OF ETHICS:

a) **Personal Ethics –** The set of rules or principles followed by an individual in his own life.

b) **Professional Ethics –** the rules or principles that govern the behaviour of an individual in a professional environment. The core values of profession are trustworthiness, respect, responsibility, fairness, decency, accuracy, transparency and kindness.

1.2.3 TYPES OF ETHICS:

a) Meta Ethics

- This is study of moral languages and moral thoughts. It delves into questions such as "What does it mean to say that something is 'good'?" or "Are moral values objective or subjective?".
- Examples:

(i) Staying out of house late night is good or bad? – For sake of work it may be good but for other bad habits it is considered bad.

(ii) Abortion is good or bad. – It is considered bad but abortion due to genuine medical complications is justified.

b) Normative Ethics

- Focuses on developing and evaluating ethical theories and principles that guide moral action.
- This type of ethics prescribes do's and don'ts about the moral rules to be followed. In simple words, it is about how people should act.
- **Examples:**
  (i) If a doctor must decide between saving one patient or five patients, **utilitarianism** suggests saving the five patients because it maximizes overall happiness.
  (ii) In a situation where a person finds a lost wallet, **virtue ethics** would suggest returning it out of honesty and integrity, regardless of any potential consequences.
  (iii) Following traffic laws is considered morally right because individuals have implicitly agreed to abide by them for the greater good of society.
  (iv) Pursuing one's own career advancement is considered morally right in ethical egoism, as it contributes to one's own happiness and success.

c) Descriptive Ethics

- Focuses on describing and analysing how people behave morally, rather than prescribing how they should behave.
- It seeks to understand and document the moral beliefs, values, customs, and practices of individuals and societies without making judgments about their correctness.
- **Examples:**
  (i) How many people think that it is not good to eat non-vegetarian.

d) Applied Ethics

- Applied ethics deals with the application of ethical principles to specific real-world issues and dilemmas.

- This includes fields such as medical ethics , environmental ethics, publication ethics etc.
- **Examples:**
  (i) Medical Field - Examples include informed consent, organ transplantation, genetic testing, end-of-life care, and allocation of medical resources.
  (ii) Business Ethics - Examples include fair labour practices, environmental sustainability, corporate social responsibility, bribery and corruption, product safety, and ethical marketing.
  (iii) Environmental Ethics - Examples include climate change, biodiversity conservation, pollution control, sustainable development, and animal rights.
  (iv) Engineering Ethics – Examples include safety standards, environmental impact assessments, whistleblowing, professional accountability, and the responsible development of recent technologies.
  (v) Animal Ethics - Examples include safety standards, environmental impact assessments, whistleblowing, professional accountability, and the responsible development of recent technologies.
  (vi) Publication Ethics - Publication ethics refers to the principles and standards that guide the conduct of individuals and organizations involved in academic and scientific publishing.

1.2.4 MORAL PHILOSOPHY

The field of ethics, or moral philosophy, investigates theories that can systematically describe what makes acts right or wrong. Moral Philosophy is the rational study of the meaning and justification of moral claims. A moral claim evaluates the rightness or wrongness of an action or a person's character. Moral philosophy is usually divided into three distinct subject areas: metaethics, normative ethics, and applied ethics.

1.2.5 NATURE OF MORAL JUDGEMENTS IN RESEARCH

- Moral judgment is the judgment which deals with the moral value or quality of an action. It is a judgement of value, and it evaluates the rightness or wrongness of our actions.
- Moral judgment in research pertains to the ethical considerations and decisions made by researchers regarding the conduct, methods, and implications of their research.
- Moral judgement contains:
    - A Subject which will be judged.
    - An Object which will be judged.
    - A standard in conformity to which the action of subject will be judged.
    - A power of judging the action.
- Moral judgements are based on the moral standards. Therefore, based on moral standards the action undertaken can be judged as right or wrong. The action is regarded as right or good or fair if it conforms to the standards and the action is regarded as wrong or bad or unfair if it deviates from the standards.
- Moral judgment is active and social in nature and character respectively.
- Researchers must assess the potential consequences of their actions on various stakeholders, including participants, communities, and society.
- Moral judgment in research pertains to the ethical considerations and decisions made by researchers regarding the conduct, methods, and implications of their research.
- The nature of moral judgment in research is influenced by cultural, societal, and disciplinary norms, as well as legal and institutional regulations.
- **Moral Judgement is Active in Nature**
    - Moral judgement in based on voluntary actions or habitual acts of a person and not upon his passive experiences.
    - When a person does something consciously then it is regarded as a voluntary act. But if a person does something regularly or repeatedly then it is known as a habitual act.
    - Passive experiences mean a person does not do anything but simply watches, looks, listens etc. Therefore, it is active in nature.

1.2.6 NATURE OF ETHICAL REACTIONS IN RESEARCH

- **Ethical reactions** in research refer to the responses and behaviours of researchers and other stakeholders when faced with ethical challenges or violations.
- Researchers may experience moral distress, guilt, or conflict when their actions or decisions conflict with their ethical principles or professional standards.
- Ethical reactions can vary depending on individual values, beliefs, and personal experiences, as well as contextual factors such as power dynamics, institutional culture, and external pressures.
- Ethical reactions may include seeking guidance from ethical review boards, consulting colleagues or mentors, or engaging in ethical deliberation and reflection.
- In cases of ethical misconduct or breaches, ethical reactions may involve reporting violations to relevant authorities, initiating investigations, or advocating for corrective actions to prevent future harm.
- Ethical reactions play a crucial role in maintaining the integrity and trustworthiness of research, as they shape the accountability, transparency, and ethical culture within the research community.

VTU PREVIOUS YEAR QUESTIONS

Aug./Sept. 2023

1) Define philosophy. Explain the nature and scope of philosophy. **[10 M]**
2) Briefly explain the concept of philosophy and ethics. **[10 M]**
3) Define Ethics. Briefly explain moral philosophy in research. **[10 M]**
4) Explain the nature of moral judgments and reactions in publication ethics. **[10 M]**

Dec. 2022

1) Define Philosophy. Explain the nature and characteristics of Philosophy. **[10 M]**
2) Explain the terms Axiology , Metaphysics , Ethic philosophy , Logic philosophy and Political philosophy. **[10 M]**
3) Mention some Philosophical objectives behind Research. **[10 M]**
4) Write a note on Ethics and hence explain Moral philosophy, Meta ethics , Normative ethics and Applied ethics. **[10 M]**

Nov. 2021

1) Define Philosophy. Explain the nature of Philosophy. **[10 M]**
2) Write a note on ethics and hence explain the terms:
   (i) Moral philosophy
   (ii) Meta ethics
   (iii) Normative ethics
   (iv) Applied ethics **[10 M]**
3) Mention some philosophical objectives behind research. **[10 M]**
4) Write notes on:
   (i) Nature of moral judgement
   (ii) Nature of ethical reactions in research **[10 M]**

2.0 MODULE – 02

2.1 ETHICS W.R.T SCIENCE AND RESEARCH

- The most common way of defining ethics is norms for conduct that distinguish between acceptable and unacceptable behaviour.
- The term "Research Ethics" refers to a wide variety of values, norms, and institutional arrangements that help constitute and regulate scientific activities. Research ethics is a codification of scientific morality in practice.
- In other words, research ethics may be referred to as doing what is morally and legally right in research.
- Broadly, there are three different perspectives on ethics:
    - **Ethics as a disposition:** Moral virtues are inherently present, just must dispose.
    - **Ethics as duty:** It is one's duty to act in a way that upholds values.
    - **Ethics as utilitarian:** Relates to principles of ethical conduct that benefits majority of stakeholders at large.

OBJECTIVES OF RESEARCH ETHICS

- Protect human participants.
- Ensure research is conducted in such a way that it serves interests of all stakeholders, society at large.
- Examine research activities for ethical soundness.

ADHERE TO ETHICAL NORMS IN RESEARCH

- Promotes the aim of research, such as knowledge, truth, and avoidance of error. For example, prohibitions against fabricating, falsifying, or misrepresenting research data promotes truth and minimizes error.
- Since research often involves a great deal of cooperation and coordination among many different people in different disciplines and institutions, ethical standards should promote values that are essential to collaborative work, such as trust, accountability, mutual respect, and fairness.
- Ethical norms must help to ensure that researchers are held accountable to the public.

- Ethical norms in research should also help to build public support for research.
- Promote a variety of other important moral and social values, such as social responsibility, human rights, animal welfare, compliance with the law, and public health and safety.

ETHICAL PRINCIPLES

- **Honesty:** Strive for honesty in all scientific communications. Honestly report data, results, methods and procedures, and publication status. Do not fabricate, falsify, or misrepresent data. Do not deceive colleagues, research sponsors, or the public.
- **Objectivity:** Strive to avoid bias in experimental design, data analysis, data interpretation, peer review, personnel decisions, grant writing, expert testimony, and other aspects of research where objectivity is expected or required. Avoid or minimize bias or self-deception. Disclose personal or financial interests that may affect research.
- **Integrity:** Keep your promises and agreements; act with sincerity; strive for consistency of thought and action.
- **Carefulness:** Avoid careless errors and negligence; carefully and critically examine your own work and the work of your peers. Keep good records of research activities, such as data collection, research design, and correspondence with agencies or journals.
- **Openness:** Share data, results, ideas, tools, resources. Be open to criticism and new ideas.
- **Transparency:** Disclose methods, materials, assumptions, analyses, and other information needed to evaluate your research.
- **Accountability:** Take responsibility for your part in research and be prepared to give an account (i.e., an explanation or justification) of what you did on a research project and why.
- **Intellectual Property:** Honor patents, copyrights, and other forms of intellectual property. Do not use unpublished data, methods, or results

without permission. Give proper acknowledgement or credit for all contributions to research. Never plagiarize.

- **Confidentiality:** Protect confidential communications, such as papers or grants submitted for publication, personnel records, trade or military secrets, and patient records.
- **Responsible Publication:** Publish to advance research and scholarship, not to advance just your own career. Avoid wasteful and duplicative publication.
- **Responsible Mentoring:** Help to educate, mentor, and advise students. Promote their welfare and allow them to make their own decisions.
- **Respect for Colleagues:** Respect your colleagues and treat them fairly.
- **Social Responsibility:** Strive to promote social good and prevent or mitigate social harms through research, public education, and advocacy.
- **Non-Discrimination:** Avoid discrimination against colleagues or students based on sex, race, ethnicity, or other factors not related to scientific competence and integrity.
- **Competence:** Maintain and improve your own professional competence and expertise through lifelong education and learning; take steps to promote competence in science.
- **Legality:** Know and obey relevant laws and institutional and governmental policies.
- **Animal Care:** Show proper respect and care for animals when using them in research. Do not conduct unnecessary or poorly designed animal experiments.
- **Human Subjects protection:** When conducting research on human subjects, minimize harms and risks and maximize benefits; respect human dignity, privacy, and autonomy; take special precautions with vulnerable populations; and strive to distribute the benefits and burdens of research fairly.

2.2 INTELLECTUAL HONESTY AND RESEARCH INTEGRITY

2.2.1 INTELLECTUAL HONESTY

- Researchers have a moral duty to be **honest**. This duty is especially important when we share ideas that can inform or persuade others.
- Intellectual honesty is honesty in the acquisition, analysis, and transmission of ideas.
- A person is being intellectually honest when he or she, knowing the truth, states that truth.
- Intellectual honesty is an applied method of problem solving, characterized by an unbiased, honest attitude, which can be demonstrated in several different ways including:
    - Ensuring support for chosen ideologies does not interfere with the pursuit of truth.
    - Relevant facts and information are not purposefully omitted even when such things may contradict one's hypothesis.
    - Facts are presented in an unbiased manner, and not twisted to give misleading impressions or to support one view over another.
    - References, or earlier work, are acknowledged where possible, and plagiarism is avoided.

Intellectual Honesty – Individual Level

- Research should be based on originality and innovation.
- Accuracy in representing contributions.
- Protect identity of respondent.
- Due acknowledgement of web-based resources.
- Avoid plagiarism.
- Citing all related papers including those submitted, but not accepted.
- Revealing conflict of interest.
- Avoid duplicate publication.
- Avoid Guest, Ghost and Gift authorship.
- Adopt best practices recommended by COPE.
- Respect Intellectual property.
- Be honest and objective while submission.
- All communication between author and journal should be treated as confidential.

Intellectual Honesty – Publisher Level

- Adherence to ethical practices (COPE or WAME).
- Reveal conflict of interest.
- Treat all information in the article as confidential.
- Be vigilant in spotting ethical misconduct.
- Motive is building better society, not commercial purpose.
- Avoid predatory or bogus journals.

2.2.2 RESEARCH INTEGRITY

- Research integrity may be defined as active adherence to the ethical principles and professional standards essential for the responsible practice of research.
- By active adherence we mean adoption of the principles and practices as a personal credo, not simply accepting them as impositions by rule makers.
- By ethical principles we mean honesty, trustworthiness, and high regard for the scientific record.

Research Integrity - Individual Level:

a) **Honesty:** Researchers should be truthful and transparent in reporting their findings, methods, and data.

b) **Objectivity:** Maintaining impartiality and avoiding bias in the design, conduct, and interpretation of research.

c) **Transparency:** Providing clear and complete information about research methods, materials, and procedures to enable others to replicate or verify the findings. Transparency also involves disclosing any conflicts of interest, sources of funding, and potential biases that may influence the research.

d) **Accountability:** Taking responsibility for one's actions and decisions throughout the research process. Researchers should be accountable for the accuracy and integrity of their work and should address any errors or discrepancies promptly and transparently.

e) **Responsible Conduct:** Conducting research in accordance with ethical guidelines and professional standards. This includes obtaining appropriate

approvals for research involving human subjects or animals, respecting intellectual property rights, and maintaining confidentiality and privacy.

f) **Respect for Participants:** Treating research participants with dignity, respect, and fairness, and ensuring their informed consent and voluntary participation in research activities.

g) **Citing Sources Properly:** Giving proper credit to the contributions of others by accurately citing sources and acknowledging the intellectual and scholarly contributions of others.

Research Integrity – Institutional Level:

a) **Policy Development:** Developing and implementing comprehensive policies and guidelines on research integrity.

b) **Training and Education:** Providing training and educational programs on research ethics and integrity to researchers, faculty, students, and staff.

c) **Compliance and Oversight:** Establishing mechanisms for monitoring and ensuring compliance with ethical standards and regulatory requirements in research. This includes appointing research ethics committees or institutional review boards to review research proposals.

d) **Promotion of Open Science:** Encouraging open and transparent research practices, such as data sharing, pre-registration of studies, and publication of research protocols, to enhance the reproducibility and integrity of research findings.

e) **Investigation and Response to Misconduct:** Implementing procedures for handling allegations of research misconduct, including plagiarism, fabrication, falsification, or other breaches of research integrity.

f) **Research Support Services:** Providing support services and resources to assist researchers in conducting ethical and high-quality research.

g) **Promotion of Ethical Culture:** Cultivating a culture of integrity, professionalism, and ethical behaviour within the institution by promoting ethical leadership, fostering open communication, and recognizing and rewarding research excellence that upholds ethical standards.

2.3 SCIENTIFIC MISCONDUCTS

Scientific Misconduct is defined as ***"fabrication, falsification, plagiarism, or other practices that seriously deviate from those that are commonly accepted practices within the scientific community for proposing, conducting, or reporting research. It does not include honest error or honest differences in interpretations or judgments of data."***

It is on the rise because:

- Increasing emphasis on research by institutes.
- Difficulty in publishing in reputed journals.
- Academic pressure.
- Lack of knowledge.

Examples of scientific/research misconduct:

1) **Ranjit Chandra:** A Canadian-based Indian nutrition researcher who faced allegations of research misconduct in the late 1990s. Chandra's studies on the effects of vitamins and nutrition on health, particularly in children, were called into question due to concerns about data manipulation and falsification. Several of his papers were retracted, and he faced criticism from the scientific community.
2) **The Indian Journal of Medical Research (IJMR) Retraction:** In 2016, the Indian Journal of Medical Research retracted a paper titled "Effect of mobile phone radiations on Nocardia asteroides exposed from distance of 10 cm" due to allegations of data manipulation and concerns about the validity of the study's findings.
3) **Soumya Swaminathan Case:** In 2018, Soumya Swaminathan, who was then serving as the director general of the Indian Council of Medical Research (ICMR), faced allegations of plagiarism related to a paper published in 2007. The paper in question, titled "Role of iron deficiency anaemia in the propagation of beta-thalassemia gene," was found to contain passages plagiarized from another paper. Swaminathan issued an apology and resigned from her position at the ICMR.

2.3.1 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. Manipulation of images or representations in a manner that distorts the data or "reads too much between the lines" can also be considered falsification.
- Examples of falsification in research misconduct include:
    - **Fabricating data:** Inventing or completely making up research data without conducting the actual experiments or observations.
    - **Manipulating data:** Altering or selectively editing research data to make it appear more favourable or to support a particular hypothesis or conclusion.
    - **Misrepresenting methods:** Providing false descriptions of research methods or procedures to make the research appear more valid or rigorous than it is.
    - **Selective reporting:** Cherry-picking data or results that support a desired outcome while ignoring or omitting data that contradict it.
    - **Falsifying images or figures:** Editing or digitally altering images or figures to enhance or falsify research findings.

2.3.2 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.
- Claims made based on incomplete or assumed results is a form of fabrication.
- The validity of knowledge created by science and the credibility of science, truth and trust, are undermined by fabrication. It is a serious breach of research ethics that undermines the integrity of the scientific process.
- Fabrication can occur at any stage of research, from data collection to analysis and reporting.

- When detected, the sanctions for perpetrators can be severe and articles will be retracted.
- Not only does fabrication affect scientific careers, but when fabricated data is presented to be real and is consequently used in real-life practice it can have life-threatening consequences.

