RESEARCH

&

PUBLICATION ETHICS

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Preface

UGC is focusing on quality research and publication in all fields. Various measures are being taken to improve the meaningful publication throughout country. Research & Publication Ethics is a book which contains collection of research articles from research and publication ethics areas. Professors, Scholars and professionals have participated to make this book useful to the readers. Readers will get a plethora of knowledge from this book. Various dimension of research and publication related topics have been discussed in this book.

I would like to thank all the participated authors who have tried their best to make this book useful. I would also like to thank all the editors and proof readers who have helped to make this book awesome.

Wakil kumar Yadav

1. UGC-Care listed Journal

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UGC has set up a **Consortium for Academic and Research Ethics** (**CARE**) to match global standards of high-quality research in all academic disciplines under its purview and to ensure prevention of academic misconduct that includes plagiarism in academic writing among students, faculty, researchers, and Faculty. The **UGC CARE** has been set up to identify, continuously monitor, report and maintain "UGC-CARE Reference **List of Quality Journals**". It's a standard quality that every journal must follow. A journal not following this reference list is considered invalid.

Why UGC Care important?

UGC is the **lifeline** of **the Indian Education System**. Its main priority is to oversee all the things related to **Higher Education in India**. It was established for this sole purpose, to **maintain quality and harmony among universities**, government, and community. UGC has many ways of doing their work, such as through the standard of **UGC Approved Universities** and **UGC CARE** which establishes Criteria for the scientific journals. Without UGC there would have been a lot of discrepancies among the **Indian Academia** and there would have been no strict standards as to how universities must function is creating a plethora of useless graduate and postgraduate degrees being handed out. A strict set of standards created by UGC ensures that everything is in order and every university is adequately funded and looked after.

How UGC Care Works?

As we know that UGC is the apex statutory body which controls the functioning of the Universities, but how does it do that? The main aim & role of UGC in higher education is to provide funds to universities. It is also supposed to coordinate, determine & maintain the ethics in institutions of higher education. It ensures that every university follows certain rules if it is supposed to function as a UGC approved university. It also promotes and coordinates university education, frame rules on minimum standards of education, and setting standards for examination like **ICAR NET**, **UGC NET** & **CSIR UGC NET**. UGC's ultimate goal is to bring every approved university to become standardized and under the same umbrella so there are no discrepancies in the quality of education being provided and that no student feels cheated. The commission upholds the interpretation and cooperation among the universities, government and the community. There is supposed to be minimum discrepancies among the expectations and deliverance among them. UGC has also set some standards and rules for the universities for being 'UGC Approved Universities'. With the growth of **higher education in India**, many top, medium, and small universities are being established day by day. Every university that wishes to be UGC approved must meet its criteria if it's supposed to get the tag of quality and excellence.

What are UGC approved Journals/UGC Care List?

Journals are the medium through which budding candidates publish their articles about their research. These sources are made available because of the UGC. If the aspirants choose any private journal except for **UGC care list** for their research other than that, it is not considered as valid. As of now, the **UGC Approved Journals list** has now been replaced by **UGC – CARE**. UGC aims to stimulate, empower and help grow the Indian academia through its "Quality Mandate". UGC aims to eradicate any plagiarized and sub-par material that might damage the reputation and standards of international research. On August 2021, I have gathered the information regarding the UGC-CARE Listed Journals using the **URL: https://ugccare.unipune.ac.in/Apps1/Home/Index [accessed Aug 12, 2021].** The

UGC-CARE List has been categorized into two groups as **UGC-CARE List Group I** and **UGC-CARE List Group II**. The UGC- CARE List Group I list the journals that qualified through the UGC-CARE protocols. However, the UGC-CARE List Group II indexed the journals that existed under the globally recognized databases such as Scopus, Web of Science, etc.

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

These journals are part of UGC-CARE List as Group II and searchable through following links.

Web of Science

1. Arts & Humanities Citation Index.
2. Science Citation Index Expanded.
3. Social Sciences Citation Index.

Scopus

1. Scopus Source List

Modern Languages Associations (MLA)

Those journals from the Directory of Periodicals by the Modern Language Association that have qualified in accordance with UGC-CARE protocols are included in UGC-CARE Group II. Please note that many MLA journals are already indexed in Scopus/ Web of Knowledge databases, and these have not been separately analyzed. The journals submitted by CARE members and CARE Universities will be analyzed by UGC Cell as per Part I, II and III of the protocol. The CARE List will comprise of four groups:

- **Group A:** Research Journals in disciplines under Science, Engineering, Technology, Agriculture and Biomedical Sciences indexed in SCOPUS and /or Web of Science (WOS). No analysis will be done by the UGC Cell for journals in this group.
- **Group B:** Journals qualified after analysis as per the protocol from the existing UGC list.
- **Group C:** Journals from social sciences, humanities, languages and Indian knowledge systems recommended by CARE members, which are qualified as per the protocol.
- **Group D:** New Journals submitted by CARE Universities which are qualified as per the protocol.

Process to search UGC-CARE List is given below.

Step 1: Visit University Grants Commission Consortium for Academic and Research Ethics website https://ugccare.unipune.ac.in/.
Step 2: At home Page, go to select option.
Step 3: Select search by option, Title, ISSN, Publisher, Subject, Language of Publication.
Step 4: Enter Search Value and click on '**Search**' option for UGC-CARE List.

UGC CARE Journal Submission Form

UGC CARE Journal Submission Form and information to submit new journal can be downloaded from below link.

UGC New Journal Submission Information
Submission Form

List of UGC Approved Journals PDF

Download UGC approved journals list PDF from below link: https://tiss.edu/uploads/files/List-of-ugc-approved-journal._2020pdf.pdf

How to publish the paper in UGC approved Journal?

If you are looking for the publication of the paper in UGC approved journal then in the following there is the complete information, for this, you have to follow all the steps.

• Submit the research article and manuscript in .DOC/.DOCX file format via email or online submission. For online submission, you have to click on the official link. Through the mail you have to write down the Submission of Manuscript/Research Paper: Name of Paper" along with the paper category and also the name of author, designation, contact number in the message body of the email.
• After the submission must prepare the research paper or manuscript in the format of the paper and the language must be English. After this, you can track the submitted paper status online by login author account for login. And you have to use the paper registration id.
• After this, you will receive the paper to accept or reject notification. If you get rejection then you have to make modifications according to the review committee.
• When the payment of the publication fees, submitted then you have to submit the documents in single mail to editor undertaking by Author form that are asked for submission.

Journals by Subject 2021

S.No	List of Journals
1.	Journals list of Medical
2.	Journals list of Dental
3.	Journals list of Pharmacy
4.	Journals list of Computer science
5.	Journals list of Education
6.	Journals list of Materials Science
7.	Journals list of Engineering
8.	Journals list of Physics
9.	Journals list of Medicinal
10.	Journals list of Phytomedicine
11.	Journals list of Gastroenterology
12.	Journals list of Chemistry
13.	Journals list of Surgery
14.	Journals list of Agriculture
15.	Journals list of Management
16.	Journals list of Weather
17.	Journals list of knowledge
18.	Journals list of Animal
19.	Journals list of Statistics
20.	Journals list of Science and Technology
21.	Journals list of Social sciences
22.	Journals list of Yoga
23.	Journals list of Biology
24.	Journals list of Botany
25.	Journals list of Environmental
26.	Journals list of Science
27.	Journals list of Arts and Humanities
28.	Journals list of Ancient
29.	Journals list of Ayurvedic
30.	Journals list of Mathematical Sciences
31.	Journals list of Drugs
32.	Journals list of Biochemistry
33.	Journals list of Accounting
34.	Journals list of Biotechnology

35.	Journals list of Banking
36.	Journals list of Finance
37.	Journals list of Orthopaedics
38.	Journals list of neuroscience
39.	Journals list of Food Science
40.	Journals list of Wildlife
41.	Journals list of Business
42.	Journals list of Nursing
43.	Journals list of Oncology
44.	Journals list of Psychology
45.	Journals list of Molecular

Journals in Medical 2021-2020

- The Journal of Emergency Medicine
- Journal of the American Society of Cytopathology
- Journal of pathology Clinical research
- International Journal of Current Microbiology and Applied Sciences
- Indian journal of microbiology
- Journal of medical case reports
- Journal of neuroscience
- American journal of nursing
- MVP Journal of Medical Sciences
- Diabetology international
- Panacea Journal of Medical Sciences
- Indian Journal of Obstetrics and Gynecology Research
- Chinese journal of academic radiology
- Nature reviews rheumatology
- Clinical Cardiology
- Journal of Mind and Medical Sciences
- Endoscopic Ultrasound
- Indian Journal of Medical Specialities
- Asian Journal of Medicine and Health
- Indian Journal of Forensic Medicine and Pathology
- Medical Journal Armed Forces India
- Indian Journal of Cancer
- Asian Pacific Journal of Tropical Medicine
- Advances in Medical Sciences
- Emerging Microbes and Infections
- Annual Review of Microbiology
- Annals of microbiology
- International Journal of Ophthalmology
- Journal of Diabetology
- Tuberculosis Research and Treatment
- Archives of Medicine and Health Sciences
- Blde University Journal of Health Sciences
- Annals of National Academy of Medical Sciences
- IP Journal of Otorhinolaryngology and Allied Science

- Pan Asian Journal of Obstetrics and Gynecology
- International Journal of Medical Science and Clinical invention
- Journal of Microscopy and Ultrastructure
- Case Reports in Rheumatology
- Journal of Orthopaedics
- IP Journal of Diagnostic Pathology and Oncology
- IP Journal of Paediatrics and Nursing Science
- indian journal of pathology research and practice
- Annals of Medical Physiology
- The New England Journal of Medicine
- Integrative gynecology and obstetrics journal
- Current Opinion in Gynecology and Obstetrics
- Journal of advanced research
- Journal of the Canadian Association of Gastroenterology
- Annals of Gastroenterology and Digestive Disorders
- Best Practice and Research in Clinical Anaesthesiology
- Journal of Anesthesia and Clinical Research
- British Journal of Anaesthesia
- Journal of anaesthesiology clinical pharmacology
- Saudi Journal of Anaesthesia
- Journal of Clinical Anesthesia
- International Journal of Anesthetics and Anesthesiology
- Journal of Cancer and Tumor International
- International Journal of Dermatopathology and Surgery
- International Journal of Anatomy Radiology and Surgery
- Journal of Spinal Surgery
- International Journal of tropical disease and Health
- International Journal of Research in Dermatology
- Journal Of Pediatric Critical Care
- Indian Journal of Community Health
- Nepal Journal of Obstetrics and Gynaecology
- South African Journal of Obstetrics and Gynaecology
- Clinics in Surgery
- Surgery Research and Practice
- International Journal of Surgery
- General Surgery Journals
- Journal of the American College of Surgeons
- The American Journal of Surgery
- Molecular Cancer
- Nutrition and Diabetes
- World journal of diabetes
- Journal of diabetes investigation
- Clinical Diabetes and Endocrinology
- Cardiovascular Diabetology
- Indian Journal of Dermatopathology and Diagnostic Dermatology
- Indian Journal of Dermatology

Journals in Dental 2021-2020

- Journal of Dental Specialities
- Indian Journal of Dental Education
- Journal of Indian Society of Periodontology
- Indian Journal of Dental Sciences
- Journal of oral biosciences
- Journal of oral biology and craniofacial research
- Journal of dentistry and oral biology
- Annals of Dental Science and Oral Biology
- Journal of Islamabad Medical and Dental College
- International Journal of Oral Health Dentistry
- IP International Journal of Maxillofacial Imaging
- IP Indian Journal of Conservative and Endodontics
- APOS Trends in Orthodontics
- Journal of the american dental association
- British Dental Journal
- Indian Journal of Multidisciplinary Dentistry
- Indian Journal of Dentistry
- Japanese Dental Science Review
- Annals of Prosthodontics and Restorative Dentistry
- International Journal of Prosthodontics and Restorative Dentistry
- Restorative Dentistry and Endodontics
- Journal of Esthetic and Restorative Dentistry
- Journal of Restorative Dentistry
- Clinical Oral Implants Research
- Contemporary Clinical Dentistry
- Journal of Orofacial Sciences
- Dental Press Journal of Orthodontics
- Iranian Endodontic Journal
- Journal of Oral Microbiology
- International Journal of Applied Dental Sciences
- Oral health and dental management
- Case Reports in Dentistry
- Journal of conservative dentistry
- Journal of Clinical Periodontology
- World Journal of Dentistry
- Journal of Endodontics
- The Journal of Contemporary Dental Practice
- International Dental Journal of Student Research
- Isfahan University of Medical Sciences
- Annals of Maxillofacial Surgery
- Indian Journal of Dental Research
- Journal of Dentistry

Journals in Pharmacy 2021-2020

- Journal of Oncology Practice
- Indian journal of pharmaceutical sciences
- Systematic Reviews in Pharmacy
- Biomedical and Pharmacology Journal

- Journal Of Pharmaceutical And Biological Sciences
- Journal of medical pharmaceutical and allied sciences
- International Journal of Medical Toxicology and Forensic Medicine
- American journal of forensic medicine and pathology
- IP International Journal of Forensic Medicine and Toxicological Sciences
- Journal of Forensic Medicine
- Journal of Forensic and Legal Medicine
- The Asian Journal of Pharmaceutical and clinical research
- International Journal of Pharmacy and Pharmaceutical Sciences
- Journal of Young Pharmacists
- Journal of pharmaceutical and biomedical analysis
- Archives of pharmacy practice
- National journal of physiology pharmacy and pharmacology
- International Journal of Pharma and Bio Sciences
- International journal of clinical pharmacy
- Acta medica marisiensis
- Pharmaceutical patent analyst
- Journal of research in pharmacy practice
- World journal of pharmacy and pharmaceutical sciences
- Journal of pharmaceutical policy and practice
- Journal of pharmacy and pharmacognosy research
- SOJ pharmacy and pharmaceutical sciences
- Journal of managed care and specialty pharmacy
- Pharmacy and pharmacology international journal
- Journal of Pharmacy and Pharmaceutical Sciences
- Journal of pharmacy and pharmaceutics
- Asian journal of pharmacy and pharmacology
- Sustainable chemistry and pharmacy
- Pharmaceutical technology in hospital pharmacy
- Journal of the American College of Clinical Pharmacy
- The american journal of medicine
- International Journal of Pharmacy and Pharmaceutical Research
- Pharmaceutical Chemistry Journal
- Pharmacognosy Reviews
- Journal of Pharmacology and Pharmacotherapeutics
- Bangladesh Journal of Pharmacology
- Indian Journal of Psychological Medicine
- Indian Journal of Pharmacology
- Annals of African Medicine
- International Journal Of Pharmaceutical Chemistry And Analysis
- Indian Journal Of Pharmacy And Pharmacology

Journals in Computer Science 2021-2020

- International Review on Computers and Software
- Advances in Human Computer Interaction
- Big Data and Society
- International journal of computers and technology
- International Journal of Data Science and Analytics

- IEEE Communications Surveys and Tutorials
- Journal of the ACM
- IEEE Transactions on Computers
- IEEE Transactions on Pattern Analysis and Machine Intelligence
- International Journal of Computational Intelligence Systems
- NPJ Quantum Information
- Procedia computer science
- International journal of machine learning and computing
- International Journal of Advanced Computer Science and Applications
- ACM Computing Surveys
- Journal of theoretical and applied computer science
- Journal of Computational Design and Engineering
- PeerJ Computer Science
- Journal of machine learning research
- Computational and Structural Biotechnology Journal
- Journal of Big Data
- SoftwareX

Journals in Education 2021-2020

- Vietnam journal of science and technology
- International Journal Of Social Welfare And Management
- Indian Journal of Law and Human Behaviour
- Australasian Journal of Educational Technology

Journals in Materials Science 2021-2020

- Journal of Materials Science Materials in Electronics
- Materials research express
- Advanced materials interfaces
- Advanced Materials Research
- ACS Applied Materials and Interfaces
- Annual Review of Materials Research
- Materials Today
- Advanced Materials
- Nature Materials
- Journal of Materials Science

Journals in Engineering 2021-2020

- International Journal of Building Performance Simulation
- Arabian journal for science and engineering
- International Journal of Engineering and Advanced Technology
- Journal of Environmental Chemical Engineering
- IETE journal of research
- Polymer engineering and science
- Journal of Construction Management
- International Research Journal of Engineering and Technology
- International Journal of Advances in Engineering Sciences and Applied Mathematics

- Current Biochemical Engineering
- Advanced Engineering Forum
- ADBU Journal of Engineering Technology
- International journal of engineering research and applications
- Engineering science and technology an international journal
- International Journal of Recent Technology and Engineering
- International Journal of Engineering Research
- The Journal of Engineering Research
- Journal of Engineering Research
- Engineering Journal

Journals in Physics 2021-2020

- Advances in Condensed Matter Physics
- Bulgarian Journal of Physics
- International Journal of Electrochemistry
- Advances in Physics

Journals in Medicinal 2021-2020

- Open Access Journal of Medicinal and Aromatic Plants

Journals in Phytomedicine 2021-2020

- Phytomedicine International Journal of Phytotherapy and Phytopharmacology

Journals in Gastroenterology 2021-2020

- Indian Journal of Gastroenterology

Journals in Chemistry 2021-2020

- Journal of biological chemistry
- Journal of Organic Chemistry
- Journal of Chemical Education
- Analytical Chemistry Letters
- New journal of chemistry
- Oriental Journal of Chemistry
- Journal of Chemistry
- Research Journal of Chemical Sciences
- Journal of Chemical Sciences
- Asian Journal of Chemistry
- Indian Journal of Advances in Chemical Science
- BMC chemistry
- Antioxidants and Redox Signaling

Journals in Surgery 2021-2020

- Indian journal of surgery

- JAMA Surgery
- American Journal of Transplantation

Journals in Agriculture 2021-2020

- Indian Journal of Agriculture Business
- Journal of Experimental Biology and Agricultural Sciences
- Agriculture and human values
- Asian Journal of Agriculture and Development
- Advances in Agriculture
- Advanced Science Letters
- Journal of Nepal Agricultural Research Council
- Journal of Agriculture and Natural Resources
- International Journal of Agricultural Sciences
- Journal Agronomi Indonesia
- Frontiers of Agriculture in China
- Journal of integrative agriculture
- International journal of agriculture innovations and research
- Asian journal of agriculture and food science
- Acta Fytotechnica et Zootechnica
- The Open Agriculture Journal
- journal of agricultural economics
- indian journal of agricultural sciences
- Indian Journal of Genetics and Plant Breeding
- Indian Journal of Agronomy
- Indian Journal of Agricultural Research
- Indian Journal of Agricultural Biochemistry
- Acta Agriculturae Scandinavica Section A Animal Science

Journals in Management 2021-2020

- The Journal of Community Health Management
- Journal of International Economics
- Journal of International Business Studies
- The American Economic Review
- Accounting Organizations and Society
- Academy of Management Review
- Academy of Management Journal
- Journal of Business Research
- Perspectives on public management and governance
- Journal of patient safety and risk management
- European Journal of International Management
- European Journal of Management
- European Management Journal
- International Journal of Business and Management
- AIMS International Journal of Management
- Journal of management
- Academy of Management Learning and Education
- Journal Of Management Research And Analysis

Journals in Weather 2021-2020

- Advances in Statistical Climatology Meteorology and Oceanography

Journals in Knowledge 2021-2020

- International interdisciplinary research journal

Journals in Animal 2021-2020

- Journal of Animal Science
- Asian Australasian journal of animal sciences
- Animal Production Science
- Journal of Animal Research
- Animal Nutrition and Feed Technology

Journals in Statistics 2021-2020

- Annals of mathematics
- Annual review of statistics and its application
- Journal of statistical software
- Australian and New Zealand journal of statistics
- The American Statistician

Journals in Science and Technology 2021-2020

- International Journal of Scientific and Technology Research
- Science and Technology Studies
- Open Access Journal of Science and Technology
- Journal of Marine Science and Technology
- Science and technology of advanced materials
- East Asian science technology and medicine
- East Asian science technology and society
- Indian journal of biotechnology
- Indian Journal of Science and Technology
- International Journal of Scientific Research and Engineering Development
- International Journal for Modern Trends in Science and Technology

Journals in Social sciences 2021-2020

- International Journal on Social and Education Sciences
- Advanced Journal of Social Science
- Asian Journal of Business Ethics
- Asian Association of Open Universities Journal
- Anthropology of Food
- Australian Intellectual Property Journal
- Asia Pacific Journal of Risk and Insurance
- Asia Pacific Journal of Public Administration
- Annals of Financial Economics

- American Journal of Business
- Advances in Social Work
- Acta Universitatis Sapientiae Economics and Business
- Social sciences in China
- The American journal of Islamic social sciences
- Pakistan journal of life and social sciences
- European journal of research methods for the behavioral and social sciences
- Journal of rural social sciences
- Journal of methods and measurement in the social sciences
- Journal of studies in social sciences
- The Russell Sage Foundation journal of the social sciences
- Journal of progressive research in social sciences
- Mediterranean journal of social sciences
- Journal of Social Sciences
- Journal of applied social science
- Advances in applied sociology
- American Journal of Cultural Sociology
- Chinese journal of sociology
- American Journal of Sociology
- The Social Science Journal
- International Journal of Social Science Studies
- International Journal of Humanities and Social Science
- International Journal of Social Sciences and Humanity Studies
- Pakistan social sciences review

Journals in Yoga 2021-2020

- International journal of yoga therapy
- Journal of yoga and physical therapy
- Indian Journal of Ancient Medicine and Yoga
- International Journal of Yoga

Journals in Biology 2021-2020

- International journal of biotechnology
- Journal of Applied Biology and Biotechnology
- Biotechnology Advances
- Trends in biotechnology
- Nature Biotechnology

Journals in Botany 2021-2020

- Pakistan Journal of Botany
- Journal of Plant Science and Research
- Current protocols in plant biology
- Botany letters
- Australian Systematic Botany
- Australian Journal of Botany
- Aquatic Botany

- Annals of Botany
- Current Trends in Biotechnology and Pharmacy
- Plant Biotechnology Journal

Journals in Environmental 2021-2020

- Nature Communications
- Journal of cleaner production
- International Journal of Global Science Research
- Journal of the Association of Environmental and Resource Economists
- Nature Environment and Pollution Technology
- Advances in Environment Research
- Applied Ecology and Environmental Sciences
- Current Opinion in Environmental Science and Health
- Environmental analysis health and toxicology
- Journal of Environmental Sciences

Journals in Science 2021-2020

- International journal of scientific research
- Scientific Reports
- AIMS Molecular Science
- Advances and Applications in Mathematical Sciences

Journals in Arts and Humanities 2021-2020

- Life Sciences Society and Policy
- Black Camera
- German as a Foreign Language
- Focus on German Studies
- Environmental Philosophy
- Art and the Public Sphere
- Journal of Popular Television
- Comparative Philosophy
- Between the Species
- IAFOR Journal of Ethics Religion and Philosophy
- International Journal of Comparative Literature and Translation Studies
- International Critical Thought
- Journal of Language and Discrimination
- IIS University Journal of Arts
- IAFOR Journal of Arts and Humanities
- Archaeology International
- Arts and the Market
- Antennae The Journal of Nature in Visual Culture
- Amphora
- Acta Germanica

Journals in Ancient 2021-2020

- Ancient Science of Life

Journals in Ayurvedic 2021-2020

- Annals of Ayurvedic Medicine

Journals in Mathematical Sciences 2021-2020

- Albanian Journal of Mathematics
- Arabian Journal of Mathematics
- Arab Journal of Mathematical Sciences

Journals in Drugs 2021-2020

- Indian Drugs

Journals in Biochemistry 2021-2020

- International Journal of Clinical Biochemistry and Research
- Biochemistry

Journals in Accounting 2021-2020

- Journal of Accounting and Economics
- Journal of Accounting Research
- Contemporary accounting research

Journals in Biotechnology 2021-2020

- Biosciences Biotechnology Research Asia

Journals in Banking 2021-2020

- Cell and Tissue Banking
- International journal of central banking
- Indian Journal of Finance and Banking
- International Journal of Banking Accounting and Finance
- Journal of Banking and Finance

Journals in Finance 2021-2020

- Journal of Finance
- Applied finance and accounting

Journals in Orthopaedics 2021-2020

- International Journal of Orthopaedics Sciences

Journals in Food Science 2021-2020

- Journal of nutritional science
- Journal of food and drug analysis
- Food and Energy Security

Journals in Wildlife 2021-2020

- Journal of Wildlife Management

Journals in Business 2021-2020

- Journal of business analytics
- Journal of Business Ethics

Journals in Nursing 2021-2020

- Advances in Nursing Science
- Advanced emergency nursing journal
- Journal of nursing education and practice
- International journal of nursing studies

Journals in Psychology 2021-2020

- Journal of personality and social psychology

Journal of Molecular Liquids

Need for UGC CARE List

- The credibility of research publications is extremely important because it represents the academic image of not just an individual, but of the institution and the entire nation.
- The number of research articles published in reputed journals is one of the globally accepted indicators considered for various academic purposes.
- The problem of predatory / dubious / sub-standard journals has become a cause of serious concern all over the world.
- Publications in dubious / sub-standard journals reflect adversely leading to long term academic damage and a tarnished image of an individual, institution and the nation.

2. Finding Solutions to the Main Problems Faced by a Researcher

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Abstract

Research means re searching a fact that already exists. While doing a research you have to find out something new from the already existing facts. It is a structured inquiry to create a new knowledge. Researchers at present encounter many problems while doing their research in a structured manner. Many researchers when they reach a midpoint in their research think about quitting research because they don't understand what they are doing. This paper tries to find out solutions to the various problems faced by researchers.

Keywords: ***Research, Problems faced in doing a Research, Solutions to the problems faced by a Researcher, Writing Skills.***

Finding Solutions to the Main Problems Faced by a Researcher.

According to Wernher Von Braun (a German philosopher), "Research is what I'm doing when I don't know what I'm doing".

Many researchers when they reach a midpoint in their research think about quitting research because they don't understand what they are doing. Many questions like why am I doing this? , what is the benefit in doing this? , Is it a research? And many more questions like this pop up in their mind. At present we can see a lot of post graduate students joining for research in order to earn a degree. That is the main problem faced in the research field. A researcher should have a deep knowledge regarding his area of topic and a well-structured plan to complete the research. Research should be carried out with your full heart otherwise you will find it difficult to complete.

The first step in a research is to find a topic, many of the students fail in the very first step because rather than focusing on their area of interest they hear opinions from different people. At last they get confused and they stop doing there research. A student who pursues to do research first should identify his area of interest and should start reading. The more you read more you get ideas regarding the topic. After completing the reading phase discuss with your guide and select a topic. While selecting a topic always select an open end topic –A topic which has multiple perspectives. The benefit of taking an open end topic is that you can develop your research from any angle. If you get saturated in the middle of your research you can switch on to the next perspective. Hence always opting an open end topic is preferred while doing research in English Literature.

As already mentioned Research is a structured inquiry that require dedication and hard work. The second problem faced by the students is that they are ignorant about research methodology. They do not know how to structure their research. In the syllabus research methodology paper should also be included so that post graduate students will have a better idea regarding how to accomplish a research.