  Example: Falsified clinical trial data - A pharmaceutical researcher in India fabricates patient data for a clinical trial testing the efficacy of a new drug. The fabricated data shows significant positive outcomes for the drug, leading to its approval and subsequent use in patients. However, further investigation reveals that the data was entirely fabricated, endangering the health and safety of patients who rely on the drug.
- Here are some key aspects of fabrication in scientific misconduct:
  - **Inventing data:** Researchers may simply make up data points, experimental results, or observations to support their hypotheses or desired conclusions. This can involve creating entirely fictional experiments or observations that never took place.
  - **Manufacturing evidence:** Fabrication may involve creating fake evidence, such as falsified photographs, graphs, or charts, to support research findings. This can include digitally altering images or manipulating data to produce desired outcomes.
  - **False citations:** Fabrication can extend to citing non-existent sources or references to lend credibility to fabricated data or results. This can involve inventing authors, journals, or publications to support false claims.
  - **Misrepresentation of collaborations:** Fabrication may also involve falsely claiming collaborations with other researchers or institutions to lend credibility to fabricated data or results.

2.3.3 PLAGIARISM

2.3.3.1 DEFINITION

Plagiarism is presenting someone else's work or ideas as your own, with or without their consent, by incorporating it into your work without full acknowledgement. All published and unpublished material, whether in manuscript, printed or electronic form, is covered under this definition. It paints a misleading picture of a researcher's own contribution. Plagiarism can involve copying words or images directly, paraphrasing sentences or passages, or co-opting someone else's ideas without citing the original work.

2.3.3.2 TYPES OF PLAGIARISM

a) **Direct/Global plagiarism:** This occurs when a person copies verbatim (word-for-word) from another source without using quotation marks or proper citation.

b) **Paraphrasing plagiarism:** This involves rewriting someone else's work in one's own words without giving credit to the original source. Even if the wording is changed, the ideas or structure of the original work remain intact.

c) **Self-plagiarism:** This occurs when an author reuses their own previously published work or parts of it without proper citation. While it is not unethical in all contexts (e.g., self-citation with appropriate acknowledgment), it can be considered misconduct if done without disclosure or permission.

d) **Mosaic plagiarism:** Also known as "patchwriting," mosaic plagiarism involves copying and pasting text from multiple sources and blending them together without proper citation.

e) **Incremental plagiarism** means inserting a small amount of plagiarized content in a mostly original text.

f) **Unintentional plagiarism:** While most cases of plagiarism are deliberate, unintentional plagiarism can occur due to carelessness or lack of understanding of citation practices. This may include improper citation formatting, failure to attribute ideas, or insufficient paraphrasing.

2.3.3.3 REASONS OF PLAGIARISM

Plagiarism can occur for a variety of reasons, ranging from intentional dishonesty to unintentional oversight or misunderstanding of proper citation practices.

a) **Lack of Understanding / Knowledge:** Some individuals may not fully understand what constitutes plagiarism or how to properly attribute sources. This can be especially common among students who are new to academic writing or who come from educational backgrounds where plagiarism is not emphasized or understood.

b) **Lack of writing skills:** Authors or researchers with weak writing skills and limited vocabulary are more likely to inadvertently plagiarize the work of others.

c) **Time Constraints / Pressure to Publish:** In situations where individuals are under pressure to produce work quickly, they may resort to copying and pasting content from other sources without proper citation.

d) **Desperation:** When people have too much work to do for their job, they might copy from others because they are worried about failing or losing their job.

e) **Promotion:** The promotions, career advancements, annual appraisal are evaluated based on the number of publications. Thus, the academicians adopt ways that lead to plagiarism.

f) **Untrusted Plagiarism Tools:** Due to unavailability of standard Anti-Plagiarism software like Turnitin, researchers rely upon other untrusted and unreliable plagiarism tools which are not effective.

g) **Ease of access to information:** The researcher finds it easy to copy and paste the text from various sources and publish them as their own work. Easy access to digital resources is the prime reason of indulgence of scholars into plagiarism.

h) **Ignorance or Indifference:** Some individuals may be aware of what constitutes plagiarism but choose to disregard ethical considerations due

to a lack of concern or a belief that they will not face consequences for their actions.

2.3.3.4 AVOIDING PLAGIARISM

a) **Understand What Constitutes Plagiarism:** Plagiarism can occur in various forms, including copying verbatim text without proper citation, paraphrasing without proper attribution, self-plagiarism (reusing your own previously published work without acknowledgment), and even insufficiently citing sources.

b) **Use Proper Citations:** Whenever you use someone else's ideas, words, or findings, make sure to cite them properly. Follow the citation style required by your field or publication guidelines (e.g., APA, MLA, Chicago). Include in-text citations and a bibliography or reference list at the end of your work.

c) **Seek Permission for Reuse:** If you wish to reuse content from your own previous work or from other sources, make sure to obtain permission from the copyright holder if necessary. Follow any guidelines or restrictions provided by the original source.

d) **Paraphrase Correctly:** If you need to paraphrase someone else's work, ensure that you express the ideas in your own words while still giving credit to the original source. Change both the wording and the sentence structure significantly.

e) **Quote Appropriately:** When quoting directly from a source, use quotation marks and provide a citation to indicate that the words are not your own. Be sure to quote accurately and include page numbers for precise referencing.

f) **Manage Your References:** Use reference management software like Zotero, Mendeley, or EndNote to organize your sources and citations. These tools can help ensure accuracy and consistency in your citations.

g) **Use Plagiarism Tools:** There are several plagiarism detection tools available that can help researchers and writers ensure the originality of their work and avoid unintentional plagiarism.

2.3.3.5 PLAGIARISM TOOLS

a) **Turnitin:** Turnitin is one of the most widely used plagiarism detection tools in educational institutions. It compares submitted documents against its extensive database of academic content, internet sources, and previously submitted papers to identify similarities and potential instances of plagiarism.

b) **Grammarly:** Grammarly not only checks for grammar and spelling errors but also includes a plagiarism detection feature in its premium version. It scans your text against billions of web pages and academic papers to detect similarities and provide suggestions for proper attribution.

c) **Copyscape:** Copyscape is primarily used for checking web content plagiarism. It can detect if your content has been copied or plagiarized from other websites on the internet.

d) **Plagiarism Checker X:** Plagiarism Checker X is a desktop application that allows users to check documents for plagiarism against multiple sources, including online repositories and the web. It provides a detailed report highlighting any similarities found.

e) **Viper:** Viper is a free plagiarism checker specifically designed for students and educators. It allows users to upload their documents and scans them against its database of academic papers and internet sources.

f) **WriteCheck**: WriteCheck is a service offered by Turnitin for individuals who want to check their papers for plagiarism before submitting them. It provides instant feedback and similarity reports.

g) **DupliChecker**: DupliChecker is a free online plagiarism checker that scans your text for duplicate content across the web. It offers a simple interface and provides a percentage of originality along with a detailed report.

2.3.3.6 UGC GUIDELINES ON LEVELS OF PLAGIARISM

UGC Recommendations: Plagiarism in submission of Thesis and Dissertations		
Level	**Characteristics**	**Penalty**
Level 0	Up to 10%	No penalty.
Level 1	Above 10% - 40%	Submit revised script within stimulated period not exceeding six months.
Level 2	Above 40% - 60%	Debarred from submitting revised manuscript for a period of one year.
Level 3	Above 60%	Registration cancelled.

UGC Recommendations: Plagiarism in Academic and Research Publications		
Level	**Characteristics**	**Penalty**
Level 0	Up to 10%	No penalty.
Level 1	Above 10% - 40%	Withdrawal of manuscript.
Level 2	Above 40% - 60%	Withdrawal of manuscript. No annual increment for one year. Not allowed to be supervisor for two years.
Level 3	Above 60%	Withdrawal of manuscript. No annual increment for successive two years. Not allowed to be supervisor for many years.

2.4 REDUNDANT PUBLICATIONS

- **Redundant publications** refer to the practice of publishing substantially similar research findings or data in multiple sources in print or electronic form.
- It occurs when two or more papers without appropriate full cross reference share same hypothesis, data, sample size, results, methodology and conclusions.
- One study in split into several parts and submitted to several journals or the findings have previously been published elsewhere without proper cross-referencing, justification and permission.
- Factors leading to redundant publications.
    - Publishing papers from one's own dissertation.
    - Writing same content in different languages.
    - Writing same content for different audiences.
    - Reporting to a longitudinal program of study.
- Following problem are created because of redundant publications:
    - **Waste of Resources:** Redundant publications consume resources in terms of time, effort, and funding both for the authors and for the peer-review process. Precious time being wasted of peer-reviewers and editors.
    - **Dilution of Quality:** Redundant publications can dilute the quality of scientific literature by flooding it with multiple versions of the same findings.
    - **Impact on Citations:** If the same research is published in multiple venues, citations and recognition for that work may be divided among the different versions, reducing the impact and visibility of the research.
    - **Ethical Concerns:** Some instances of redundant publication may violate ethical standards, such as those related to plagiarism or self-plagiarism. Authors have a responsibility to contribute novel and original work to the scholarly community.
    - **Misleading Literature:** When the same research findings are published multiple times without proper acknowledgment of prior publication, it can mislead other researchers and readers.
    - Leads to flawed meta-analysis.
    - Distort academic reward systems.
    - Infringement of copyright.

2.4.1 DUPLICATE PUBLICATIONS

- **Duplicate (form of redundant) publication** occurs when an author reuses substantial parts of their own published work without providing the appropriate references. This can range from publishing an identical paper in multiple journals, to only adding a small amount of new data to a previously published paper.
- **How to identify duplicate publication?**
  - Reproduction of an article already published using identical samples and outcomes.
  - Assembly two or more articles to produce a new one.
  - Reporting different outcome from same study samples.
  - New data is added to previous preliminary article.
  - Reporting part of large trial and reporting identical outcomes.
- **Problems caused by duplicate publication.**
  - They waste finite resources. Journals have limited number of pages available and duplicate submissions will be reviewed twice, indexed twice, copyedited twice, distributed twice and so on.
  - They overload available information.
  - They overemphasize the findings.
  - Duplicate publications violate copyright law if you have signed your copyright across to another journal.
- **How to avoid duplicate publications?**
  - No need to repeat unless further confirmation.
  - Cite all related papers, including those submitted, but not yet accepted.
  - Full disclosure about previous publications.
  - Being clear about latest information.
  - Have knowledge of publication ethics and follow it.
  - Emphasis on quality over quantity.
  - Awareness programs.
  - Strict rules and penalties.
  - Disclose full details of related papers.

2.4.2 OVERLAPPING PUBLICATIONS

- **For research reports:** When **two or more articles** share the **same analysis** of the same data or include only a little bit of latest information compared to what was already published. This can happen in a way that makes it hard for reviewers or readers to notice that some findings have been published previously.
- **For reviews and editorials:** when two (or more) review articles or editorials include material that has been published elsewhere by the author(s).

2.4.3 SALAMI SLICING

- **Salami slicing** is also known as '**data fragmentation**' or '**piecemeal 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.
- It is the practice of dividing single study into several parts to bring out more than one publication of it. It is also known as "**Salami Slicer Syndrome**."
- It is the problematic act of dividing a research report in small units for the sake of multiple publications.
- Splitting of data derived from a single research idea into multiple smaller "publishable" units or "slices.
- Involves breaking up or segmenting a large study in to two or more publications.
- **Why Salami Slicing is unethical?**
    - It involves distortion of data and results.
    - The readers may not be able to comprehend the significance of the complete study if the results are widely distributed in multiple articles.
    - Same date published in multiple studies with different conclusions makes it complicated for the readers to have its complete understanding which a single complete publication would have given.

- It unfairly increases the citation record of the author.
- It leads to wastage of time and resources of readers as well as that of editors and reviewers.
- Author's biodata improves regarding quantity of publications, but the quality deteriorates.
- It distorts the 'scientific database' as it simply increases the amount of literature, but not the amount of knowledge.
- The credibility of such research gets diluted as many of the sliced articles are published in the journals having low impact factor.

- **When is it justified?**

  If a major research project is so extensive that it involves several research groups across disciplines, then it is justified that there are multiple publications to convey the overall impact of the research.

  Example:

  Q) 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.

- **How to avoid salami publications?**
  - 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.

2.5 SELECTIVE REPORTING AND MISREPRESENTATION OF DATA

2.5.1 SELECTIVE REPORTING

- **Selective reporting** in publications refers to a practice of deliberately emphasizing certain results to supress negative or undesirable results.
- This practice can occur in various forms and at different stages of the research process, including during study design, data collection, analysis, and interpretation.
- **Selective reporting** can have serious consequences, as it can distort the scientific record, mislead readers, and ultimately undermine the integrity of research findings.

2.5.1.1 WAYS IN WHICH SELECTIVE REPORTING CAN OCCUR:

- **Cherry-picking results:** Researchers may selectively highlight findings that align with their hypothesis or desired conclusions while ignoring or minimizing conflicting evidence.
- **Publication Bias:** Journals may be more inclined to accept results that are statistically appropriate leading researchers to highlight these results and hide negative or undesirable results.
- **Citation Bias:** Positive studies are more likely to be cited than negative studies.
- **Spin:** Communicating results in such a way which amplifies positive findings or tones down negative findings.
- **Design bias:** When a research team plans how to do an experiment, they create the steps to follow. If they do not include a good mix of various kinds of people and if there are not enough people in the group they are studying, it could make the study unfair. This is called design bias. Selective reporting can happen here too. If the researchers leave out certain groups of people who could be important to the study, the result might not be right.
- **Procedural bias:** Procedural bias happens when a researcher thinks the next part of an experiment should go a certain way, even if the results of the last part do not show that. This often occurs if the researcher is in a hurry,

there is a time limit, they are short on money or tools, or if the equipment they're using doesn't work right.

- **Personal bias:** The most difficult types of biases to avoid are personal biases because they are part of the researcher's character the scholar may not even realize they exist.

2.5.1.2 FACTORS LEADING TO SELECTIVE REPORTING:

- Omitting outcomes from the final publication of a study because of a selective decision that those findings were not significant enough to warrant being included in the article.
- Choosing data based on personal choices rather than including all collected data for a clear picture.
- Only reporting subsets of the data collected instead of using all the data to demonstrate a full understanding of a subject.
- Choosing to under-report data because of a decision that the changes in the collected information were not deemed to be significant by the researcher.

2.5.2 MISREPRESENTATION OF DATA

2.5.2.1 DEFINITION

- **Misrepresentation of data** is 'communicating honestly reported data in a deceptive manner.' But what is deceptive communication. The use of statistics presents researchers with numerous opportunities to misrepresent the data.
- **For example**, one might use a statistical technique, such as multiple regression to make one's results appear more significant or convincing that they really are.
- Misrepresenting data include drawing unwarranted inference from data, creating deceptive graphs of figures, and using suggestive language for rhetorical effect; Interpretation of the results that is not consistent with the actual results of the study.
- **Example Case Study:**

Let us say a company wants to promote its new product, a nutritional supplement. They conduct a study to demonstrate its effectiveness and decide to present the results in a misleading way:

Original Data: In a clinical trial involving one hundred participants, 60 reported feeling increased energy levels after taking the supplement for two weeks.

Misrepresentation: The company decides to only highlight the positive aspect of the study by stating "60% of participants experienced increased energy levels with our supplement!" without mentioning the total number of participants or any potential side effects or limitations of the study.

2.5.2.2 TYPES OF MISREPRESENTATION

a) Innocent misrepresentation

Innocent misrepresentation occurs when false information is provided without any intent to deceive. In this situation, the person making the statement genuinely believes it to be true, but it later turns out to be false. Despite the lack of intent to deceive, innocent misrepresentation can still lead to legal consequences, particularly if someone relies on the false information and suffers harm as a result.

b) Negligent misrepresentation

Negligent misrepresentation occurs when false information is provided due to a lack of reasonable care or diligence. Unlike innocent misrepresentation, negligence implies that the person making the statement did not exercise proper care in verifying the accuracy of the information.

c) Fraudulent misrepresentation

Fraudulent misrepresentation involves intentionally providing false information with the intent to deceive and induce someone to act upon it to their detriment. Unlike innocent and negligent misrepresentation, fraudulent misrepresentation involves deliberate deception for personal gain or to cause harm to others.

2.5.2.3 MANIPULATION OF IMAGES

Manipulation of images refers to the process of altering or enhancing digital images using various techniques and software tools.

- Image tampering.
- Resizing image.
- Usage of filters to manipulate image.
- Use of AI tools to modify images.
- Using same image to represent different results.
- Distorting visual representation such as increasing brightness.

Guidelines to prevent manipulation of images.

- Authors must provide original unprocessed images.
- Journals should provide clear guidelines.
- Adjustments are only acceptable if they apple equally across the entire
- Image
- Checking correctness of images.

2.5.2.4 AVOIDING DATA MISREPRESENTATION

a) **Follow Ethical Guidelines:** Adhere to the ethical standards and guidelines set forth by the journal, professional organizations, and regulatory bodies.

b) **Transparent Reporting:** Provide clear and transparent descriptions of the methods used for data collection, analysis, and interpretation.

c) **Peer Review:** Submit your manuscript for peer review by experts in the field. Peer reviewers can help identify any potential issues with data integrity, analysis, or interpretation before publication.

d) **Data Availability:** Whenever possible, make the raw data underlying your findings publicly available.

e) **Avoid Selective Reporting:** Present all relevant data, including both positive and negative results, rather than selectively reporting findings that support a particular hypothesis. This helps prevent bias and misrepresentation of the overall research findings.

f) **Check for Errors:** Thoroughly review the data and analysis for any errors, inconsistencies, or anomalies.

g) **Cite Sources Appropriately:** Provide proper attribution for all sources of data, including previous studies, datasets, or other sources used in your research.

h) **Be Open to Corrections:** If errors or misrepresentations are identified after publication, be open to issuing corrections or retractions, as necessary.

i) **Declare Conflicts of Interest:** Disclose any potential conflicts of interest that could influence the research or its interpretation. This includes financial conflicts, personal relationships, or affiliations that could bias the results or conclusions.