The third problem faced by students in doing their research is poor writing skills. A student who wish to do research must work on his writing skills. Writing skill is very important in academic and professional life. While doing a research a very clear and flawless language should flow in your paper for that

develop your writing skills. A very simple tip to develop writing skills is by writing about anything you like. Daily write something and keep your own journal. Improve your vocabulary by writing down new words in a book and use them in your journal. This will help you to improve your writing skills.

The fourth problem a researcher face is the habit of procrastination. This is a common habit found among researchers, they procrastinate very simple tasks and later feel research is a burden. If you are a researcher stop procrastinating things. Do your works before the scheduled time and complete your tasks on time. A Researcher at his initial stage should chart out his tasks and keep a deadline for everything so that he can complete it. Most of the researchers do not keep a plan and used to run out of time. Research is a burden if you do not plan it well, hence make a plan and enjoy doing research.

The fifth problem faced is lack of motivation in doing the research work. If you do not like your topic or you are doing your research to earn a degree the whole research process will be boring for you. There are so many students who drop out of their research because of their lack of interest and motivation. Supervisors and teachers should motivate their students in their journey of research. Communicate with your supervisor and seek his guidance in every step.

When a research is carried out in an organized manner it is simple as well as an interesting process. You gain a lot of knowledge when going through this process. When done in a well planned way you can complete your research on time without any stress. Among post graduate students teachers should promote a ‘culture of research'. Motivate students to indulge in research because many of them are preoccupied with the thought that doing research is a Herculean task. In syllabus include papers that develop writing skills as well as research methodology. By providing scholarships and funds to researchers many of the students will turn up to do research. As Neil Armstrong said "Research is creating new knowledge." Let new researchers bloom and create new knowledge.

Work Cited

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3. Book Review: Ranjit Kumar's Book on Research Methodology

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Book: RESEARCH METHODOLOGY: a-step-by-step guide for beginners

Author: Ranjit Kumar

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Research is a way of finding out the answers to our questions. To conduct research, in fact, we have to follow many rules and systems. Research Methodology provides us those processes of conducting research. Precisely, research methodology is used in almost every discipline, including- Education, Health, Library Studies, Marketing, Nursing, Psychology, and Public Health. There are different methods of research, qualitative and quantitative research. More importantly, a few disciplines emphasized quantitative research and others prioritize qualitative research. The author of the book prioritizes both quantitative and quantitative methods of research.

First and foremost, Ranjit Kumar defined research in his book and argued that research is a process of examining our daily work through knowing guiding principles to develop new advancements in our daily professional work. In brief, research is a system or process of what we think. Particularly, he classified the research based on three perspectives, including- application of research findings; objectives of the research study; and mode of investigation applied in doing the study. On the whole, this way of classifying research is easy to understand and apply in our daily life.

It goes without saying, every research is done in order of any process or method. In particular, the main theme of the book is describing the research process one after another. In accordance with this book, the whole process of research is operational through eight steps.

Step 1: The main part of the research is identifying the research problem or deciding what we want to examine. Most importantly, based on the research problem, a researcher initiates to conduct his or her research at all times. For this way, research supervisors ask the researcher what he or she intends to find out.

Step 2: In the second step, he discussed the importance of research design. Research design is the way of explaining how we will conduct our research and which procedures we will take in our research, including- sampling, measurement process, the frame of analysis and the frame of time. Without applying a suitable research design in our research, we will not reach valid findings.

The researchers have to select the method of research whether quantitative or qualitative. Quantitative research is structured which emphasizes quant and finds out mathematical or statistical results. And qualitative research finds out explaining the result of the situation, feeling, perceptions, etc. This is a clear difference between quantitative and qualitative research for beginners what the author wrote in the book.

Step3: The 3rd step of research is to formulate an instrument of data collection. Afterward, when we make a research design, we have to collect data on the basis of research design. The fact of the matter is if we select a quantitative method, we collect data through interviews and observations by using structured questions. In addition, we use not predetermined questions and collect data through interviews in the qualitative method.

The above methods are the way of collecting primary sources. Moreover, we can use Secondary sources of data, which are collected for the sake of other purposes. As a consequence, books, the internet and journals can be sources of secondary data.

Step 4: Sampling is the way of nominating the representatives of the whole study population. Usually, we can't use all of the study population in our research. We use sampling for saving time, money and human resources during the research. He clarified the sampling procedures of quantitative and qualitative methods. In quantitative sampling, samples are selected randomization but samples are selected in qualitative sampling by our own judgment.

He argued that all sampling are classified into three categories, such as- probability (simple random sampling, stratified sampling and cluster sampling); non-probability sampling (quota, judgmental, snowball and accidental) and mixed (systematic sampling method).

Step 5: After completing the above steps, the researcher should provide all information to the supervisor, this is called a research proposal. That means a previous plan to do research or finding out the answers to all questions is the research proposal. Supervisors review the research proposal and decide whether the proposal is sufficient or invalid to conduct the research. Matter of fact that, if the proposal is approved, the researcher has to continue the next steps.

Step 6: In step 6th, the researchers have to collect data based on research instruments from the data sources. Data can be collected through interviews, focus group discussions, mail-out questions, etc. But researcher, participants who are directly involved in research and funding organizations must have to abide by all ethical issues to make valid research. Otherwise, research, as a matter of fact, will not be successful in no way.

Step 7: After collecting data, researchers have to process or display them. In the case of qualitative data, we have to write the report in compliance with the analysis of collected data. Subsequently, we can analyze qualitative data both manually and with computer software, such as- NVivo, NUD*IST N6, Ethnograph. In quantitative data, we can analyze data both manually and computer based programs, like- SPSS.

Step 8: This step is the last where we discuss or identify the findings of the study and draw a conclusion of our findings. Indeed, if we follow the rules above clearly, we will be able to, in full swing, do a valid research report.

It is notable that before doing research, researchers have to review by turns all the relevant kinds of literature. As a result, they can know what has been studied and what they can examine by their research. Beyond all doubts, the researchers get a clear knowledge about the topic and the use of methods of previous researchers. Especially, he took a look at all concepts, associated with researches which are defined easily by and by.

In the same way, the book discussed all of the matters related to research but mainly deals with the basic process of doing research. Most of the students feel fear when they hear that they have to do research as his academic course. In this case, this book is essential for them and they will be a success if they follow the process of doing research. Equally important, the author wrote every inch of the book in simple language to the end so that beginnings can learn research methods clearly by reading the book.

Above all, the book is available on Google and anyone can download free of cost. Of course, the whole book is well–organized on a large scale. To be more precise, this book is the clear guidelines for novices to the last and it paves the way to do many pieces of research from the students. By which the amount of research will increase and new solutions will come.

4. What is an Academic Research?

Ms. Gopika M S

Guest at Government Institute of Fashion Designing (GIFD),Kerala.

Academic research in simple terms is nothing but a re – search into a pre-formed area of research for revising it or it can also mean a search that leads to new arenas of knowledge. When a student finds an area of study interesting or if he finds answers to certain gaps in the area of study he wish to pursue. That is when and where a researcher is born. A researcher who has a pool of knowledge to his side will be himself surprised to find unknown interpretations and meanings for a text he might have read. Now my dear student researchers a text can be literal, an experience or it can even be a visual clip that you sees in a media. We must also understand that a meaning that a researcher draws might be influenced by his/her or the other's social, cultural, intellectual as well as psychological spectrum of knowledge.

We having talked about the multiple levels of meanings that a researcher finds in a text for himself must also be concerned about the meanings the author might have intended and the researcher should be able to see these meanings in the light of criticism. And by criticism, it in no way should be subjective. A researcher should always see to it that his research should always tread in the path of objectivity. A biased search never becomes a research!

A research is a mark of degree and honor for a researcher. Apart from that the UGC (University Grants Commission) encourages teachers at various universities and colleges to do research and expand their spectrum of knowledge. An academic research is a systematic process in itself. It is also important to note that there is specific ways of conducting research in each area like Sciences, Social Sciences, Humanities etc. there is no huge difference in the pathways of research in each of these disciplines. It is just that each discipline have its own indigenous factors attached to it. For example research in sciences in addition to following a fixed process may also include testing the variables in laboratories. And in social sciences the interaction in society and recording and studying these instances is important.

As I have mentioned there is some indigenous factors added to every research that makes it unique in its own way but if we place these things apart there is a general pathway through which every researcher should walk that is here after explained. Now I am trying to explain this complex process in the simplest terms I can find in English. It is a general overview of what a research is. Now imagine one day in a library, you were reading books on a particular area of interest. While reading you felt that certain questions in your mind is not answered. Here comes the first stage of defining and redefining your 'problem' of enquiry. Certain objectives get planned in our mind for which we have to find answers through this process of research. The objectives show us the way as well as depth of a research.

A 'literary review' is done next. Here we must be reading all kinds of literature included in our area of study. This will of course add many new as well as known but forgotten facts to our knowledge system that help us in our journey undertaken. The researcher will form a relevant 'hypothesis' which he attends to prove. On the flip side there will be a possibility of getting your hypothesis disproved that is when an ethical and un-corrupted researcher accepts his test results bravely. Collection of data is our next step. Here we collect data that is relevant to our research topic. The sources can be primary as well as secondary. Primary sources are those that are direct source of knowledge. For example an interview conducted by the researcher. Secondary sources are those sources of knowledge that are not directly acquired by the researcher. For example a books, reviews etc. obtained by the researcher in a library are secondary sources. Our data should prove as well as defend our hypothesis from all the possible

criticism this is called data analysis and hypothesis testing. Towards the end we interpret our results obtained. It is called report submission when it comes to scientific researches.

A good researcher is always a curious reader and a person who will be able to read between the lines. A research is a never ending process. A research ends with the possibility of further research. As H V Deshpande has said a researcher must do three kinds of work i.e, creative intellectual and clerical. Of these three the last one is the most difficult one that is putting our ideas into words in a research paper plus the referencing work that takes much of our pain before the reward of a Ph.D. or M.Phil. A research is always built on a research methodology. It is simply the methods through which a research is done. There are various methods through which a research could be done like exploratory research, empirical research, constructive research etc. These methods are chosen according to the nature of research, the discipline in which you chose to do the research and various other factors based on your research.

There are some key concepts that a researcher should know before starting with his work that is, while doing a research a researcher should make sure that the research is 'reliable'. That means the researcher throughout the process of research should make sure that the results he or she is getting is consistent throughout. In other words it should be trustworthy. A research should be 'valid' means the research should measure what it actually intends to measure. It should be replicable and precise. Meaning the research should bring out the same results when done again or by someone else also a research should not consist un-necessary information that is not relevant to research. There are so many concepts like this that this single article cannot hold together in just two pages, a researcher should be aware of these things before conducting a research. In short, going through books, articles and every possible resource regarding previous research conducted by a researcher might help in budding out a perfect researcher out of you.

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5. Publication Ethics & Misconducts

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The word ethics is derived from a Latin word called "ethos" which means character. Ethics are the moral principles that govern person's behaviour in our context it is how a person conducts an activity. In simpler words ethics are nothing but the set of rules which deals with what is right or wrong, good practice or bad, moral or immoral etc.

Publication of the research work is an important aspect for communicating your research work with the rest of the world. The author gets an opportunity to share their thoughts, ideas, and methods with the community. It creates a permanent record of your contribution in that field and gives you recognition and acknowledgment for your efforts. Readers will be aware of the work being conducted in their area and benefit them in their work. So it is very crucial to pay due attention to publication ethics. Publication ethics plays an important role in producing quality research literature.

Publication misconduct generally tend to occur due to lack of awareness among authors, pressure for publication with respect to professional advancements, financial gain and lack of monitoring and control mechanisms in place.

Fig 1: Different perspectives of publication ethics

- **Moral** perspective to publication ethics refer to publishing false or fabricated data
- **Professional** perspective refers to not giving due credit to contributing authors
- **Legal** perspective involves violation of copyrights or other intellectual properties.

The chapter is written to make the readers and prospective authors aware about the various publication misconducts which they must avoid and ethical practices which they must follow.

- **Data fabrication and falsification**

  Data Fabrication is making up data or results. It also includes construction of data that has never occurred during the experimentation or the experiments might not have been conducted only. It also includes the claims made in the paper on the incomplete data set or the ideally assumed results.

  Data Falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record. It's the manipulation of data giving false impression of the study. It also includes unethical practices like conveniently removing the outliers in the results and making up the data. Researchers must ensure to publish accurate and transparent reporting of the experiments.

- **Plagiarism and self-plagiarism or text recycling**

  Using other researcher's ideas, work or even a sentence without giving them credit through proper citation is considered plagiarism. Even using your own prior work without citing is considered as self-plagiarism. Obtaining permission for the material, work, figures is essential from ethical point of view. Plagiarism is considered as one of the prominently done malpractice which every researcher must consciously avoid.

- **Redundant Publication or Salami Publication or Segmented Publication**

  The research work and data are segmented here in just "minimal publishable units" and published in separate papers. This over publishing increases the count of publications and considered as unethical practice but is not as serious as plagiarism and data falsification. People spread their experimental methods, results into multiple papers unnecessarily which instead could have been represented into one meaningful paper. Salami publication involves redundancy of methods, hypothesis and results and may not involve text similarity.

- **Dual submissions**

  This involves submitting the same articles to multiple journals at the same time. This wastes the time and efforts of multiple reviewers of different journals and in case if it gets published then it is very confusing for the readers or the researchers as to which articles to consider for citation. Sometimes the dual submissions contain the same contents may be in different languages which is also not considered as an ethical practice.

- **Improper author contribution or Inappropriate authorship**

  All the authors mentioned in the paper must have contributed to the work presented in the paper. Every contributor to the work must be included into list of authors. Including the author who has not contributed and excluding the ones who has contributed toward the research work comes under the inappropriate authorship. Authors must be included in specific order which is agreed by all authors. The co-authors must be aware of the content being covered and claimed by the paper. These practices must be strictly followed to avoid any authorship disputes. Those people who have contributed toward the work and the manuscript preparation but do not qualify as co-authors may be included in the acknowledgement section.

- **Gift authorship**

  The main author or first author creates the idea, plans, carry outs the work and writes the paper. Gift authors are the ones which are included as co-authors but not have significantly or not at all contributed to the work presented in the paper. This may be done in order to get grants, sponsors, good grades etc. Sometimes these may be your senior colleagues, supervisors or heads of the departments. In the era of "publish or perish", under the pressure of increasing the count of publication these influential people get themselves listed as co-authors.

- **Ghost Authorship**

Ghost author means the one who has participated in the study, analysis, experimentation and even in publication draft writing but are not named under the author list. Especially this occurs in case the ghost author is your junior colleague who contributed in all aspects till publication but he is neither listed in the author list nor in the acknowledgement. This type of misconduct in famous and critical has consequences in the medical field where instead of the original authors or contributors, they use the name and reputation of the renowned scientist who may not even know how the work has been carried out and what is being published under their name.

- **Conflict of interest**

  When authors have a financial or personal interest which consequently influences his/her actions, judgements and content being published. This is also called as competing interest or competing loyalties. Such undeclared conflicts of interest are treated as unethical practices. In such cases these interests affects the opinions or conclusions drawn from the study and if the conflict of interests are revealed later on the reader may feel misled or deceived. Hence such conflict of interest must be revealed to the editor or publisher while submitting the manuscript and then it is left to the journal whether to disclose the conflict of interest at the footer of the publication or straightaway reject such submissions on the basis of such conflicts.

- **Citation manipulation**

  Many times authors include the citations whose mere purpose is to increase number of citations to the given author's work. Author should also refrain themselves from excessive citing of their own previous work or their friends, colleague's or institution's publications if they have not actually read. Researchers must also avoid copying the references from other publications if they have not gone through the cited work.

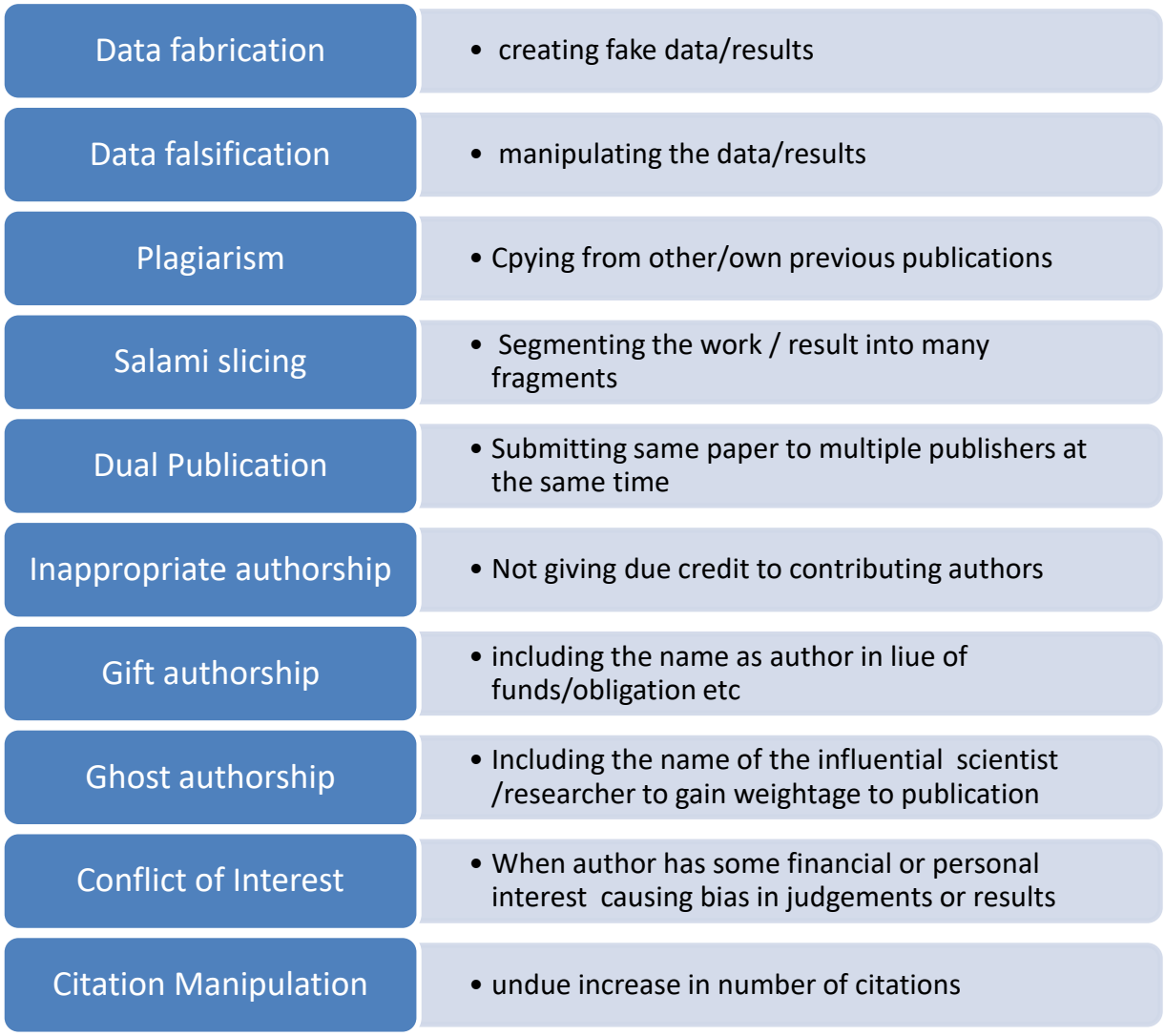

Fig 2: Summary of publication Misconducts

What causes these violations of publication ethics?

In today's era of 'publish or perish' culture, there is immense pressure to publish in order to succeed in the academic career, employment, getting promotions and sometimes for maintaining the job. Bigger is the publication list better is the CV but lacks merit, skills, knowledge. So this race of increasing the count of publication and frequent or continuous publications many times lead to unethical publication practices, distracts you from where we should be actually concentrating on i.e. the actual research work which will help the mankind and society at large.

Conclusion

Hence we as a responsible researcher, author must abstain from any of the unethical practices mentioned above. Concentrate on more quality work and publication which is true, reliable and will take the life a step ahead. If you do not adhere to publication ethics, it may give you false sense of progress for time being but in long run it will cause more harm directly or indirectly.

6. Publication Misconduct: Concept, Types, Reasons and Consequence

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Abstract
The content is about Publication misconduct in research. It is a worldwide problem. It mars the credibility of the concerned researcher and the institution. There is ethics to be followed. Ethics guide what human being ought to do and what ought to not. Due to unethical behaviour publication misconduct occur. These misconducts are Falsification, Fabrication , Plagiarism, Duplicate submission, Authorship conflict etc. The paper has also discussed about the definition, concept, reason, consequence of publication misconduct. For this purpose the researcher has collected the data from different journals, articles, e books and websites. There are different ethical requirements for the researchers. Policies are to be formed. Govt. will have to set the standards also.
Keywords : ***Misconduct, Plagiarism, Fabrication, Falsification, Salami Slicing***

Introduction
Ethics is concerned with right or wrong and good or evil of human behaviour. It guides man how to become good. What is right is ethical and what is wrong is unethical. Research process includes study design, data collection and data analysis. The analyzed data is published therefore by appropriate body(Redman, 2013).The process is done in an ethical way. The committee on Publication Ethics (COPE) is responsible body with the task of developing appropriate code of conduct (Sengupta & Honavar,2017).Researchers, publishers and editors are guided by it.

Objectives of the Study
- To study about Publication Misconduct
- To study about the types of Publication misconduct
- To study the reason of publication misconduct
- To study the consequence of publication misconduct
- To study about ethical requirements to avoid publication misconduct

Methodology
The researcher has collected information from different articles, journals, e books, websites, national and international publication etc. It gives a brief description on Publication Misconduct, its types, reason,consequence and ethical requirements to stop such misconduct.

What is Publication Misconduct
Publication is the process by which a researcher publish his work in a journal, a book or a magazine to bring recognition of his work. It is made public then . The researcher who wants to work on same area collects information from that book and enrich themselves. But when the researchers violates the ethical requirements misconduct occur. This includes Plagiarism, Fabrication, Falsification, Authorship conflict, Redundant Publication, Salami Slicing etc.

Types of Publication Misconduct

Plagiarism
Plagiarism is one of the most dangerous misconducts in research . " Plagiarism is the appropriation of other people's material without giving proper credit"(the European Code of Conduct for Research Integrity) . "Plagiarism is the appropriation of another person's ideas processes, results or words without

giving appropriate credit."(Us Federal Policy on Research Misconduct). There are different types of plagiarism :

- **Direct plagiarism** in which a portion of someone's writing is copied word by word.
- **Self Plagiarism** in which the researcher presents his or her own previously published data.
- **Mosaic Plagiarism** in which a student uses someone's writing without quotation marks.
- **Accidental Plagiarism** in which the researchers does not cite their sources or even misquotes without giving proper attribution.

Fabrication

In the European Code of conduct fabrication is defined as "making up results and recording them as if they were real". It is the act of making up data and reporting the made up data as a true reflection of never conducted research study(Martyn, 2003). Data fabrication are undertaken by immoral and moral individuals(Gerrets,2016).

Falsification

Falsification is the changing or omission of research data to present an incorrect result (Martyn,2003). In this way the data is manipulated and a false impression is created. According to Irving Hexham "Falsifying is the deliberate undertaking to deceive the pursuer through the designation and depiction as one's own work".

Authorship Conflict

- ✓ **Authorship** is identifying the person who has given his contribution in a noteworthy way to the particular research work.
- ✓ **Acknowledgement**: The ICMJE guidelines state that "All others who contributed to the work who are not authors should be named in the acknowledgement".
- ✓ **Contributorship**: The ICMJE guidelines recommend that "author should provide a description of what each contributed and editor should publish that information".
- ✓ **Ghost author**: It is seen that some writer's role are not acknowledged though the name should be there according to the ICMJE guidelines. They involve themselves in data collection and data interpretation.
- ✓ **Guest authorship /Gift authorship**: There are some persons whose names are listed but actually they did not make a significant contribution. They do not fulfill the ICMJE guidelines. They are often senior figures. Sometimes the name is added on understanding.

Redundant Publication

It is the publication of a paper which is similar to a published paper by the same author . He does this without acknowledging the source. It is an example of 'poor scholarship' and the study contributes very less. It is turned to be a wastage to the editor and reviewer in every way.

Salami Slicing

Sometimes the researcher wants to enhance their publication number. As a result they divide the data set. It would have been a meaningful paper with the whole data but due to splitting different papers have been formed. It affects the importance of the data. This is called the salami publication or salami slicing.

Reason of Publication Misconduct

- ➢ Lack of awareness about research and publication ethics
- ➢ Pressure for publication
- ➢ Financial enticement to compromise integrity
- ➢ Wish for massive curriculum vitae
- ➢ Academic advancement and promotion
- ➢ Competition among the colleagues
- ➢ Professional supremacy

Consequence of Publication Misconduct

- It could mean the end to career as a researcher. He may be dismissed and rejected.
- Academic achievement may be taken away.
- It means a huge loss of fund, time, reputation to the editor and reviewer as well as the researcher.
- Destroy the public trust on researchers because people in general have lot of faith on the researchers.

Ethical Requirements

- Honesty and Carefulness
- Objectivity and Integrity
- Transparency and Confidentiality
- Responsible publication and Responsible Mentoring
- Non Discrimination and Competence
- Legality

Conclusion

Publication of research work is very much important.The published work helps the young researchers to enrich their knowledge.They gather information from that .But there is research ethics . All researchers must be aware of that standard procedure to avoid publication misconduct.As discussed researchers are found guilty and they have been deregistered and their papers are being retracted. The misconducts have immense impact. So Govt. and Research Institutes must enforce effective policies to guide research studies across the world.

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7. Use of Urkund Software for Plagiarism Detection in Tumkur University : A Study

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India is the third largest country with higher education system with 54 Central University , 434 State Universities and more than 129 Deemed Universities and more than 185 private universities, and around 36000 colleges is moving towards new education policy era. The higher education land scape has changed with stringent measure towards academic and research excellence. The information available in abundant has created new challenges in bringing originality where the plagiarism is become common practice due to finger tip internet world where text, audio, video can be downloaded and change to the convenient and present it as own and not acknowledging the author or the original creator. The autonomous agencies of higher education in India have identified this and put brake into practice by adopting using of plagiarism check tools to prevent and bring awareness about publication and ethics. This paper is an study of experience in using the plagiarism detection software in the Tumkur University and its outcome.
*Keywords**: University, Plagiarism, Urkund, Ouriginal, Shodhganga, Higher***

INTRODUCTION

Plagiarism is not the new term become popular, because of its use in academic circle. Copy and paste is common phenomena due to availability of ICT tools which has made scholarly work easy to reproduce and change according to their needs. In the Dictionary of Etymology, the word plagiarism, which means "literary theft", is explained as coming from the English word "plagiary" ('one who wrongfully takes another's words or ideas'), derived from the Latin plagarius ('kidnapper, seducer, plunderer, literary thief'), from plagium (kidnapping) from plaga (snare, net) (Barnhart, 1988, p. 801). The Compact Oxford English Dictionary (2009) defines plagiarism as the act of "taking the work or idea of someone else and pass it off as one's own."

Plagiarism is academically dishonest work as they claiming others work into theirs. Popularly following are the disguised types of plagiarism practice you may witness and its tough detect without sophisticated software and methodology incorporated in it.