VTU PREVIOUS YEAR QUESTIONS

1) Briefly explain scientific misconducts in research publications. (10 Marks)
2) What is Scientific Misconduct and mention few causes of Misconducts. (07 Marks)
3) What is Plagiarism? State any six possible reasons for Plagiarism. (07 Marks)
4) Explain Redundant Publications. (06 Marks)
5) What is Salami Publication? How to avoid Salami publications and what are its characteristics? (07 Marks)
6) Explain how ethics is important with respect to science and research. (10 Marks)
7) Explain intellectual honesty and research integrity with respect to scientific conduct in research. (10 Marks).
8) Write a note on Intellectual Honesty. (06 Marks)
9) Explain selective reporting and misrepresentation of data in research. (10 Marks)

3.0 MODULE – 03

3.1 ETHICS W.R.T SCIENCE AND RESEARCH

3.2 INTRODUCTION

3.2.1 WHY PUBLICATIONS?

- ✓ Publication is the final affirmation of scholarly accomplishment.
- ✓ Scientific community can assess, correct & further develop only if the scientific results are published.
- ✓ Today, authors are eager to publish, their main purposes being to advance science and, they hope, mankind.
- ✓ The author receives acclaim and finds publication of his or her work satisfying. Academic advancement, "publish or perish," as well as prestige, are other important driving forces.
- ✓ There are many financial benefits (direct and indirect) in publishing such as promotion and further research funding.
- ✓ Many of these forces can lead to ethical lapses.

3.2.2 PUBLISH OR PERISH (PoP)

- ✓ Publish or perish' (PoP) is a phrase that describes the pressure put on academics to publish in scholarly journals rapidly and continually as a condition for employment (finding a job), promotion, and even maintaining one's job.
- ✓ POP may be advocated on the grounds that a good track record in publications brings attention to the authors and their institutions, which can facilitate continued funding and the progress of the authors themselves.
- ✓ The POP culture has led to a relentless quest for publications – the sole objective being CV building rather than the advancement of human knowledge.
- ✓ One perceived benefit of the POP model is that some pressure to produce research is necessary to motivate academics early in their careers to focus on research advancement and learn to balance research activity with other responsibilities.

3.2.3 ETHICS

- ✓ **Ethics**, derived from the Greek word '**ethikos'** are a set of principles for right conduct in a particular field.
- ✓ They carry a greater significance in the field of medical research and publication as these are directly related to the suffering humanity.
- ✓ In recent times, there has been a gradual neglect towards the ethical principles guiding a scientific research paper writing, and its publication.
- ✓ The misconduct in behaviour may be intentional or may arise due to ignorance.
- ✓ It not only affects other authors, reviewers, and editors, but also the common man.
- ✓ As a research author, it's essential to abreast oneself with these ethical principles and avoid any scientific misconduct.

3.2.4 WHY PUBLICATION ETHICS

- ✓ Significant evolution of scholarly landscape.
- ✓ Advances in publishing technology.
- ✓ Development of open science.
- ✓ Increasing predatory publishing
- ✓ Globalization of academic activity.
- ✓ Increasing use of research assessment & replication crisis.

3.3 PUBLICATION ETHICS

3.3.1 DEFINITION

- Ethical code of conduct that binds researcher at every stage.
- Publication ethics are rules of conduct generally agreed upon when publishing results of scientific research or other scholarly work.
- Generally, it is a standard that protects intellectual property and forbids the re-publication of another's work without proper credit. It also forbids the use of plagiarism of another's efforts.

3.3.2 IMPORTANCE OF PUBLICATION ETHICS

Novelty in Publication: The authors should publish with an objective of communication of research for advancements of the knowledge, and not just for sake of advancement of their careers. This is possible only if the research is undertaken on new ideas or new areas. Novelty in research and publication paves way for further research and addition to existing database of knowledge. Thus, one should not duplicate any research work that already exists.

Authors and Co-authors: The author is responsible and accountable for accuracy, integrity and truthfulness of the published work. For the publications having more than one author, it is important to clearly state the contributions of each author to define their responsibilities. The sequence of authors should also be decided in advance to avoid any dispute in future. The authors should refrain from practicing unethical authorships like gift author, ghost author etc.

Maintaining Integrity: Publication ethics ensure that research findings are accurately reported and presented. This helps to maintain the integrity of the scientific record and prevents the dissemination of false or misleading information.

Building Trust: Ethical publishing practices foster trust among researchers, scholars, and the public. When readers can trust that published research has

been conducted and reported ethically, they are more likely to rely on it in their own work and decision-making processes.

Protecting Participants: Ethical guidelines help protect the rights, privacy, and well-being of research participants, including human subjects and animals. This includes obtaining informed consent, ensuring confidentiality, and minimizing any potential harm.

Preventing Plagiarism: Publication ethics include guidelines to prevent plagiarism, which is the unauthorized use or appropriation of another person's ideas, words, or work. Plagiarism undermines academic integrity and can have serious consequences for both the plagiarizer and the reputation of the publication.

Avoiding Conflict of Interest: Ethical publishing practices require authors, reviewers, and editors to disclose any potential conflicts of interest that could bias their research or decision-making processes. This helps to maintain objectivity and transparency in the publication process.

Ensuring Fairness: Ethical guidelines promote fairness and equality in the publication process by ensuring that all researchers have equal opportunities to disseminate their work, regardless of their institutional affiliation, funding sources, or personal connections.

Promoting Responsible Authorship: Ethical publishing practices emphasize the importance of responsible authorship, including acknowledging the contributions of all individuals who have made significant contributions to the research, and avoiding honorary or ghost authorship.

Combatting Research Misconduct: Publication ethics play a crucial role in identifying and addressing research misconduct, including fabrication, falsification, and manipulation of data, as well as other forms of unethical behaviour.

3.4 BEST PRACTICES / STANDARDS

3.4.1 COPE

History of COPE

- ✓ **Committee on Publication ethics (COPE)** was founded in 1997 by a group of medical journal editors in the United Kingdom, led by **Dr. Elizabeth Wager**. These editors recognized the need for a collaborative effort to address ethical issues such as plagiarism, duplicate publication, and authorship disputes in academic publishing.
- ✓ In its early years, COPE focused on raising awareness about publication ethics and providing guidance to journal editors facing ethical dilemmas.
- ✓ Over the years, COPE's membership expanded beyond medical journals to include editors and publishers from a wide range of academic disciplines and geographic regions. This growth reflected the increasing awareness of publication ethics issues across different fields of research.
- ✓ COPE has developed a range of guidelines, flowcharts, case studies, and other resources to help editors, authors, and reviewers navigate ethical issues in academic publishing. These resources cover topics such as authorship, peer review, conflicts of interest, and data integrity.
- ✓ COPE collaborates with other organizations, publishers, and institutions around the world to promote ethical publishing practices globally. It has partnerships with organizations such as the World Association of Medical Editors (WAME), the International Committee of Medical Journal Editors (ICMJE), and the Council of Science Editors (CSE).
- ✓ COPE has published two codes of conduct:
    - Code of Conduct for editors.
    - Code of Conduct for publishers

Membership in COPE

- ✓ COPE extends membership to the editors of peer reviewed academic journals, companies and publishers those who publish peer reviewed journals and the individuals who are interested in publication ethics.
- ✓ The membership is available on subscription basis. Membership subscription fee varies, depending on membership type. The committee considers the requests for membership on reduced subscription fee as well as free membership for non-profit organizations.

COPE Membership Benefits

Access to Resources: COPE provides access to a wealth of resources related to publication ethics, including guidelines, flowcharts, case studies, and educational materials. These resources are invaluable for editors, publishers, authors, and reviewers seeking guidance on ethical issues in publishing.

Networking Opportunities: COPE membership provides opportunities to connect with other professionals in the publishing industry who are committed to upholding ethical standards. This networking can facilitate collaboration, knowledge-sharing, and support among members.

Training and Education: COPE offers training workshops, webinars, and seminars on various topics related to publication ethics. These educational opportunities help members stay informed about best practices and emerging issues in the field.

Consultation Services: COPE provides consultation services to members facing specific ethical challenges in their publishing work. This might include guidance on handling cases of research misconduct, conflicts of interest, authorship disputes, or other ethical dilemmas.

Access to COPE Forum: COPE organizes regular forums where members can seek advice and discuss ethical issues with peers from around the world. These forums provide a platform for sharing experiences, seeking feedback, and learning from others' expertise.

Recognition and Accreditation: COPE membership demonstrates a commitment to ethical publishing practices, which can enhance the reputation and credibility of individuals and organizations in the academic community. Some publishers display COPE membership status on their websites as a mark of integrity.

Advocacy and Representation: COPE advocates for ethical publishing standards at a global level and represents the interests of its members in discussions with policymakers, funding agencies, and other stakeholders. Membership gives individuals and organizations a voice in shaping the future of academic publishing.

Access to COPE Publication Audit Tool

3.4.2 WAME

- **World Association of Medical Editors** was established in **1955**.
- **Aim**:
  - Facilitate worldwide cooperation and communication among editors of peer reviewed journals, improve editorial standards and promote professionalism in medical editing through education, self-criticism and self-regulation.
  - Encourage research on principles and practice of medical editing.
- WAME stands for World Association of Medical Editors was established in 1955.
- Membership is free and open to all; small journals are well represented.
- WAME Ethics and Policy committee covers broad areas like:
  - Ethics and professionalism
  - Authors
  - Conflict of interest
  - Global health and politics
  - Peer review
  - Policy archives

3.4.3 BEST PRACTICES FOLLOWED BY GOOD JOURNALS

To ensure ethical publication of the research work, there are certain practices or standards framed by various scholarly organizations which are expected to be followed by authors, editors and publishers. The principles of transparency and best practice in scholarly publishing as framed by COPE, WAME, DOAJ and OASPA are simplified as below:

1. **Journal Website**
   - The journal website shall clearly mention the basic terms and conditions for publishing like aims and scope of the journal, readership, print and electronic ISSN, peer reviewed or not, authorship details, processing fees, publication ethics, publication criteria, time to publication and review, information about plagiarism, information about indexing etc.
   - It must not contain any ambiguous or misleading information.

2. **Journal Name**

   The Journal name shall be unique and not be one that is easily confused with another journal or that might mislead potential authors and readers about the Journal's origin or association with other journals.

3. **Ownership and Management**

   The information about the ownership and management of a journal shall be clearly provided on the website of the journal.

4. **Governing Body**

   - The members of the editorial board or other governing bodies of a journal shall be recognized experts in their respective subject fields.
   - The information about their full names and affiliations shall be included in the scope of the journal provided on its website.

5. **Editorial Board and Contact Information**

   - The journals shall provide information about the full names and affiliations of their editors/editorial board on its website.
   - The contact information including complete address of the editorial office shall also be provided on the website.

6. **Copyright and licensing**

   - The policy for copyright shall be clearly stated in the author guidelines and the copyright holder named on all published articles.
   - Likewise, licensing information shall be clearly described in guidelines on the website, and licensing terms shall be indicated on all published articles, both HTML and PDFs.
   - If authors are allowed to publish under a **Creative Commons license**, then any specific license requirements shall be noted.
   - Any policies on posting of final accepted versions or published articles on third party repositories shall be clearly stated.

7. **Peer Review Process**

   - **Peer review** is defined as obtaining advice on individual manuscripts from reviewers' expert in the field who are not part of the journal's editorial staff.

- Journal content must be clearly marked as whether peer reviewed or not. All processes as well as any policies related to the journal's peer review procedures, shall be clearly described on the journal website, including the method of peer review used.
- Journal websites should not guarantee manuscript acceptance or very short peer review times.

8. Process to handle research misconduct.

- Publishers and editors shall take reasonable steps to identify and prevent the publication of papers where research misconduct has occurred, including plagiarism, citation manipulation, and data falsification/fabrication, among others.
- If a journal's publisher or editors are made aware of any allegation of research misconduct relating to a published article in their journal, the publisher or editor shall follow COPE's guidelines (or equivalent) in dealing with allegations.

9. Publication ethics

A journal shall also have policies on publishing ethics. These should be clearly visible on its website, and should refer to:

- Journal policies on authorship.
- How the journal will handle complaints and appeal.
- Journal policies on conflict of interest.
- Journal policies on data sharing and reproducibility.
- Journal policies on intellectual property and ethical oversight.
- Journal policies on post publication discussions and corrections.

10. Publication schedule

The periodicity at which a journal publishes shall be clearly indicated.

11. Author fee

Any fees for manuscript processing or publication should be clearly stated and easy for authors to find before submission. If no fees are charged, this should also be clearly noted.

12. Access

The information about the mode of access of the journal as its individual articles shall be available to public through the journal website i.e. **open access** or **subscription based** or **per article view.**

13. Archiving

A journal's plan for electronic backup and preservation of access to the journal content (for example, access to main articles via CLOCKSS or PubMedCentral) in the event a journal is no longer published shall be clearly indicated.

14. Revenue sources

Business models or revenue sources (e.g., author fees, subscriptions, advertising, reprints, institutional support, and organizational support) shall be clearly stated or otherwise evident on the journal's website. Publishing fees or waiver status should not influence editorial decision making.

15. Advertising

- Journals shall state their advertising policy if relevant, including what types of adverts will be considered, who makes decisions regarding accepting adverts and whether they are linked to content or reader behaviour (online only) or are displayed at random.
- Advertisements should not be related in any way to editorial decision making and shall be kept separate from the published content.

16. Direct Marketing

- Any direct marketing activities, including solicitation of manuscripts that are conducted on behalf of the journal, shall be appropriate, well targeted, and unobtrusive.
- Information provided about the publisher or journal is expected to be truthful and not misleading for readers or authors.

3.5 CONFLICTS OF INTEREST

3.5.1 WHAT IS CONFLICT OF INTEREST?

- *A **conflict of interest** in research can be defined as a situation in which an individual has "interests in the outcome of the research that may lead to a personal advantage and that might therefore, in appearance, compromise the integrity of the research."*
- Conflict of interest exists when a person may take compromises with his professional duties and responsibilities under the influence of vested financial or non-financial interests.
- The conflict of interest does not refer to actual misconducts, but it refers to one's potential of getting indulged into an unethical practice or committing misconduct.
- Conflicts of interest comprise those which may not be fully apparent, and which may influence the judgment of author, reviewers, and editors.
- They have been described as those which, when revealed later, would make a reasonable reader feel misled or deceived.
- They may be personal, commercial, political, academic or financial.

3.5.2 TYPES OF CONFLICT OF INTEREST

3.5.2.1 FINANCIAL / TANGIBLE

- A financial interest relates to monetary profit or reward. It includes payments, consultation fee, honorarium gifts, IP rights, patents, copyrights, royalty rights or other monetary benefits form the companies or research sponsoring institutions.
- For example, a scientist studying the health effects of a certain product may receive funding from the manufacturer of that product, potentially influencing the results or interpretation of the study.

3.5.2.2 NON-FINANCIAL / INTANGIBLE

- A non-financial conflict of interest occurs when an individual or entity has competing interests that are not primarily financial or tangible in nature but still have the potential to influence their decision-making or actions.

- A non-financial secondary interest relates to academic, religious, personal, political and such other interests of researcher. It also includes recognition, prestige, career advancement, power, relationships, enmities, identity, desire to publish etc.
- For example, consider a peer reviewer who is evaluating a study that decreases the importance of reviewer's own research. This could lead the reviewer to recommend rejection of the study even if the study itself is original and robust.
- Another example may be a reviewer creating a situation wherein his/her papers to be cited in the published work.

3.5.3 HOW TO DETERMINE CONFLICT OF INTEREST

The Integrity Coordinating Group has outlined an excellent list-known as the six Ps-that researchers can use to determine whether a conflict of interest exists:

Purpose: Researchers should consider whether their actions align with the primary objectives of their research, ensuring that personal interests do not compromise the integrity of the study.

Position: Researchers should evaluate their roles and responsibilities within the research context and avoid using their positions to pursue personal gain or benefit that conflicts with the research's objectives.

Person: Researchers need to assess their relationships with others involved in the research, including colleagues, sponsors, or stakeholders, to identify any potential conflicts of interest arising from personal connections.

Payment: Researchers should disclose any financial interests, such as funding sources or consulting fees, that could influence the research findings or their objectivity in conducting the study.

Policy: Researchers should adhere to ethical guidelines and institutional policies regarding conflicts of interest, ensuring transparency and accountability in their research practices.

Publicity: Researchers should disclose any potential conflicts of interest to relevant parties, including funders, journal editors, and research participants, to maintain transparency and trust in the research process.

3.5.4 WHY MUST AUTHORS DISCLOSE CONFLICT OF INTEREST?

- Almost all scientific and non-technical journals require authors to disclose potential or actual conflicts of interest related to their study. Some journals, like Journal of the American Medical Association (JAMA), require authors to submit signed financial disclosure statements. Other journals, like BMC Cancer, insist in their guidelines that a separate section on conflict of interest be included in the manuscript and that any details be provided in the covering letter.
- When declaring conflicts of interest, researchers are expected to provide detailed information about relevant financial interests; grants, financial support, and funding received from industry, and other intellectual benefits like filed or pending patents that represent future financial gains.
- Researchers are also required to specify the role of the funding organization or sponsor in the study design and conduct; data collection, analysis, and interpretation; and manuscript drafting, review, and final approval.
- It is very important to inform journals about conflicts of interest. Journals may not always publicly disclose conflicts of interest at the time of publishing the paper. However, it any one questions the study or raises doubt that a conflict of interest exists, the journal will publish the authors' conflict of interest disclosure and mention that the authors had already informed the journal; this makes the authors' conduct seem less suspicious.
- If the authors had not informed the journal and it is discovered that conflicts of interest did indeed exist, the consequences can be serious, including retraction of the paper and investigation by the authors affiliated institutes.

3.5.5 HOW TO PREVENT CONFLICT OF INTEREST?

Disclosure: Researchers should disclose any financial interests, relationships, or affiliations that could potentially bias their work. This includes financial support, consulting fees, honoraria, equity interests, and other relevant connections with organizations that could benefit from the research outcomes.

Transparency: Transparency is key to addressing conflicts of interest. Researchers should openly communicate any potential conflicts to

stakeholders, collaborators, publishers, and funding agencies. This transparency helps stakeholders assess the potential impact of conflicts on the research findings.