1. Direct plagiarism
2. Self-plagiarism
3. Accidental plagiarism
4.Mosaic plagiarism
5. Paraphrasing
6.Complete plagiarism

The methods of fighting plagiarism may generally be divided into two classes according to Lukashenko et al (2007), that is, methods of plagiarism prevention as the first class and methods of plagiarism detection as the second class

Review of Literature

Awasthi(2019)conducted study on plagiarism and academic misconduct during 2009-2018. This highlights earlier studies that dealt with the concepts of plagiarism and academic misconduct, factors of plagiarism, types of plagiarism, strategies to avoid plagiarism, anti-plagiarism software/ tools and need for anti-plagiarism software. From the study, it is found that the abundance of literature is available on

plagiarism and academic misconduct, which implies that the majority of users are aware of the concept of plagiarism and academic integrity. It is also found that in academics, a vigilant approach is required to tackle the problem related to plagiarism and other forms of academic misconduct and accordingly measures must be implemented to control them. Autade, Suryawanshi(2018) in their research work presented systematic survey on 7 best text plagiarism detection tools. Systematic survey presents core methodology of Tool, supported file formats limitations and future enhancements in tool. Chowdhury et al. (2016) provided a comprehensive list of available plagiarism detection systems. The Analytical perspective study made by Singh(2016) gave suggestion on Sustaining Skills to Avoid Plagiarism/Reduce the Percentage of Plagiarism at the Institution Level by considering both open access and licensed softwares.

In India higher education regulatory bodies like UGC, AICTE, NAAC, ICMR etc have taken toughest measures against plagiarism in academic space and due to those stringent policies, most of the universities and technical institutes across nation using Antiplagiarism software of their choice available in the market. Indian education market is having huge scope for antiplagiarism software as it has more than 50K colleges, 850+ universities and other publicly funded several research and development organizations.

URKUND Plagiarism Detection Software

The URKUND **(New Name : Ouriginal)** anti-plagiarism software tool is presently freely available to all eligible universities in India through Information and Library Network (INFLIBNET) (an Inter-University Centre of University Grants Commission a higher education monitoring organization of Government of India) to scan the doctoral theses with the intention of plagiarism detection/ similarity check before submission of thesis to the particular universities in India.

UGC Guidelines 2018 University Grant Commission clearly says in its notification dated 23rd July 2018 about plagiarism policy. What kind of documents needs to be plagiarism check and what things needs to be exclude from uploading documents are. In order to uphold the academic ethics in Indian academic environment and research activities must and should have stringent policies.

"Plagiarism" means the practice of taking someone else's work or idea and passing them as one's own.

"Script" includes research paper, thesis, dissertation, chapters in books, full-fledged books and any other similar work, submitted for assessment / opinion leading to the award of master and research level degrees or publication in print or electronic media by students or faculty or researcher or staff of an HEI; however, this shall exclude assignments / term papers / project reports / course work / essays and answer scripts etc.;

"Source" means the published primary and secondary material from any source whatsoever and includes written information and opinions gained directly from other people, including eminent scholars, public figures and practitioners in any form whatsoever as also data and information in the electronic form be it audio, video, image or text; Information being given the same meaning as defined under Section 2 (1) (v) of the Information Technology Act, 2000 and reproduced here in Regulation 2 (l);

Penalties

Penalties in case of plagiarism in submission of thesis and dissertations

Institutional Academic Integrity Panel (IAIP) shall impose penalty considering the severity of the Plagiarism.

Level 0: Similarities upto 10% - Minor Similarities, no penalty.

Level 1: Similarities above 10% to 40% - Such student shall be asked to submit a revised script within a stipulated time period not exceeding 6 months.

Level 2: Similarities above 40% to 60% - Such student shall be debarred from submitting a revised script for a period of one year.

Level 3: Similarities above 60% -Such student registration for that programme shall be cancelled.

Based on the recommendation of Sub-Committee, National Steering Committee (NSC) of e-ShodhSindhu, The Ministry of Education, Govt. of India has initiated a programme "ShodhShuddhi" which provides access to Plagiarism Detection Software (PDS) to all universities/Institutions in India since Sept 1, 2019. 1000+ institutions are identified which includes Central Universities, State Universities, Deemed to be University, Private Universities, Centrally funded Technical Institutions(CFTIs).

Under this initiative, Ouriginal (formerly Urkund) a Web Based Plagiarism Detection Software system is being provided to all users of universities/Intuitions in the country. This initiative is formally launched by Former Minister of Education (formerly MHRD) on September 21, 2019.

Ouriginal (formerly Urkund) is a plagiarism software solution that combines text-matching with writing style analysis, enabling educators and users to assess the authenticity of any text. Our product helps create an environment which fosters fairness and sparks creativity among students, facilitating personal development by unlocking their full potential.
This Software can be used in Learning management system and also a stand-alone product.

Easy to use

Ouriginal is adaptable and easily integrated with popular learning management systems such as Moodle, Blackboard, D2L/Brightspace, Canvas, Microsoft, and Google Classroom along with scores of regional solutions and eLearning tools.

Efficient and accurate

It delivers accurate analysis reports quickly.

Highly accessible and reliable

Service Provider uses multiple servers at independent sites to store data and run the application. So even if one of them goes down, system can continue functioning as normal. It is designed in a way that there is no single point of failure.

Data security

Privacy and data security are taken very seriously at Ouriginal. Documents are treated with absolute confidentiality and will never grant access to others without Institution administrator or Co-ordinator permission. You always remain in full control of your data.
Ouriginal offers access to the PPP. It is an exclusive joint archive that enables the cross-checking of new submissions with documents already submitted by other clients. The pool expands constantly because it adds all submissions from participating institutions and publishers.

Seamless integrations

Our tools can seamlessly integrate into your current workflow without having to change how you work. Ouriginal can be integrated with an ever-increasing list of learning management systems and eLearning tools

.**Metrics**

This feature takes stylometry to the next level. By using pre-defined quantitative parameters, the software can analyze different writing styles and identify writer patterns which can then be used to verify the authorship of a document to deter ghost writing/ contract cheating.

Licensed content from quality sources

In addition to open access content available on the internet, the software solution provider strategy includes the aggregation of important scholarly content from academic publishers such as Springer, Taylor & Francis, Wiley, IEEE and Gale/Cengage.

Reducing false positives

False positives can greatly undermine the overall analysis and can make it increasingly frustrating for a user to evaluate the originality of a text. Ouriginal's machine learning algorithms identify false positives and remove them from the analysis, thereby enhancing the accuracy of the findings.

Detailed reporting

The analysis report is detailed and presents the findings in an easily readable format. The report highlights the matches in text in the submitted document and lists the most relevant sources to the matched content.

Methodology

Tumkur University is using Urkund software from 2016, provided by INFLINBNET under Shodhganga MoU with University signed in the month of July 2015 to uploaded the thesis, the state university is NAAC accreditated with 12(B) status and effectively used for the academic and research activities purpose. the downloaded thesis report with its percentage data taken and the uploaded thesis to plagiarism detection software from 2018-2020 were taken into consideration since more number of thesis for plagiarism check were submitted from 2018 compared to previous years. The percentage of each thesis was taken and tabulated according to the disciplines. The limitation is only for three years and 2021 awarded thesis are not fully uploaded in the portal.

Table-1: Percentage of Total No. of Tumkur University Awarded Thesis uploaded to Shodhganga Repository

Sl.No	Subject	Total No. of Thesis uploaded to Shodhganga	Thesis uploaded to Urkund Plagiarism Software (2018-2020)	Percentage of Thesis uploaded
1.	Chemistry	21	22	**95%**
2.	Physics	18	13	**72%**
3.	Bio-Chemistry	03	11	**27%**
4.	Bio-Technology	04	08	**50%**
5.	Business Administration	17	19	**89%**
6.	Commerce	14	45	**31%**
7.	Economics	17	26	**65%**
8.	Electronics	02	02	**100%**
9.	English	05	09	**55%**
10.	History and Archaeology	07	06	**116%**
11.	Kannada	16	00	**--**
12.	Library and Information Science	06	05	**83%**
13.	Mathematics	02	02	**100%**
14.	Microbiology	02	02	**100%**
15.	Music	02	00	**--**
16.	Sanskrit	02	00	**--**
17.	Social Work	13	15	**83%**
18.	Sociology	02	05	**40%**
19.	Zoology	03	00	**--**
20.	Political Science	07	06	**116%**
21.	Computer Science	05	05	**100%**
	Total	**168**	**201**	

This table shows that as on 23-08-2021 168 thesis has been uploaded in the shodhganga portal more number of thesis uploaded in Chemistry, followed by Physics and Business Administration. Out of 201 thesis checked for plagiarism(2018-2020) and cleared only 168 thesis been uploaded. The percentage of uploaded thesis is 83% and 95% of chemistry thesis is uploaded to the portal followed by 89% thesis uploaded in Business Administration (2018-2020) compared to the second highest thesis uploaded in Physics subject least number of thesis uploaded compared to plagiarism uploaded thesis is Bio-Chemistry (27%), followed by Commerce with (31%)

Table-2: Plagiarism Percentage of the Science Discipline Uploaded thesis in Urkund Software

Sl. No	Subject	2018-2020 Average Percentage
1.	Biochemistry	5%
2.	Biotechnology	5%
3.	Botany	6%
4.	Chemistry	8%
5.	Computer Science	6%
6.	Electronics	6%
7.	Library and Information Science	9%
8.	Mathematics	8%
9.	Microbiology	5%
10.	Physics	9%
11.	Zoology	5%

The highest number of plagiarism percentage is found in Library and Information Science 9% , Physics followed by Chemistry 8% and Mathematics8%. Botany, Computer Science, Electronics, showing 6% followed by Biochemistry, Biotechnology, Microbiology, Zoology is 5% this shows that higher percentage are found in Physics and Chemistry because of thesis uploaded to plagiarism check before July 2018 when the plagiarism

Table-3: Plagiarism Percentage of the Commerce & Management Uploaded thesis in Urkund Software

Sl. No	Subject	2018-2020 Average Percentage
1.	Commerce	7%
2.	Management	4%

The highest average percentage in the above table is found in Commerce 7% compared to the Management subject which shows 4%. This indicates that plagiarism are more found in commerce due to less awareness of plagiarism check and balance compared to business faculty.

Table-4 : Plagiarism Percentage of the Social Sciences Discipline Uploaded thesis in Urkund Software

SL. No	Subject	2018-2020 Average Percentage
1.	Economics	7..5%
2.	History and Archaeology	5.5%
3.	Islamic Studies	9%
4.	Political Science	9%
5.	Social Work	5%
6.	Sociology	2%

Table 4 shows the percentage of Social Science subject, under this more percentage are found in Political Science and Islamic Studies, followed by Economics with 7.5%. This indicates that faculty of Political Science and Religious study need more awareness and Economics faculty are aware of plagiarism their average percentage is due to many of thesis uploaded before July 2018 before the UGC new plagiarism policy

Table-5 : Plagiarism Percentage of the Humanities Discipline Uploaded thesis in Urkund Software

SL. No	Subject	2018-2020
1.	English	4%

The above table shows that average percentage is 4%, the regional language Kannada thesis are not checked in the Urkund, due to limitation of regional language database and scholars are not following the Uni-code for formatting the thesis and same be submitted.

Findings:

The Average plagiarism check percentage in Science discipline is 7%
The Average plagiarism check percentage in Social Science discipline is 4%

The Average plagiarism check percentage in Commerce and Management is 5%

The percentage of uploaded thesis of Commerce is less compared to uploaded thesis to the plagiarism software check and which has been cleared for the submission.

Overall there is less rejection of thesis after the plagiarism check for the award of the degree as per the analysis the meagre thesis in related to Physics and Chemistry has sent for resubmission with recheck in software tool. Time tested it was found that when a regional language thesis was uploaded for trial and error purpose the percentage shown by thesis was 1%. In the Urkund software the analysis shows 3% in the dashboard but when downloaded the report shows 2%, this technical snag has been overcome in New version Ouriginal where the dashboard shows 2% and the downloaded report also shows 2%.

Conclusion:

There is misinformation about plagiarism still among the scholars and students, the awareness of plagiarism in a systematic way to be trained by the concerned authorities, the ethics on publication related should be imbibed at the elementary level and acknowledging culture has to be practised consistently and writing, reading culture should be practised more proactively to improve the academic and research excellence, since the cut and paste has become a habit knowingly or un-knowingly. Prevention is better than further checking at different level and filtering by software tool and also finally a human intervention to give justice.

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8. Ethics of Research

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Albert Einstein very popular Quote "If we knew what it was we were doing, it would not be called research" is tells us much more depth of the research. Research is sometime creativity it's been hypothesis and has many unsolved questions in mind before we think to start it. But the prime think is to know the ethics of research

Dictionary defines the ethics as moral principles that govern a person's behaviour or the conducting of an activity. The standard of research is been maintained by various ethics and hence it become necessary to think Ethics in Research work our aptitude to surprise generates idea of research.

The aptitude of humans to transfer the new information to the next generation leads in development of the subject specific knowledge .Inquisitiveness and the self-driven hard work to please individual curiosity form the basis of research.

Research involves methodical and original investigations in any field of comprehension be it about rational or acquisitive issues, or anything in this Universe that. Such acts improve the understanding, enable postulation of operative laws and enhance knowledge. The improved knowledge in turn facilitates new conclusions and raises new questions. Being a social organism, it is natural that individuals, who acquired new knowledge/ understanding, share the same with others. This in turn implies that the society comprises both the owners and recipients of new information.

Ethics of Research: Chaddah, (1). Defines concept as Different but complementary domains so that the question being asked can be examined from different perspectives. In some cases collaboration develops at a late stage of investigation when help of another laboratory or researcher is required to fill in some gap/s for which the original lab is not so competent Developing and maintaining healthy and productive collaboration requires good ethical practices. Such collaborations within the institution or outside should be forged on good and a priori well defined understanding to avoid possible conflicts at a later stage.

A healthy and lasting collaboration is built on honesty and mutual trust for the long-term sustenance. Depending upon the need in specific cases, collaboration may be a one-time event or may be a long-term partnership. In either case, the bases of collaboration and credit-sharing should be understood and agreed upon at the initial stages itself as a safeguard against any later stage misunderstanding or dispute.

A collaborative work may also involve one or more Ph.D. student(s). In such cases, the basis for inclusion of specific aspects of the collaborative outcome in the doctoral thesis of the student/s should be understood and agreed upon ab-intio, by collaborating partners. This would ensure error-free data, avoid any accidental plagiarism and would make the dissemination of the research output smoother.

Collaboration may also be required in some cases when a research proposal is required to be submitted to make use of a centralized user facility (e.g., synchrotron radiation sources, neutron sources, particle accelerators, an inter-university Centre, a centralized or national computational facility or an instrumentation center) where use of the facility is allotted based on merit of the proposed work.

Research Supervisor-Student Relationship

Paul Gill in 2008 (2) noted that Research has shown that effectual direction can significantly influence the quality of the PhD and its eventual success or failure. Consequently, many common problems experienced during a PhD often relate to difficulties in the supervisory process. PhD students and supervisors often have different expectations, needs and ways of thinking and working. The purpose of this paper is, therefore, to provide an overview of the key elements of research supervision.

The affiliation among a research guide and Ph.D. scholar is markedly dissimilar teacher-student relationship. It requires interaction so that the actual research work gets better synergized and the research student gets really involved in planning and execution of the plan, rather than working only as a technical help to the supervisor. Since the doctoral degree is generally the last step in formal learning, a good foundation in ethical practices is essential to prepare quality researchers who can be effective leaders in times to come. Some general practices that should be followed by the supervisor and students are noted below.

The research objectives and research plan that a new Ph.D. scholar wishes to undertake for his/her doctoral thesis should be adequately discussed by supervisor and student. For an informed and meaningful discussion leading to student's desire to work on the given topic, the student also needs to have read the relevant literature. A research student should choose the doctoral supervisor keeping in view his/her personal interests and competence in a given field and the research interests and competence of the proposed supervisor. A good matching of 'wavelengths' of the supervisor and student is essential for developing a healthy and lasting relationship.

The research plan should be discussed by both the student and the supervisor so that the research student understands why a given strategy is being followed as also the modus operandi on data collection, recording of observations and interpretations. Research supervisor should guide and steer progress of the student's research efforts so that the work to be embodied in the doctoral thesis can generally be completed within the stipulated time-frame available to the Ph.D. scholars. An overly ambitious plan with a large proportion of uncertainty should generally be avoided. However, if an enthusiastic student is willing to take the challenge, he/she may work on such questions with an explicit understanding that negative results can also be useful science. It must be realized at all level that more than anything else; a doctoral thesis is a training for a student to learn to carry out a project independently. This focus should never be lost.

Supervisor needs to ensure adequate training of research students on safe, ethical and appropriate usages of the various research methods and equipment. While they learn the technique, they should also be trained to understand their operative principles. Students should be encouraged to read widely, to participate in seminars and discussion meetings and to periodically present their own data and/or data from other publications to improve their ability to effectively communicate. They should be encouraged to share their ideas and it is the responsibility of the senior to create an ambience of trust.

Research students need to be encouraged and provided with opportunities to improve their writing skills (Moore, 2018). They should be encouraged to prepare the first drafts of manuscripts for publication or for the doctoral thesis. Any corrections/modifications made by the supervisor

Responsible research publication

Accuracy and Reliability: The research being reported should have been conducted in an ethical and responsible manner and follow all relevant legislation. The research being reported should be sound and carefully executed. Researchers should use appropriate methods of data analysis and display (and, if needed, seek and follow specialist advice on this).Authors should take collective responsibility for their work and for the content of their publications. Researchers should check their publications carefully at

all stages to ensure methods and findings are reported accurately. Authors should carefully check calculations, data presentations, typescripts/submissions and proofs.

Honesty of research publication: Researchers should present their results honestly and without fabrication, falsification or inappropriate data manipulation. Research images (e.g. micrographs, X-rays, pictures of electrophoresis gels) should not be modified in a misleading way. Researchers should strive to describe their methods and to present their findings clearly and unambiguously. Researchers should follow applicable reporting guidelines. Publications should provide sufficient detail to permit experiments to be repeated by other researchers. Reports of research should be complete. They should not omit inconvenient, inconsistent or inexplicable findings or results that do not support the authors' or sponsors' hypothesis or interpretation. Research funders and sponsors should not be able to veto publication of findings that do not favour their product or position. Researchers should not enter agreements that permit the research sponsor to veto or control the publication of the findings (unless there are exceptional circumstances, such as research classified by governments because of security implications).Authors should alert the editor promptly if they discover an error in any submitted, accepted or published work. Authors should cooperate with editors in issuing corrections or retractions when required. Authors should represent the work of others accurately in citations and quotations. Authors should not copy references from other publications if they have not read the cited work.

Balance: New findings should be presented in the context of previous research. The work of others should be fairly represented. Scholarly reviews and syntheses of existing research should be complete, balanced, and should include findings regardless of whether they support the hypothesis or interpretation being proposed. Editorials or opinion pieces presenting a single viewpoint or argument should be clearly distinguished from scholarly reviews. Study limitations should be addressed in publications.

Originality: Authors should adhere to publication requirements that submitted work is original and has not been published elsewhere in any language. Work should not be submitted concurrently to more than one publication unless the editors have agreed to co-publication. If articles are co-published this fact should be made clear to readers. Applicable copyright laws and conventions should be followed. Copyright material (e.g. tables, figures or extensive quotations) should be reproduced only with appropriate permission and acknowledgement. Relevant previous work and publications, both by other researchers and the authors' own, should be properly acknowledged and referenced. The primary literature should be cited where possible. Data, text, figures or ideas originated by other researchers should be properly acknowledged and should not be presented as if they were the authors' own. Original wording taken directly from publications by other researchers should appear in quotation marks with the appropriate citations. Authors should inform editors if findings have been published previously or if multiple reports or multiple analyses of a single data set are under consideration for publication elsewhere. Authors should provide copies of related publications or work submitted to other journals. Multiple publications arising from a single research project should be clearly identified as such and the primary publication should be referenced. Translations and adaptations for different audiences should be clearly identified as such, should acknowledge the original source, and should respect relevant copyright conventions and permission requirements. If in doubt, authors should seek permission from the original publisher before republishing any work.

Transparency: All sources of research funding, including direct and indirect financial support, supply of equipment or materials, and other support (such as specialist statistical or writing assistance) should be disclosed. Authors should disclose the role of the research funder(s) or sponsor (if any) in the research design, execution, analysis, interpretation and reporting. Authors should disclose relevant financial and non-financial interests and relationships that might be considered likely to affect the interpretation of their findings or which editors, reviewers or readers might reasonably wish to know. This includes any relationship to the journal, for example if editors publish their own research in their

own journal. In addition, authors should follow journal and institutional requirements for disclosing competing interests.

Acknowledgement: The research literature serves as a record not only of what has been discovered but also of who made the discovery. The authorship of research publications should therefore accurately reflect individuals' contributions to the work and its reporting. In cases where major contributors are listed as authors while those who made less substantial, or purely technical, contributions to the research or to the publication are listed in an acknowledgement section, the criteria for authorship and acknowledgement should be agreed at the start of the project. Ideally, authorship criteria within a particular field should be agreed, published and consistently applied by research institutions, professional and academic societies, and funders. While journal editors should publish and promote accepted authorship criteria appropriate to their field, they cannot be expected to adjudicate in authorship disputes. Responsibility for the correct attribution of authorship lies with authors themselves working under the guidance of their institution. Research institutions should promote and uphold fair and accepted standards of authorship and acknowledgement. When required, institutions should adjudicate in authorship disputes and should ensure that due process is followed. Researchers should ensure that only those individuals who meet authorship criteria (i.e. made a substantial contribution to the work) are rewarded with authorship and that deserving authors are not omitted. Institutions and journal editors should encourage practices that prevent guest, gift, and ghost authorship all authors should agree to be listed and should approve the submitted and accepted versions of the publication. Any change to the author list should be approved by all authors including any who have been removed from the list. The corresponding author should act as a point of contact between the editor and the other authors and should keep co-authors informed and involve them in major decisions about the publication (e.g. responding to reviewers' comments).Authors should not use acknowledgements misleadingly to imply a contribution or endorsement by individuals who have not, in fact, been involved with the work or given an endorsement.

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9. Variables in the Educational Research

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Introduction:

An observation is information collected by an individual or thing, possess a variety of characteristics. If the characteristics of an observation is the same for every member of the group i.e., if it does not vary it is called constant. If a characteristic of an observation differs for group members it is called a variable. Variable is something that can change and or can have more than one value in simple words. A variable as the name implies, is something that varies. It may be weight, height, temperature, test scores, attitude, aptitude etc, it may change from person to person, group to group or even within one person over time. Some variables can be concrete and clear, such as gender, birth order, and type of blood groups while others can be more abstract and vague.

Variables are a property that takes one different values. It is also a logical grouping of attributes. Attributes are characteristics or qualities that describe an object, example – If gender is variable then male and female are the attributes. Variables can be defined in terms of measurable factors though a process of operationalization. It will convert difficult concepts into easily understandable concepts. A variable is a concept or abstract idea that can be described in measurable terms. In research the variable refers to the measurable characteristics, qualities, traits or attributes of a particular individual, object or situation being studied. Thus variables are properties or characteristics of some event, object or person that can take on different values or amount.

A variable is a property that takes on different values was stated by Kerlingers.

Black and Champion define variables as “rational units of analysis that can assume any one of a number of designated sets of values”.

Webster defined variable as “An able to vary or alter, susceptible to change, having no fixed value”.

A concept which can take on different quantitative values is called variable. It is the value that can be manipulated, measured, described or controlled value after giving a name becomes variable. Example temperature, age, year etc. A variable can represent anything whose values change over a set of units. It is an image, perception or concept that is capable of measurement. Every variable has at least two possible values in order to vary. A variable may have different values and takes on different values from case to case, from time to time. Thus variables are the one that can be measured, controlled or manipulate in the research.

Variables may also include an aspect of the educational system, such as a specific teaching method or counseling program. A variable is any property, a characteristic, a number, or a quantity that increases or decreases over time or can take on different values (as opposed to constants, such as n, that do not vary) in different situations. It is pertinent for a researcher to know as how certain variables within a study are related to each other. It is thus important to define the variables to facilitate accurate explanation of the relationship between the variables. There is no limit to the number of variables that can be measured, although the more variables, the more complex the study and the more complex the statistical analysis.

Characteristics of Variables:

- Variables can change
- Variables can take up different values
- Variables can be selected by the researcher
- Variables can be either manipulate by researcher or the effect of another variable can be observed or studied by the researcher
- In variables raw data or figures will be gathered by researcher for statistical purposes
- Values of one variable can be predicted on the basis of another variable
- Variables have a period when they start and stop
- Variables have pattern such as daily, weekly, monthly
- The values of the variables can change over time or across units.
- It plays a key role in the selection of the methods and tools in a study and also influences the result of the study
- Variables provides focus to the study
- Variables are used to study the characteristics of a person or objects
- In variables, the values will arise from counting from measurement
- Variables are measured on different scales, where one end they can only be categorized or ranked, at the other end they can be analyzed statistically.

Thus variable is a quantity of a phenomenon that can be measured or classified.

Types of variables: Based on the casual relationship, the variables are classified in to six types

1. Independent variable
2. Dependent variable
3. Intervening variable
4. Extraneous variable
5. Moderator variable
6. Control variable

1) **Independent variable:** These are the variables which are manipulated or controlled or changed. It is a variable that explains other variable. It is also called explanatory, predictor or manipulated variable. The researcher has the control over the independent variable and can choose to control over the independent variable and can choose to alter or change them and has effects on dependent variable. **Example**: A study of the effect of teachers' praise on reading achievement on fifth graders.
   Independent Variable - Teachers' Praise
   Dependent Variable - Reading achievement
2) **Dependent variable**: These variables are which depends upon or is a consequence of the other variable. It is an outcome variable. It is the variable which is explained by other variable. Thus the variable which changes on account of independent variable is known as dependent variable. It is also called the outcome response, criterion variable or explained variable. The outcomes or changes brought by introduction of an independent variable. It shows the effect of manipulating or introducing the independent variables. Dependent variable changes or reacts to the state of the independent variable. The variation in the dependent variable depends on the variation in the independent variable. The terms Dependent and independent variables are applied in experimental research. **Example:** Poverty leads to drop out of students from school.
   Dependent variable - Dropout of students
   Independent Variable – Poverty

3) **Intervening variables**: variable that is not directly observable but that link the independent and dependent variable is called intervening variables. It is also called confounding variable. In certain situations the relationship between an independent and a dependent variable cannot be established without the intervention of another variable. And this variable that linked the dependent and independent variable but cannot be observed is called intervening variables because it intervenes in the relationship between dependent and independent variables. **Example** – Language learning and Teaching. In language learning and teaching, they are usually inside the subject heads, including various language learning processes which the researcher cannot observe. In this example, if the use of a particular teaching technique is the independent variable and mastery over the objectives is the dependent variable, then the language learning processes used by the subjects are considered intervening variable.
4) **Extraneous variables:** Extraneous variables are the variables that are not related to the purpose of the study, but may affect the dependent variable, are termed as extraneous variables. They are dangerous; they may damage a study's validity by making it impossible to know whether the effects were caused by the independent and moderator variables or some extraneous factors. If they cannot be controlled, extraneous variables must at least be taken into consideration when interpreting results. A study must always be so designed that the effect upon the dependent variable is attributed entirely to the independent variable and not to extraneous variable. **Example**: The researcher wants to test the hypothesis that there is a relationship between children's gain in social studies achievement and their self-concepts. In this case self concept is an independent variable and social studies achievement is a dependent variable. Intelligence may as well affect the social studies achievement, but since it is not related to the purpose of the study undertaken by the researcher it will be termed as an extraneous variable.
5) **Moderator variable:** It is a type of variable that when introduced into an analysis alters or has a contingent effect on the relationship between an independent and a dependent variable. A moderator variable is an independent variable that is not of primary interest that has levels, which when combined with the levels of the independent variable on interest produces different effects. Thus a moderator variable is the one, which is measured, manipulated or selected by the researcher to discover whether it modifies the relationship of the independent variable to an observed phenomenon. It is a special type of independent variable. **Example:** In a study of two methods of teaching reading, one of the methods of teaching reading may work better with boys than girls. Method of teaching reading is the independent variable and reading achievement is the dependent variable. Gender is the moderator variable, because it changes the relationship between the independent and dependent variable.
6) **Control variable:** Control variables are the variables that are not measured in a particular study must be held constant, neutralized/balanced or eliminated, so they will not have a biasing effect on the other variables. Control variable is also known as covariate. It is the factor that is kept constant all throughout the experiment. Such variables that have been controlled in this way are called control variable. There can be many controlled variables in an experiment. **Example:** Students of different ages were given the same jigsaw puzzle to put together.