Ethics Review: Ethics committees should carefully review research proposals to identify and address potential conflicts of interest. These committees can provide guidance on managing conflicts and ensuring research integrity.

Independent Oversight: Establishing independent oversight bodies or committees can help monitor and manage conflicts of interest in research. These bodies may include representatives from diverse disciplines, institutions, and stakeholders to provide unbiased evaluation and guidance.

Policy Development: Institutions, funding agencies, and professional organizations should develop clear policies and guidelines for identifying, disclosing, and managing conflicts of interest in research. These policies should be regularly updated to address emerging issues and maintain relevance.

Training and Education: Researchers, students, and other stakeholders should receive training on identifying, disclosing, and managing conflicts of interest. Education programs can raise awareness about the importance of research integrity and ethical conduct.

Mitigation Strategies: Researchers should implement mitigation strategies to minimize the potential impact of conflicts of interest on research outcomes.

Peer Review: Peer review plays a crucial role in identifying and addressing conflicts of interest in research publications. Reviewers should be vigilant in assessing potential biases and conflicts, and editors should consider these factors when making publication decisions.

Public Access to Data: Providing public access to research data and methodologies can enhance transparency and accountability, allowing others to independently verify findings and assess potential biases.

3.6 PUBLICATION MISCONDUCT

3.6.1 DEFINITION

Publication misconduct refers to any unethical or deceptive behavior in the process of publishing scholarly works, particularly in academic journals or other platforms.

3.6.2 PROBLEMS THAT LEAD TO UNETHICAL BEHAVIOR

- **Plagiarism:** Presenting someone else's work, ideas, or words as one's own without proper acknowledgment.
- **Fabrication:** Creating or reporting data, results, or information that do not actually exist.
- **Falsification:** Manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented.
- **Duplicate publication:** Submitting the same work or data for publication in multiple journals without proper disclosure.
- **Salami slicing:** Dividing research into multiple publications when it could have been presented as a single cohesive study.
- **Undisclosed conflicts of interest:** Failing to disclose financial, personal, or other conflicts of interest that could potentially bias the research or its interpretation.
- **Misrepresentation of authorship:** Improperly attributing authorship or omitting deserving authors from the publication.
- **Failure to comply with ethical guidelines:** Violating established ethical norms or guidelines for research conduct and publication, such as those outlined by professional associations or institutional review boards.
- Covering up misconduct and failure to report misconduct.
- Misuse of confidential information and misuse of research funds.
- Unethical authorship practices other than plagiarism.
- Misrepresentation of one’s affiliation or qualification.

3.6.3 TYPES OF PUBLICATION MISCONDUCT

Fabrication, Falsification and Plagiarism. Please refer to Module 02.

3.7 VIOLATION OF PUBLICATION ETHICS

Violations of publication ethics refers to the misconduct in reporting research in form of publications. It includes plagiarism, fabrication, falsification, duplicate submission, multiple submission, salami publication, ghost authorship, gift authorship, fake affiliation, pressured authorship. Violation may lead to retraction of the publication and nullification of research.

3.7.1 COMMON ETHICAL VIOLATIONS

1) **Plagiarism:** Presenting someone else's work, ideas, or words as one's own without proper acknowledgment.
2) **Fabrication:** Falsifying research data or results, including creating data that does not exist.
3) **Falsification:** Manipulating research materials, equipment, or processes, or changing or omitting data or results to suit the researcher's agenda.
4) **Duplicate submission or publication:** Submitting the same manuscript to multiple journals simultaneously or publishing the same research findings in more than one journal without appropriate disclosure.
5) **Salami publication,** also known as "salami slicing" or "fragmented publication," refers to the unethical practice of dividing the results of a single research study into multiple smaller publications and submitting them to journals separately.
6) **Fake affiliation:** Wrong author and institution details.
7) **Authorship disputes:** Improperly assigning authorship or omitting deserving authors from the list.
8) **Gift Authorship:** Co-authorship awarded to a person who has not contributed significantly to the study.
9) **Ghost Authorship:** Contribution to produce a paper excluded in the final publication.
10) **Guest Authorship:** Senior authors who are included because of their respect or influence in the hope that this will increase the likelihood of publication and/or impact of the paper once published.
11) **Pressured Authorship:** When a person uses their position of authority to obtain authorship.
12) **Conflict of interest:** Failing to disclose financial, personal, or professional relationships that could influence the research or its interpretation.

13) **Data misinterpretation:** Misrepresenting research findings or drawing conclusions not supported by the data.
14) **Ethical oversight:** Failure to obtain necessary approvals for research involving human subjects, animals, or other sensitive areas, or disregarding ethical guidelines.
15) **Review process misconduct:** Peer review manipulation, such as suggesting biased reviewers, coercing reviewers, or submitting fraudulent reviews.
16) **Undisclosed funding sources:** Failing to disclose financial support or conflicts of interest related to funding sources for the research.

3.7.2 CAUSES FOR VIOLATION OF PUBLICATION ETHICS

Researchers may engage in violations of publication ethics for various reasons:

- **Pressure to Publish:** There is often significant pressure on researchers to publish their work in prestigious journals and to produce a high volume of publications. This pressure can lead some individuals to cut corners or engage in unethical behaviour to expedite the publication process.
- **Career Advancement:** In many academic fields, career advancement, promotion, and tenure decisions heavily rely on publication records. This can create a strong incentive for researchers to publish frequently and in reputable journals, sometimes at the expense of research integrity.
- **Financial Incentives:** Some researchers may be motivated by financial gain, particularly in cases where there are commercial interests involved, such as patents, royalties, or industry funding. This can create conflicts of interest that may compromise ethical standards.
- **Competition:** The competitive nature of academia can lead to unethical behaviour as researchers vie for limited resources, recognition, and opportunities.
- **Ignorance or Lack of knowledge:** The researcher may have limited knowledge of publications.
- **Publication Bias:** Researchers may be more likely to engage in unethical behaviour, such as selective reporting or data manipulation, to produce results that are more likely to be published or to support a particular hypothesis.

3.7.3 HOW TO PREVENT VIOLATION OF PUBLICATION ETHICS

Preventing violations of publication ethics is crucial for maintaining the integrity of academic and scientific research. Here are some key steps to help prevent such violations:

- **Understand Publication Ethics:** Familiarize yourself with the basic principles of publication ethics, including plagiarism, data fabrication, falsification, authorship guidelines, conflicts of interest, and duplicate publication. Resources like COPE (Committee on Publication Ethics) provide detailed guidelines.
- **Follow Authorship Guidelines:** Clearly define authorship criteria and ensure that all authors meet these criteria. This helps prevent issues like ghost authorship or honorary authorship.
- **Modern Tools Usage:** Use plagiarism detection software, AI tools to avoid any conflicts in published work.
- **Disclosure of Conflicts of Interest:** Disclose any potential conflicts of interest that could influence the research, its interpretation, or its publication. This includes financial interests, affiliations, or personal relationships.
- **Adhere to Journal Guidelines:** Follow the specific guidelines provided by the journal you are submitting to. This includes formatting requirements, author instructions, and ethical guidelines.
- **Ethical Approval:** Obtain necessary ethical approval for research involving human subjects, animals, or sensitive data. Follow institutional or national guidelines for ethical conduct in research.
- **Review and Peer Feedback:** Seek feedback from colleagues and peers during the research and writing process. Peer review helps identify and address potential ethical issues before publication.
- **Educate Researchers and Authors:** Provide training and education on publication ethics to researchers and authors. Ensure that all members of the research team understand their responsibilities and ethical obligations.

3.8 AUTHORSHIP AND CONTRIBUTORSHIP

3.8.1 AUTHORSHIP

- Authorship refers to list of authors who have contributed to the published work. Authorship entails responsibility and accountability. Authorship is a **privilege** and not a **right**.
- Responsible and ethical authorship requires that the work to be **trustworthy**, **truthful** and **fair**.
    - **Truthfulness** means that false claims are not present, including claim of authorship. False claims must be distinguished from errors or inaccuracies, which occur in up to 20% of manuscripts.
    - **Trustworthy** means that the authors have attempted to eliminate the bias in analysing the truthful information presented to the readers.
    - **Fairness** is the public disclosure of the affiliations of all those who were part of research study and its preparation.
- Authors should be ethical, accountable and independent.
- **Author: "*A Student or a faculty or a researcher or staff of HEI who claims to be the creator of the work (intellectual) under consideration*"**
- Authorship is based on the following four criteria:
    1. Substantial contribution to the conception or design of work; or the acquisition, analysis, or interpretation of data of the work.
    2. Drafting or revising the article for intellectual content.
    3. Approval of final version.
    4. Accountable for all aspects of work and Integrity of work.

Types of Inappropriate Authorship

a) Guest Authorship:

- Guest Authorship is a type of authorship in which a person who has not contributed anything to the publication is designated as an author or co-author of a publication.
- This is done to improve the chances of its being accepted for publication in a reputed journal or improving its citations of for the personal benefits.

b) Ghost Authorship:

Ghost Authorship is the case when name of the person who has contributed to the work is intentionally not included as author of the final publication. This generally happens with junior researchers and students.

c) Gift Authorship:

- Co-authorship awarded to a person who has not contributed significantly to the study. This is done to increase the number of publications on in each other's biodata.
- Another type of gift authorship is that of multiple authors originating from the thesis of student. A thesis is work of student and his guide and contain only their names. But in many cases multiple authors exist.

d) Pressured Authorship: When a person uses their position of authority to obtain authorship.

e) Surrogate Authorship:

In Surrogate Authorship researchers hire professional writers for their publications. These professional writers fabricate a research and write the manuscript. The name of the person who has done the research is not included and the researcher who pays for the agency is included. This is known as surrogate authorship and is considered as highly unethical practice.

f) Anonymous Authorship

- Anonymous authorship refers to the practice of publishing written works without revealing the identity of the author or authors.
- In some cases, authors intentionally choose to remain anonymous for personal, professional, or ideological reasons.
- Occasionally, works may be published anonymously due to historical circumstances, lost records, or incomplete documentation. In such cases, the author's identity may be unknown or lost to history.
- Pseudonymous authorship involves using a pen name or pseudonym instead of one's real name.
- Some works are authored collectively by a group of individuals, but they choose to publish under a collective pseudonym or anonymously.

WHAT CAUSES AUTHORSHIP PROBLEMS?

- No authors specified.
- Author from unrelated domain.
- Unspecified role in acknowledgement.
- No significant contribution.
- Questionable roles.
- Unable to respond to reviewer's comments.
- Similar articles published under different author names.
- Language quality differs in various sections of manuscript.

GUIDELINES TO MINIMIZE AUTHORSHIP PROBLEMS

- Journals must specify clear authorship criteria.
- Journals should require confirmation from authors and co-authors.
- Journals should ask authors for a short description of their contribution.
- Copyright transfer and Exclusive license agreements.
- Journal should require that all authors agree with the order of authorship.
- Encourage towards having unique IDs (ORCID) to bypass matching author names.

3.8.2 CONTRIBUTORSHIP

- **Contributorship** is a statement published by reputed journal as a mandatory component of every article. Contributorship refers to Contributorship statement at the end of the paper, giving details of who did what in planning, conducting, and reporting the work.
- Contributorship includes information about the authors as well as non-author contributors.
- The designation of each non-author contributor is clearly mentioned like "**scientific advisor**", "**collaborator**", "**investigator**", etc.
- This practice enables the readers to determine the individual contribution of each and everyone associated with research and publication process. It helps to avoid the practice of inappropriate authorship to large extent.
- This statement generally appears at the end of the article.

3.9 COMPLAINTS & APPEALS, DATA & REPRODUCIBILITY, ETHICAL OVERSIGHT

3.9.1 COMPLAINTS AND APPEALS

3.9.1.1 PUBLICATION COMPLAINTS

What are Complaints?

- It refers to concerns raised by individuals or organisations regarding conduct, content or processes related to a published research article or academic paper.
- Complaints may involve plagiarism, fabrication, falsification, authorship disputes, ethical violation, or other breaches of research integrity.
- The complaint may also be about the decision of the editorial board member regarding the manuscript of the author.

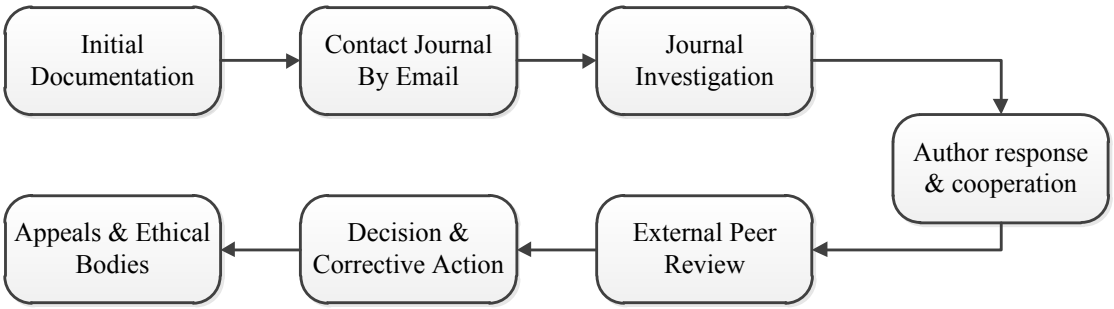
What are Complaints?

- Complaints from authors.
- Complaints about plagiarism, fabrication and falsification of data.
- Duplicate publication or submitting same article to various journals.
- Research results misappropriation.
- Conflict of interest.

How to make complaints?

Complaints should be emailed as per the instructions provided by the journal. The journals should clearly mention the details of relevant contact persons.

Steps in publication complaint process.



If Complaint is not satisfactorily resolved?

Contact COPE or any legal counsel in your jurisdiction.

3.9.1.2 APPEALS

- Appeals refers to the formal process through which authors can challenge editorial decisions made by a journal regarding the acceptance, rejection or handling of their manuscript.
- The appeal process allows authors to request a reassessment of the journal's decision based on initial submission and peer review, with the aim of reconsidering the publication status of their research article.

- Appeals can take various forms as mentioned below:
  a) **Appeal of Rejection:** If a manuscript is rejected by a journal, the author may appeal the decision, providing additional information or addressing concerns raised by the reviewers or editors.
  b) **Appeal of Review:** Authors might appeal a review if they believe it is unfair, inaccurate, or biased. This could involve providing counterarguments or requesting a revaluation by the editorial board.
  c) **Appeal of Retraction:** If a published article is retracted due to issues such as misconduct or errors, the authors may appeal the decision, providing evidence to refute the reasons for retraction or showing that the issues can be corrected.
  d) **Legal Appeals:** In cases where publication decisions lead to legal disputes, individuals or organizations may appeal to higher authorities or courts to challenge decisions, particularly if they believe their rights have been violated or the decision was made improperly.
  e) **Ethical Appeals:** Appeals can also be made on ethical grounds, such as arguing that a publication decision goes against ethical guidelines or standards in academic publishing.

- **Steps in Appeal Process:**

3.9.2 DATA & REPRODUCIBILITY

a) **Data Integrity:** Publication misconduct often involves falsification and fabrication of data. Maintaining data integrity is fundamental to ethical research conduct. Researchers must accurately collect, record and analyse data, ensuring free from manipulation.

b) **Data Sharing:** Transparent sharing of research data promotes reproducibility and helps detect misconduct. Many journals and researchers have made it mandatory to share data on request through public repositories. This enables independent verification of results and enhances the credibility of published research.

c) **Reproducibility:** It refers to researchers to obtain same results as mentioned in the published article by following same methods and constraints.

d) **Methodological Transparency:** Clear and detailed descriptions of research methods are very much necessary for reproducibility. Publications should provide sufficient information about experimental protocols, data collection procedures, and data analysis techniques to enable other researchers to replicate the study.

e) **Data Verification:** Journals may employ various methods to verify the integrity of data submitted for publication. This may include conducting statistical checks, verifying the authenticity of images or graphs, or using plagiarism detection software to identify potential data manipulation or fabrication.

f) **Peer Review:** Peer review plays a crucial role in evaluating the validity and reproducibility of research findings.

g) **Retractions and Corrections:** When publication misconduct is identified, journals may retract the affected paper or issue corrections to rectify the record. Retractions are typically issued when there is clear evidence of data fabrication, plagiarism, or other serious misconduct. Corrections may be issued for honest errors or mistakes that do not undermine the overall validity of the research.

3.9.3 ETHICAL OVERSIGHT

Ethical oversight should include, but is not limited to, policies on consent to publication, publication on vulnerable populations, ethical conduct of research using animals, ethical conduct of research using human subjects, handling confidential data and ethical business/marketing practices.

Here are some key aspects:

a) **Informed Consent:** Participants must be fully informed about the nature of the research, its potential risks and benefits, and their rights as participants before they agree to take part.

b) **Protection of Participants:** Researchers must ensure that participants are not exposed to undue harm, whether physical or psychological, during the study. This includes measures to safeguard their privacy and confidentiality.

c) **Avoidance of Compulsion:** Participants must have the freedom to withdraw from the study at any time without penalty.

d) **Beneficence:** Researchers should strive to maximize benefits and minimize harm to participants and other affected parties.

e) **Honesty and Integrity:** Researchers must always conduct themselves with honesty and integrity, accurately reporting their findings and avoiding fabrication, falsification, or plagiarism.

f) **Responsible Conduct of Research (RCR):** This encompasses a broader set of principles and practices aimed at promoting integrity and ethical behaviour in all aspects of the research process, including data management, publication practices, and interactions with colleagues and the broader community.

g) **Oversight Mechanisms:** Institutions typically have institutional review boards (IRBs), or ethics committees tasked with reviewing research proposals to ensure that they meet ethical standards and regulatory requirements.

h) **Compliance with Regulations:** Researchers must adhere to relevant laws, regulations, and professional standards governing research ethics, such as the Declaration of Helsinki or the Belmont Report.

i) **Continuous Monitoring and Evaluation:** Ethical oversight should be an ongoing process, with mechanisms in place to monitor the conduct of research and address any ethical concerns that may arise during the study.