   Independent variable – Ages of the students
   Dependent variable – Time to put puzzle together
   Control variable – Same puzzle

The combined Variables: The relationship between the types of variables based on Causes-Relationship-Effect. Independent, moderator and control variables are causes. The independent and moderator variables are those being studied where as control variable are neutralized. At the other end, dependent variables represent effects, while intervening variable conceptualizations that intervene

between operationally control causes and operationally stated effects. **Example:** Do increases in teacher enthusiasm produce increased pupil achievement in social studies at the Fourth grade level? Do the effects of teacher enthusiasm interact with student reading ability or student gender?

- The independent variables is degree of teacher enthusiasm with three levels : High, Medium and low
- The moderator variables are a) student reading ability b) student gender
- The control variables are a) grade level and b) subject matter
- The intervening variable might be student attention or involvement or over activity
- The independent variable is pupil achievement.

OPERATIONALIZATION OF VARIABLES: Operationalization is the process of firmly defining variables into measurable factors. The process defines unclear concepts and allows them to be measured, experientially and quantitatively. Operationalizing a variable means finding a measurable, quantifiable, and valid index for your variable (independent and dependent variables), and sometimes deciding a way to manoeuver that variable in such a way as to have two or more levels. In the process of defining a term, we also need to think about how we are going to evaluate the concept. Operationalization refers to the process of figuring out how to measure the concepts that interest us. Many of the common concepts are not concrete. We cannot really point them directly. Instead, we have to find a way to measure them, often indirectly.

Conclusion:

Variables are basic ingredients of every research and the new entrant to the field should study this aspect of research very critically because failure to have well defined variables at the beginning of the studies will lead to blind alley along the line. Thus, the most difficult part of planning a research study is identifying the research variables and research design. Considerable time and thought needs to be given to this step. Once the key variables have been identified, then the research study can be developed. Therefore Variables play a significant role in educational research.

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10. Educational Research Hypotheses

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Introduction

We cannot take a single step forward in any inquiry unless we begin with a suggested explanation or solution of the difficulty which originated it. Such tentative explanations are suggested to us by something in the subject-matter and by our previous knowledge. When they are formulated as propositions, they are called hypotheses. The hypothesis (plural hypotheses) is a tentative solution of a problem. It is very essential to a research worker to understand the meaning and nature of hypothesis. The researcher always plan or formulate a hypothesis in the beginning of the problem.

Meaning of Hypotheses

If we go by the origin of the word, it is derived from the Greek word 'hypotithenai' meaning '*to put under*' or to '*to suppose*'. The Etymological meaning, according to *Kumar Singh* (2006) of hypothesis is from two Greek roots, 'Hypo' and 'thesis' = Hypothesis.

'Hypo' means,

- *tentative or subject to the verification*
- *composition of two or more variables which is to be verified.*

'Thesis' means,

- *statement about solution of a problem*
- *position of these variables in a specific frame of reference.*

The word meaning of the term hypothesis is a tentative statement about the solution of the problem. Hypothesis offers a solution of the problem that is to be verified empirically and based on some rationale. Another meaning of the word hypothesis which is composed of two words - 'Hypo' means composition of two or more variables which is to be verified, 'thesis' means position of these variables in the specific frame of reference. It is the presumptive statement of a proposition or a reasonable guess, based upon the available evidence, which the researcher seeks to prove through his study.

- A hypothesis is a tentative statement about the relationship between two or more variables.
- A hypothesis is a formal tentative statement of the expected relationship between two or more variables under study.
- Hypothesis is considered as an intelligent guess or prediction, that gives directional to the researcher to answer the research question.
- A hypothesis is an assumption about relations between variables. It is a tentative explanation of the research problem or a guess about the research outcome.
- Hypothesis or Hypotheses are defined as the predictive statement or explanation, capable of being tested by scientific methods that show the relationship between two or more independent to some dependent variables in a specified population.
- A hypothesis is a specific, testable prediction about what you expect to happen in your study. To be complete the hypothesis must include three components,
  - The variables;
  - The population; and
  - The relationship between the variables.

Definitions of Hypotheses

- *Eric Rogers* (1966) stated, "Hypotheses are single tentative guesses, good hunches assumed for use in devising theory or planning experiments intended to be given a direct experimental test when possible".
- According to *Kerlinger* (2002), "A hypothesis is a conjectural or unproven statement of the relation between two or more variables".
- *Creswell* (1994) defined it as "a formal statement that presents the expected relationship between an independent and dependent variable".
- *Me Guigan* (1998) define a hypothesis as "a testable statement of potential relationship between two or more valuables".
- According to *Calpine* (1975), "It is an assumption which serves as a tentative explanation for a researcher, it is a question put to nature to be observations".
- *Rebar & Rebar* (2001) have defined hypothesis as "any statement, proposition or assumption that serves as a tentative explanation of certain facts".
- *George A Lumberg* have defined it as "the hypothesis is a tentative generalization, the validity of which remains to be tested. In its most elementary stage, the hypothesis may be any hunch, guess, imaginative ideas, which become the basis for action or investigation".
- *Sarantakos* (1933) stated, "A hypothesis can be defined as a tentative explanation of the research problem, a possible outcome of the research, or an educated guess about the research outcome".
- *Macleod Clark J & Hockey* L (1981) have defined it as "a statement or explanation that is suggested by knowledge or observation but has not, yet, been proved or disproved".
- *Webster* (1968) has defined hypothesis as "a tentative assumption made in order to draw out and test its logical or empirical consequences." 'Test' here means "either to prove it wrong or to confirm it".
- According to *Good* and *Hatt*, "Hypothesis is a shrewd guess or inference that is formulated and provisionally adopted to explain observed facts or conditions and to guide in further investigations".

A hypothesis is therefore a shrewd and intelligent guess, a supposition, inference, hunch, provisional statement or tentative generalisation as to the existence of some fact, condition or relationship relative to some phenomenon which serves to explain already known facts in a given area of research and to guide the search for new truth on the basis of empirical evidence. The hypothesis is put to test for its tenability and for determining its validity.

In this connection Lundberg observes: quite often a research hypothesis is a predictive statement, capable of being tested by scientific methods, that relates an independent variable to some dependent variable. For example, consider statements like the following one: "Students who receives counselling will show a greater increase in adjustment than students not receiving counselling" or "There is a positive relationship between emotional intelligence scores and scores on social adjustment inventory for high school students".

Importance of Hypotheses

A hypothesis, which is a provisional formulation, plays significant role in empirical or socio-legal research. It not only navigates research in a proper direction but also contributes in testing or suggesting theories and describing a social phenomenon. Hypothesis may not be

required in all types of research. The research which are based on fact finding (historical or descriptive research) do not need hypothesis. *Hillway* also says that, "when fact-finding alone is the aim of the study, a hypothesis is not required.

- Hypotheses enable the researcher to objectively investigate new areas of discovery. Thus, it provides a powerful tool for the advancement of knowledge. They provide tentative explanation of facts and phenomenon, and can be tested and validated.
- Hypotheses provides link between theories & actual practical research.
- It provides a bridge between theory realities.
- As it is a tentative statement of anticipated results, it guides the researcher towards the direction in which the research should proceed.
- A hypothesis suggests which type of research is like to be most appropriate.
- It provides clarity to the research problem and research objectives.
- A hypothesis helps to translate the research problem and objectives into a prediction of the expected results or outcomes of the research study.
- It describes, explains or predicts the expected results or outcome of the research.
- Hypothesis provides clear and specific goals to the researchers. These goals provide the investigator with a basis for selecting sample and research procedures to meet the set goals.
- It directs the research study process.
- It identifies the population of the research study that is to be investigated or examined.
- It facilitates data collection, and implies the statistical techniques needed in the analysis of data. The relationship between the variables to be tested.
- It also helps to delimit his study in scope. So that it does not become broad.
- It serves as a framework for drawing conclusions of a research study. In other words, we can say that it provides the outline for setting conclusions in a meaningful way.
- Without hypothesis research would be like aimless wondering.

George J. Mouley thinks that Hypotheses serve the following purposes,

- They provide direction to research and prevent the review of irrelevant literature and the collection of useful or excess data.
- It Sensitize the investigator certain aspects of situation which are irrelevant from the standpoint of the problem at hand.
- Enable the investigator to understand with greater clarity his/her problem and its ramification.
- Serve as a framework for the conclusive, in short a good hypothesis: (a) Gives help in deciding the direction in which he has to proceed. (b) It helps in selecting pertinent fact. (c) It helps in drawing conclusions.

Van Dalen advocates the importance of hypothesis in the following ways -

- Hypotheses are essential research instrument, for they build a bridge between the problem and the location of empirical evidence that may solve the problem.
- A hypothesis provides the map that guides and expedites the exploration of the phenomena under consideration.
- A hypothesis pin points the problem. The investigator can examine thoroughly the factual and conceptual elements that appear to be related to a problem.
- Using hypothesis determines the relevancy of facts. A hypothesis directs the researcher's efforts into a productive channel.
- The hypothesis indicates not only what to look for is an investigation but how to obtain data. It helps in deciding research design. It may suggest what subjects, tests, tools, and techniques are needed.

- The hypothesis provides the investigator with the most efficient instrument for exploring and explaining the unknown facts.
- A hypothesis provides the framework for drawing conclusions.
- These hypotheses simulate the investigator for further research studies.

Criteria for Hypothesis Construction

Hypothesis is never formulated in the form of question. *Bailey* (1982), *Becker* (1989), *Selltiz* et al (1976), and *Sarantakos* (1998) have pointed out a number of standards to be met in formulating a hypothesis:

1. It should be empirically testable, whether it is write or wrong.
2. It should be specific and precise.
3. The statement in the hypothesis should not be contradictory.
4. It should specify variables between which the relationship is to be established.
5. It should describe one issue only.

A hypothesis can be formed either in descriptive or relational form. A hypothesis can also be formed in the directional, non-directional or null form.

Sources of Hypothesis

A good hypothesis can only be derived from experience in research. Though hypothesis should precede the collection of data, a good hypothesis can come only from experience. But, some degree of data collection, review of related literature or a pilot study will help in the development and gradual refinement of the hypothesis. A researcher should have quality of an alert mind to derive a hypothesis and quality of critical mind of rejecting faulty hypothesis. The following sources can help the researcher in coming up with a good hypothesis.

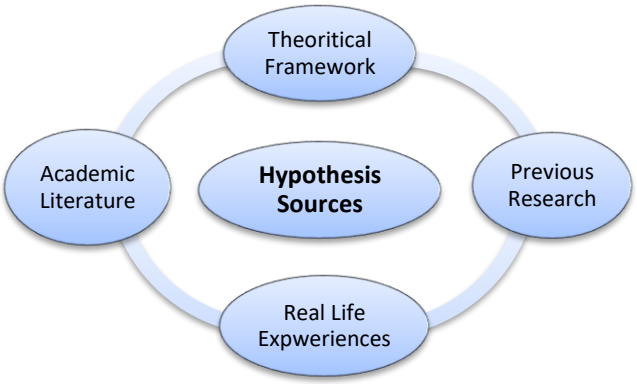

Fig: Diagramatic Representation of Sources of Hypotheses

Theoretical Framework - Theoretical framework or conceptual framework are the most important sources of hypothesis. Through a deductive approach these hypothesis are drawn from theoretical framework for testing them. Ex: Pavlov's theory – a hypothesis can be drawn about modification of behaviour.

Previous Research – A hypothesis may originate from findings of other studies. A hypothesis that rests on the findings of other studies is obviously from the first limitation.

Real-Life Experiences - Real life experiences may contribute in the formulation of hypothesis. The way in which an individual reacts also contributes in the statement of hypothesis. Newton had life changing experience of the falling of an apple and formulated the hypothesis that the earth attracts all the mass towards its centre before generating a law of gravity.

Academic Literature - Academic literature is based on formal theories, empirical evidences, experiences, observations and conceptualizations of academicians. These literatures may serve as good source for formulating hypothesis for research studies.

Thus, a hypothesis may originate from a variety of sources, in isolation or in combination with another. However, in-spite of these fertile sources of hypotheses, it is not easy to formulate a usable or workable hypothesis. It is often more difficult to find and formulate a problem than to
solve it. If a researcher succeeds in formulating a hypothesis, he/she can assure that it is half-solved. While formulating a hypothesis, researcher has to keep reminding that he/she has to formulate tentative proposition in such a way that it becomes usable in systematic study.

Difficulties In The Formulation of Hypothesis,

1. Lack of clean theoretical background.
2. Lack of logical background.
3. Lack of knowledge of scientific method.
4. Scientific theory.
5. Analogies.
6. Personal experiences.

Types of Research Hypotheses

Before researchers can begin working on a question that interests them, they need to formulate a research hypothesis. This is an important step in the scientific method because this determines the direction of the study. Scientists need to scrutinize previous work in the area and select an experimental design to use that helps them find data that either supports or rejects their hypothesis. Research hypotheses are of different types. They are,

Simple Hypothesis

Simple hypothesis is that one in which there exits relationship between two variables one is called independent variable or cause and the other is dependent variable or effect. This predicts the relationship between single independent and a single dependent variable.

Example:

- Smoking leads to cancer
- The higher ratio of unemployment leads to crimes.
- Hard work leads to more achievement.

Complex Hypothesis

Complex hypothesis predicts the relationship between two or more independent variables and two or more dependent variables.

Examples:

- Smoking and other drugs leads to cancer, tension, chest infections etc.
- The higher ration of unemployment, poverty, illiteracy leads to crimes like dacoit etc.
- Eating more vegetables and fruits leads to weight loss, glowing skin and reduce the risk of many diseases.

Directional Hypothesis

Directional hypothesis specifies not only the existence of a relationship between the variables, but also the expected direction of the relationship between variables i.e. it states the

nature of the relationship between two or more variables such as positive, negative or no relationship.

To express the direction of relationship between the variables, the directional terms are used to state the hypothesis such as, positive, negative, less, more, increased, decreased, higher, lower etc.

Scientific journal articles generally use this form of hypotheses. The investigator bases this hypothesis on the trends apparent from previous research on this topic.

Examples:

- High quality of teacher education will lead to high quality of teaching skills.
- There is a positive experience between years of teaching experience and job satisfaction among secondary school teachers.
- High school students who participates in extracurricular activities have a lower grade point average than those who do not participates in such activities.
- Adolescent boys with high IQ will exhibits low anxiety than adolescent boys with low IQ.

Non directional Hypothesis

Non-directional hypothesis is used in studies where there is no sufficient past research on which to base a prediction. It predicts/reflects the relationship between the independent variable and the dependent variable, but it does not specific the anticipated direction and nature of relationship such as positive or negative. It indicates the existence of relationship between the variables.

Examples:

- Teacher student relationship influence student's learning.
- There is a relationship between years of teaching experience and job satisfaction among secondary school teachers.
- The academic achievement of high school students is related to their participation in extracurricular activities.

Associative hypothesis

Associative hypothesis predicts an associative relationship between the variables that occurs or exists in natural settings without manipulation. When there is a change in any one of the variables, changes also occurs in the other variable. Do not indicate the cause and effect.

The associative relationship between the independent and dependent variables may have either,

– Positive association

– Negative association

Causal Hypothesis

Causal hypothesis predicts a cause and effects relationship or interaction between two or more independent variable and dependent variable in experimental or interventional setting, where independent variable is manipulated by the researcher to examine the effect on the dependable variable. This hypothesis predicts the effect of the independent variable on the dependent variable.

In this the independent variable is the experimental or treatment variable. The dependent variable is the outcome variable.

Examples:

- High school students who participate in extracurricular activities spend less time studying which leads to a low academic achievement.

Null Hypothesis

Null Hypothesis is also called statistical hypothesis because this type of hypothesis is used for statistical testing and statically interpretation. These are used when the researcher believes there is no relationship between two variables or when there is inadequate theoretical or empirical information to state a research hypothesis. It is denoted by: H_0 or H_n.

It states the existence of no relationship between the independent and dependent variables. It involves a statement that says, there is no significant relationship between two groups that the researcher compares on certain variable.

Examples:

- There is no significant difference in mental health of male and female secondary school teachers.
- There is no significant difference in mean gain scores of achievement in science of experimental and control group.
- There is no relationship between smoking and the incidence of coronary artery diseases.

Alternate Hypothesis

The alternative hypothesis proposes a relationship between two or more variables. It is denoted by H_1 or H_a. We give special consideration to the null hypothesis. This is due to the fact that the null hypotheses relates to the statement being tested, whereas the alternative hypothesis relates to the statement to be accepted if when the null hypothesis is rejected.

For example: If a researcher was interested in examining the difference in academic achievement of urban and rural secondary school students.

Ho: There is no significant difference in academic achievement of urban and rural secondary school students.

The final conclusion, once the test has been carried out, is always given in terms of null hypothesis. If we reject the null hypothesis then, suggests that the alternative hypothesis may be true.

Characteristics of the Hypothesis

The hypothesis is a clear statement of what is intended to be investigated. It should be specified before research is conducted and openly stated in reporting the results. It must be written in declarative form using present tense. It must contain variables, population under study and should be relevant to the research problem & objectives. A good hypothesis must possess the following characteristics,

1. *Conceptual Clarity* - A good hypothesis consists of clearly defined and understandable concepts. The concepts used in the hypothesis should be clearly defined, not only formally but also, if possible operationally. Formal definitions of the concepts will clarify what a particular concept stands for, while the operational definition will leave no ambiguity. To facilitate the conceptual clarity, hypothesis can be stated in declarative statement, in present tense.
2. *Empirical Referents* - A research must have an ultimate empirical referent. No usable hypothesis can embody moral judgments. A good hypothesis must have empirical basis from the area of enquiry.
3. *Objectivity* - Hypothesis must be objective which facilitates objectivity in data collection, and should be able to keep research activity from researcher value judgment.
4. *Specificity* - A good research hypothesis must be specific, not general and should explain the expected relations between the variables. *Ex*: Regular exercise reduces the sugar level.
5. *Relevant* - The hypothesis should be relevant to the problem being studies as well as the objectives of the study. In addition, hypothesis must have relevance with a theory under test in a research process.

6. *Testability* - Hypothesis should be testable and should not be a moral judgment. It should be directly or indirectly measurable. It must be verifiable.
   Ex: A hypothesis such as "bad parents produce bad children", this type of hypothesis cannot be tested.
   A testable hypothesis clearly states the manipulatable independent variables and measurable dependent variables in specific population which provides a clear idea about an interventional protocol and whether it will be implemented precisely and consistently as a treatment in the study.
   A good hypothesis states the causal link between independent and dependent variables, which is later evaluated by using inferential statistical tests.
7. *Consistency* - A hypothesis should be consistent with an existing body of theories, research findings and other hypothesis. It should correspond with existing knowledge.
8. *Simplicity* - A hypothesis should be formulated in simple and understandable terms. It should require fewer conditions and assumptions.
9. *Availability of Technique* - The researcher must ensure that, scientific methods are available for testing their proposed thesis.
10. *Purposiveness* - The researcher must formulate only purposeful hypothesis. Purposiveness refers to the relevance of hypothesis to the research problem and its objectives.
11. *Verifiability* - A good hypothesis should be verifiable in practical terms.
12. *Profundity of Effects* - A good hypothesis should have profound effect upon a variety of research variables.
13. *Economical* - The expenditure of resources can be controlled if the hypothesis underlying the research that which is undertaken is good.

Uses of Hypotheses in Educational Research

1. Hypotheses are indispensable for experimental researches. The experiments are conducted to collect empirical data to verify hypotheses. The experimental method or experimental designs are based on hypotheses. Hypotheses are the crucial aspects of such researches.
2. In normative survey research the investigator may or may not employ hypothetical type thinking, depending upon the purpose of the research study. Hypotheses are essential for analytical studies and there is little scope in descriptive type studies.
3. In complex casual research the hypotheses have important role in such investigations. These types of studies are conceptual in nature whereas historical are more factual in nature. Therefore, formulation of hypothesis is a crucial step of this type of studies.

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11. Methods of Data Collection in Research

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Introduction :

Data are individual facts, statistics or items of information which are collected through observation, interview, questionnaire and schedule methods. Data as a general concept refers to the fact that some existing information or knowledge is represented or coded in some form suitable for better usage or processing. Research data is any information that has been collected , observed, generated or created to validate original research findings. Although usually digital, research data also includes non-digital formats such as laboratory notebooks and diaries. Research data is nothing but the recorded factual material commonly accepted in the scientific community as necessary to validate research findings. Data collection is an important aspect of research.

Data is a set of values of subjects with respect to qualitative or quantitative variables. Data is raw, unorganized facts that need to be processed. It can be something simple and seemingly random and useless until it is organized. When data is processed, organized and structured or presented in a given context so as to make it useful, it is called information. The information is necessary for research activities which achieve in different forms. There are various types of data such as primary data, secondary data, cross-sectional data, categorical data, time series data, spatial data, ordered data etc.

Data Collection :

Data Collection is defined as the procedure of collecting, measuring and analyzing accurate insights for research by using standard validated techniques. A researcher can evaluate their hypothesis on the basis of collected data. In many cases, data collection is the primary and most important step for research, irrespective of the field of research. The approach of data collection is different for different fields of study, depending on the required information. The most critical objective of data collection is ensuring that information-rich and reliable data is collected for statistical analysis, so the data-driven decisions can be made for the research.

Definition of Data :

Some important definitions of Data are as follows –

1) " Fact is an empirically verifiable observation ." – **Goode and Hatt**
2) "Facts are not limited to the tangible, thoughts and feelings and sentiments are facts in social science. Facts must be seen as physical, mental or emotional occurrences or phenomena which can be affirmed with certainty and are accepted as true in a given world of discourse. " – **Pauling Young**
3) "Social fact is a phase of behavior such as thinking, feeling or acting which can objectively be observed and has a coercive or compelling nature."
– Durkheim

Methods of Data Collections :

There are four major types of data collection.

1) Observation
2) Interview
3) Questionnaire

4) Schedule

Observation :

The word 'Observation' has been derived from two Latin words, 'ob' means 'before' and 'serve' means 'keeping'. Combining both, we get observe which gives the meaning a process through which a thing or situation is kept before to see and watch carefully. Observation is a way to gather data by watching people, events or noting physical characteristics in their natural settings. Observation is a way of collecting data through observation. Observation method is used in cases where you want to avoid an error that can be a result of bias during evaluation and interpretation processes . It is a way to obtain objective data by watching a participant and recording it for analysis at a later stage.

A researcher can use the observation method in a Montessori school and record the behavior of the children at a young age. Are the children comfortable sharing their tiffin at such an early age will make a good study for the researcher ?

In this example, the researcher can observe and record the details objectively. Observation data collection method is associated with a few ethical issues as it needs the full consent of a research participant.

Definitions of Observation :

The observation method is described as a method to observe and describe the behavior of a subject. As the name suggests, it is a way of collecting relevant information and data by observing. It is also referred to as participatory study, because the researcher has to establish a link with the respondent and for this has to immerse himself in the same setting as theirs. Only then can be used the observation method to record and take notes. Some definitions of observation techniques are as follows.

1) " Observation is a systematic and deliberate study through spontaneous eye occurrence ." – **P.V. Young**
2) "In the strict sense, observation implies the use of the eyes rather than of the ears and the voice." – **C.A. Mozer**
3) "Observation is the recording of behavior simultaneously with its spontaneous occurrence ." – **Johoda**
4) "Observation is the careful and systematic watching of facts occurring in nature having cause and effect relation." – **Goode and Hatt**
5) "Accurate watching, knowing of phenomena as they occur in nature with regards to cause and effect or mutual relation." – **Oxford Dictionary**

Characteristics of Observation :

The Characteristics of observation techniques are as follows.

1) Full use of Human Sense
2) Primary Data Collection
3) Direct Study
4) Minute Observation
5) Deliberate Study
6) Reliability
7) Search about Cause-Effect Relationship
8) Scientific Method
9) Empirical Studies
10) Study of Collective Behavior
11) Verification of Collective Data

Types of Observation :

There are various types of observation.

1) Participant Observation
2) Non- Participant Observation
3) Quasi Participant Observation
4) Non Controlled Observation
5) Controlled Observation

Interview :

An interview is an essentially a structured conversation, where one participant asks questions and the other responds to it. In common word ' Interview ' refers to a one-on-one conversation between an interviewer and an interviewee. The interviewer asks questions to which the interviewee responds, usually providing information. That information may be used or provided to the audiences immediately or later. This feature is common to many types of interviews. Usually interview takes place face -to-face. Face to face interview helps both parties to interact and form connection and understand to other. It is important to note that face to face interview sessions can be more enjoyable.

When interview is used as a tool for gathering data for research purpose it is called 'research interview.' When interview is used for clinical purpose or to secure information about a pupil's problem, his past history, adjustment patterns etc. it is called ' clinical interview.' Interviews provide an opportunity for both potential employer and employee to decide if the individual's skill and character align with the firm's need and culture. Interviews are when you get to gather useful knowledge about the potential colleague that you cannot get out of one's resume.

Definitions of Interview :

In an Interview, the employer can collect complete information about the job seeking candidate. Interview collects information about the candidate's cultural and educational background, work experience, intelligence quotient, communication skills, personality type, interests, social behavior etc. Interview gives an opportunity to the interviewer to know about the applicant. Various types of quality and accuracy of information obtained through application form and tests. Interview helps to obtain additional information from the candidates as required by the job. Some definitions of interview are as follows.

1) " The Interview may be regarded as a systematic method by which one person enters more or less imaginatively into the inner life of another who is generally a comparatively stranger to him." – **P.V. Young**
2) "Interview is fundamentally a process of social interaction." – **Goode & Hatt**
3) "An Interview can be defined as a meeting of person face to face on some points." – **M.N. Basu**
4) "Interview consists of dialogues or verbal responses between two persons or between several persons." – **Hader and Lindman**
5) "An interview is a face to face, oral, observational and personal appraised method." – **Jucius Michael**

Characteristics of Interview :

The Characteristics of interview techniques are as follows.

1) In interview two or more persons are included.
2) In interview method there is face to face relation.
3) Interview is a fundamental process of social interaction.
4) Interview method is easy for data collection.
5) In interview, we can know the innermost qualities of each other.
6) In interview technique, it is very easy to obtain secret and personal information.

Types of Interview :

There are various types of interview.

1) Diagnostic Interview
2) Treatment Interview
3) Research Interview
4) Formal Interview
5) Informal Interview
6) Personal Interview
7) Group Interview
8) Controlled Interview
9) Uncontrolled Interview
10) Focussed Interview
11) Repeated Interview
12) Qualitative Interview
13) Quantitative Interview
14) Mixed Interview
15) Short Contact Interview
16) Prolonged Contact Interview

Questionnaire :

A questionnaire is a research instrument consisting of a series of questions for the purpose of gathering information from respondents. A research questionnaire is typically a mix of close-ended questions and open-ended questions. Open-ended long-form questions offer the respondent the ability to elaborate on their thoughts. Research questionnaires were developed in 1838 by the Statistical Society of London. The data collected from a data collection questionnaire can be both qualitative as well as quantitative in nature. A questionnaire may or may not be delivered in the form of a survey, but a survey always includes a questionnaire.

The main purpose of a questionnaire is to extract data from the respondents. Its a relatively inexpensive, quick and efficient way of collecting large amount of data even when the researcher isn't present to collect those responses first hand. But an important factor to note is that a questionnaire isn't the process of analyzing the responses. The process is surveying.

Definitions of Questionnaire :

Questionnaire considered as an important tool which is used in the survey process. A questionnaire is an effective tool to measure the attitudes beliefs, behavior , preference, opinions and intentions of a relatively large number of people with respect to one or more than one specific subjects. Some definitions of questionnaire are as follow.

1) " In general the word questionnaire refers to a device for securing answers to questions by using a form which the respondent fills in himself."
– Goode & Hatt
2) "A questionnaire is a list of question given to number of persons for them to answer." – **Bogardus**
3) "Fundamentally the questionnaire is a set of stimuli to which literate people are exposed in order to observe their variable behavior under these stimuli."
– George Lundberg
4) "It does constitute a convenient method of obtaining a limited amount of information from a large number of persons or from a small selected group which is widely scattered ." **– Wilson Gee**
5) "In its simplest form the questionnaire consist of a schedule of questions, sent by mail to persons on a list or in a survey sample." **– Hsin Pao Yong**
6) "Questionnaire is written verbal stimulus and written verbal response."

– John Galtung

Characteristics of Questionnaire :

The main characteristics of questionnaire are as follows.

1) It deals with a significant topic.
2) It seeks only that information which cannot be obtained from other sources.
3) It is an short as possible, only long enough to get the essential data.
4) It is attractive in appearance, neatly arranged and beautifully printed.
5) Directions are clear and complete
6) The questions are objective , with no leading suggestions to the desired response.
7) The questions are presented in good psychological order, proceeding from general to more specific responses.
8) It is easy to tabulate and interpret.

Types of Questionnaire :

There are various types of questionnaire.

1) Questionnaire of Facts
2) Questionnaire of Opinion and Attitude
3) Structured Questionnaire
4) Non- Structured Questionnaire
5) Closed Questionnaire
6) Open Questionnaire
7) Pictorial Questionnaire
8) Mixed Questionnaire

Schedule :

Schedule is a tool or instrument used to collect data from the respondents while interview is conducted. Schedule contains questions, statements and blank spaces or tables for filling up the respondents. A Schedule is a structure of a set of questions on a given topic which are asked by the interviewer or investigator personally. The order of questions, the language of the questions and the arrangement of parts of the schedule are not changed. However, the investigator can explain the questions if the respondent faces any difficulty. It contains direct questions as well as question in tabular form.

Schedule includes open-ended questions and close-ended questions. Open-ended questions allow the respondent considerable freedom in answering . However, questions are answered in details. Close-ended questions have to be answered by the respondent by choosing an answer from the set of answers given under a question just by ticking.

Definitions of Schedule :

The schedule is a formalized set of questions, statements and spaces for answers, provide to the enumerators who ask questions to the respondents and note down the answers. Some definitions of schedule are as follows.

1) " Schedule is the name usually applied to a set of questions which are asked by fields in by an interviewer in a face to face situation with another person." **– Goode & Hatt**
2) "The schedule represents a formal method for securing facts that are in objective form and easily describe. The schedule is filled out by the investigator himself ." **– Bogardus**
3) "The schedule is a device for isolating are elements at a time and thus intensifying our observation." **– George Lundberg**
4) "Since it is handled by investigator it can be fairly formal document in which efficiency of field handling rather than attractiveness is the major operative consideration in design." **– C.A. Moser**
5) "The schedule is nothing more than a list of questions which it seems necessary to answer in order to test the hypothesis and hypotheses ."

– Thomas Carson Macormic

Characteristics of Schedule :

The main characteristics of schedule are as follows.

1) It is easily communicated.
2) It is flexible.
3) It has the commitment of the project team.
4) It shows interrelationships among tasks very clearly.
5) It is prepared in calendar time , not in number of work days.
6) It forces early deadlines.
7) It allows for revision time following each review.
8) It builds in time for slippage.
9) It has correlation with other projects assigned to the team.
10) It extends beyond the due date of the contract.

Types of Schedule :

There are various types of schedule.

1) Observation Schedule
2) Document Schedule
3) Institutional Survey Schedule
4) Evaluation Schedule
5) Interview Schedule
6) Rating Schedule

Epilogue:

In research, the methods of data collection is very important. There are various methods for data collection. The major and important methods for data collection are observation, interview, questionnaire and schedule.

Observation is a direct and careful study of a phenomena through naked eye to collect the real information's about a problematic situation. Observation is the basic method of obtaining the information about the world around us. Observation is the most important and general technique of making new discoveries and conducting researches in the field of natural and social sciences. In recording the observed phenomena, the observer specified those which has importance in problem. Observation techniques involve observing actual behaviors which are subsequently scored.

An interview is the most prevalent kind of planned communication. Interview is a special technique of communication, which is used to examine the behavior of an individual or individuals to match their statements and to study the clear conclusions of social interaction. An interview is generally a qualitative research technique which involves asking open-ended questions to converse with respondents and collect elicit data about a subject. Interviews are conducted with a sample from population and the key characteristic they exhibit is their conversational tone.

A questionnaire is a very useful tool to gather first-hand information from a large group of audience. It is the good instrument of data collection. A questionnaire refers to a device for securing answers to questions by using a form which the respondent fills in by himself. It consist of some questions printed or typed in a definite order. These forms are actually mailed to the respondent who was expected to read and understand the questions and reply them by writing the relevant answers in the spaces provided. Ideally speaking, respondent must answer to a verbal stimulus and give a written or verbal response. It is totally devoid of any table. Its purpose is to collect information from the respondents who are scattered over a vast area.

The schedule can be used in very narrow spheres of a social research. A schedule, however, takes more time as compared to a questionnaire. A questionnaire has less dada collecting ability than a schedule. A questionnaire can cover a very wide field of data whereas, a schedule is a problem-oriented data collecting method. A questionnaire takes for itself and is self-explanatory, whereas schedule has to be explained by the investigator.

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12. Ethics, Ethical Principles in Scientific Research and Higher Education

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Abstract:
High ethical standards constitute the foundation of high-quality scientific research. Scientific research as a public trust must be conducted according to specific codes, rules, governmental laws, and regulations relating to research ethics. The aim of this paper is to highlight the fundamental ethical principles in scientific research, and those common to sport science and medicine. A healthy ethics constitutes the essence of a civilized society, in other words the ethics is the foundation on which we build relations both in everyday life and in business. One can say that ethics does not refer to the links that you build with others, because all the people have relations with each other or some over others. It refers to the quality and integrity of these links. Regardless of the type of scientific research, it must not be carried out at random and must be rigorously designed, organized and planned. The purpose of the article is to highlight the close link between ethics and science created in order to improve the quality of scientific research.

Key words: ethics, science, scientific research, research ethics, publication research, scientific code of ethics.

1. Introduction:

Interest in ethics, both in science and technology, is increasing, as its importance has long been recognized after the World War II. There are two main reasons: the well-known examples of unethical research, so-called "ethic scandals", for example medical experiments in Nazi Germany in World War II [1, 2], and increased numbers of scientists, resulting from the increased founding of research by governments and private businesses. Unfortunately, honesty and integrity of data, conflict of interest or misconduct behaviors, such as plagiarism, fabrication, and falsification of data, became part of the scientific research. Although the role of ethics and guidelines for conducting research have been commonly accepted by scientists, and a series of research ethics scandals were known, there was a need to document ethical standards for high-quality scientific research. Therefore, two very important initiatives were designed and started the promotion of responsible research with humans – the Nuremberg Code containing ten basic ethical principles and the Helsinki Declaration. The latter document is continuously updated and contains basic ethical principles for conducting biomedical research, which are contained in the Nuremberg Code and, additionally, guidelines designed to maintain the unique principles responsibility for the health and welfare of human subjects participating in clinical research. Also, guidelines for the responsible conduction of research with animals, detailing sale, transport, and other care instructions were regulated.

The importance of ethics in all fields of science and technology is summarized by Jean-Michel Baer, in his foreword to the 2010 European Textbook on Ethics in Research [1]. He claims that "Ethics is of great importance to science and technology. There are many developments in science and technology that regularly give rise to ethical questions in European societies – stem cell research, genetically modified food, human enhancement, to name just a few. The intense social debate such developments trigger, highlights the importance of high ethics

standards for science and technology. These standards reflect our adherence to the ethical values and fundamental rights, such as human dignity, freedom, democracy, pluralism, solidarity, integrity and non-discrimination, on which the EU is founded". "High ethics standards also add to the quality of research, and increase its likely social impact". Given the importance of ethics in the scientific research and academic learning, the purpose of this paper is to highlight the fundamental ethical principles in scientific research and to provide guidance on ethical core principles, common to sport science and medicine. Recently, one of us (J.E.S) had the opportunity to speak with a medical student about a research rotation that the student was planning to do. She would be working with Dr. Z, who had given her the project of writing a paper for which he had designed the protocol, collected the data, and compiled the results. The student was to do a literature search and write the first draft of the manuscript. For this she would become first author on the final publication. When concerns were raised about the proposed project, Dr. Z was shocked. "I thought I was doing her a favor," he said innocently, "and besides, I hate writing!" Dr. Z is perhaps a bit naive. Certainly, most researchers would know that the student's work would not merit first authorship. They would know that "gift" authorship is not an acceptable research practice. However, an earlier experience in our work makes us wonder. Several years ago, in conjunction with the grant from the Fund for the Improvement of Post-Secondary Education (FIPSE), a team of philosophers and scientists at Dartmouth College ran a University Seminar series for faculty on the topic "Ethical Issues in Scientific Research." At one seminar, a senior researcher (let's call him Professor R) argued a similar position to that of Dr. Z. In this case Professor R knew that "gift" authorship, authorship without a significant research contribution, was an unacceptable research practice. However, he had a reason to give authorship to his student. The student had worked for several years on a project suggested by him and the project had yielded no publishable data. Believing that he had a duty to the student to ensure a publication, Professor R had given the student some data that he himself had collected and told the student to write it up. The student had worked hard, he said, albeit on another project, and the student would do the writing. Thus, he reasoned, the authorship was not a "gift."These two stories point up a major reason for encouraging courses in research ethics: Good intentions do not necessarily result in ethical decisions. Both of the faculty members in the above scenarios "meant well." In both cases, the faculty members truly believed that what they were doing was morally acceptable. In the first case, Dr. Z's (indefensible) error was that he was unaware of the conventions of the field. In particular, he seemed blissfully oblivious to the meaning of first authorship. In the second case, Professor R was doing what he thought best for the student without taking into consideration that morality is a public system and that his actions with regard to a single student have public consequences for the practice of science as a profession. Well-meaning scientists, such as those just mentioned, can, with the best of intentions, make unethical decisions. In some cases, such decisions may lead individuals to become embroiled in cases of misconduct. A course in research ethics can help such scientists to appreciate that it is their responsibility to know professional conventions as well as to understand the public nature of morality. There are scientists for whom a course in research ethics will be less useful. Efraim Racker, [3] in a 1989 article, described a student in his lab who was a "professional" fabricator of data. This student composed lab books without performing experiments, added radioactive material to gels to produce bands where he

wished those bands to be, and lied to his colleagues about his actions. Another researcher, Elias Alsabti,

described by D. J. Miller, [4] was a meticulous plagiarizer. This physician-researcher fabricated his curriculum vitae, copied a colleague's grant for his own use, published other people's data under his own name, and co-authored his pilfered data with fictitious collaborators. Individuals such as these are unlikely to learn research ethics through instruction because they are not interested in becoming ethical practitioners. The ethics of scientific research is somewhat unique within professional ethics in the sense that good science requires the ethical practice of science (this is discussed in more detail in Section 4). Nevertheless, a course in research ethics cannot and should not have as its central focus the question, "Why should I be moral?" This question, while important, is not specific to the field of scientific research. A course in research ethics, as envisioned by the Dartmouth team, must be a course that teaches the tools for making ethical decisions relative to matters of research. It will be designed for those scientists who are already committed to being ethical researchers. Such a course should provide students the answers to the question, "How can I make moral decisions?"Although it is the fabricators and the plagiarizers whom we most often think of when we think of research misconduct, these are not the only people accused of misconduct. They are also not the only people who are guilty of misconduct. Many other scientists have had lives and careers affected by misconduct cases.It is undoubtedly unfair to generalize from a few cases of misconduct to an entire profession. Nevertheless, reported cases of misconduct are not uncommon, and this could reflect a failure to train students to the highest ethical standards. The 1993 Office of Research Integrity (ORI) publication reported the 1991–1992 caseload to include 29 institutional inquiries, 21 institutional investigations, and [7] ORI inquiries or investigations.[5] The 1995 ORI publication reported the 1994 caseload as 13 institutional inquiries, 17 institutional investigations, and 8 ORI inquiries or investigations.[6] Of actions closed in these years (55 in 1991–1992; 44 in 1994), some involved fabrication, some falsification, some plagiarism, and others some combination of fabrication, falsification, plagiarism, and "other misconduct." Slightly fewer than half of the investigated cases closed as of these reports were found to involve misconduct and resulted in sanction against the accused party. The academic rank of the accused ranged from technician to full professor. Cases were reported from a number of institutions, and the accused parties were funded by a variety of funding sources.Cases of misconduct are not simple matters to evaluate. One source of concern is confusion within the field of science about just what constitutes a punishable infringement of ethical standards. In the fields of engineering, law, and medicine, clear written guidelines exist for defining ethical conduct. Although some particularly difficult cases may test the limits of these guidelines, most do not. In scientific research, a written code of conduct is not available. [7] The federal government [8] and individual institutions [9] have been struggling to clarify the standards under which misconduct can be adjudicated. The central definitions that delineate misconduct in science include fabrication, falsification, and plagiarism. However, these are confused by other less clear categories of misconduct, which include "other questionable behavior" or "other misconduct." Within this confusion of definitions it is not always obvious to students or faculty where and toward whom their obligations lie.

Complicating the confusion generated by the way in which we define research misconduct is the teaching process by which students routinely learn about the ethical obligations of their profession.Traditionally a scientist trains with a single mentor. From this mentoring relationship the graduate student is expected to learn about scientific method, the body of knowledge that constitutes the specific field of science she is studying, and the "institution" of science. What is learned about the institution of science includes knowledge of the mechanics of obtaining funding, information on the writing of grants and papers, and an understanding of the roles and responsibilities for maintaining and sharing research data. As part of her instruction in all of these areas, it is assumed that she will also learn the ethics of scientific research.
In the case of the story of Dr. Z above, it is clear that Dr. Z's relationship with his mentor did not result in his having learned a basic convention of the field. So, it is not surprising that Dr. Z was prepared to pass his unrecognized confusion to a student who was working with him. Mentoring relationships within science education do not necessarily result in adequate familiarity with the ethics of research.

Judith Swazey of the Acadia Institute has studied this issue and presents some very distressing data on the efficacy of mentoring relationships in graduate education.[10] Although 89% of 2,000 graduate student respondents from 98 departments of major research institutions said that they related to a single faculty member who was particularly supportive of their work, less than 45% of students felt that this faculty member gave them "A lot" of help toward teaching them the details of good research practice, and 15 to 20% of the students felt that the help they got in this area was "None." Fewer than 45% of students believed that they got "a lot" of helpful criticism on a regular basis. [11] In the majority of cases; students felt that their faculty support person did not provide the type of mentoring relationship that one would hope for in the ethics training of a research scientist.
When Swazey asked students to compare the role that a department should take in preparing students to recognize and deal with ethical issues in their field to the role actually taken by the department, her results were equally disturbing. Eighty-two percent of students felt the department should take an "Active" or "Very active" role in this process, while only 22% felt that an active or very active role was actually taken.[12]
The perceptions of faculty were not much different from those of the students. Ninety-nine percent of 2,000 faculty members surveyed felt that "academics should exercise collective responsibility for the professional conduct of their graduate students"; only 27% of these faculty felt that they followed through with this responsibility. [13]
These data provide evidence to indicate that individual mentoring is a less than adequate teaching method for ethics. If the majority of students do not receive mentoring that leaves them with a clear understanding of their responsibilities as scientists, then cases of unintentional misconduct and questionable practice are inevitable.
The role and importance of ethics education have begun to be recognized by the NIH. Guidelines for NIH research training grants now require a minimal number of hours of ethics education. [14] Ethics need not be taught within a single graduate course, but it is beginning to be recognized that education in the basic conventions of the field and in the basic approaches to ethical decision making can no longer be left to one-on-one mentoring alone.
As the ever-dwindling availability of research funds fuels the fire of competition, there will be increased pressure on scientists to bend or break rules. Research laboratories, particularly large groups where some students rarely see their faculty advisors, cannot be assumed to teach research ethics, or even to train students in all research conventions. Whether scientific ethics is approached through a single course or a series of courses or seminars throughout the graduate curriculum, it has become obvious that students need exposure to ethics in a number of contexts. Research ethics can and must be taught in a

formalized manner. It is our belief that courses in research ethics that incorporate a solid philosophical framework have the greatest potential for long-term usefulness to students. While other methodologies may reinforce this material, a course of the type described in this monograph has the potential to help a student develop the tools to see ethical problems from a new vantage point. It is in this context and for these reasons that we designed our course in research ethics.

2. Ethical Behavior of Scientific Professionals:

The above cases unfortunately represent just a handful of the many examples of scientific misconduct too numerous to list. This is not meant to dishearten the scientific community, but on the contrary, to empower it to learn from past mistakes and to continue advocating for the integrity on which scientific progress is built. As a rebuttal to such unethical behaviors, the American Chemical Society (ACS) and the National Institutes of Health (NIH) Office of Research Integrity, among others, offer guidelines for scientific professionals on how to act responsibly and avoid unethical conduct.

Many scientific organizations, including the ACS though it's Committee on Ethics, Division of Professional Relations, and Committee on Economic and Professional Affairs, have active programs and resources for raising awareness of principles and issues related to scientific ethics. Many institutions have definitions and categories of scientific misconduct, such as the NIH Office of Research Integrity in its extensive 2007 publication *Introduction to the Responsible Conduct of Research*, which covers

authorship, institutional and human subject boards, data collection, analysis, and much more [15].

3. Ethical Ethos:

Researchers have to take the sole responsibility for the ethical conduct of their own research. In simple terms, we can say ethics are researcher's responsibility. First and the foremost responsibility of a researcher is to take care of the safety, dignity, rights and well-being of the participants. Researchers have to take care of various other issues at different stages of the research process. Both the researcher and participants have an important role to play. Ones' rights are the others' obligations. Researchers have to take care of the participants' right and must consider their research from participants' perspective.

According to the University of Sheffield, the principle concern to take care of in "research involving human participants, personal data and human tissue is respect for the participants' dignity, rights, safety and well-being." Further, as per the university, all the ethical issues encountered at various stages of the research process may be taken care of at two major levels.

4. Research ethics principles:

The term "research ethics" is defined in the free encyclopedia Wikipedia, as follows: "Research ethics involves the application of fundamental ethical principles to a variety of topics involving scientific research. These include the design and implementation of research involving human experimentation, animal experimentation, various aspects of academic scandal, including scientific misconduct (such as fraud, fabrication of data and plagiarism), whistle blowing; regulation of research, etc." In the opinion of the Centre for Bioethics, the University of Minnesota (2003) "research ethics provides guidelines for the responsible conduct of biomedical research. In addition, research ethics educates and monitors scientists conducting research to ensure a high ethical standard". Many universities, government agencies (e.g. The National Centre for Research and Development in Poland), and professional

associations, have adopted ethical standards based on the Nuremberg Code and the Declaration of Helsinki, in agreement with national and international laws. They are summarized by professor David Resnik of the University of Wyoming and Bioethicist and the National Institute of Environmental Health Science IRB Chair [16]. Among
them we can find:

4.1 Principle of honesty – reported data, methods, and procedures, results and publication status must be truthful and accurate, i.e. without fabrication, falsification or plagiarism of data. Also, collaborators, colleagues, students, granting agency, the public, cannot be deceived.

4.2 Principle of objectivity – researchers are obligated to avoid or to minimize errors in all scientific actions: experimental design, results interpretation, grant writing, action as expert or referee, etc. The personal or career benefit, as well as financial interest, cannot affect research. Interpretation of results and expert decisions must be based on facts, without the influence of external sources.

4.3 Principle of integrity – "keep your promises and agreements; act with sincerity; strive for consistency of thought and action" [16].

Principle of carefulness – decisions dealing with the researcher's work and that of others have to be assessed completely, carefully, and fairly; results should be validated through replication.

4.4Principle of openness – methods, data, results and their interpretations should be presented and published,
thus submitted to criticism

4.5 Principle of responsibility – researchers are obligated to make efforts to ensure that their research does not duplicate research carried out by other researchers, thus to give evidence of their professional responsibility [17]. All authors bear full responsibility for the research process and the result publication; a special social responsibility (promotion of social good and other moral duties to society) and proper respect in conducting research on human subjects and animals are rested with the researchers.

Also, the standards of good scientific practices must be obligatory for teaching and academic training (response mentoring). It is worthwhile mentioning that the research ethics is a key part of advanced academic learning in all academic disciplines, as it prevents different forms of misconduct and fraud [18]. Owing to the fact that students and young scientists participating in research have not passed through formal special training in ethics education, it is important to discuss ethical standards during the presentation of students' projects or during preparation of dissertation. It allows them to make ethical decision, linked to responsibility, honesty, and fairness. It is also very important for students to learn competence in using the research results of other person in accordance with national/international law.

Additionally, it is important to protect one's own research and to acquire the ability of their utilization in commercial purposes. It should be noted that universities offer courses in research ethics for students in different academic fields and disciplines. The postgraduate courses offered by the Centre for Research Ethics & Bioethics (Uppsale Universitet) or the University of Minnesota's Center for Bioethics (www.bioethics.umn.edu) are illustrative. We should also remember that there is a huge list of unethical activities, regarded by the majority of researchers as deviations from acceptable research practice, which do not fall into the category of misconduct classification[16]. For example, activities that constitute deviation according to the list of unethical activities include "promising a student a better grade by sexual favors" or "publishing the same results in two different journals without telling the editors" [16].

5. Publication ethics:

Information on ethical issues useful to editors are divided into Research Ethics and Publication Ethics. This means that they are obligatory either for editors review boards, sponsors or authors. They have been summarized by the World Association of Medical Ethics and are available online. These topics include a guide for the process of publication research with humans, and contain information useful for epidemiological studies, case-control studies, clinical trials, and genetic research. The rights and responsibilities of editors and publishers, per reviews, referees, authorship, conflict of interest, and ethical principles in human and animal research, are detailed basing on the Declaration of Helsinki, the Institute for Laboratory Animal Research of the National Research Council's Guide for the Care and Use of Laboratory Animals and the World Medical Association. According to the above reported ethical standards and laws, these are the most common to Sport and Medicine: Protection of participants' right. The rights and welfare of research participants must be respected. In the case of research with human subjects, we must remember that human life and well-being is most valuable. Human privacy, confidentiality, dignity and autonomy must be respected.

Ethical approval. Each research using human participants or animals must be reviewed and approved before starting by an appropriate Ethics Commission in accordance with national and international laws.The research protocol for a study. Authors reporting experiments involving human individuals or animal subjects must certify that their study has been approved by appropriate research ethics committee, and that all investigations complied with the ethical and humane standards of research. The study design and selection of the observational or experimental participants must be clearly described. This should include eligibility, exclusion criteria and characteristics of the source population (cases group and control group). Research projects that use humans or animals must assess the risks and benefits of using these subjects in research. The projects must be carried out by qualified and responsible researchers. In case of a harmful study, research protocol with human subjects should contain details of any hazard risk or compensation. When reporting experiments involving animals, the researcher must show proper respect and care. The researchers are obligated, among other actions, to acquire animals legally, to apply appropriate experimental methods, and procedures, to ensure that animals have safe and hygienic conditions of living and nourishment, to maintain a protocol of animal care and examination, and to avoid unnecessary suffering [19]. For a comprehensive description of ethics standards in exercise science research see Shephard [20]. Methods, apparatus and procedures should be detailed, allowing other researchers to reproduce reported results. The statistical methods should be applied to quantify findings and to present measurement errors (e.g. confidence intervals, standard deviations, correlation coefficients). Results should be presented in a logical sequence, e.g. in the form of tables, figures. The discussion section should include summary of the important finding, their interpretation and comparison with findings of other workers (if such data are available), and specification of strengths and limitations of the study. Also, future research directions should be indicated (Saudi Journal of Sports Medicine).

Informed consent. Informed consent for subjects participation and publication must be obtained to ensure that the research allows for voluntary participation in the project as a study subject. If a study involves children or other subjects that cannot sign the consent, the consent should be obtained using other possibilities prior to procedure approval. Informed consent must include: purposes of the research; research methods and procedures; potential risks and anticipate benefits; potential discomfort; rights to ask questions and to refuse to participate in the study or to withdraw consent at any time; sources of funding, conflict of interest (possible financial or personal conflicts) and institutional affiliations. According to the definition given by the University of Minnesota Center for Bioethics (2003) "Conflicts of interest arise when a person's (or organization's) obligations to a particular research project

conflict with their personal interests or obligations". The item 'conflicts of interest' has been recently discussed by Khan et al. [21].

6. Research Ethics: Researcher-Participant:

Conducted ethically, research is a public trust. So, researchers must fully understand the theories and policies designed to guarantee upstanding research practices. It becomes important for the researcher to know what constitutes an ethical research. With an up-to-date knowledge, the researchers should develop a way with the basic ethical principles ensuring the safety and security of the participants of the study. Different types of research methods need a different set of ethical guidelines. To make it easy to understand, let's divide the research ethics simply into two groups; Research-Participant Ethics and General Ethics. We will enlist different ethical issues arising at various stages of the research process. The researcher has a primary responsibility towards the participants and other researchers.