3.10 PREDATORY PUBLISHERS AND JOURNALS

3.10.1 INTRODUCTION

- The term "**Predatory journals**" was coined by Jaffrey Beall.
- A predatory journal is a publication that prioritizes profit over academic quality. It typically accepts articles for publication without proper peer review, charges exorbitant fees, and lacks credibility within the academic community.
- Predatory Journals take advantage of authors by asking them to publish for a fee without providing peer-review or editing services.
- Exist solely for profit.
- The focus of predatory or fake journals is to mirror real journals sufficiently to confuse and attract young and inexperienced researchers to submit their manuscripts.
- Hijacked journals are duplicate or fake websites of legitimate ones utilizing the title, ISSN and other information of the reputable journal. They are often created by a malicious third party for the purpose of fraudulently offering academicians the opportunity to rapidly publish their research online for a fee.

3.10.2 CHARACTERISTICS OF PREDATORY JOURNAL/PUBLISHERS

- Their primary goal is to mint money (handsome fees are to be charged for publication).
- They do not care about the quality of the work published (no or little editing or peer-review process).
- They make false claims or promises (false claims of impact factors and indexing).
- They engage in unethical business practices (not as per advertisement).
- They fail to follow accepted standards or best practices of scholarly publishing.
- Predatory publisher exploits a new publishing model by claiming to be legitimate open access operation. Online predatory publishers take advantage of the Gold Open Access model.

- While sending a predatory publisher a manuscript may see it published there is no guarantee that it underwent peer review, is included in indexes like Web of Science and Scopus.
- A predatory journal is a publication that actively asks research scholars/authors for manuscripts without peer-review system or a proper editorial board and publishes bogus research unethically against some money.
- Predatory journals take advantage of authors by asking them to publish for a fee without providing peer-review or editing services.
- Because predatory publishers do not follow the proper academic standards for publishing, they usually offer a quick turnaround on publishing a manuscript.

3.10.3 IDENTIFICATION OF PREDATORY JOURNALS/PUBLISHERS

- **Questionable Editorial Practices:**
  - No single individual is identified as specific journal's editor with no formal editorial/ review board or the same editorial board for more than one journal.
  - The editor and/or review board members do not have academic expertise in the journal's field.
- **Misleading Names and Similarities to Legitimate Journals:** Predatory journals may adopt names like well-established, reputable journals to deceive authors. This tactic aims to exploit researchers who may mistake them for legitimate publications.
- **Lack of Peer Review or Poor Peer Review:** Predatory journals often claim to conduct peer review, but the process is either superficial or non-existent.
- **Low or Non-Existent Publication Standards:** Predatory journals often have low or non-existent publication standards. They may accept papers without proper scrutiny of scientific rigor, methodology, or ethical considerations.
- **Rapid Publication:** Predatory journals often promise extremely fast publication times, sometimes within days or weeks of submission.

- **Aggressive Marketing Tactics:** Predatory journals frequently employ aggressive email solicitation campaigns, spamming researchers with invitations to submit papers or join editorial boards.
- **Overly Broad Scope:** Predatory journals often claim to cover a wide range of disciplines, from humanities to hard sciences, without a clear focus.
- **Dubious Indexing and Impact Metrics:** Predatory journals often boast about being indexed in obscure or questionable databases that lack credibility in the academic community. They may also promote misleading metrics, such as fake impact factors or indexing in irrelevant databases, to deceive authors.
- **Unprofessional Website and Publishing Practices:** Predatory journals often have poorly designed websites with grammatical errors, typos, and inconsistencies. They may also lack transparency regarding publication fees, copyright policies, and editorial board members.
- **No Reputable Affiliations:** Predatory journals lack affiliation with reputable academic institutions, societies, or publishing houses.
- **Minimal Archiving and Preservation:** Predatory journals may lack proper archiving and preservation practices, which can lead to the loss of scholarly work over time and undermine the integrity of the scientific record.
- **Frequent Publication Fees:** Predatory journals often charge exorbitant publication fees, sometimes without providing the promised services such as proper peer review, editing, or indexing. These fees are usually paid by the authors, sometimes with the promise of quick publication or guaranteed acceptance.
- **False Indexing Claims:** Predatory journals may falsely claim to be indexed in reputable databases such as PubMed, Scopus, or Web of Science to deceive authors.
- No retraction policy.
- Do not follow COPE or WAME guidelines.
- Hidden charges and failure to mention copyright.
- Guaranteed acceptance of manuscript upon submission.
- Have a “contact us” page that only includes a web form or an e-mail address, and the publisher hides or does not reveal its location.

3.10.4 STEPS TO BE TAKEN TO AVOID PREDATORY JOURNALS

a) **Do Your Research:** Before submitting your work to any journal or publisher, thoroughly research the publisher's reputation. Look for reviews, feedback from other researchers, and any reports of predatory practices associated with the publisher.

b) **Check Journal Indexing:** Verify if the journal is indexed in reputable databases like PubMed, Scopus, Web of Science, or the Directory of Open Access Journals (DOAJ). Being indexed in these databases is an indicator of a journal's credibility.

c) **Assess Journal Quality:** Evaluate the quality of the journal by examining its editorial board, scope, peer-review process, publication frequency, and impact factor. High-quality journals typically have a transparent peer-review process and a well-defined editorial board comprising experts in the field.

d) **Beware of Unsolicited Emails:** Be cautious of unsolicited emails inviting you to submit your work to a journal.

e) **Review Publication Fees:** Predatory publishers may charge exorbitant publication fees or offer discounts for rapid publication. Review the publication fees and consider whether they are reasonable compared to other reputable journals in your field.

f) **Check Copyright Policies:** Review the journal's copyright policies to ensure they are fair and aligned with your interests as an author. Predatory publishers may require authors to transfer copyright without adequate rights or compensation.

g) **Examine Journal Website:** Visit the journal's website and examine its layout, design, and content. Legitimate journals typically have well-designed websites with clear information about their editorial process, peer-review policy, and publication standards.

h) **Verify Contact Information:** Ensure that the journal provides valid contact information, including a physical address and phone number. Predatory publishers may provide minimal contact information or use generic email addresses.

i) **Consult Colleagues and Mentors:** Seek advice from trusted colleagues, mentors, or supervisors when evaluating the credibility of a journal or publisher. They may have valuable insights or experiences to share.

j) **Use Whitelists and Blacklists:** Utilize whitelists and blacklists of journals curated by reputable organizations or researchers in your field. These lists can help you identify predatory publishers to avoid or reputable journals to consider.

k) Is the publisher a member of a recognized industry initiative (like COPE, DOAJ, and OASPA)?

VTU PREVIOUS YEAR QUESTIONS

Aug. 2023

1) Define Publication Ethics. Explain its importance in Publication Ethics. **[10 M]**
2) Explain conflicts of interest in publication ethics. **[10 M]**
3) Explain the importance of ethics, authorship and Contributorship in research publication. **[10 M]**
4) Briefly explain predatory publishers and journals in research publication. **[10 M]**

Dec. 2022

1) Explain the Publication Ethics in Research. **[07 M]**
2) What is Violation of Publication Ethics? Mention a few common ethical violations.
3) What are the steps to be taken to Avoid Predatory Publishers?. **[06 M]**
4) How can Researchers Safeguard against being published in a Predatory Journal?. **[07 M]**
5) What is a Predatory Publisher? What are the common characteristics of Predatory Publisher? **[07 M]**
6) Explain the terms : i) Complaints and Appeals ii) Data and Reproducibility iii) Ethical Oversight. **[06 M]**

Nov. 2021

1) What is meant by conflict of interest in research. Explain the occurrence of financial and non-financial conflict of interests. **[10 M]**
2) Explain publication ethics in research. **[10 M]**
3) What are the good practices to be followed by good journals. **[10 M]**
4) What is a Predatory Publisher? What are the common characteristics of Predatory Publisher? **[10 M]**

4.0 MODULE – 04

4.1 OPEN ACCESS PUBLISHING AND INITIATIVES

4.1.1 NEED FOR OPEN ACCESS PUBLICATIONS

a) **High Subscription Rate**

Scholarly journals are a major source of sharing research and scientific information across the globe. But these publications charge very high subscription rates to provide across the information. Not all can afford and pay these subscription rates.

b) **High Rate of Inflation in the Subscription Charges**

The subscription charges are increasing at an alarming rate. Due to this even the institutions in low- and middle-income countries are unable to afford every year.

c) **Addressing Equity and Inclusivity:**

Access to subscription-based journals can be prohibitively expensive for individuals and institutions in low- and middle-income countries, as well as for independent researchers, small businesses, and community organizations. Open access publications promote equity and inclusivity by ensuring that everyone, regardless of their financial means or institutional affiliation, can access scholarly knowledge.

d) **Access to Knowledge:** Open access publications ensure that research findings are freely available to anyone with an internet connection, regardless of their location or financial resources.

e) **Transparency and Reproducibility:** Open access publications promote transparency and reproducibility in research by allowing others to freely access and scrutinize the underlying data and methodology. This enhances the credibility and reliability of scientific findings, contributing to the advancement of knowledge.

4.1.2 DEFINITION

Open Access is defined "***as free, online, immediate, permanent access to the full-text version of a scientific or scholarly article over Internet. Anyone from anywhere in the world can access the content of articles published in Open Access.***"

4.1.3 CHARACTERISTICS OF OPEN ACCESS JOURNALS

a) **Free Access:** Open access journals make their articles freely available online, often immediately upon publication. This allows researchers, students, and the public to access the latest scientific findings without encountering paywalls.

b) **Free from copyright and licensing restrictions:** Open access articles are typically published under licenses that allow for redistribution and reuse, such as Creative Commons licenses. This encourages collaboration, innovation, and the development of derivative works.

c) **Digital in nature:** As most of the content is digital in nature, anyone can access the content freely from any part of the world without hurdles.

d) **Archiving:** Open access publishers often provide long-term archiving of articles, ensuring that research remains accessible and preserved for future generations.

e) **Transparency:** Open access publishing promotes transparency in scholarly communication by providing unrestricted access to research findings. This transparency can enhance the reproducibility and reliability of scientific research.

f) **Global Reach and Collaboration:** Open access publishing facilitates global dissemination of research, enabling scholars from around the world to access and build upon each other's work. This can lead to greater diversity of perspectives and collaboration across geographic boundaries.

g) **Editorial Board and Peer Review Process:** Many open access journals employ efficient peer review and production processes, allowing for rapid dissemination of research findings.

h) **Variety of Content:** Open access publishing includes scholarly articles, conference proceedings, data sets, and educational materials, enriching the scholarly record and promoting interdisciplinary collaboration.

4.1.4 OPEN ACCESS STRATERGIES

4.1.4.1 OPEN ACCESS JOURNALS (OAJ)

Open access journals are scholarly journals that provide free, unrestricted access to their content online, typically without requiring a subscription or payment. These journals publish articles that have undergone peer review and meet certain quality standards. Authors may retain copyright to their work, and articles are often published under open licenses that permit reuse and redistribution.

Some key characteristics of open access journals include:

- Online Accessibility
- Peer Review
- Licensing
- Article Processing Charges (APCs)
- Diverse Disciplines

Examples of open access journals are:

a. **DOAJ (Directory of Open Access Journals):** While not a single journal, the DOAJ is an online directory that indexes thousands of open access journals across various disciplines. It provides a comprehensive list of reputable open access journals that adhere to quality standards and best practices.
b. **PLOS ONE:** PLOS ONE is a multidisciplinary open access journal published by the Public Library of Science (PLOS).
c. **MDPI Journals:** MDPI (Multidisciplinary Digital Publishing Institute) publishes a wide range of open access journals in science, technology, engineering, and medicine.
d. **Frontiers Journals:** Frontiers is a publisher of open access journals in a variety of academic disciplines, including neuroscience, psychology, medicine, environmental science, and more.

Some of the Indian open access journals are Indian Journal of Medical Research (IJMR), Indian Journal of Pharmaceutical Sciences (IJPS), Indian Journal of Psychiatry (IJP), Indian Journal of Surgery (IJS), Indian Journal of Ophthalmology (IJO), Indian Journal of Community Medicine (IJCM) etc.

4.1.4.2 OPEN ACCESS REPOSITORIES (OAR)

Open access repositories are digital platforms that provide free access to scholarly outputs, such as articles, preprints, theses, dissertations, datasets, and other research materials. These repositories collect and preserve scholarly works, often with the goal of increasing the visibility and impact of research outputs.

Some key characteristics of open access repositories include:

- Self-Archiving: Authors can deposit their research outputs in open access repositories, either before or after publication in traditional journals. This practice, known as self-archiving or green open access, allows authors to share their work freely with the global research community.
- Institutional and Subject Repositories: Open access repositories may be hosted by academic institutions, research organizations, funding agencies, or subject-specific communities. Institutional repositories typically showcase the research outputs of a particular institution, while subject repositories focus on a specific academic discipline or topic.
- Long-Term Preservation: Repositories may offer long-term preservation services to ensure the integrity and accessibility of deposited content over time, contributing to the scholarly record and cultural heritage.

Examples of open access repositories are:

a) **arXiv:** arXiv is a preprint repository primarily focused on physics, mathematics, computer science, quantitative biology, quantitative finance, and statistics.

b) **PubMed Central (PMC):** PubMed Central is a free full-text archive of biomedical and life sciences journal literature.

c) **Shodhganga:** Shodhganga is a national repository of electronic theses and dissertations (ETDs) submitted by research scholars in Indian universities. It provides open access to a vast collection of doctoral theses across various disciplines.

d) **Indian Academy of Sciences (IAS) Repository:** open access to the academy's journals, including the Journal of Astrophysics and Astronomy, Journal of Biosciences, and Proceedings - Mathematical Sciences.

e) Indian Institute of Science (IISc) Eprints Repository:

f) Indian Institute of Technology (IIT) Delhi Open Access Repository

g) Indian Institute of Science Education and Research (IISER) Institutional Repository

h) Mahatma Gandhi University Online Theses Digital Library

i) The Tata Institute of Fundamental Research (TIFR) Publications Repository

4.1.5 MODELS OF OPEN ACCESS PUBLICATIONS

Green Open Access: Also known as self-archiving or repository-based open access, this model involves authors depositing a version of their manuscript (usually the preprint or postprint) into an institutional or disciplinary repository. This version is made freely accessible after an embargo period, during which access may be restricted to subscribers.

Gold Open Access: In this model, research articles are made freely available to readers immediately upon publication. Authors typically pay an article processing charge (APC) to cover the costs of publication. Journals employing this model often provide free and unrestricted access to articles, allowing for widespread dissemination of research findings.

Hybrid Open Access: It is a mix of subscription based and OA wherein some articles of a journal are free to access, and some are accessible on payment of subscription charges. Many Indian journals fall in Hybrid OA category. In such journals, authors have choice to make their articles as OA article or subscription-based article.

Diamond or Platinum Open Access: In these models, neither authors nor readers bear the cost of publication. Instead, funding for the publication process comes from institutions, libraries, or other sources. Journals operating under these models are entirely free to both authors and readers, and often rely on volunteer work or institutional support.

Bronze Open Access: This type of OAP charges nothing from the authors and is silent about the licensing policy. This category of articles is freely accessible at publisher's website but cannot be reused as it lacks Creative Commons License.

Delayed Open Access: Some journals provide free access to articles after an initial embargo period, during which access is restricted to subscribers.

Subscribe-to-Open (S2O): This emerging model involves subscription-based journals converting their entire content to open access if they receive enough support from subscribing institutions. This allows for the entire journal to become freely accessible without the need for article processing charges.

4.1.6 OPEN ACCESS INITIATIVES

Open Access initiatives aim to make scholarly research freely accessible to anyone, anywhere, without any barriers such as paywalls or subscription fees. Here are some key initiatives and movements in the Open Access space:

a) 2002 – 2003 Tools

- PubMed Central Launched.
- First Creative Commons Licenses released.
- Directory of Open Access Journal (DOAJ) released.

b) 2002 – 2003 Declarations

Budapest Open Access Initiative (BOAI):

- Launched in 2002.
- Emphasized Two modes of Open Access:
    - Open Access through Journals
    - Open Access through Repositories

Bethesda Statement on Open Access Publishing

- Launched in 2003.
- The declaration defines two conditions that publications must meet to be open access:
    - A free, irrevocable right to access and a licence to copy, use, distribute and make derivative works.
    - Deposit in an online repository ensuring open access, interoperability and long-time archiving.

Berlin OA Declaration

- Launched in 2003.
- Emphasized Internet as a functional instrument for a global scientific knowledge dissemination through OA.

c) 2005

- NIH Public Access Policy goes into effect: Scientists receiving NIH grants are asked to deposit in PubMed Central on a voluntary basis.
- Wellcome Trust implements Open Access mandate for Wellcome-funded research.
- Columbia University, University of Kansas, and Case Western Reserve, adopt statements in support of OA.

d) 2008

- Federal mandate takes effect requiring OA for NIH-funded research through deposit in PubMed Central
- Harvard mandates OA deposit of faculty scholarly works.

e) 2009

MIT mandates OA deposit of faculty scholarly works.

f) 2010 Onwards

Transformational changes in terms of

- Volume
- OA Publishing Models
- OA content aggregation and indexing
- OA discovery platforms
- OA publishing and archiving platforms
- OA national and institutional policies

4.1.7 FULL OPEN ACCESS JOURNAL V/S HYBRID JOURNALS

Aspect	Full Open Access Journals	Hybrid Journals
Access to Articles	All articles are freely accessible to readers without subscription or paywall barriers.	Only selected articles are freely accessible (those for which authors have opted for Open Access), while others are behind a paywall.
Business Model	Typically funded through article processing charges (APCs) paid by authors, institutional support, grants, or subsidies.	Subscription-based model, with authors having the option to pay an article processing charge (APC) to make their individual articles Open Access.
Copyright and Licensing	Authors usually retain copyright of their work, and articles are often published under licenses that allow for reuse and redistribution (e.g., Creative Commons licenses).	Copyright policies may vary, but authors may grant licenses allowing for Open Access to their articles while retaining copyright.
Sustainability	Sustainability depends on revenue from APCs, institutional support, grants, or subsidies.	Revenue is derived from both subscription fees and APCs, leading to concerns about "double-dipping."
Journal Type	Entire journal content is Open Access.	Only select articles are Open Access, while others are part of the subscription-based content.
Examples	PLOS ONE, BMC Public Health, DOAJ-listed journals.	Springer Open Choice, Wiley Online Open, Elsevier Open Access Journals.