1. Informed consent is the prime responsibility of the researcher. A standard procedure in professional codes of ethics is 'informed consent' [22]. Seek consent for the participation from people. In the case of children and few other exceptional cases, the informed consent of participants, as well as their guardians must be obtained.
2. The researcher must reveal all the risks associated with the research to the participants. She should highlight all the negative and positive aspects of the research during the consent process. Aim, objectives and nature of the research, duration of the study, sponsors and other important information must be revealed to the participants.
3. The knowledge gap between the researcher and the participants must be considered.
4. The privacy, anonymity and confidentiality of the participants and data must be given due consideration [23]. As professional guidelines and some form of a cultural consensus are still being negotiated, research projects need to consider carefully issues of anonymity, confidentiality, and 'informed consent.'
5. Participants must be given an option of rejecting data-gathering devices like camcorders, audio recorders etc.
6. To make them convenient and easily understandable, the questionnaire and other forms of rating scales must be designed in the native language of the participants.
7. Participants' safety is the prime concern. They should not be exposed to risks greater than they encounter in their normal lifestyle.
8. In case, it's the responsibility of the researcher to protect participants from the risks arising from their research.
9. The researcher should protect and promote the rights and interests of the participants.
10. The researcher must take care of their own safety.
11. She must take care of cultural, religious, economic, psychological, spiritual, physiological, biological, political, social and other issues of the participants.
12. Researchers are expected to consider ethical implications of their research.
13. To uphold the ethical standards in the research process, the researcher must accept and respect the principles of integrity, honesty, objectivity and openness.

7. Analysis on ethics in research:

It can be said that the ethics of scientific research as well as thematic area belongs to the field of scientific research, without neglecting however the area of ethics. Within the framework of scientific research has an important role the Scientific ethics Code,
conceived in 2000 by four people: Patton-Mallory, Marcia, Franzreb, Kathleen, Carll, C., R. Cline, to promote justice, correctness, integrity. According to its content, the conduct flawed research, falsification of data, treatment data and irresponsible of the resources are important issues in the context of a research.

7.1 Scientific ethics code: consisting of eleven fundamental principles that must be known by any researcher, will be presented in the following:
I. The promotion and advancement of scientific knowledge;
II. Deployment, organization, assessment and reporting of scientific research, in a fairly, fully and without being subject to a conflict of interest;
III. Prevention of the abuse of all resources, correct treatment of all persons;
IV. Not to interfere deliberate in the research of others, and non-participation to dishonest actions, fraud, deception;
V. Assessment of constructive criticism;
VI. Recognition of individuals who contributed to the achievement of personal success;
VII. Copyright compliance for a product of research;
VIII. copyright request for a product research only if the person has made a major intellectual contribution (as part of the conception, design, data collection, data analysis and interpretation) and significant contributions in his presentation (drafting, reviewing or editing);
IX. The publication and use of original ideas, research data or unpublished findings of others, without the written approval;
X. Refraining from publishing, twice, the results of an investigation, as the original;
XI. Care for the preservation of resources such as databases. I believe that any research scientist, young or not, must comply with these principles, if not, will give evidence of improper conduct in research, such as manufacture, counterfeiting, plagiarism and fraud. Before I can avoid them, I find useful knowing exact terms. "Incorrect Conduct in research is defined as the production, falsification or
plagiarism in proposing, performing, or reviewing research, or in reporting research results. Manufacturing is the manufacturing data or results and recording or reporting them. Spoofing is the handling of research materials, equipment, or processes, or changing or omitting data or results such that the research results are not shown correctly. Plagiarism is the appropriation of ideas, processes, results, or words of another person without proper attribution.
Fraud in science is regarded as the provision of false information or submission of false results to the community of researchers or their spread, for example in a publication, in a paper presented at a Conference.Fraud in science research community means deception and often misleading to those who take decisions." Copyright concern the moral rights (moral attributes) associated with creation, the right to object to the warp or change of the work, the right to decide the time of publication. Theft of ideas should be avoided, the publication of several times the same results, manufacturing data, because in this way will lose confidence in the fairness and quality of scientific research.

7. Ethical Issues in India:

Mostly matters of research ethics differ from method to method. Most importantly, ethics also vary from place to place. For example; A Christian lady in white indicates a bride, while a Hindu lady in white indicates a widow. In most of the cases, cultures in India vary from state to state, and even from city to city. So, researchers should have a depth knowledge of cultures and other things of the place, they are working in.
1. During the study, Indian researchers should give utmost importance to the cultural diversity and religiosity of the country.
2. They must work within a framework suitable for all the customs, traditions, languages, castes, creed, colour, classes, regions etc.
3. They must work for the promotions of all the cultures, religions etc., not the other way round.

4. During the research, the researchers must keep in mind the wide economical, knowledge and technological gap between the people of India.

9. Ethics Committees:

Indian universities lack research ethics committees. Researchers have no other option but to rely on their own common sense to eliminate and minimize various crucial ethical issues. Therefore, need for a common policy or a common framework both at domestic as well as national level assisting Indian researcher in addressing the ethical issues is cardinal. Keeping in mind the aforementioned concerns, following suggestions may prove to be fruitful:

1. As there is a difference in the nature of issues arising in various methods of research, all the universities in India must be equipped with research ethics committees at the departmental level or faculty level.
2. Research protocols may be submitted to such committees for consideration, guidance, improvement and approval before the commencement of the study.
3. These committees may help to promote the awareness regarding the do's and don'ts of the research.
4. The committees may act as the mediators and advisor in disputed cases.
5. The ethical issues have shown an increase with an advent in technology, as witnessed, these committees may provide advice on all such matters.
6. Such ethical committees may encourage an organizational research culture based upon defensible standards of research practices.
7. These committees must be committed to high quality, transparent and accountable research ethics throughout India.
8. The committees may also monitor the progress of the ongoing studies.
9. On the other side, the researcher may also update the committees regarding the events and issues and status of the research.
10. At last, a copy of the thesis or research paper may also be submitted for the perusal of these committees.

10. Conclusions:

In research, education and professional practice it is necessary to apply the highest possible standards included in different national and international laws and Codes of Ethics. For any researcher, independently of a discipline, the knowledge of the code of ethics and basic principles of the proper conduction in scientific research and education should be obligatory. Researchers should have an awareness that reliability of our research record, scientific knowledge, and social responsibility, depend on adhering to the ethical codes and guidelines. Ethics is a tool in the development of moral judgments. Represents the foundation of the individual in the correct and ethical decision making. Although most of the times ethical reasoning are not very easy to be taken and ethical principles are not always supported by specialists, must join the ethical rules, because they promote the objectives of the research, such as truth, knowledge, avoiding the error. Otherwise, any relationship between people is based on communication, communication established on trust, and just this confidence is promoted by ethical principles in order to establish a collaboration.

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13. Research and Publication Ethics

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What Is Research?

The research program is an endeavor to train and retain and attract highly skilled human resources towards the human resource department (HRD) particularly after post-graduation to the doctorate degree.

The word research itself is a combination of "re" and "search," which is meant by a systematic investigation to gain new knowledge from already existing facts. Frankly speaking, research may be defined as a scientific understanding of existing knowledge and deriving new knowledge to be applied for the betterment of mankind. The significant contribution of Research deals with the progress of the nation as well as an individual with commercial, social, and educational advantages.

To the philosophers and thinkers, research means the outlet for new ideas and insights, whereas to the intellectual people research can be the development of new styles and creative work. Research is a random walk, but scholars need to systematically continue towards the destination. Failure is an inevitable step in the research phase, but maybe a pillar of success. Creativity, good written and verbal communication skills, and in-depth knowledge of the subject are essential for the successful completion of research work. A researcher should have a sound fundamental knowledge of the domain to be undertaken. A querying attitude is one of the important factors. Anything and everything is questionable. This questioning attitude of the scholar is the essence of research and invention. Practical intelligence is the ability to adopt day-to-day requirements while persistent, tenacious, uncompromising, and stubbornness are some of the characteristics of creative people. Important ingredients for a good researcher are:

1. Dedication and Commitment;
2. Consistency and Patience;
3. Good Written Communication;
4. Domain Knowledge;
5. Good Verbal Communication;
6. Creativity.

Different types of research may be are classified into various categories including Applicability, the mode of inquiry in conducting the study, and major objectives of the study. Main research types include:

- **Basic Research**:
  1. pure or fundamental research;
  2. no immediate need;
  3. new theories can be added to the knowledge cluster;
  4. may solve problems but may not have practical applications;
  5. broader scope as compared to applied research.
- **Applied Research:**
  1. tries to solve an immediate specific problem faced by industry or society;

2. the obtained solution can be deployed to solve the problem;
3. duration of is shorter as a quick solution is expected;
4. optimized search type problem (e. g. engineering domain);
5. Either address the unsolved problem or improve the existing solution.

• **Descriptive Research:**
1. used in business analysis or social problems;
2. does not have any control over the parameters or variables;
3. just tries to represent or analyze the previous and or current facts;
4. Correlational methods, survey methods, and comparative studies are used.

• **Analytical Research:**
1. uses existing information to explain a complex phenomenon or to perform a critical evaluation;
2. an identified hypothesis can be accepted or rejected depending on the analysis;
3. from experience the hypothesis can be redefined;
4. observed in historical study, forensic work, food, in the medical domain, etc.;
5. summarizes and evaluates the ideas in historical research for accessing both witness and literature sources to document past events;
6. Data can be presented to support the data in a comprehensive model.

• **Correlational Research:**
1. focuses on exploring the relationship or association between incidences, variables;
2. from the collected data, researchers may come up with the number of observations and
Analytics.

• **Qualitative Research:**
1. mainly deals with the quality or the types of the parameters considered for the research;
2. differences in the parameter may occur with time;
3. related to human behavior;
4. more complicated and requires more guidance;
5. less emphasis is given on generalization and more focus is towards individual;
6. The focus of the work is to find results with respect to qualitative parameters.

• **Quantitative Research:**
1. involves measurements of quantities of characteristics that can be used as features for the research study;
2. assumes that the world is stable and uses statistical analysis on parameter values for conclusions;
3. Statistical quantities that can be measured are involved.

• **Experimental Research:**
1. focuses on the fieldwork and experiments that can control the independent variable;
2. Can be tested and trained with pre-and post-experimental research design.

• **Explanatory Research:**
1. tries to analyze and justify the reason behind the occurrence of a particular phenomenon or association between the variables;
2. answers the “Why” type of questions;
3. aims to explain why a relationship, association, or interdependence exist;
4. Causal research with three important components like time-to-time sequences which will occur before the effect, concomitant variations, where the variations will be systematic between two variables.

• **Exploratory Research:**
1. explores the areas that have required meager attention;

2. For checking the possibility of research in a particular domain or area.
3. A small-scale study is done to decide the further scope of advancement in a domain.
4. Depending on the outcomes of the study, the domain is further explored for in-depth research on the specific topic.

Some philosophical definitions are as under:

• A **thesis** is a scientific assertion, a formulated idea.
• Particular cases of a thesis are **axiom and theorem**.
• An **axiom** is an initial thesis of a scientific theory taken to be valid without logical proof and used to prove other theses of the theory.
• The issue regarding the validity of an axiom is solved either within the framework of another theory or by means of interpretation, i.e., a meaningful explanation of this theory.
• A **theorem** is also a thesis whose validity is established through logical proof.
• **Auxiliary theorems** serve to prove a basic one is called lemmas or statements;
• A concept is an idea reflecting objects, phenomena, and their interconnections by fixing general and specific attributes, the properties of objects and phenomena;
• A category is an extremely wide concept reflecting the most general and essential properties, attributes, interconnections and relations of objects and phenomena of the surrounding world (e.g., matter, motion, space, time, etc.);
• A **principle** is a concept playing a dual role and acts as a central concept representing the generalization and extension of a thesis to all phenomena and processes in a domain used to abstract this principle;
• A **law** is an essential, objective, general, stable, and repetitive relation between phenomena and processes;
• A **metatheory** is a theory that analyzes structures, methods, properties, and ways of constructing scientific theories in a certain field of scientific knowledge.
• An **idea** is the supreme form of cognizing the world, not just reflecting the object considered, but being directed to its transformation;
• A **doctrine** is almost a synonym of a concept, a theory;
• A **paradigm** also acts as a concept, a theory, or a model of a problem statement accepted as a standard solution to research problems.
• Semiotics is the science studying the laws of designing and functioning of systems of signs.

Research Ethics are moral principles that Guide a researcher to conduct and report research without deception or intention to harm the participants of the study or members of the society as a whole, whether knowingly or unknowingly.

"Ethics" It is generally defined as a set of principles that distinguish between acceptable and unacceptable behavior and way of conducting a task. These guidelines or principles may vary across countries, disciplines, institutions, and even laboratories

Researcher: → A key role player in "knowledge economy in India. Research is a positive outcome.

Cutting edge Research:

Potential cutting-edge research is for setting up Standard and it is research for incentives, competition, and successive evaluation. It involves awareness and inclusion of local knowledge paradigms.

Research function

Demand quality→ Relevance→ ownership→ innovation→ molding of lifelong learning needs.

Value factors in research

There are some important factors of research such as: -

- personal values factor

- ethical values factor
- social value factor
- market value factor
- global value factor

Some important factors to boost research such as: -

⟶ Mechanism to boost a researcher includes: -

1. self-direction
2. Supervisor's support and mentoring.
3. Departmental support.
4. elective training courses
5. Research participation in workshops, conferences, etc. for developing research skills and methodology training.

Research Supervisor: - Role and Responsibility

A qualified academic person who supervises the research is the research supervisor.

1. Helpful in a selection of research topics.
2. Management of time for completion of the research.
3. A supervisor is the first examiner.
4. Mentor.
5. Promoter.
6. Patronize of the researcher.
7. Guide.
8. Friend.
9. Job giver.

Problems of Researcher

Some important problems of research in research such as: -

1. The topic of research is too heavy, too wide, or too narrow.
2. Too heavy a teaching load.
3. Relation with supervisor: -poor, non-co-operative.
4. Lack of financial support.
5. Lack of basic infrastructure to conduct research.
6. Ph.D. scholar as an unofficial teaching assistant to their supervisor or mentor.
7. Ph.D. scholar as serving sometimes domestic assistant to the supervisor.
8. Inappropriate validation of doctoral students.
9. Exportation of research work in servation of supervisor contribution of research work.
10. Maybe the problem in terms of other people who are researchers is anyone in this situation.
11. Other health delays to manage women candidates.
12. The researcher is performing poorly.

Conflict of interest

Conflicts of interest can also arise when an author, researcher, editor, or peer reviewer has a relationship (personal or financial) that can directly or indirectly affect his/her objectivity in making decisions or influence his/her actions. Conflicts of interest can arise because of the following: **Financial relationships:** These can include direct employment, consultancies to a related organization/company, stock options, grants, patents, and paid expert testimony.

Personal relationships: These can include rivalries and bias.

Intellectual beliefs: These can include moral convictions or personal beliefs that can influence scientific opinions.

Academic competition: It can include biased judgments because of the direct or indirect competition with peers or colleagues. Such situations are sometimes unavoidable and finding

yourself in such a situation itself is not unethical. Therefore, all the stakeholders, including authors, editors, and reviewers must maintain transparency and disclose all potential or actual conflicts of interest. So, what is your responsibility as an author in reporting and managing conflicts of interest? The Office of Research Integrity (ORI) suggests that to manage or remove conflicts of interest, take the following steps.

- Disclose all interests so that the stakeholders are aware and can take the required steps.
- Monitor research and research results for transparency and integrity.
- Remove the person in question from important processes such as data interpretation or review process.
- As an author, make sure you follow the guidelines.

Managing Research Data

Data are important outputs of a research process. These can be used to accept or reject a hypothesis or frame a new hypothesis. Data management, therefore, is crucial during and even after the research. It can include the following aspects. Data ownership: It implies ownership of the legal rights to the research data during and after the research project. The important stakeholders include funders, research institutions, principal investigators, and even data sources.

Data collection: It implies the consistent and quality-controlled collection of data. Few important aspects include obtaining required authorization, using appropriate methods, and applying attention to details.

Data storage: It implies the protection of data from damage, loss, or theft. Data storage is important to recheck the findings, prioritize research activities/tasks, and be reanalyzed by others.

Data sharing: It implies deciding what to share and with whom (general public or other researchers) to share the preliminary data or final results. Data withholding is also an important aspect. Researchers have the responsibility to maintain the integrity of the research data. The group members involved in the handling of the data should maintain privacy and confidentiality of the data while recording on hard-copy or electronic evidence. Lapses in the management of research data can give rise to many ethical issues. These issues are more prominent in studies involving human subjects.

Researchers should, therefore, provide a data management plan (DMP) to ethics committees for clinical studies/trials for approval. Moreover, informed consent to obtain data and protecting or anonymizing a certain part of data during analysis or sharing should also be proactively implemented. An effective data management plan can help you avoid ethical issues.

Assign Authorship

Do you know the importance of the names appearing at the top of a research or a review paper? Allocating authorship allows researchers to assign appropriate credit and acknowledge their contribution to the research. However, assigning authorship is not always that simple as it also implies accountability and responsibility for the published work. Authorship issues can sometimes lead to conflicts and give rise to misconduct. Many journals now, therefore, request researchers to submit a contributor ship statement mentioning the role of each researcher. According to ICMJE, an author must satisfy these four criteria. Made substantial contributions to the design and conception of the study; data collection, analysis, and interpretation. Drafted or revised the intellectual content/ output. Approved the final version of the manuscript for publication. Agreed to be accountable for the research work, ensuring that queries related to the accuracy or integrity of the research are resolved. Moreover, the author should be able to identify which co-authors are responsible for which part of the work. According to ICMJE, in a large multi-author study, the decision on

authorship should be taken before submitting a manuscript to the journal. Each author of such studies should qualify those four criteria and individually submit conflicts of disclosure forms to the journal editor. Additionally, some large multi-author groups can choose a group name to assign authorship. In that case, a group name should be used when making a submission to the journal along with a description of who all qualify as authors in that group. What about individuals who do not qualify all four of the criteria, but have contributed to the study? You should make sure to acknowledge them as contributors. Contributors usually help in the acquisition of funding, supervising research groups, providing administrative support, assisting in technical writing, editing, proofreading, etc.

Apart from that, the corresponding author communicates with the journal during manuscript submission,

Peer Review and publishing. He/she ensures that all the documentation requirements related to the ethics committee's approvals, authorship, conflict of interest, clinical trial registration, etc. are met. Read through the figure below to identify disputes and misconducts in authorship. Researchers, especially those at the early stage of their careers, should ensure to follow appropriate author guidelines by the target journal or international organizations such as ICMJE, World Association of Medical Editors (WAME), and the American Medical Writers Association (AMWA).

Authorship issue

Guest authorship: – the author has not contributed to research or writing but his/her credentials can increase the credibility of the published work.

The most common ethical practice is to include the name of the Ph.D. advisor or department head as an author.

Gift authorship: –

The author may have an association with the research of the manuscript but does not qualify the four criteria defined by the ICMJE.

The most common unethical practice is to include the name of the Ph.D. advisor or head of the department as an author.

Ghost authorship: –

The author should have been recognized as the author according to the ICMJE guidelines but is excluded from the list.

The most common unethical practice is to exclude professional writers working in medical communications for a pharmaceutical company.

Avoiding Plagiarism

"If you have to read text A to be able to create text B, then text A must be cited as a source"

According to Jude Carroll, Oxford Brookes University, and Carl Mikael Zetterling, KTH Learning Lab, plagiarism occurs when someone describes another's thoughts or wording as though they were one's own. This means that plagiarism does not necessarily have to be about textual similarity. It could also be a question of structural or conceptual similarity. "In your text, you are responsible for ensuring that both the thoughts and wording are your own. If you describe someone else's thoughts or wording as your own, you have plagiarized." (Carroll & Zetterling, the year 2009) What it means in effect is that if you have to read text A to be able to create text B, then text A must be cited as a source. Not mentioning the source constitutes plagiarizing.

When drafting the manuscript, authors refer to published/unpublished work to draw upon ideas or to support their statements. However, researchers often end up in plagiarism traps intentionally or accidentally. Plagiarism is defined as an unethical practice of using someone else's work, ideas, data, concept, words, methods, images, etc. without proper

acknowledgment and presenting them as their own. It is serious misconduct and a professional infraction. Therefore, it is important to give appropriate credit to the author or the source. The severity and extent of plagiarism can vary and can fall under the following categories.

- **Complete plagiarism/ intellectual theft:** Submit work under one's name when somebody else has created it.
- **Source-based plagiarism:** Reference a source that is incorrect or does not exist i.e. a misleading citation. May also occur when the author cites only the primary source without citing the secondary source from where information was obtained.
- **Verbatim plagiarism:** Copy word-to-word from original work without quoting & citing it.
- **Self-plagiarism:** Reuse significant portions of own previously published work without attribution.
- **Paraphrasing plagiarism:** Use someone else's writing with some minor changes in the sentences (using synonyms) and using it as one's own.
- **Mosaic/patchwork plagiarism:** Interlay someone else's phrases or text within their work.

Plagiarism is a serious offense. It can not only have legal implications but also damage the credibility and reputation of the author. In academic publishing, plagiarism can lead to retraction of the published work and loss of academic positions or jobs. Avoid plagiarism when drafting your manuscript. Authors can also use plagiarism checkers such as PlagScan, iThenticate, etc. to avoid text plagiarism. However, all plagiarism checkers are not created equal. While few have access to premium databases (e.g., Crossref) for similarity check, others do not.

Five of these examples are plagiarisms.

1. Writing or copying a short piece from a source verbatim without stating who the original author is.
2. Translate another author's text into a different language and use the result without citing the source.
3. Make use of an existing text without stating who the original author is, but make small adjustments that alter the word sequence and sentence structure, replace words with synonyms, remove or add individual words, and so on.
4. Reading several texts and reworking the contents of these into a new document that isn't like any of the original sources other than a few words or a sentence being the same, without citing any of the sources.
5. Translate a text you have originated you into another language and make use of the result.
6. Build further on a text that has previously been graded without indicating which parts are old.

Quoting

When using word-to-word (verbatim) text from any source, use quotation marks for the extract and cite the source.

For longer extracts, some style guides recommend using block quotes.

Summarizing

When summarizing, use your own words to convey the main message/idea of the original work in an abridged form.

Make sure to cite the original source.

Paraphrasing

When paraphrasing original work, make sure to use your own words and sentence structures to convey the same meaning.

You have to always cite the original source.

Common knowledge

Universal truths or facts expected to be known to readers need not be cited.

Cite statistical information or lesser-known facts. When in confusion whether the fact or statement is common knowledge or not, always cite to remove any doubt!

Publishing Research Ethics

Researchers primarily use journal articles or books to communicate the results of their research to the scientific community and the general public. Therefore, following publishing ethics is equally important for researchers and journals. Journals require authors to disclose whether the same research has been published before or is being considered for publication elsewhere. Duplicate publications and simultaneous submissions account for serious misconduct! Often, in biomedical research, authors present the same data with different analyses (of a subgroup). In that case, authors should disclose the original source of the data and previous publications when making a submission. ICMJE defines simultaneous submissions and duplicate publications as follows: Submission. Simultaneous Submissions: Submitting the same manuscript in the same or different language(s) to one or more than one journal at the same time. Duplicate publications: Publishing a paper that is significantly similar to the paper published previously. The Committee on Publication Ethics (COPE) has outlined guidelines for journal editors to identify and avoid such misconducts in submitted manuscripts and published papers. Researchers should consider the following points to avoid unethical publishing practices. Do not submit the same paper to different journals. Maintain transparency during submission and peer review process on previously published work (disclose publication in conference proceedings, submission to a preprint repository, etc.). Check with the publisher about translating and publishing the work again. Disclose already published and/or translated versions of the submitted manuscript. Avoid dividing your study into multiple publications. Journals may allow secondary publications in certain cases. Author(s) has got approval from the editors of both the journals (ensure they have access to the original/primary 26 published work). The editors have agreed on the publication interval between the primary and secondary publications. The secondary publication refers (cite) to the data and interpretation of the primary publication. The secondary publication informs readers that the primary publication has been published previously (whole or in parts) by citing it appropriately. The title should indicate that it is a secondary publication.

Duplicate Publication/Submissions

Significance in terms of data or results. change in title or author order to hide Similarity. No reference/citation of previously published work.	The similarity is only a few parts/sections. May also include reanalysis of the same data, extended follow-up or different result interpretations for a different audience. **Data aggregation**: already published research data published again with some new data, representing different outcomes (e.g., mean, standard deviation, figures, graphs, etc.). **Data Disaggregation**: Research data from previously published work is published without some data points and without disclosing the relationship to the previously published work. **Data segmentation/salami slicing:** Fragmentation one study into multiple publications. Usually related to self-plagiarism (similarity in text and data to prior work published by the same authors. **Reanalysis**: already published data are reanalyzed using a new technique or a new perspective without reference to the previously published work. **Different conclusions**: interpreting results in different ways with a slight change in the introduction/discussion section for the same data/dataset without reference to the previously published work.

Research Misconduct

WHAT IS RESEARCH MISCONDUCT?

The ORI defines research misconduct as fabrication, falsification, or plagiarism in designing, conducting, or reviewing research or in reporting the findings of the research. Falsification involves misrepresentation of the research by changing data or results or by tampering with equipment, research methods, or materials.

Fabrication involves reporting false or made-up data, results, or research outputs.

Plagiarism involves presenting others' ideas, works, or words without acknowledging or providing appropriate credit to the original authorship.

What about errors that are unintentional or situations that arise because of different opinions? These do not fall under scientific misconduct or fraud. Universities and research institutions define policies and guidelines for researchers to maintain scientific integrity while conducting research. These guidelines also provide information on how to report any such cases. Make sure you are aware of your university's policies. Most cases of scientific misconduct involve image or data manipulation. Researchers are often not aware of the nuances between image modification and manipulation. They use image processing tools without having appropriate training in concepts such as vector graphics, RGB vs. CMYK, continuous tone images, etc.

Image Manipulation

Dos

1. CONSIDER YOUR IMAGE AS DATA.
2. Retain an original copy of the image.
3. make simple adjustments when modifying images
4. crop within acceptable standards/limits
5. Collect image data that needs to be compared under the same conditions.
6. Change the size (pixels) of images carefully.
7. Exercise caution when changing magnification or resolution of images.
8. Make intensity measurements on raw data, calibrated to an accepted standard.

Don'ts

1. Clone an object on your image.
2. Manipulate/ modify only specific areas of images to highlight or alter the background.
3. Use filters in the software especially on biological images.
4. Crop such that the inference of the remaining image changes.
5. Alter brightness or contrast to fade an object or clear the background.
6. Make color changes that alter the inference of the image.
7. Resize an image that alters aspect ratio, resulting in a change in boundaries, shape, etc.

Research Reproducibility: Reproducibility in research is important to validate findings. What is reproducibility? Reproducibility is defined as when a researcher can duplicate the same phenomenon even when experimental conditions are varied. Whereas, replicability is defined as when a researcher can obtain the same results when the experiment is conducted under the same experimental conditions. Although reproducibility is promoted in science, researchers are not keen to replicate or read published results. Moreover, published work is expected to be reproducible but it's rarely tested on those grounds later. It is the responsibility of the researchers to promote reproducibility. So, how can you ensure that your work is reproducible?

1. Write detailed experimental protocols that are easy to understand/implement.
2. Share your research outputs in an open access repository to make them accessible.
3. Perform experiments (with variations) in duplicates/triplicates to increase the robustness of your findings.
4. Refrain from data fabrication or manipulation.
5. It is important to note that reproducible research is not always correct. There are many instances as follows.
6. False positives in published research.
7. Bad quality of data and data analysis.
8. Poor study design.
9. Missed confounding variables.
10. Omitted data points.

Source of References

Depending on your discipline, the standards of referencing can vary. Some of the most commonly used include Harvard, Oxford, IEEE, APA, MLA, Chicago/ Turabian. Keep in mind that no matter the style you choose, NEVER combine them in one essay. With the exception of IEEE, the two main style differences are based on whether you use footnotes or in-text references.

Ethical Codes and Academic Independence Ethical codes appear to be designed to protect the weak and the vulnerable from exploitation or harm, which is entirely proper. Educational

research is not focused exclusively on communities defined or self-defined as 'disempowered', communities that lack either legal or psychological 'ownership' of research or the research process. The British Education Research Association (BERA) Council had drawn to its attention several research contracts which seemed to allow the commissioners of the research an inordinate amount of control over, among other things, the research methods to be employed, the form in which the research report will be published. The Association considers that all educational research should be conducted within an ethic of respect for

1. The Person;
2. The Knowledge;
3. The Democratic Values;
4. The Quality of Educational Research;
5. Academic Freedom.

In guiding researchers on their conduct within this framework the Association sets out its guidelines under the following headings:

1. Responsibilities to Participants;
2. Responsibilities to Sponsors of the Research;
3. Responsibilities to the Community of Educational Researchers.

"Researchers must avoid agreeing to any sponsor's conditions that could lead to a serious contravention of any aspect of these guidelines or that undermine the integrity of the research by imposing unjustifiable conditions on the methods to be used or the reporting outcomes. Attempts by sponsors or funding agencies to use any questionable influence should be reported to the Association" (BERA Ethical Guidelines, 2004). Educational researchers are free to interpret and publish their findings without censorship or approval from individuals or organizations, including sponsors, funding agencies, participants, colleagues, supervisors, or administrators. This understanding should be conveyed to participants as part of the responsibility to secure informed consent. Educational researchers should not agree to conduct research that conflicts with academic freedom, nor should they agree to undue or questionable influence by government or other funding agencies. Examples of such improper influence include endeavors to interfere with the conduct of the research, the analysis of findings, or the reporting of interpretations. Educational researchers should not accept funds from sponsoring agencies that request multiple renderings of reports that would distort the reports or mislead readers. The right of researchers independently to publish the findings of their research under their names is considered the norm for sponsored research, and this right should not be lightly waived or unreasonably denied. This right is linked to the obligation of researchers to ensure that their findings are placed in the public domain and within reasonable reach of educational practitioners and policymakers, parents, pupils, and the wider public. Researchers must avoid agreeing to any sponsor's conditions that could lead to a serious contravention of any aspect of these guidelines or that undermine the integrity of the research by imposing unjustifiable conditions on the methods to be used or the reporting of outcomes. Researchers have the right to dissociate themselves publicly from accounts of the research that they conducted, the subsequent presentation of which they consider misleading or unduly selective. Sponsors enjoy a similar right. It is in the interests of researchers and sponsors alike to prevent this situation arising by agreements on publication or, if necessary, through arbitration. The fact that research codes of national research associations do address some of these issues of responsibility to both an informed public and an academic community of scholars is part of an answer to the concern.

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7. Guidance for IRBs, Clinical Investigators, and Sponsors: https://www.fda.gov/downloads/regulatoryinformation/guidances/ ucm328855.pdf
8. Introduction to the Responsible Conduct of Research: https://ori.hhs.gov/sites/default/files/rcrintro.pdf
9. Research ethics: How to Treat People Who Participate in Research: https://bioethics.nih.gov/education/ FNIH_BioethicsBrochure_WEB.PDF
10. Reporting guidelines for Main Study Types: http://www.equator-network.org
11. Best Practice Guidelines on Publication Ethics: a Publisher's Perspective: https://www.ncbi.nlm.nih.gov/pmc/articles/ PMC1804120/
12. Promoting Research Integrity: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1804120/#__sec12title
13. ARRIVE Guidelines: https://www.nc3rs.org.uk/arrive-guidelines
14. What are the 3Rs?: https://www.nc3rs.org.uk/the-3rs
15. A Brief Overview on Conflict of Interests: https://ori.hhs.gov/plagiarism-35
16. Author Responsibilities—Conflicts of Interest: http://www.icmje.org/recommendations/browse/roles-and-responsibilities/ author-responsibilities--conflicts-of-interest.html
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18. Defining the Role of Authors and Contributors: http://www.icmje.org/recommendations/browse/roles-andresponsibilities/defining-the-role-of-authors-and-contributors.html
19. Plagiarism: https://ori.hhs.gov/plagiarism-3
20. 8 Most Common Types of Plagiarism to Stay Away from!: https://www.enago.com/academy/fraud-research-many-typesplagiarism/
21. Overlapping Publications: http://www.icmje.org/recommendations/browse/publishing-and-editorial-issues/overlappingpublications.html
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28. Questionable Practices: https://ori.hhs.gov/education/products/RIandImages/practices/default.html

14. Publication Ethics-Definition, Introduction and Importance

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Publication Ethics Definition

Academic Publication involves the publishing of the manuscript prepared by the author in a reputed Journal or International and National Books. Publication ethics is defined as the rules of conduct that has to be followed the author while publishing his work to a publisher company (1). Generally, it involves the research work or scientific work of the author in which standard agreement is set in which appropriate credit is provided for the authors who have contributed for the research work. Publication ethics involves protection of the intellectual rights of the contributing authors so that there is no falsification of the data. The research work and data furnished by the research scholar should be original and should not be submitted to any other database. According to the Committee on Publication Ethics (COPE), frames a guideline for editors, research scholars, publishers of peer reviewed journals for practicing the “code of conduct “and “best practice guidelines” for publishing their original research work.

Introduction to Publication ethics

Publication of an original research article in this modern evolution requires the professional advancement and responsibilities. The authors should abide to the Good Publication Practices (GPP). Publications which have their data or work from the existing research work can prove as a detrimental negative effect on the research field, health care research and society. Unfortunately, due to some circumstances, some original work has status of publish or perish attitude that has led to the unethical practices in health science publication sectors. Real and good science can blossom only when the research work planned is executed and research work is being conducted, documented with ethical policy and honesty. A scientific paper involves the research problem, organized description of the hypothesis, data and conclusions that is intended to provide the readers a legible view of the plot of the research study. The planning of the research article and publication of the research article provides the author as well as the reader the dissemination of the observation and findings. Publication of the research work in a peer reviewed journal improves the confidence of the authors and gives national and international recognition to authors, department, university and institution. The importance of publication in the career is further emphasized by the adage “publish or perish” publish your research or lose your identity. There are governing regulatory organizations that provides the recommendations and guidelines to assist the authors, editors and reviewers. The purpose is to create and gather accurate data, clear, help the authors reproduce unbiased research papers. The list of few organizations with the publication ethics are International Committee of Medical Journals Editor (ICJME), World Association of Medical Editors (WAME), Committee on Publication ethics (COPE). The authors must submit the original research finding of their research work and the objective discussion of their study findings

must be submitted according to their study. The authors and their colleagues who have contributed to the research work must be provided with the necessary authorship and credits. Any facts which have or create she conflict of interest among the authors must be mentioned in the paper prior before submission to the concerned publisher unit. The list of data, figures and tables must be available to the researcher who is going to perform the research work in that particular filed since it can be helpful for the beginners in the field of research work. The credits or citations of the necessary data must be provided as a die respect to the author of original research work. Submissions of the research work must be submitted to a journal or publisher company at a time and duplication must be avoided. The research work must be novel and it should not be published in any other language. If the data, figures, tables have been utilized from the main author research work then necessary publishing copyright permission has to be obtained from the copyright right holder. Similarly, the author must be aware of the journal or publication company code of ethical publications and follow it accordingly.

Importance of Publication Ethics

Publications are regarded as an asset which enables the authors to gain recognition and it act as acknowledgement of author who has his expertise in that particular field at National and International level in their respective fields. Publication in Science citation journals, Scopus indexed journals, UGC care journals and peer-reviewed journal gives international recognition to the individual, department, university and institutions. Assumption, interpretation and experimentation are the basic pillars of science. In the past, numerous scientists have worked in several fields without any social boundaries (Maqbool et.al). Every person should have authority to utilize the scientific innovations for a favorable lifestyle. According to the COPE guidelines the US office of Research Integrity defines the misconduct terminology as the fabrication, falsification or plagiarism in proposing, performing or reviewing the research or in reporting research results. Journals must consider and take the allegations seriously of misconduct and pre-publications and post-publication. Journals should clearly prescribe the process of handling allegations, and if the issues are bought to the journals or publisher's attention "COPE expects members to have well described and publicly documented practices in all the areas for their journals and organizations. There are several reasons for importance of the publication's ethics in the research field. To promote the aims of research such as knowledge, truth & avoidance of error, it is important to reduce the falsification and fabrication of data and in return it promotes the truth and minimize the error. In the field of research, a great amount of collaborative work is required among individuals who work in group and it promotes the traits such as trust, accountability, mutual respect and fairness. The ethical norms in research such as authorship guidelines, copyright and patenting policies, data sharing policies, confidentiality rules in peer review are framed to protect the intellectual property rights of the authors in collaborative work. The authors and researchers always except to receive the credit for their contributions and do not want their ideas to be stolen or disclosed beforehand. The research work that has been performed enables the researcher to be accountable to the public. The work of researcher is supported by an organization if they trust the integrity and quality of the research work executed by them. Certain norms of research work promote the characteristics such as moral and social values.

These build social responsibility, human rights, compliance with the law and public health and safety. Publication ethics involves components such as statutory and ethics approval, informed consent, data manipulation and research fraud, plagiarism, simultaneous submission, duplicate publication material, ethics of authorship and conflicts of interest (2).

Figure: Types of Research and Publication Ethics (2)

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15. Use of Computers in Research

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The computer is the electronic digital device. It is one of the most versatile developments of the technological age. Today computer is used in every walk of life. It is immensely used in education also. Researchers are using it for conducting their research effectively. Computers are very useful and important when large sample in used. It saves the time of researcher and gives more accurate and fast results. The advanced models of computers have incorporated micro circuitry of more compact size, improved storage capacity and greater processing speed. In scientific and social science research, computers opened up new opportunities to researchers to get valuable information and knowledge. It has become one of the most useful research tools in the Physical and behavioral sciences as well as in the Physical education and sports. The computer can perform many statistical calculations easily and quickly, for e.g., computation of means, standard deviation, correlation, coefficients, t-tests, analysis of various non-parametric analysis.

Computer Machine

Computer is comprised of an input device, a Central Processing Unit and an output device. It has the following functions.,

1. **Speed** – Computer is known for its fast speed and takes friction of seconds to perform any function.
2. **Storage** – Computer can store and retrieve huge data. It can be used when needed. There is no risk of data lost, as it can restore also. The Storage in the device is depend upon the use and need of the research work. It can be start from 500 Gigabyte to 5000 terabyte. Internal or external hard drives can be used or attached.
3. **Accuracy**– Computer is known for its accuracy. Most of the time the machine gets accurate data operations with a success rate of 99% using a correlation algorithm and a direct distortion estimation algorithm. Sometimes it can be inaccurate due to some technological weaknesses and poorly designed system. A recent study has found that malicious bots generated nearly a quarter of overall website traffic in 2019. These malicious bots perform activities such as price and content scraping, account creation and takeover, credit card fraud, denial of service, etc. The hacking, malicious attacks are also responsible of inaccuracy of computers sometimes.
4. **Automatic Machine** – The Computer machine is based upon the algorithm, programming, which are run on computer are automatic. They can be operated through some instructions and commands.
5. **Industrious** – Computer are made to work 24X7 Pattern. Computer can do large data analysis, tirelessly as compare to human.
6. **Size**- the Computer machine is made human friendly sizes and shapes. One can use it as per the need and availability of space, nature of work etc. we can choose computer from a wide range of variety such as Personal Computers, Servers, Laptops, Palm tabs, Tablets, etc.

Phases of Computer to Researcher

1. **Conceptual Phase and Computer:** use of new idea through the gateway of computer.

2. **Design and Planning Phase and Computer:** Create the mind art to make it a clear picture what one can think about the research concept or Questions.
3. **Empirical Phase and Computer:** the researcher gathers relevant empirical data using qualitative or quantitative observation methods, and this goes ahead to frame the research hypotheses or assumptions for the further research work.
4. **Data Analysis and Computer:** A systematic e filings, tabulations, data gathering, and accurate analysis can help the researchers to draw the accurate findings.
5. **Research Dissemination and Computer:** use of internet and the trusted resources, sites, data centers, laboratories, and other repositories such as inflibnet, Shodh ganga, Open access journal can be easily accessible to the researcher for further studies.
6. **References and computer:** studies of other researchers are considered as a resource material to justify the researchers' work. The A citation database is a form of bibliographic index which provides a record of citations between publications, enabling a user to see which publications have cited which other publications, and indexing, Reviewing and bibliographical references are easily categorized through computer.

Physical Education and Research

Computer learning is now essential to everyone starting from early age of schooling to higher education. All the curricula of teaching have essence of computer learning. The in hand practical training is given to students to know the basic to advance computer learning. The use of Computer is a way of advancements to compete in this competitive world. It shouldn't be a surprise to hear that they use computer applications to improve their speeds. At the U.S. Olympic Training Center in Colorado, coaches use a computer application to develop perfect swimming strokes. This simulation software attempts to copy the way water flows around parts of the swimmer's body, such as the arms and hands.

Researches in Physical Education and Sports is advancing day-by-day. And most of the scientific researches require the use of computers. Now-a-days we can say that the scientific research is impossible without the use of the computer. Some of the uses of computers are given below:

1. **Literature search** – computer helps a lot in searching the relevant literature. Hence, all the researches should become familiar with online searching. Procedure of searching id given as, first we have to select the file to be used. Then we should follow, author, title words, journal name, year of publication, descriptors (key words), words in the text of abstract, language, document type (for e.g., book, article , Govt. publications etc.).
2. **Search about Sports medicine**- the sites of public medicine and about.com search engine has the all about clinical inventions related to sports medicine, Physiotherapy, Physiology, Anatomy etc. Computers are most suitable for researches in exercise physiology. The uses are listed below
    a) To precisely control the experimental factor.
    b) Simultaneously record multiple measures from subjects.
    c) To determine the blood pressure, heart rate, pulse rate etc. (for all these, the computer must be able to understand the transferred signals. It can be done by installing analog to digital converter (ADC) in to the computer).
    d) To calculate the subjects' body fat percentage based on skin fold or circumference, measures.
    e) To find out the percentile rank of the subject for particular performance items on a physical fitness test.
    f) To monitor minute to minute to minute changes in lactic acid levels in muscular tissue.

3. **Record Tracking**- computers to track scores, maintain player records, create virtual playing fields, and model new sports techniques and methods.
4. **Sports Industries**- Sports equipment manufacturers use computers to design and test new equipment.
5. **Biomechanical Analysis:** Computers are used to store sports videos. To make analysis and study the playing game pattern of Athletes, their movements and body language, physical conditions, researchers uses videos.
6. **Physiological and Anatomical Analysis:** The advanced software and precise equipments are now easy to operate and store the Athlete data, to make diagnosis and pre-post analysis of the player's performance.

Conclusion

Research gets a long way to find conclusions. The use of computer and computing tools helps to decrease the time duration, and the boredom of the huge data analysis. The help of Computer in Research is the value of Time and Money. The Precious efforts of a Researcher are saved through Computer uses.

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16. Introduction to Business Research Methodology Structure

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INTRODUCTION

Just close your eyes for a minute and utter the word research to yourself. What kinds of images does this word conjure up for you? Do you visualize a lab with scientists at work Bunsen burners and test tubes, or an Einstein-like character writing dissertations on some complex subject, or someone collecting data to study the impact of a newly introduced day-care system on the morale of employees? Most certainly, all these images do represent different aspects of research. Research is simply the process of finding solutions to a problem after a thorough study and analysis of the situational factors. Manager's in organizations constantly engage themselves in studying and analysing issues and hence are involved in some form of research activity as they make decisions at the workplace. As is well known, sometimes managers make good decisions and the problem gets solved, sometimes they make poor decisions and the problem persists, and on occasions they make such colossal blunders that the organization gets stuck in the mire. To be a successful manager it is important for you to know how to go about making the right decisions by being knowledgeable about the various steps involved in finding solutions to problematic issues.

SCOPE OF BUSINESS RESEARCH

The scope of business research is limited by one's definition of "business". Certainly research in the production, finance, marketing, or management areas of a for-profit corporation is within the scope of business research. A broader definition of business, however, includes not-for-profit organizations, such as the American Heart Association, the Sac Diego Zoo, and the Boston Pops Orchestra, Each of these organizations exists to satisfy social needs, and they require business skills to produce and distribute the services that people want. Business research may be conducted by organizations that are not business organizations. The reserve bank of India, for example, performs many functions that are similar, if not identical, to those of business organizations. Reserve bank economists may use research techniques for evaluative purposes much the same way as managers at Reliance or Ford. The term business research is utilized because all its techniques are applicable to business settings. Business research covers a wide range of phenomena. For managers the purpose of research is to fulfil their need for knowledge of the organization, the market, the economy, or another area ofun certainty.

BUSINESS RESEARCH DEFINED

The task of business research is to generate accurate information for use in decision making as we say above, the emphasis of business research is on shifting decision makers from intuitive information gathering to systematic and objective investigation. Business research is defined

as the systematic and objective process of gathering, recording, and analysing data for aid in making business decisions. This definition suggests, first, that research information is neither intuitive nor haphazardly gathered. Literally, research (re-search) means to "search again". It connotes patient study and scientific investigation wherein the researcher takes another, more careful look at data to discover all that can be known about the subject of study. Second, if the information generated or data collected and analysed are to be accurate, the business researcher must be objective. The need for objectivity was cleverly stated by the nineteenth-century American humorist Atriums Ward, who said, "It isn't the things we don't know that gets us in trouble. It's the things we know that isn't so". Thus, the role of the researcher is to be detached and impersonal, rather than biased in an attempt to prove preconceived ideas. If bias enters the research process, the value of the data is considerably reduced. A developer who owned a large area of land on which he wished to build a high-prestige shopping centre wanted a research report to demonstrate to prospective retailers that there was a large market potential for such a centre. Because he conducted his survey exclusively in an elite neighbourhood, not surprisingly his findings showed that a large percentage of respondents wanted a "high-prestige" shopping centre. Results of this kind are misleading, of course, and should be disregarded. If the user of such findings discovers how they were obtained, the developer loses credibility.

MANAGERIAL VALUE OF BUSINESS RESEARCH

We have argued that research facilitates effective management. At the Ford Motor Company, a marketing manager stated, "Research is fundamental to everything we do, so much so that we hardly make any significant decision without the benefit of some kind of market research. The risks are too big." Managers in other functional areas have similar beliefs about research in their specialties. The prime managerial value of business research is that it reduces uncertainty by providing information that improves the decision-making process. The decision-making process associated with the development and implementation of a strategy involves three interrelated stages.

1. Identifying problems or opportunities
2. Selecting and implementing a course of action
3. Evaluating the course of action Business research, by supplying managers with pertinent information, may play an important role by reducing managerial uncertainty in each of these stages. Identifying Problems or Opportunities Before any strategy can be developed, an organization must determine where it wants to go and how it will get there. Business research can help managers plan strategies by determining the nature of situations by identifying the existence of problems or opportunities present in the organization. Business research may be used as a diagnostic activity to provide information about what is occurring within an organization or in its environment. The mere description of some social or economic activity may familiarize managers with organizational and environmental occurrences and help them understand a situation. For example, the description of the dividend history of stocks in an industry may point to an attractive investment opportunity. Information supplied by business research may also indicate problems. For example, employee interviews undertaken to delineate the dimensions of an airline reservation clerk's job may reveal that reservation clerks emphasize competence in issuing tickets over courtesy and friendliness in customer

contact. Once business research indicates a problem, managers may feel that the alternatives are clear enough to make a decision based on experience or intuition, or they may decide that more business research is needed to generate additional information for a better understanding of the situation. Whether an organization recognizes a problem or gains insight in to a potential opportunity, an important aspect of business research is its provision of information that identifies or clarifies alternative courses of action. Selecting and implementing a course of action after the alternative courses of action have been identified, business research is often conducted to obtain specific information that will aid in evaluating the alternatives and in selecting the best course of action. For example, suppose a facsimile (fax) machine manufacturer must decide to build a factory either in Japan or in South Korea. In such case, business research can be designed to supply the exact information necessary to determine which course of action is best of the organization. Opportunities may be evaluated through the use of various performance criteria. For example, estimates of market potential allow managers to evaluate the revenue that will be generated by each of the possible opportunities.

The Omnibus survey is conducted quarterly to determine who is flying and for what reasons. It enables United to track demographic changes and to monitor customer ratings of its services on a continuing basis, allowing the airline to gather vast amounts of information at low cost. The information relating to customer reaction to services can be compared over time. For example, suppose United decided to change its menu for in-flight meals. The results of the Omnibus survey might indicate that shortly after the menu changed, the customers' rating of the airline's food declined. Such information would be extremely valuable, as it would allow management to quickly spot similar trends among passengers in other aspects of air travel, such as airport lounges, gate-line waits, or cabin cleanliness, thus managerial action to remedy problems could be rapidly taken. When analysis of performance indicated that all is not going as planned, business research may be required to explain why something "went wrong." Detailed information about specific mistakes or failures infrequently sought. If a general problem area is identified, breaking down industry sales volume and a firm's sales volume into different geographic areas may provide an explanation of specific problems, and exploring these problems in greater depth may indicate which managerial judgments were erroneous.

WHEN IS BUSINESS RESEARCH NEEDED?

A manager faced with two or more possible courses of action faces the initial decision of whether or not research should be conducted. The determination of the need for research centres on (1) time constraints, (2)the availability of data, (3) the nature of the decision that must be made, and (4) the value of the business research information in relation to its costs. Although not ideal, sometimes the urgency of a situation precludes the use of research. Availability of data frequently managers already possess enough information to make a sound decision without business research. When there is an absence of adequate information, however, research must be considered. Managers must ask themselves, "Will the research provide the information needed to answer the basic questions about this decision?" If the data cannot be made available, research cannot be conducted. For example, prior to1980 the people's republic of China had never conducted a population census.

The nature of such a decision is not totally independent from the next issue to be considered: the benefits versus the costs of the research. However, in general the more strategically or tactically important the decision, the more likely that research will be conducted.

Benefits versus costs some of the managerial benefits of business research have already been discussed. Of course, conducting research activities to obtain these benefits requires expenditure; thus, there are both costs and benefits in conducting business research. In any decision-making situation, managers must identify alternative courses of action, and then weigh the value of each alternative against its cost. It is useful to think of business research as an investment alternative. When deciding whether to make decision without research or to postpone the decision in order to conduct research, managers should ask:

(1) Will the payoff or rate of return be worth the investment?

(2) Will the information gained by business research improve the quality of the decision to an extent sufficient to warrant the expenditure? And

(3) Is the proposed research expenditure the best use of the available funds?

For example, TV Cable Week was not test-marketed before its launch. While the magazine had articles and stories about television personalities and events, its main feature was a channel-by-channel program listing showing the exact programs that a particular subscriber could receive. To produce a "custom" magazine for each individual cable television system in the country required developing a costly computer system. Because development required a substantial expenditure, one that could not be scaled down for research, the conducting of research was judged to be an improper investment. They analysed the cost of the information (i.e., the cost of business research) relative to the potential benefits.

INTERNAL VERSUS EXTERNAL CONSULTANTS/RESEARCHERS

Internal Consultants/Researchers Some organizations have their own consulting or research department, which might be called the Management Services Department, the Organization and Methods Department, R & D (research and development department), or by some other name. This department serves as the internal consultant to subunits of the organization that face certain problems and seek help. Such a unit within the organization, if it exists, would be useful in several ways, and enlisting its help might be advantageous under some circumstances, but not in others. The manager often has to decide whether to use internal or external researchers. To reach a decision, the manager should be aware of the strengths and weaknesses of both, and weigh the advantages and disadvantages of using either, based on the needs of the situation. Some of the advantages and disadvantages of both the internal and external teams are now discussed.

Advantages of Internal Consultants/Researchers: There are at least four advantages in engaging an internal team to-do the research project:

1. The internal team would stand a better chance of being readily accepted by the employees in the subunit of the organization where research needs to be done.

2. The team would require much less time to understand the structure, the philosophy and climate, and the functioning and work systems of the organization.

3. They would be available for implementing their recommendations after the research findings are accepted. This is very important because any "bugs" in the implementation of the recommendations could be removed with their help. They would also be available for

evaluating the effectiveness of the changes, and considering further changes if and when necessary.

4. The internal team might cost considerably less than an external team for the department enlisting help in problem solving, because they will need less time to understand the system due to their continuous involvement with various units of the organization. For problems that are of low complexity, the internal team would be ideal.

DISADVANTAGES OF INTERNAL CONSULTANTS/RESEARCHERS:

There are also certain disadvantages to engaging internal research teams for purposes of problem solving. The four most critical ones are:

1. In view of their long tenure as internal consultants, the internal team may quite possibly fall into a stereotyped way of looking at the organization and its problems. This would inhibit any fresh ideas and perspectives that might be needed to correct the problem. This would definitely be handicap for situations in which weighty issues and complex problems are to be investigated.

2. There is scope for certain powerful coalitions in the organization to influence the internal team to conceal, distort, or misrepresent certain facts. In other words, certain vested interests could dominate, especially in securing a sizable portion of the available scant resources.

3. There is also a possibility that even the most highly qualified internal research teams are not perceived as “experts” by the staff and management, and hence their recommendations do not get the consideration and attention they deserve.

4. Certain organizational biases of the internal research team might in some instances make the finding less objective and consequently less scientific.

External Consultants/Researchers: The disadvantages of the internal research teams turn out to be the advantage of the external teams, and the former’s advantages work out to be the disadvantages of the latter. However, the specific advantages and disadvantages of the external teams may be highlighted.

ADVANTAGES OF EXTERNAL CONSULTANTS

The advantages of the external team are:

1. The external team can draw on a wealth of experience from having worked with different types of organizations that have had the same of similar types of problems. This wide range of experience would enable them to think both divergently and convergent rather than hurry to an instant solution on the basis of the apparent facts in the situation. They would be able to ponder over several alternative ways of looking at the problem because of their extensive problem-solving experiences in various other organizational setups. Having viewed the situation from several possible angles and perspective (divergently), they could critically assess each of these, discard the less viable option and alternatives, and focus on specific feasible solutions (think convergent).

2. The external teams, especially those from established research and consulting firms, might have more knowledge of current sophisticated problem-solving models through their periodic training programs, which the teams within the organization may not have access to. Because knowledge obsolescence is a real threat in the consulting area, external research institutions ensure that their members are current on the latest innovations through periodic organized

training programs. The extent to which internal team members are kept abreast of the latest problem-solving techniques may vary considerably from one organization to another.

Disadvantages of external consultants:

The major disadvantages in hiring an external research team are as follows:

1. The cost of hiring an external research team is usually high and is the main deterrent, unless the problems are very critical.
2. In addition to the considerable time the external team takes to understand the organization to be researched, they seldom get a warm welcome, nor are readily accepted by employees. Departments and individuals likely to be affected by the research study may perceive the study team as a threat and resist them.
3. The external team also charges additional fees for their assistance in the implementation and evaluation phases. Keeping in mind these advantages and disadvantages of the internal and external research teams, the manager who desires research services has to weigh the pros and cons of engaging either before making decision.