4.2 SHERPA / RoMEO

- **Sherpa/RoMEO** is a helpful tool for academics and researchers. It's an online database that provides information about publishers' copyright and self-archiving policies.
- This resource assists scholars in understanding what rights they retain when it comes to sharing their research, particularly in terms of depositing their work in institutional or subject repositories.
- Sherpa (Securing a hybrid environment for research preservation and access) Romeo is an online resource that aggregates and analyses publisher open access policies from around the world and provides summaries of publisher copyright and open access archiving policies on a journal-by-journal basis.
- RoMEO's (Rights Metadata for Open archiving) own database covers around 22000 journals.
- Gives publication information such as Title, ISSNs, URL, Publishers.
- Gives information regarding publisher policy such as OA fee, OA publishing, Embargo, Licence, Copyright owner, Location and so on for Published, Accepted and Submitted versions.
- Sherpa/RoMEO categorizes publishers' policies into different colours to indicate what version of a manuscript can be archived, whether pre-print, post-print, or publisher's version/PDF. It's a valuable resource for navigating the often-complex landscape of academic publishing and copyright. RoMEO has other colours and descriptions for different conditions, such as Embargo, Paid Access, and Restricted Access.

Colour	Indicator
Green	Publishers allow authors to archive pre-print and post-print versions of their manuscripts.
Blue	Publishers allow authors to archive post-print versions of their manuscripts.
Yellow	Publishers allow authors to archive pre-print versions of their manuscripts.
White	Publishers allow authors to archive pre-print versions of their manuscripts.

Q) What is the significance of the data base RoMEO? Explain the indications of the green colour with

(i) Archive pre-print. (ii) Archive post-print. (iii) Publisher's version.

Answer:

The RoMEO (Rights Metadata for Open Access) database is significant for researchers and academics because it provides valuable information about publishers' copyright policies regarding self-archiving. Understanding these policies is crucial for authors who want to share their research openly while complying with publishers' requirements. Here's the significance of the green colour in the RoMEO database:

(i) Archive pre-print:

- Green colour with the indication "Archive pre-print" means that the publisher allows authors to deposit the pre-peer reviewed version of their manuscript in an institutional or subject repository before it undergoes formal peer review.
- This is significant because it allows researchers to share their initial findings and research outcomes with the academic community even before the peer review process is complete.
- It facilitates the rapid dissemination of research and fosters collaboration and feedback among scholars.

(ii) Archive post-print:

- Green colour with the indication "Archive post-print" means that the publisher allows authors to deposit the post-peer reviewed version (i.e., the final accepted manuscript after peer review but before typesetting by the publisher) in an institutional or subject repository.
- This is significant because it enables authors to share the finalized version of their work, including any revisions made based on peer review feedback, with the wider academic community.
- It promotes transparency and accessibility in scholarly communication by providing access to the most up-to-date and accurate research outputs.

(iii) Publisher's version:

- Green colour with the indication "Publisher's version" typically means that the publisher allows authors to archive the final published version of the article, often in PDF format, in an institutional or subject repository.
- This is significant because it enables researchers to make the version of record freely accessible to readers, enhancing the visibility and impact of their work.
- It promotes open access to scholarly literature and supports the principles of open science by removing barriers to accessing and using research outputs.

4.3 SOFTWARE TOOLS TO IDENTIFY PREDATORY JOURNALS

4.3.1 PREDATORY JOURNALS

- The term "**Predatory journals**" was coined by Jaffrey Beall.
- A predatory journal is a publication that prioritizes profit over academic quality. It typically accepts articles for publication without proper peer review, charges exorbitant fees, and lacks credibility within the academic community.
- Predatory Journals take advantage of authors by asking them to publish for a fee without providing peer-review or editing services.
- Exist solely for profit.
- The focus of predatory or fake journals is to mirror real journals sufficiently to confuse and attract young and inexperienced researchers to submit their manuscripts.
- Hijacked journals are duplicate or fake websites of legitimate ones utilizing the title, ISSN and other information of the reputable journal.

4.3.2 COMPLAINTS OF PREDATORY JOURNALS

- Their primary goal is to mint money.
- They do not care about the quality of the work published (no or little editing or peer-review process).
- They make false claims or promises (false claims of impact factors and indexing).
- They engage in unethical business practices (not as per advertisement).
- They fail to follow accepted standards or best practices of scholarly publishing.
- Predatory publisher exploits a new publishing model by claiming to be legitimate open access operation. Online predatory publishers take advantage of the Gold Open Access model.
- While sending a predatory publisher a manuscript may see it published there is no guarantee that it underwent peer review, is included in indexes like Web of Science and Scopus.
- A predatory journal is a publication that actively asks research scholars/authors for manuscripts without peer-review system or a proper editorial board and publishes bogus research unethically against some money.
- Predatory journals take advantage of authors by asking them to publish for a fee without providing peer-review or editing services.

4.3.3 POPULAR SOFTWARE TOOLS

- **DOAJ (Directory of Open Access Journals):** DOAJ maintains a whitelist of reputable open-access journals. While it doesn't directly identify predatory journals, being listed in DOAJ can indicate legitimacy.
- **Journal Quality List:** This list has been compiled by Dr. Anne-WillHarzing. It includes rankings according to various sources. This database can be consulted to check the quality of a journal in which the author is planning to submit the manuscript.
- **Cabell's Blacklist:** Cabell's Scholarly Analytics provides a blacklist of deceptive and predatory academic journals.
- **Think. Check. Submit.:** This is a campaign to help researchers identify trusted journals. They offer a checklist and resources to help researchers make informed decisions about where to publish.
- **COPE (Committee on Publication Ethics):** While not a tool per se, COPE provides guidelines and resources to help researchers identify predatory practices and maintain ethical standards in publishing.
- **Retraction Watch:** This website tracks retractions of scientific papers, which can sometimes be a sign of predatory or unethical publishing practices.
- **Journal Citation Reports (JCR) and Scopus:** While primarily used for assessing journal impact, these databases can also give insights into the legitimacy of a journal. Reputable journals are often indexed in these databases.
- **Predatory Journals Database by Stop Predatory Journals:** This database provides a list of suspected and confirmed predatory journals.
- **Web of Science:** This database has been developed by Clarivate Analytics which is a list of academic journals providing the information about impact factor of each. Thus, it can be used to ascertain the quality of journal.
- **Journal Citation Report:** Journal Citation Report has been developed by Clarivate Analytics and is integrated with WoS. This tool provides important information about the quality of registered journals which helps the authors to take decision while submitting the manuscripts.

4.3.4 UGC – CARE

UGC-CARE- A Quality Mandate for Indian Academia

To match global standards of high-quality research, in all academic disciplines under its purview, the University Grants Commission (UGC) aspires to stimulate and empower the Indian academia through its "Quality Mandate". A public notice was issued by the UGC, on the 28th of November 2018, to announce the establishment of a dedicated **Consortium for Academic and Research Ethics (CARE)** to carry out this mandate.

Objectives of the UGC-CARE

- To promote research quality research, academic integrity and publication ethics among Indian universities.
- To promote high quality publications in reputed journals that would achieve help in achieving global ranks.
- To develop an approach and methodology for identification of reputed journals.
- To prevent publications in predatory / dubious / sub-standard journals, which tarnish the image of Indian academia.
- To create and maintain "UGC-CARE Reference List of Quality Journals" for all academic purpose.

The Scope of the UGC-CARE List

- UGC-CARE has taken the responsibility of preparing the **"UGC-CARE Reference List of Quality Journals" (UGC-CARE List).**
- **UGC-CARE Group I**: A list of Indian journals, especially from disciplines of Arts, Humanities, Languages, Culture and Indian Knowledge Systems is being prepared and updated quarterly.
- **UGC-CARE List Group II**: The UGC-CARE List includes journals from all disciplines indexed in globally accepted databases, such as indexed in Scopus (Source list) or Web of Science (Arts and Humanities Citation Index Source Publication, Science Citation Index Expanded Source Publication, Social Science Citation Index Source Publication). These journals are to be considered for all academic purposes. Journals indexed in Scopus and / or Web of Science are part of UGC-CARE List Group II.

UGC Cell for Journal Analysis

- UGC has established a "**Cell for Journals Analysis**" at SPPU, Pune (UGC Cell, SPPU) at the Centre for Publication Ethics (CPE), Savitribai Phule Pune University (SPPU) to create and maintain the UGC-CARE List.
- INFLIBNET Centre, Gandhinagar, is serving as a supporting agency.

UGC-CARE List

The UGC-CARE List now has only TWO groups, instead of the original FOUR groups to simplify the search process. These are NOT hierarchic or ranked groups.

- **UGC-CARE List Group I:** Journals found qualified through UGC-CARE protocols.
- **UGC-CARE List Group II:** Journals indexed in globally recognised databases.

Updation of UGC-CARE List

The UGC-CARE List is dynamic. It shall be updated quarterly i.e. on the first of January, April, July, and October (or on the next working day if there is a public holiday on these dates) every year.

4.3.5 SOFTWARE TOOLS DEVELOPED BY SPPU

The **Centre for Publication Ethics (CPE)** is a full-fledged independent Centre of the **Savitribai Phule Pune University (SPPU)**, Pune, Maharashtra. The CPE affirms a deep commitment to ethics to achieve excellence in teaching, research, and publication.

Vision and Mission:

"Enhancing and propagating quality research and promoting ethical publishing practices among the faculty and research students."

Objectives:

- To maintain, update and strengthen the "Research Portal" at SPPU.
- To maintain and update UGC-CARE reference list of quality journals.
- To organize workshops, seminars and training programmes to generate awareness about publication ethics and research integrity.
- To undertake research projects, to develop e-learning modules and conduct courses on publication ethics.

RESEARCH PUBLICATIONS PORTAL BY SPPU

- Operation from 2016 under the aegis of Savithrabai Phule Pune University **(SPPU)**.
- Single point access to research publications of SPPU faculty.
- Accessible online at http://research.unipune.ac.in
- The data received from faculty and other reliable databases are updated on daily basis.
- Faculty upload bibliographic details via individual login and password access.
- Data is also collected and verified from various worldwide accredited databases.
- Email alerts have been created for new publications published by researchers.
- The research portal is dynamic resource for SPPU, the faculty, and the wider ecosystem of academicians and research.

UGC-CELL FOR JOURNALS ANALYSIS

- Operational since 2019, under the aegis of the University Grants Commission's Consortium for Academic and Research Ethics (CARE).
- The cell creates and maintains the UGC-CARE List, to promote quality research, academic integrity and publication ethics in Indian Universities.
- Accessible at https://ugccare.unipune.ac.in
- Data from designated UGC CARE committees, council members and universities are critically analysed, and cross verified prior to approval for listing under UGC CARE.
- The CARE-List is dynamic and is updated quarterly.
- The cell adopts various mechanisms to counteract the problem of predatory, dubious and sub-standard journals.
- The UGC-CARE List Group I is collated from Indian journals, and with special reference to Arts, Humanities, Languages, Culture and Indian Knowledge Systems.
- The UGC-CARE List Group II is developed from all disciplines indexed in globally accredited databases.
- The first UGC-CARE List was published on 14th June 2019.

4.4 JOURNAL FINDER / SUGGESION TOOLS

- Once the author is ready with the manuscript, the major challenge ahead is to publish the manuscript in the right journal in stipulated time. The common problem faced by all authors is to find the right journal. Every author wants his article to be read by many readers to increase the citation. Journal finder tools are used to resolve this problem.
- Journal finder tools help a researcher in locating the best suited journal for publishing his/ her research work.
- Journal finder identifies highly ranked journals based on some standard metrics such as Scopus or Journal Citation Reports (JCR)

4.4.1 FACTORS FOR SELECTING A JOURNAL

- **Identify relevant Journals.**
  - Look for journals that regularly publish articles on topics related to your research. The manuscript should be published in the journal that suits your research domain.
  - You can use academic databases, such as PubMed, Scopus, Web of Science, or Google Scholar, to search for journals in your field.
- **Consult Colleagues and Mentors**

  Seek advice from colleagues, mentors, or your research advisor who are familiar with your field. They may have insights into which journals are most respected or suitable for your work.
- **Check Previous Publications**

  Look at the recent articles published in your shortlisted journals to see if they are similar in topic, methodology, or scope to your own research. This can give you an idea of whether your work would be a good fit.
- **Determine the reputation and impact factor of Journal.**

  Impact factor, journal rank, article influence, and h-index are used to determine the journal impact factor. Journals with higher impact factors generally have a greater reach and influence in the academic community.
- **Open Access Options:** Consider whether you want to publish in an open access journal or a traditional subscription-based journal. Open access

journals can increase the accessibility and visibility of your research but may have publication fees.

- **Acceptance Rate:**

  The acceptance rate of a journal refers to the percentage of submitted manuscripts that are ultimately accepted for publication after undergoing the peer review process.
- **Review Journal Guidelines:** Review the author guidelines and scope of each journal to ensure that your article aligns with their requirements and fits within their scope.
- **Time of Publication:**

  The time to publication, also known as the publication timeline, refers to the duration between submitting a manuscript to a journal and its eventual publication. This timeline can vary significantly depending on several factors such as journal policies, peer review process, manuscript preparation etc.
- Check if it is listed in UGC-CARE reference list of journal. Check the quartile index of the journal as per the policies of universities where you are conducting the research.

4.4.2 ONLINE JOURNAL SELECTION TOOLS

Journal Finder Tools:

- These tools help researchers identify potential journals where they can submit their manuscripts based on specific criteria such as subject area, keywords, publication scope, and manuscript type.
- They often provide a searchable database of journals along with filters to narrow down the options.
- Examples of journal finder tools include Elsevier's Journal Finder, Springer's Journal Suggester, and Sherpa/RoMEO.

Journal Reviewing Tools:

- Journal reviewing tools, on the other hand, aid researchers and academics in evaluating the quality and credibility of journals.
- They may provide information on factors such as journal impact factor, peer-review process, publication ethics, indexing databases, and editorial board members.

- These tools help researchers make informed decisions about which journals are reputable and appropriate for publishing their work.
- Examples of journal reviewing tools include Scopus, Web of Science, PubMed, and Cabells Scholarly Analytics.

4.4.3 JANE (JOURNAL AUTHOR NAME ESTIMATOR)

- **The Journal Author Name Estimator (JANE)** is a tool designed to help researchers identify potential journals for their manuscripts. By inputting the title and abstract of a paper, JANE suggests relevant journals based on similarity to other articles indexed in PubMed. It's a useful resource for researchers seeking the right publication venue for their work.
- Accessible online at https://jane.biosemantics.org/
- Steps to find the journal.
    - Copy the abstract or title of the manuscript.
    - Click on “Find Journals” to find potential journals.
    - Click on “Find authors” to find list of authors with similar articles.
    - Click on “Find articles” to find similar articles.
- Research can further refine with extra filters provided.
    - Language – Choose your preferred language.
    - Open access options: Three options are available.
        a) No preference
        b) Search only in open access journals.
        c) Exclude open access journals.
    - Select publication type.

      Example: Clinical trial, Case study, Journal article, evaluation studies etc.
    - Included journals in PubMed Central? Four options are available.
        a) No preference.
        b) Only journals with immediate access.
        c) Only journals with maximum access delay of 12 months.
        d) Only journals in PubMed Central.
- **Keyword Search**

  Instead of using a title or abstract, you can also search using a keyword search, like popular web search engines.

4.4.4 ELSEVIER JOURNAL FINDER

- **Elsevier Journal Finder** is a tool that uses a **machine learning algorithm** to recommend Elsevier journals that match the scope of your manuscript.
- Accessible online at http://journalfinder.elsevier.com
- Two ways to find the Journal.
  - Match my abstract is designed to suggest journals which have published articles with content like your manuscript.
  - Search by keywords or journal title is designed to discover journals in your field of research.
- Journal Finder can be used without creating an Elsevier account.
- Researchers can create Elsevier account and save relevant journals.
- Researchers can also check whether they are eligible for OA savings by clicking on the option "Check if you're eligible for Open Access (OA) savings".
- If the journal is discontinued, it will be mentioned as discontinued journals in the search result. It's no longer possible to submit your manuscript to this journal. Readers can still access historic content via ScienceDirect as per the journal's access requirements.
- **Steps for finding the list of relevant journals.**

a) Copy the abstract or enter the keywords or title and click on find journals.

b) List of suggested journals are displayed. Suggested journals are ranked in order of relevancy, using a scoring system to match the text you entered.

c) The search results can be sorted as per Best match, Journal name, Cite Score, Impact Factor, Acceptance Rate, Time to 1st Publication and Time to 2nd Publication.

d) Metrics of each journal is displayed as below.

Cite Score	Impact Factor	Acceptance Rate	Time to 1st decision	Time to publication
19.0	8.7	8%	4 Weeks	8 Weeks

e) Other details which are displayed are open access or subscription type, subject area, related recent articles, journal scope, benefits to authors and CAS journal ranking.

f) More filtering options provided on the left pane as adjustable slider search.

(i) Publication Type: Journals that offer gold OA or Journals with subscription.
(ii) Cite Score Range: 0 to 10+
(iii) Impact Factor: 0 to 10+
(iv) Time to 1st decision: 0 to 52+ weeks.
(v) Time to publication: 0 to 52+ weeks.

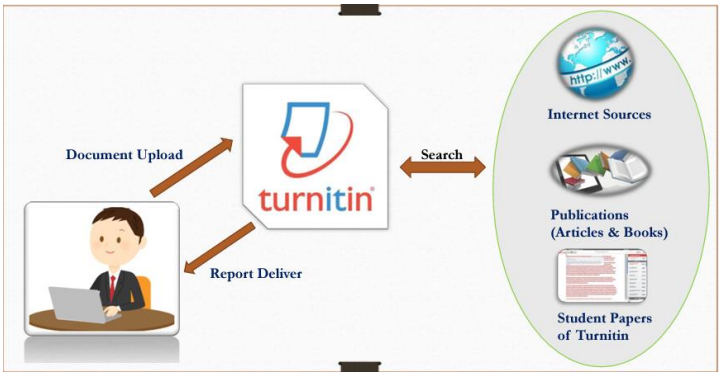
4.4.5 SPRINGER JOURNAL SUGGESTER

- Accessible online at http://journalsuggester.springer.com
- Two options are provided.
  - Browse our A-Z list of journals from Springer and BMC.
  - Search by keywords across all Springer Journals.

- **To find a journal using the Springer Journal Suggester:**
  a) **Access the Tool:** Visit the Springer Journal Suggester webpage. You can typically find this tool on the Springer website or through a search engine.
  b) **Enter Keywords or Abstract:** Input keywords related to your research topic or paste your abstract into the designated search bar.
  c) **Receive Recommendations:** After entering your keywords or abstract, the tool will generate a list of suggested Springer journals that closely match your research.
  d) **Review Recommendations:** Carefully review the list of suggested journals. Each suggestion should include information about the journal's focus, scope, and audience.
  e) **Select a Journal:** Based on the recommendations provided, select the journal that best fits the topic and scope of your research.
  f) **Submit Your Manuscript:** Once you've chosen a journal, visit the journal's website to learn more about its submission process and guidelines. Follow the instructions to submit your manuscript for consideration.

4.5 SOFTWARE TOOLS

4.5.1 TURNITIN



4.5.1.1 INTRODUCTION

- Turnitin is a web-based plagiarism detection software provided by www.turnitin.com
- Turnitin is a tool to find and indicate the matching content.
- Turnitin's Plagiarism prevention tool generates reports that show how much of a document is original, cited from other sources and unoriginal.
- It helps students to identify their mistakes or weaknesses in citations 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.

4.5.1.2 TURNITIN COVERAGES

Turnitin primarily relies on two major databases:

a) **Internet Sources:** Turnitin scans a vast array of websites, including both publicly accessible web pages and subscription-based content. This database encompasses a wide range of online sources, from academic journals and articles to blogs, forums, and websites of various institutions and organizations.

b) **Repository of Previously Submitted Papers:** Turnitin maintains a repository of previously submitted papers from students and academic institutions around the world. This database allows Turnitin to compare newly submitted documents against a large collection of existing works to identify similarities and potential instances of plagiarism.

4.5.1.3 TURNITIN FEATURES

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

4.5.1.4 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

4.5.1.5 TURNITIN SUBSCRIPTION

1) **Consortium**

   A top-level account containing several institutional accounts for clients with multiple locations which may be geographically separated.

2) **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.

3) **Department**

   This account type can only allow individual instructor accounts to be created as subaccounts.

4) **Individual**

   A single user Turnitin account. Only a single instructor profile can be joined to an individual account.

4.5.1.6 TURNITIN ACCESS LEVELS

1) **Administrator –** Administrators can create instructors and download the usage statistics report of Turnitin account.
2) **Instructor –** instructors can create classes, assignment, add students, filter settings, and exclude matching sources in the report.
3) **Student –** Student can upload a paper in the assigned class and download originality report.

4.5.1.7 TURNITIN REPOSITORY OPTIONS

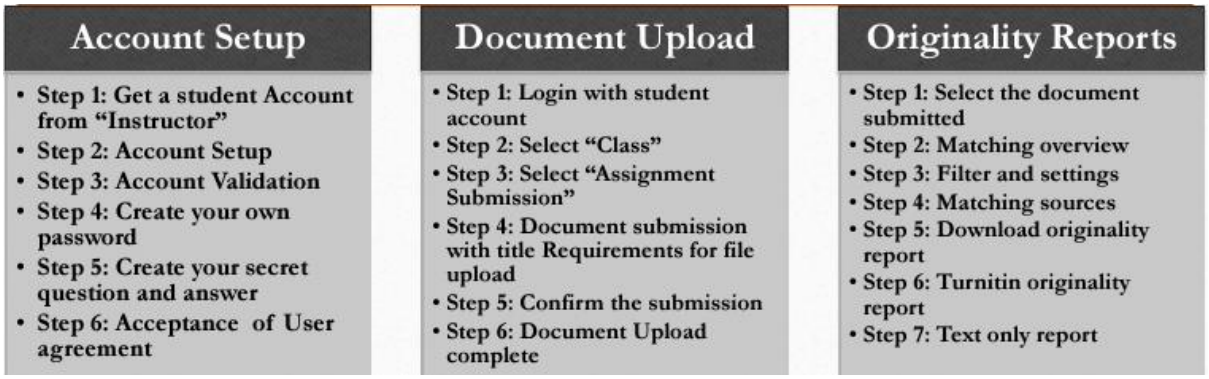
a) No Repository

- 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 of the same or different institutions.

b) 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.

4.5.1.8 TURNITIN PROCESS



4.5.1.9 REMOVING PAPER FROM TURNITIN REPOSITORY

- 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 the administrator provides these.
    - 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.

4.5.2 URKUND

4.5.2.1 INTRODUCTION

- **Urkund** is an automated text-matching software used to prevent and detect plagiarism**.**
- **URKUND** is a completely automated system against plagiarism (Anti-plagiarism software) and is being successfully used at universities and colleges all around the world.
- **URKUND's system** checks all documents against three central source areas:
  - **a)** The Internet
  - **b)** Published material such as Journals, Books etc.
  - **c)** Previously submitted student material (e.g. memoranda, case studies and examination work)

4.5.2.2 HOW URKUND WORKS?

- **URKUND** never determines what a plagiarism is, but **Urkund** compares textual similarity and subject similarity.
- The reports generated by **Urkund** to your teachers consist, in the event of its finding similarities, of a text comparison.
- **Urkund** marks your document that are like other sources, in URKUND's archives, on the Internet and in published material, and give the teacher access to the original material where **Urkund** have found the similarity.

4.5.2.3 FILE FORMATS SUPPORTED BY URKUND

.doc, .docx, .ppt, .pptx, .pdf, .txt, .rtf, .html, .htm, .wps, .odt, .sxw, .zip

4.5.2.4 DOCUMENT LIMIT TO BE UPLOADED

Every document submitted for plagiarism check will be treated as a separate document. Documents containing more than400,000 characters will be considered as more than one document.

4.5.2.5 URKUND PROCESS

1) **Submission:** Users (usually students or researchers) submit their documents through the Urkund system. This can be done through various platforms such as email, a web interface, or integration with learning management systems.

2) **Document Analysis:** Once the document is submitted, Urkund analyses it by comparing the text against its extensive database, which includes academic papers, journals, websites, and other sources. It checks for similarities in the text that may indicate plagiarism.

3) **Plagiarism Detection:** Urkund generates a report highlighting any matches found between the submitted document and the sources in its database. It typically categorizes the matches based on the level of similarity and provides a percentage of the document that matches existing sources.

4) **Report Generation:** Urkund generates a detailed report that summarizes the findings of the plagiarism detection process. This report is usually accessible to both the user who submitted the document and the relevant instructors or administrators.

5) **Review and Action:** Users and instructors review the Urkund report to determine the extent of any potential plagiarism and decide on appropriate actions. This may include providing feedback to the user, issuing warnings or penalties for academic dishonesty, or taking other disciplinary measures as per institutional policies.

6) **Educational Use:** Urkund reports can also serve an educational purpose by helping users understand the importance of academic integrity and proper citation practices. Instructors may use the reports to teach students about plagiarism and how to avoid it in their future work.

Overall, the Urkund process aims to uphold academic integrity by detecting and addressing instances of plagiarism while also promoting a culture of originality and responsible scholarship.

VTU PREVIOUS YEAR QUESTIONS

Aug. 2023

1) What is Open Access publishing? Explain the online resource to check publisher copyright and self-archiving policies. (20 M)
2) Explain journal finder and journal suggestion tools in research publication. (20 M)

Dec. 2022

1) Discuss the Database Romeo which helps to Check publisher copyright and Self – archiving policies. (07 Marks)
2) Mention the characteristics of Open Access Journals. (07 Marks)
3) What are the complaints of Predatory publications? (06 Marks)
4) What are Open Access Journals? Explain the difference between Full Open Access Journals and Hybrid Journals. (07 Marks)
5) Define Plagiarism. Explain the functioning of URKUND and TURNITIN. (07 Marks)
6) Write a note on Journal finder, Elsevier Journal finder. (06 Marks)

Oct / Nov. 2021

1) What are open access journals? Explain the difference between full open access journals and hybrid journals. [10 M]
2) Define plagiarism. Explain the functioning of (i) URKUND (ii) TURNITIN.
3) What are the most common complaints of predatory publications?
4) What is the significance of the data base RoMEO? Explain the indications of the green colour with
    (ii) Archive pre-print.
    (iii) Archive post-print.
    (iv) Publisher's version.

5.0 MODULE – 05

5.1 INDEXING DATABASES

5.1.1 INTRODUCTION

- **Indexing** is the process of creating indexes for record collections.
- The function of an index is to give users systematic and effective shortcuts to the information needed.
- Having indexes allows researchers to find records more quickly for specific individuals; without them, researchers might have to look through hundreds or thousands of records to locate an individual record.
- It also represents a number referring to a list of terms, definitions, topics etc. arranged in alphabetical order to efficiently guide the readers to the desired information within the content.
- Indexing facilitates the organization of literature in such a manner that makes the document of interest easily identifiable by the readers.

5.1.2 HOW INDEXING IS DONE?

- The indexer usually receives a set of page proofs for the journal at the time of final proof reading.
- The indexer requires page proofs to make list of heading, sub-headings and list of pertinent information.
- After completion of the rough index, it is edited for structure, clarity and consistency, formatted to specifications, proofread and submitted to the client as final soft copy.
- The time period for indexing depends on the length of manuscript. The more the content of the manuscript, the more time it will take to be indexed.

5.1.3 BENEFITS OF INDEXING

- Researchers gain access to the most recent literature, even if it has not been indexed by other sources.
- Automatic set-up of holdings means zero administration.
- Faster results with fewer headaches through automatic e-journal results included with every database search.
- Keeps user on top of their areas of interest with a single place to manage journal alerts and search alerts.

5.1.4 CHALLENGES IN INDEXING

- Sometimes using truncation or limiters can disable other search features, depending on the database.
- Database access is not free and usually requires subscription or affiliation to an institution.
- A simple keyword search may provide too many results that may not be relevant to the researcher.
- Sometimes using truncation or limiters can disable other search features, depending on the database.

5.1.5 STEPS INVOLVED IN INDEXING JOURNAL DATABASES

a) Data Collection

Gather articles from various journals that are to be indexed.

b) Metadata Extraction

Extract relevant metadata from the articles include author names, title, abstracts, keywords, data of publication and other pertinent information.

c) Standardization

Standardize the metadata format to ensure consistency across all indexed articles.

d) Quality Control

Check the extracted metadata for accuracy and completeness. This may involve manual review or automated checks to identify errors or missing information.

e) Indexing

Add the indexed articles and their metadata to the database, making them searchable using various search criteria such as author names, keywords, publication dates, and subject categories.

f) Updates

Regularly update the database to include new articles and ensure that existing metadata remains accurate and up-to-date.

5.1.6 WELL KNOWN INDEXING DATABASES

1) **IEEE Xplore:** This database is particularly focused on engineering and technology literature, providing access to journals, conference proceedings, and standards published by the Institute of Electrical and Electronics Engineers (IEEE) and its partners.

2) **Scopus:** Scopus is a comprehensive abstract and citation database covering a wide range of disciplines, including science, technology, medicine, social sciences, and arts and humanities. It is developed by Elsevier.

3) **Web of Science:** Produced by Clarivate Analytics, Web of Science is a multidisciplinary citation database that covers thousands of scholarly journals across various disciplines. It includes the Science Citation Index Expanded, Social Sciences Citation Index, Arts & Humanities Citation Index, and other citation indexes.

4) **Google Scholar:** While not a traditional indexing database, Google Scholar provides a freely accessible web search engine that indexes the full text or metadata of scholarly literature across an array of disciplines.

5) **PubMed:** Developed and maintained by the National Center for Biotechnology Information (NCBI), PubMed is a free search engine accessing primarily the MEDLINE database of references and abstracts on life sciences and biomedical topics.

6) **Directory of Open Access Journals(DOAJ):** DOAJ indexes open-access journals from around the world.

7) **Indian Citation Index (ICI):** Indian Citation Index is a multidisciplinary indexing database covering scholarly literature from Indian journals.

8) **UGC-CARE List:** The UGC-CARE list includes a selection of quality journals across disciplines.

5.2 CITATION DATABASES

5.2.1 INTRODUCTION

5.2.1.1 CONCEPT OF CITATION

- "A **Citation** is formal reference to source of information that is used in academic or scholarly writing to acknowledge the source of ideas, data, quotations, arguments presented in a paper or research work."
- A formal reference to a published or unpublished source that you consulted and obtained information from while writing your research paper.
- Citation means when one paper explicitly refers to another paper with reference given in bibliography.
- Major performance indicator: Reflects Impact and quality of research.
- Symbolizes conceptual association of scientific ideas.
- Citation: Author's name, date of publication, title of the work being cited, title of the journal, vol and issue numbers, page numbers, DOI etc.

5.2.1.2 IMPORTANCE OF CITATION

a) **Credit and Recognition:** Citations give credit to the original authors and creators of ideas, data, and concepts.

b) **Transparency and Accountability:** Citations provide transparency by allowing readers to trace the origins of information and verify the accuracy and credibility of the sources used.

c) **Avoiding Plagiarism:** Proper citation helps authors avoid plagiarism.

d) **Contextualization and Further Exploration:** Citations enable readers to explore the topic further by providing references to relevant sources.

e) **Building on Existing Knowledge:** By referencing previous research, authors demonstrate how their work contributes to, builds upon, or diverges from existing knowledge in the field.

f) **Peer Review and Evaluation:** Citations allow peer reviewers and readers to evaluate the quality and validity of the research by assessing the sources cited.

g) **Promoting Dialogue and Collaboration:** Citations facilitate scholarly dialogue and collaboration by connecting researchers with related studies and providing a foundation for further discussion, debate, and collaboration within the academic community.

5.2.1.3 SELF CITATION

- **Self-citation** occurs when an author cites their own previously published work within a new publication. It is a common practice in academic writing, especially when the author's earlier work is directly relevant to the current research or provides foundational knowledge for the new study.
- Self-citations serve several purposes:
    - Providing Context and Background.
    - Acknowledging Previous Contributions.
    - Building on Previous Research.
    - Supporting Arguments or Claims.
- Self-citation rate:

$$\text{Self Citation Rate} = \frac{\text{No. of self} - \text{citations}}{\text{Total number of citations}} \text{ x } 100$$

5.2.1.4 CITATION TOOLS

Citation tools are software applications or online platforms designed to help researchers and writers properly cite their sources. They often provide functionalities such as generating citations in various formats (e.g., APA, MLA, Chicago), organizing references, and managing bibliographies. Some popular citation tools include:

a) **Mendeley:** Another popular citation manager that offers both a desktop application and a web-based version.

b) **Zotero:** A free, open-source citation management tool that allows users to collect, organize, cite, and share research sources.

c) **BibTeX:** A reference management software package used in LaTeX documents, commonly used in academia for typesetting documents with complex bibliographies.

d) **EndNote:** Widely used in academic and research institutions, EndNote helps users search online databases, organize references, and create bibliographies.

e) **RefWorks:** A web-based citation manager that facilitates citation creation, reference organization, and collaboration among researchers.

5.2.2 CITATION DATABASES

Citation databases are collections of referenced papers/ articles/ books and other material entered into an online system (database) in a structured and consistent way.

5.2.2.1 SCOPUS

- Scopus-Elsevier is a source-neutral abstract and citation database which was launched in 2004.
- Content: Health Sciences, Life Sciences, Physical Sciences, Social Sciences.
- Peer reviewed journals, book series, trade publications.
- All journals covered in Scopus database are reviewed each year to ensure high quality standards.
- Scopus gives 4 types of quality measure:
    - h-index
    - CiteScore
    - SJR (SCImago Journal rank)
    - SNIP (Source Normalized Impact per Paper)

5.2.2.2 WEB OF SCIENCE (WoS)

- Global citation database; World's first citation index.
- Developed by Clarivate Analytics, Web of Science is one of the most comprehensive citation databases covering various disciplines, including science, social sciences, arts, and humanities.
- WoS core collection consists of 4 online databases:
    - SCIE (Science citation index expanded)
    - SSCI (Social sciences citation index)
    - AHCI (Arts & Humanities citation index)
    - ESCI (Emerging sources citation index)
- Some of the salient features of this database are:
    - High quality content
    - Multidisciplinary coverage
    - Advanced Search and Filtering
    - Citation Analysis Tool
    - Integration with Other Clarivate Analytics Products

5.2.2.3 GOOGLE SCHOLAR

- Google scholar citations is free of charge.
- Provides information about citations of authors by tracking online journals, book chapters, conference papers, web pages and so on
- Easy to set up if one has an existing google account.
- Tracks academic articles, thesis, book titles towards citation metrics.
- Helps in locating relevant data for researchers in a scientific way via advanced search option.
- Provides in-depth details pertaining to a document.
- Individual scholar can also set up his/ her own Google scholar profile.
- Limitation: Fails to recognize and exclude predatory sources.

5.2.2.4 CITESEER

- **Citeseer**, also known as **CiteSeerX**, is a digital library and search engine for academic and scientific literature, primarily focusing on computer and information science.
- It indexes articles from various sources, including conference papers, journal articles, and technical reports.
- **CiteseerX** provides access to a large collection of freely available scholarly documents and offers features such as citation analysis and search capabilities.
- One of the distinguishing features of **Citeseer** is its autonomous citation indexing system, which automatically indexes and extracts citations from documents. This allows users to discover related works and track citation patterns within the literature.
- CiteseerX aims to facilitate the dissemination and discovery of academic literature in the field of computer science and related disciplines. It provides researchers, students, and practitioners with access to a vast repository of scholarly publications and offers tools to explore and analyze academic content.

5.2.3 COMPARSION OF CITATION DATABASES

Characteristics	Scopus	WoS	Google Scholar
Year of official inauguration	2004	2004	2004
Developer	Elsevier	Clarivate Analytics	Google Inc.
No. of journals	21000	8700	No data
Languages	English + 30	English + 45	English plus any language
Focus Content	Physical Sciences, Health Sciences, Social Sciences, Life Sciences	Science, Technology, Social Science, Arts & Humanities	Biology, Engineering, Social Sciences, Arts & Humanities, Chemistry, Business, Administration, Finance & Economics
Period Covered	1996 – present	1900 – present	Theoretically covers all which is available electronically.
Abstract	(+)	(+)	(+)
Authors	(+)	(+)	(+)
Citations	(+)	(+)	(+)
Patents	(+)	(+)	(-)
Updating	1 – 2 times weekly	Weekly	Monthly
Databases covered	Medline, Embase, Geobase, Biobase	SCIE, SSCI, AHCI, ESCI	PubMed, OCLC first search

5.3 RESEARCH METRICS

5.3.1 JOURNAL LEVEL METRICS

Journal level metrics refer to various quantitative measures used to evaluate the performance and impact of academic journals within a particular field. These metrics are useful for researchers, institutions and publishers to access the quality and significance of scholarly publications.

5.3.1.1 IMPACT FACTOR (IF)

- Measures the average number of citations received per paper published in a particular journal during the preceding two years.

- **Frequency of calculation** - Updated annually.

- **Calculation Period** – Based on citations from the previous 2 years to articles published in the last 2 years.

- Developed by **Clarivate Analytics**.

- Covers journals covered in WoS and not inherently field normalized.

- **Impact Factor (IF) Calculation**

$$\text{IF} = \frac{\text{No. of citations in the current year to articles published in previous 2 years}}{\text{Total number of articles published in those 2 years}}$$

- **Example:**

  If a Journal published 100 articles in 2020 and 2021, and those articles received a total of 500 citations in 2022, then the Impact Factor would be:

$$\text{Impact Factor (IF)} = \frac{500}{100} = 5$$

  So, the Impact Factor of Journal would be 5.

- Journals with higher Impact Factors are considered more prestigious and influential.

5.3.1.2 SOURCE NORMALIZED IMPACT PER PAPER (SNIP)

- **Source Normalized Impact per Paper (SNIP)** is a metric used to measure the impact of a scholarly journal by considering the citation patterns within its subject field.

- Makes cross-discipline comparisons easier between journals.

- Published twice a year and looks at a 3-year period.

- In SNIP citation in a field with higher citation rates will have more weight than a citation in a field with lower citation rates.

- SNIP Calculation

$$\textbf{SNIP} = \frac{\textbf{Citations of a journal}}{\textbf{Citation potential in subject field}}$$

Where,

Citations of a journal = Total number of citations received by papers published in the journal over a specific period.

Citation potential in subject field = Average number of citations received by papers in the subject field over the same period.

- **Example:**

Consider a journal by name “Journal of Image Processing” for which SNIP for 2023 needs to be calculated.

Let average number of citations received by papers in the subject field for the year 2023 is 5.

Let the total number of citations for the year 2023 be 500.

$$\text{SNIP} = \frac{500}{5} = 100$$

The SNIP is then normalized by dividing it by the citation potential of all papers in the subject field.

5.3.1.3 SCIMAGO JOURNAL RANK (SJR)

- **SCImago Journal Rank (SJR)** is a metric developed by **SCImago Lab** that evaluates the quality and prestige of academic journals based on citation data from the Scopus database.
- The calculation of SJR involves a complex algorithm that considers not only the number of citations received by a journal but also the quality of the journals citing it.
- Journals cited by highly ranked journals will receive a higher SJR score than those cited by lower-ranked journals. This makes SJR a more sophisticated metric for evaluating the significance and influence of academic journals in their respective fields.
- **SJR Calculation:**

$$SJR \text{ of Current Year} = \frac{\text{Average number of weigher citations in a given year}}{\text{No. of articles published in previous 3 years}}$$

5.3.1.4 IMPACT PER PUBLICATION (IPP)

- Impact per Publication (IPP) is another metric developed by SCImago Lab that measures the average number of citations received by papers published in a particular journal within a specific time limit.
- **IPP Calculation:**

$$\mathbf{IPP} = \frac{\mathbf{Total\ Citations}}{\mathbf{Total\ Publications}}$$

Where,

Total Citations is the total number of citations received by papers published in the journal during the calculation period.

Total Publications is the total number of papers published by the journal during the same calculation period.

- **Example:**

Let's say the total number of citations received by articles published in the journal during 2021, 2022 and 2023 is 1500.

Let us say the journal published a total of 500 papers during 2021, 2022, 2023.

$$\text{IPP} = \frac{\text{Total Citations}}{\text{Total Publications}} = \frac{1500}{500} = 3$$

5.3.1.5 CITE SCORE

- CiteScore calculates the average citations per document in a specific year to items published in the previous three years.
- It is developed by Elsevier and updated annually.
- Calculation Period - Based on citations from the previous 3 years to articles published in the last 3 years.
- Covers journals indexed in Scopus & available freely to anyone to access.
- Field-Normalized to ensure fair comparisons across different disciplines.
- **CiteScore Calculation**

$$\textbf{CiteScore} = \frac{\textbf{A}}{\textbf{B}}$$

Where,

A = Citations received by a journal in one year to documents published in the three previous years.

B = Number of documents indexed in Scopus published in those same three years.

- **Example:**

In 2023, a journal received 500 citations to articles published in 2020, 600 citations to articles published in 2021 and 700 citations to articles published in 2022.

In 2023 the journal published 50 articles.

Therefore, Sum of citations received in 2023: 500 + 600 + 700 = 1800

$$\textbf{Therefore, CiteScore} = \frac{\textbf{1800}}{\textbf{50}} = \textbf{36}$$

So, the CiteScore for Journal for the year 2023 would be 36.

5.3.1.6 CITE SCORE V/S IMPACT FACTOR

Criteria	CiteScore	Impact Factor
Definition	Calculates the average citations per document in a specific year to items published in the previous three years.	Measures the average number of citations received per paper published in a particular journal during the preceding two years.
Source	Developed by Elsevier.	Developed by Clarivate Analytics.
Frequency	Updated Annually	Updated Annually
Calculation Period	Based on citations from the previous 3 years to articles published in the last 3 years.	Based on citations from the previous 2 years to articles published in the last 2 years.
Coverage	Covers journals indexed in Scopus.	Covers journals indexed in Web of Science (WoS).
Transparency	Methodology publicly available.	Methodology publicly available.
Accessibility	Available freely for anyone to access.	Often requires a subscription or institutional access.
Field Normalization	Field-Normalized to ensure fair comparisons across different disciplines.	Not inherently field-normalized.
Consistency	More stable over time due to a longer citation window and broader coverage.	Can be more volatile due to a shorter citation window and narrower coverage.
Criticism	Some critics argue it may inflate scores due to self-citations and citations from predatory journals.	Criticized for favouring journals in fields with higher citation rates and being susceptible to manipulation.

5.3.2 AUTHOR LEVEL METRICS

5.3.2.1 h-index

- Introduced by Jorge Hirsch in 2005; also known as **Hirsch index** or **Hirsch number**.

- The h-index is a metric used to measure the productivity and impact of researcher/s work. It is based on number of citations received by their publications.

- An author with **h-index 'h'** means that a researcher has published **'h' papers** that have been **cited at least 'h' times**. Therefore,

  h-index = No. of publications (h) with a citation number greater than or equal to 'h.'

- For instance, an h-index of 17 means that the scientist has published at least 17 papers that have each been cited at least 17 times. If the scientist's 18th most cited publication were cited only 10 times, the h-index would remain at 17. If the scientist's 18th most cited publication were cited 18 or more times, the h-index would rise to 18.

- Example:

Paper ID	Rank	Citations
Paper 01	1	25
Paper 02	2	20
Paper 03	3	15
Paper 04	4	10
Paper 05	5	8
Paper 06	**6**	**6**
Paper 07	7	4
Paper 08	8	2
Paper 09	9	1
Paper 10	10	0

  For Paper 07, number of publication < number of citations.

  Hence h-index = 6

- **Advantages of h-index:**
  - Simple and easy to understand.
  - **Combines Quantity and Quality:** Unlike simple citation counts, the h-index considers both the number of publications and the number of citations each publication receives.
  - **Stability:** The h-index tends to be stable over time, as it is less sensitive to sudden changes in citation counts compared to other metrics.
  - **Comparison Across Disciplines:** Allows for direct comparisons within disciplines.

- **Disadvantages of h-index:**
  - **Not Comprehensive:** The h-index is just one of many metrics used to evaluate research impact. It does not capture other important factors such as the significance of individual publications, the researcher's role in collaborative work,
  - **Sensitive to Career Stage:** Early-career researchers may have lower h-index scores simply because they have not had as much time to accumulate citations. Similarly, late-career researchers may have inflated scores due to the cumulative impact of their earlier work.
  - **Manipulable:** The h-index can be manipulated by strategic publishing or self-citation practices.
  - **Ignores Citation Context:** The h-index treats all citations as equal, regardless of whether they come from highly influential sources or less reputable ones.
  - **Discipline Bias:** Citation practices vary widely across different fields, so the meaning of a particular h-index score can differ significantly depending on the discipline. This makes it difficult to compare researchers across disciplines.

5.3.2.2 g-index

- Suggested by Leo Egghe in 2006.
- The g-index is calculated by first arranging a researcher's publications in descending order of the number of citations they have received. Then, the g-index is the highest number such that the top g articles together have received at least g^2 citations.
- Hence, a g-index of 10 indicates that the top 10 publications of an author have been cited at least 100 times.
- **Example:**

Paper ID	Rank	Citations	Add up Citations	Square of Rank (g^2)	Sum of citations $\geq g^2$
Paper 01	1	25	25	1	Yes
Paper 02	2	20	45	4	Yes
Paper 03	3	15	60	9	Yes
Paper 04	4	10	70	16	Yes
Paper 05	5	8	78	25	Yes
Paper 06	6	6	84	36	Yes
Paper 07	7	4	88	49	Yes
Paper 08	8	2	90	64	Yes
Paper 09	**9**	**1**	**91**	**81**	**Yes**
Paper 10	10	0	91	100	No

Hence g-index = 9

- **Advantages of g-index:**
  - Accounts for the performance of author's top articles.
  - Helps to make difference between author's respective impacts.
  - The inflated values of g-index help to give credit to low cited or non-cited papers while giving credit for highly cited papers.
- **Disadvantages of g-index:**
  - Introduced in 2006 and the debate continues whether g-index is superior to h-index. It is not widely accepted as h-index.
  - The g-index gives more weight to highly cited articles.
  - Someone's g-index will always be equal or greater than the h-index.

5.3.2.3 i-10 index

- Created by Google Scholar and used only in Google's My Citations feature.
- **i-10 index =** number of publications that have gained at least 10 citations each.
- For instance, an **i-10 index of 20** means that the researcher has at least 20 publications that have been cited at least 10 times each.
- Example:

Paper ID	Rank	Citations
Paper 01	1	25
Paper 02	2	20
Paper 03	3	15
Paper 04	4	10
Paper 05	5	8
Paper 06	6	6
Paper 07	7	4
Paper 08	8	2
Paper 09	9	1
Paper 10	10	0

In the table given, four papers have citations greater than or equal to 10. Hence i10-index = 4.

- **Advantages of i10-index:**
  - Simple and straightforward to calculate and understand.
  - My citations in Google Scholar are free and easy to use.
  - By considering only papers with at least 10 citations, the I-10 index emphasizes the impact of a researcher's work rather than just the number of publications.
  - It provides a quick snapshot of a researcher's impact without requiring detailed analysis of individual citations or publication lists.
- **Disadvantages of i10-index:**
  - Used only in Google Scholar.
  - The i-10 index only counts papers with at least 10 citations, which might penalize researchers in fields where citation counts tend to be lower. It can disadvantage early-career researchers.

- By focusing only on papers with 10 or more citations, the I-10 index ignores the impact of papers with fewer citations, potentially overlooking valuable contributions.
- Manipulable: As with any metric, the I-10 index can be manipulated by strategic publication or citation practices, such as self-citation or citation cartels.
- The effectiveness of the I-10 index may vary across different academic disciplines, as citation practices and publication rates differ widely between fields.

5.3.2.4 Problems

1) Define the terms h-index and i10 index. Hence illustrate on the entries 254, 169, 8, 7, 6, 2 represented in the following table:

	All	Since 2016
Citations	254	169
h-index	8	7
i10-index	6	2

Answer:

The researcher has a total of 254 citations, with 169 citations since 2016.

h-index

- The h-index is 8 for all publications, meaning they have published at least 8 papers, each of which has been cited at least 8 times.
- Since 2016, the h-index is 7, which indicates that since 2016, they have published at least 7 papers, each cited at least 7 times.

I10-index

- The i10-index is 6 for all publications, indicating that they have published at least 6 papers that have each been cited at least 10 times.
- Since 2016, the i10-index is 2, meaning they have published at least 2 papers since 2016 that have each been cited at least 10 times.

2) Determine h-index, g-index and i10 index for the following.

Publications	Citations
P – 01	26
P – 02	12
P – 03	06
P – 04	11
P – 05	02
P – 06	29
P – 07	14
P – 08	11
P – 09	07
P – 10	15
P – 11	09
P – 12	04

Answer:

Arrange in descending order of citations and assign order of rank accordingly.

Rank	Publications	Citations	Add up citations	Square of rank	Sum of citations ≥ rank^2
1	P – 06	29	29	1	Yes
2	P – 01	26	29 + 26 = 55	4	Yes
3	P – 10	15	55 + 15 = 70	9	Yes
4	P – 07	14	70 + 14 = 84	16	Yes
5	P – 02	12	84 + 12 = 96	25	Yes
6	P – 04	11	96 + 11 = 107	36	Yes
7	P – 08	11	107 + 11 = 118	49	Yes
8	P – 11	09	118 + 09 = 127	64	Yes
9	P – 09	07	127 + 07 = 134	81	Yes
10	P – 03	06	134 + 06 = 140	100	Yes
11	P – 12	04	140 + 04 = 144	121	Yes
12	P – 05	02	144 + 02 = 146	144	Yes

i-10 index

i-index is no. of publications that have gained at least 10 citations each.

$$\therefore \mathbf{i-index = 07}$$

h-index

h-index is the number of publications (h) with a citation number greater than or equal to 'h'.

$$\therefore \mathbf{h-index = 08}$$

g-index

g-index is the highest number such that the top g articles together have received at least g^2 citations,

$$\therefore \mathbf{g-index = 12}$$

5.3.3 ARTICLE LEVEL METRICS (ALTMETRICS)

Read more at https://www.altmetric.com/

- In scholarly and scientific publishing, altmetrics are proposed as an alternative or complement to more traditional citation impact metrics, such as impact factor and h-index.
- Used to track and analyze online activity around scholarly outputs; encapsulates multiple digital indicators related to a scholarly work.
- Measure of attention a research output gets from various sources.
- It is a quantitative measure of the attention a specific article has received in public policy documents, Wikipedia references, mainstream news, social networks, blogs and even social media platforms.
- **The Altmetric Attention Score:**

  The Altmetric Attention Score is an automatically calculated, weighted count of all the attention a research output has received. It is based on 3 main factors:

  a) **Volume:** The score for an article rises as more people mention it. We only count one mention from each person per source, so if you tweet about the same paper more than once, Altmetric will ignore everything but the first.

  b) **Sources:** Each source has a weightage, for example, a newspaper article contributes more than a blog post, which contributes more than a tweet.

  c) **Authors:** We look at how often the author of each mention talks about scholarly articles, whether or not there's any bias towards a particular journal or publisher, and who the audience is.

- **Benefits and Applications:**

  a. **Academic Institutions**

  Altmetrics can be used to benchmark the influence of your research against your peers, helping you to assess and manage your reputation globally. This means more funding, higher calibre staff, happy stakeholders, and increased alumni donations.

b. Corporate R&D

Identify the key opinion leaders and influencers in your field and track the waves made by clinical trials or data sets. Altmetrics help you find the right audiences, platforms, and collaboration opportunities to drive innovation, accelerate the pace of discovery, and to maximize the value of your research.

c. Scholarly publishers

Altmetrics help publishers to see the bigger picture. Altmetric data insights supply valuable evidence to assist authors' future funding applications by demonstrating where their work is being mentioned. From finding collaborators and identifying influencers, to reporting to stakeholders and enhancing marketing plans, Altmetric results can underpin an array of operations.

d. Government and funders

Altmetrics don't just provide clear evidence of the influence of your funded research. They can also play a key role in refining outreach strategies for departments and empowering governments and funders when justifying their investments. The Altmetric dashboard creates clear visuals that can be easily exported, allowing users to benchmark projects, track engagement, and identify potential gaps.

VTU PREVIOUS YEAR QUESTIONS

Aug./Sep. 2023

1. Explain the role of databases in research and publication. **[20M]**
2. Explain the impact of research metrices in research and publication. **[20M]**

December 2022

1. What are the differences between Cite Score and Impact factor? **[10M]**
2. Define G – Index. Mention any 4 advantages and 2 constraints of G – Index. **[10M]**
3. How to measure a Journal Impact Factor? **[10M]**
4. Define i10 – Index. State any four advantages and four disadvantages of i10 – Index. **[10M]**

Oct./Nov. 2021

1. What are the differences between cite score and impact factor. **[10M]**
2. Define i10 – Index. State any four advantages and four disadvantages of i10 – Index. **[10M]**
3. Define G – Index. Mention any four advantages and two constraints of G - Index. **[10M]**
4. Define the terms h-index and i10 index. Hence illustrate on the entries 254, 169, 8, 7, 6, 2 represented in the following table:

	All	**Since 2016**
Citations	254	169
h-index	8	7
i10-index	6	2