BUSINESS RESEARCH IN A GLOBAL ACTIVITY

Business today operates globally. Business research, like all business activity, has become increasingly global. Some companies have extensive international business research operations. Upjohn conducts business research in 160 different countries. Companies that conduct business in foreign lands must understand the particular nature of those markets and determine whether they require customized business strategies. For example, although the 14 nations of the European Community not share a single market, business research shows that they do not share identical tastes for many consumer products. Business researchers have learned that there is no such thing as a typical European consumer or worker; the nations of the European Community are divided by language, religion, climate, and centuries of tradition. For example, Scant el Research, a British firm that advises companies on colour preferences, found inexplicable differences in the way Europeans take their medicine. The French prefer to pop purple pills, while the English and Dutch wish for white ones. Consumers in all three countries dislike bright red capsules, which are big sellers in the United States. This example illustrates that companies that do business in Europe must learn whether they need to adapt to local customs and habits. A.C. Nielsen, the company that does television ratings, is the world's largest business research company. More than 60 percent of its business comes from outside the United States. Although the nature of business research can change around the globe, the need for business research is universal. Throughout this book we will discuss the practical problems involved in conducting business research in Europe, Asia, Latin America, the Middle East, and elsewhere.

ETHICS AND BUSINESS RESEARCH

Ethics in business research refers to a code of conduct or expected societal norm of behaviour while conducting research. Ethical conduct applies to the organization and the members that sponsor the research, the researchers who undertake the research, and the respondents who provide them with the necessary data The observance of ethics begins with the person instituting the research, who should do so in good faith, pay attention to what the results indicate, and surrendering the ego, pursue organizational rather than self-interests. Ethical conduct should also be reflected in the behaviour of the researchers who conduct the

investigation, the participants who provide the data, the analysts who provide the results, and the entire research team that presents the interpretation of the results and suggests alternative solutions. Thus, ethical behaviour pervades each step of the research process data collection, data analysis, reporting, and dissemination of information of the Internet, if such an activity is undertaken. How the subjects are treated and how confidential information is safeguarded is all guided by business ethics. There are business journals such as the journal of business Ethics and the Business Ethics Quarterly that are mainly devoted to the issue of ethics in business. The American Psychological Association has established certain guideline for conducting research, to ensure that organizational research is conducted in an ethical manner and the interests of all concerned are safeguarded.

SUMMARY AND CONCLUSION

Business research is a management tool that companies use to reduce uncertainty. Business research, the manager's source of information about organizational and environmental conditions, covers topics ranging from long-range planning to the most ephemeral tactical decisions. Business research is the systematic and objective process of gathering, recording, and analysing data for decision making. The research must be systematic, not haphazard. It must be objective to avoid the distorting effects of personal bias. The objective of applied business research is to facilitate managerial decision making. Basic research is used to increase the knowledge of theories and concepts. Managers can use business research in all stages of the decision-making process. There is a broad variety of applied research topics, such as general business, economic, and corporate research; financial and accounting research; management and organizational behaviour research; sales and marketing research; and corporate responsibility research.

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17. Development of Physical Education and Sports through Research

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INTRODUCTION

Research is simply the process of finding solution to a problem after thorough examination and analysis of factors. The scope for research is everywhere. Each of the sectors of the Society, industries, and allied areas has research prevalence. Educational developments are based upon new–new inventions, alterations, solutions, and remedies to provide quality education. This can only be done through the continuous research and development. The progress of any sector is relies upon the cost effectiveness and uniqueness. More the innovative, more it helps to the particular establishment. Physical education and sports is one of the most progressing areas of Learning and having a wide long way, providing to researches. The demanding new innovations in the professional sports such as, Football, Cricket, Swimming, Athletics, etc. are always welcomed to research in it. Physical education subject can have a bright scope in terms to develop through researches. The innovative ideas and its implications to sports make the game faster and action packed. Physical Education is a field of Practical learning of movement education with the help of drills and methods associated to learning methodologies and theories. The Education has many branches and Physical education is one of its vital branches to overall human development, Healthy lifestyle, Discipline, development of Leadership qualities, Sportsmen ship, improves socio-psycho behaviors and produces a refined citizen of the country.

Research in Physical Education

Research is systematic and objective process of collecting, recording and analyzing data to facilitate research decisions. Basic or Pure Research is an attempt to verify the acceptability of theory or to expand the limits of knowledge. Applied Research is conducted when a decision is made about specific real-life problem. Research Methods are methods/techniques used for concluding a research. Research Methodology is a way to systematically solve a research problem. Scientific Method attempts to achieve a systematic interrelation off acts by experimentation, observation, logical arguments from accepted postulates and a combination of these in varying proportions. One reason for conducting research is to develop and evaluate concepts and theories. Basic- or pure-research attempts to expand the limits of knowledge. It does not directly involve the solution to particular, pragmatic problem, but it had been said, “There is nothing as practical as a good theory.” Although this statement is true in the long run, basic research findings generally cannot be immediately implemented.

Basic research is conducted to verify the acceptability of a given theory or to know more about a certain concept. For example, consider this basic research conducted by a university. Academic researchers investigated whether or not an individual’s perception that he or she

was doing well on a task would have any influence on future performance. Learning of Physical Education is a whole life process and its scope is limitless. The good habits in early days of life cycle can lead a solid base to develop more progressively. Healthy body has a sharp mind too. By the help of Physical Education one can achieve his life goals as an ease. Following are some benefits of Physical education Studies.

1. Physical education learning is a Practical based pedagogy
2. Physical education is a first step towards sportsmanship.
3. Sports talents can be found through Physical education.
4. Carrier based on Physical Education has a wide scope and Bright future.
5. Physical education can be studied up to higher level with its many sub branches, like Sports Training, Sports management, Sports Medicine, Sports Physiotherapy, Sports Psychology, Sports Business development, Sports Media and Broadcasting, Sports Engineering, Sports Goods Manufacturing, Sports Pedagogy, Sports Coaching etc.

As Physical Education Curriculum is accepted and promoted worldwide, new changes are needed rapidly to enhance the beauty of the subject.

Research Practical Approaches

Research is a careful investigation leading to the discovery and interpretation of information in physical education. There are many different types of research that discover or reinterpret information collected by experimentation or observation and suggest practical application or theoretical implication of that information. In physical education field, research often involves experimentation which tests a researcher's hypothesis. Research may also involve the investigation and synthesis of the findings of other researchers.

Our research in physical education could be primary or secondary. Primary research looks at documents and other firsthand evidence such as data collected in experiments or reports of an event, or an individual's life. Secondary or Bibliographic research investigates what others have written about a topic. Because of the knowledge and time usually required for primary research, most research projects done by undergraduate students involve secondary research. Research is a continuous process because in some sense it is never finished. The process begins with interest sparked by an observation or question, the desire to discover and learn more and to a new understanding because of what has been discovered. Therefore Research plays an important role in the field of physical education.

Impact of Research in Physical Education and Sports Field

The prevalence of research in physical education can perhaps be related to a general trend in this country towards a technocratic approach to decision making. In this approach, decisions are seen not so much as philosophical issues, but as inevitable responses to the evidence supplied by research-rather than by intuition. As a result research has in some cases overthrown long accepted beliefs in favor of new facts. Research is often regarded as a force for change, and it has clearly had that effect in physical education. The scientific movement has accrued a fund of technological information, which points to new directions and illuminates old values. There is a fixed reality, which accompanies this scientific trend; it emphasizes the problematic nature of human beings. In the search for answers, research in physical education has also turned up baffling new problems-considerations, which could not even have been envisioned in pre-research days.

The major effect of research has been to subject every area of physical education to new questions-to infuse the field with the spirit of inquiry. It is no longer acceptable to blindly believe certain things are true. Research has had this impact because it not only probes for increased understandings but also because it provides the means discovering answers.

For example-Athletes in training need large amounts of protein. There was once a widespread misconception that high-protein diets would improve athletic performance. This led athletes to consume disproportionately large amounts of red meat and along with special protein supplements. It is now known, however, that a well-balanced diet will Supply more than adequate amounts of protein for any athletic performance (Barness, 1977).

Importance of Research in Physical Education and Sports

As stated earlier, the demand of a thing is based upon the uses of a thing. Many of countries have realized the truth of Health values. These values are nutrition through Learning of Physical Activities and sports by Physical Education studies. The Researches in the Field of Physical Education and Sports can fulfill this demand and supply the value-added base, through mass gets benefited. Here are some need and importance of Research in Physical Education and Sports.

1. Research is needed for the progress of the field of physical education.
2. It gives new dimension to physical education and sports to up-bring the Traditional Sports and Activities in the mass.
3. Research is needed for the development of new equipments and facilities, and generates quick-fast game temperament.
4. Research helps for the invention of new Trends, methods, technique, procedures and dimensions in Sports and Physical Education field.
5. Research helps to solve the critical problem, and avoid the ambiguity in Progression.
6. It helps to spread the finest and filtered views of physical Education and Sports, to attract the masses.
7. It helps to prevent athletics injury, provide proper diagnosis, and healing through scientific bases.
8. Research is useful for the development of scholarly knowledge, Literature and critical thinking.
9. It gives pride, prestige, respect, status and confidence to the physical educationists, Coaches, and Trainers to produce more talents.
10. Research is needed for professional betterment and all round developments.
11. Research is important for the growth of and development of exercise physiology, sports psychology, sports sociology, learning health education and sports engineering.
12. Research will record the progressive changes and probability to accomplish the require goal.
13. Due to research the norms are made in all the major games and field events for all age groups and gender.
14. Research can contribute to the medal tally of any country, which can only be achieved through precise scientific training and coaching using advance methodologies.
15. Research can contribute the Physical activities and Sports reachable to all, in terms of Cost and availabilities.

16. Due to researches online virtual gaming platforms are developed now days.
17. Many of the Major Competition such as, Chess, Archery, karate, Carom, Athletics, Cycling, are getting benefited through the Technological advancements in sports due to the research.
18. Holding research webinars, seminars and workshops, are the tools of research promotion in the field of Physical Education and Sports.
19. The in hands training of Practical methodology have been easier due to the research contribution in the field of Physical Education and Sports.
20. The Research and Developments In the field of Sports and Physical educations helping the youth to choose many untouched avenues in it for future career.

Conclusion

Research is a process of discovery. Its major goal is to arrive at the truth of a situation using the most objective and scientific techniques possible. Using research in physical education and sports can boost the performance of athlete and help them to achieve the goals. Whereas research implications in physical education Subject, leads a solid base to produces advance trainers and field Researchers. Therefore the demand of Research cannot be ignored.

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18. Research Trends in Physical Education: A Critical View

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Introduction

Physical education is a branch of general education. It is an experience learns by a teacher given to the student. The general aim of physical education as of all education is, the harmonious development of the child's body and mind. Whether a child goes to school or not his working life will be one of vigorous physical and mental activity. It is the work of the school to see the activities in both satisfying to the child and also remains of growth and development.

As an integral part of education physical education needs more emphasize over research work in terms of Higher Education in terms of preparation of research environment, we need to follow the trend of research under the heading of physical education and sports. Research is an endless process of collecting analyzing and interpreting information to answer questions but to qualify as research the process must have certain characteristics it must as far as possible be controlled rigorous systematic valid and verifiable empirical and Critical controlled in real life there are many factors that affect and outcome. Research is a point of view and attitude of enquiry or frame of mind it asks question which have not been asked, and it seeks to answer them by following a fairly definite procedure. Some Definitions about the Research in General are as given.

Research is considered to be more formal, systematic, intensive process of carrying on the scientific method of analysis. It involves a more systematic structure of investigation usually resulting formal records, procedures, reports and conclusion." Best J. W.

"Research is an honest, exhaustive, intelligent searching for fact and their meanings or implications with reference to a given problem." Cook P.M.

According to George J. Mouly, Educational research is "the systematic and scholarly application of the scientific method interpret it in its broader sense, to the solution of educational problems conversely, any systematic study, designed to promote the development of education as a science can be considered Educational Research.

According to Francis G. Cornell, “to be sure the best we search is that which is reliable, verifiable and exhaustive, so that it provides information in which we have confidence. The main point here is that research case, literally speaking a kind of human behavior, an activity in which people engage by this definition and intelligent human behavior, involve some research"

According to The word of Clifford Woody, 'research is not merely a search of truth but a prolonged intensive purposeful search in the last analysis research constitutes a method for which discovery of truth, which is rarely a method of critical thinking. It comprises defining and redefining problems, formulating hypothesis, are suggested solutions, collecting,

organizing and evaluating, that are making deductions and reaching Conclusion, and at last carefully testing, the conclusions to determine whether they fit the formulating hypothesis.

Physical Education

Some Definitions are self explanatory in nature abut Research.

"Physical Education, an integral part of the total education process, is a field of Endeavour that has as its aim the improvement of human performance through the medium of physical activities that have been selected with a view to realizing this outcome." Charles A. Bucher

"Physical Education is an education of and through human movement where many of the educational objectives are achieved by means of big muscle activities involving sport, games, gymnastics, dance and exercises." Harold M. Barrow

"The great thought in physical education is not the education of the physical nature, but the relation of physical training to complete education." Thomas Wood.

The trend study is an interesting application of the descriptive method. In essence it is based on a longitudinal consideration of recorded data indicating what has been happening in the past, what the present situation reveals, and on the basis of these data, what is likely to happen in the future."

Need of Research in Physical Education

The 'New' Physical education emphasize education through the Physical as a Philosophical basis for Sports, Fitness and Physical Education, a Philosophy in which activity is believed to contribute to physical, mental, social and intellectual strength paving way for all-round, wholesome and harmonious development of an individual."

"Modern concept of Physical Education has given rise to a Global perspective and has become one of the most viable factors in cross culture integration. Sports have its own language and can provide a medium for international understanding and goodwill among nations. It has assumed great importance not only for self actualization at the national level but for social maturation and survival at the Global level."

Co-ordination and maintenance of standards in teaching and research is the statutory responsibility of University Grants Commission and in this connection the Commission consults the Universities as well as the experts on its various Panels, The Act of the Commission empowers it to frame regulations in some of these matters and a violation of the regulations by any institution could cause suspension or withdrawal of the grants provided by the Commission. Since the Universities and the Commission are equally keen to maintain and raise standards of education and research there has always been cooperation in this sphere.

The Commission has taken a variety of decisions to foster better standards of education for example by framing the Regulation regarding the qualification of the teachers at the time of recruitment, or providing guidelines for minimum examination reform, or advice to the universities for striving to raise the number of days on which classes or laboratories are held to a figure of above 180 in a year etc. The Commission has also been pressing for modernization and relevance of syllabi and methods of teaching which require students to do assignments, tutorials, projects, or field work etc, exercising their own initiative and creativity. Number of journals are being started or being strengthened (for example journals of Education in Physics, Chemistry, Mathematics and Biology etc.) particularly to help teachers to improve their professional performance.

In research, the Commission has taken a number of policy decisions to make more fund available to expand the base - for example in minor and major research projects, to improve the infrastructure in selected institutions in order to enable them to raise standards of postgraduate education and attract projects from many national agencies in relation to areas of national importance. A cadre of Research Scientists in all subjects in the Lecturers, Readers, Professors, has also been created so as to make research and excellence oriented careers an attractive proposition for talented young men and women. Government of India approved by parliament in 1968 required that research institutions should function within the fold of the universities in close association with them. The Commission is creating major research.
facilities in the university system with cooperative and autonomous management and use of such facilities.

The universities have a proud record in research - in fact, practically all famous Scientists and Scholars whom we remember were university people. The strength of the university system which makes it so effective in research is its free atmosphere and constant induction of fresh minds who work with dedication to solve problems within severe limitations of time. In order to maintain the position of pre-eminence in research, however, the universities have to be self critical and show readiness to improve their performance in research.

The various panels of experts advising the Commission have expressed concern over the quality of research, particularly in the context of its great expansion in the universities, and during the last year several meetings were held to discuss the problem. Finally, a two-day discussions of university Scientists and those other leading institutions and agencies was held in November, 1983 in which all aspects of improving research were thoroughly examined and a series of recommendations made to the University Grants Commission. An Implementation Committee has been set up to free this effort from routine delays and to persuade the universities and the senior academics, as also the younger supervisors.

Importance of Research in Physical Education

The education policies are responsible certainly to create a solid road map to make mass research program starting from graduation level. The new education Policy has emphasis on the Research environment in the early stage of learners. The integrated research degree courses are introduced in this manner to bring the new and innovative researchers in the mainstream. Physical Education should also be considered to this mainstream of research environment. As of the performance of sports and physical Activities are integrally connected to the scientific training and coaching to the athletes. The researchers are standing as major supporting tools to develop the athlete at extreme level to get the maximum output from them through the scientific research tools invented by the researchers worldwide. The work on R&D in sports and Physical Education is not satisfactory in the country like India as compared to other Asian county like china. Indian universities are promoting research through ought the year providing financial and infrastructural support to the deserving scholars are not enough as compared to other developing countries.

In the light of the current topic, the data on research enrolment and the award of Ph.D. degree was examined, and the view taken is that there has been no over production of Ph.D.s, although in some subjects, particularly in languages, the enrolment is quite large often without scholarships. The needs, both of providing trained research personnel to the agencies and of manning institutions, where postgraduate education is conducted, are so large that we should not shrink from expanding the base of research provided excellence can be maintained. With insistence on excellence, the enrolment should be curtailed without hesitation wherever quality cannot be maintained. The UGC's insistence on research qualifications for teachers in the universities was considered to be proper and timely.

Need of improvement in the quality of postgraduate education in Physical Education is the required component for further improvisation in future researches. The foremost step in improving the quality of research is the improvement of the educational foundation of the scholars. The present undergraduate and postgraduate education and corresponding examinations generally do not present an intellectual challenge to students, and provide them no opportunity for creative work. The project can be of varying degrees of simplicity or complexity requiring reflection, planning, designing, execution, and critical evaluation of the result of the work. They are widely in practice even in schools of the developed countries, and they are an excellent means of giving research opportunities to students. Term papers and seminars are other devices to broaden the base of knowledge, oblige students to read many books, listen to invited talks, and in postgraduate classes, to read original publications in journals, and to present and discuss with teachers and other students. Such inter-active learning would prepare a student's much better for every activity or job they might take up later and specially so for research. Evaluation of performance in the above activities, which are more related to problem-solving, creativity and communication abilities, can only be done by teachers who are involved in the conduct of these activities over a period of time that the student spends in the Department.

Some of the points are needed to create a research environment among the Physical Education Studies.

1. Include Physical Education as a compulsory subject starting from schooling.
2. Create Research innovation centers at every cluster of Education institutions.
3. Mobilize the Research resources, accessible to all at ease.
4. Promote Researchers starting from higher education.
5. Create special curricula to research enthusiastic learners.
6. Make More Budgetary provisions apart from general budget to provide more financial assistance to the Young researchers.
7. Organize; allow more research workshop, feast, Seminars, and Conclave.
8. Include Credits for research, innovations, discoveries and creation of any new ideas separately to the curricula of physical education.
9. More practical Approaches should be recognizing to identifying the Young Researchers Talent.
10. Include sports Startups in main stream.

A National Testing for Research

It is essential to carefully select those who would be awarded Fellowships for undertaking research in the university system, through a National Examination or Test. In the absence of such a test, it has been found that a number of scholars, not suitably equipped for under taking research, get admitted into the system, and there after need prolongation of the period required for research and produce work of a quality which often leaves much to be desired. The Commission has already notified that these tests will be held in a number of science and Social Science subjects starting from 1984, and universities have been advised that no Junior Research Fellowships in the specified fields may be awarded to those who have not qualified through the National Test. Similarly, persons engaged in Junior Research Fellowships in schemes and projects would also have to qualify through the test. When qualified persons are available, the universities may use other devices for selecting the best research workers - for example through a viva. (UGC's PPIRU)

Conclusions

The Future of Physical Education is Bright as observing the current trends of world to Health and Fitness. Now Sports and Physical Education is a Million's Dollar Industry. Keeping the Future growth, many corporate housed is coming forward to get advantages of the future

growth. This trend attracts new avenues to the young researchers to create something innovative to develop the Physical education field. We have to be ready to grab this trending opportunity to make us more industrious in the field of Physical Education and Sports.

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19. Importance of Literature Review in Physical Education Researches

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Research is a combination of two word **Re+Search**, which means, again find the truth. Research is everywhere and a need of current scenario. It's a process of collecting, analyzing and interpreting information to answer questions. To answers the questions, research methodology requires facts, and evidences to support answers. The base of any research is the collection of the past understandings and facts, already done in line to support the current answer. Research is a structured enquiry that utilizes acceptable scientific methodology to solve problem and get new knowledge that is generally applicable. Although we engage in such process in our daily life the difference between our casual day-to-day generalization and the conclusions usually organized as scientific method lies in the degree of formality rigorousness verify ability and general ability of letter. Human knowledge has three phases: preservation, transmission and advancement. Practically all human knowledge can be found in books and journals and papers. By building upon the accumulated and recorded knowledge of the past, man constantly adds to the vast store of knowledge which makes possible progress in all areas of human Endeavour. The investigator can ensure whether considerable work has already been done on topics which are directly related to his proposed investigation.

Before taking up any specific research project in the development of Physical education subject, the researcher must be thoroughly familiar with previous theory and research. To assure this familiarity, every research project in the allied subject, has to review the available theoretical and research literature.

Review of Literature

The term 'review' means to organize the knowledge of the specific area of research to evolve an edifice of knowledge to show that the proposed study would be an addition to this field. In research methodology the term literature refers to the knowledge of a particular area of investigation of any discipline which includes theoretical, practical and its research studies. The task of review of literature is highly creative and tedious because the researcher has to synthesis the available knowledge of the field in a unique way to provide the rationale for his study. A summary of the writings of recognized authorities and of previous research provides evidence that the researcher is familiar with what is already known and what is still unknown and untested.

In historical research, the researcher does much more than only review already published material. He needs to find and integrate new information which has never been reported and considered. Citing studies that show substantial agreement and those that seem to present conflicting conclusions helps to sharpen and define understanding of existing knowledge in the problem area, provides a background for the research project, and makes the reader aware

of the status of the issue. Parading a long list of annotated studies relating to the problem is ineffective and inappropriate.

According to the words of Good, Barr and Scates. “The competent physician must keep abreast of the latest discoveries in the field of medicine... Obviously the careful student of Physical education, the research worker and investigator should become familiar with location and use of sources of related information."

According to W.R. Borg, “The literature in any field forms the foundation upon which all future work will be built. If we fail to build the foundation of knowledge provided by the review of literature our work is likely to be shallow and naive and will often duplicate work that has already been done better someone else."

Charter V. Good has stated as “The keys to the vast storehouse of published literature may open doors to sources of significant problems and explanatory hypotheses and provide helpful orientation for definition of the problem, background for selection of procedure and comparative data for interpretation of results. In order to be creative and original, one must read extensively and critically as a stimulus to thinking."

John W. Best elaborated it as “Practically all human knowledge can be found in books and libraries. Unlike other animals that must start anew with each generation, man builds upon the accumulated and recorded knowledge of the past. His constant adding to the vast store of knowledge makes possible progress in all areas of human endeavor."

In survey and experimental research in education and Physical education, the review of the literature serves a variety of background functions preparatory to the actual collection of data. In these approaches, the literature is reviewed to create the context from the past for the new study to be conducted with new subjects and newly gathered data. In the historical approach, one cannot ignore the past and therefore in review of the literature the term 'literature' is used in the broadest possible sense.

Phases reviewing the literature

1. Identification and Reading. It includes identifying all the relevant published material in the problem area and reading that part of it with which we are not thoroughly familiar

2. Writing. The second phase of the review of literature involves writing this foundation of ideas into a section of the research report for the joint benefit of the researchers and readers.

Importance of Review of Literature

1. Create understanding to the past studies.
2. Helps to identify the source of Problem of Study.
3. Review of literature provides a source of problem of study.
4. It helps to select own problem of research.
5. It helps to researcher frame hypotheses on the basis of past review of literature.
6. Helps to make a clear idea of the Problem.
7. Helps to provide theories, ideas, explanations or hypotheses which may prove useful in the formulation of a new problem.
8. Helps to identify the availability of resource.
9. Helps to suggest method, procedure, sources of data and statistical techniques appropriate to the solution of the problem.

10. Helps to locate comparative data and findings useful in the interpretation and discussion of results.
11. Helps to draw conclusions significantly.
12. Avoids Duplication.
13. Reviews help to develop expertise and critical analysis abilities of the investigator.
14. Helps to get the accurate knowledge.
15. Helps to frame the limitations and delimitations for the research work.
16. Helps to support the methodology and research tool use.

Steps of Review of literature

To collect review is a systematic way towards the actual reaches to a researcher in the field of physical education and sports. As the subject itself has mixed in nature having imperial, social, and historical, surveys, case studies, experimental, demographic, senses studies, a mixed approach is to be needed while selecting an area of specific research. Learning when previous research has been conducted will determine how far back chronologically his review of the literature will follow. It will show the wealth of recent research in the problem area. When there is contemporary lack of interest in the field, the researcher will need to go further back until he comes upon the research. The supporting data in the shape of literature, Sample, equipments, questioners, Books, journals, periodicals, handbooks, etc. are some of the common ways to get the reviews. To get the accurate reviews researcher must follow these steps.

1. Developing the insight about the general nature of his problem.
2. The logical starting point is to get a clear picture of the problem to be solved.
3. A text-book usually provides the theoretical aspects of the problem.
4. Review of the empirical researches of the area. The best reference for this phase is the Handbook of Research, Encyclopedia of Educational Research, the Review of Educational Research and International Abstracts for more up-to-date findings.
5. Systematic and thorough research for library material available at the spot.
6. Notes Taking to uniformity, accuracy and ease of assembly of the data.
7. Collect bibliographic data.

5. A general valuation of each source, rather than simply a summary of its content should be made.

6. The literature for the purpose of conducting research is a precise and exacting task of locating specific information for the specific purpose.

As reviewing the literature is essentially the library phase of the project, one must become thoroughly conversant not only with the way in which libraries in general function, classify, and catalogue, but also with the way in which the specific library does these things. Obviously, one must become thoroughly familiar with the general catalogue and Library of Congress cataloguing system. Individual libraries differ. The simplest procedure is to thoroughly familiarize oneself with the rules and techniques of the libraries in which one shall do his bibliographic research. Most libraries have staff available to give an overview of the procedure and rationales by which the library material is catalogued and organized, and one should take advantage of this advice.

The knowledge of methodology provides good training especially to the new research worker and enables him to do better research. It helps him to develop disciplined thinking or a 'bent of mind to observe the field objectively. Hence, those aspiring for careerism in research must develop the skill of using research techniques and must thoroughly understand the logic behind them.

Discussion and Conclusion

New research unconnected to previous thinking and research is fails to move knowledge forward, an isolated entity bearing only accidental relevance to what has gone before. When research in Physical Education subject is based on past literature, one can hope for cohesive and integrated approaches to problems and for solution of them. An understanding of the status of research in the field comes from reviewing the research literature. This phase has several specific sub-functions which may be described in terms of what, when, who and how, four words which provide the basic information revealing the status of the research in hand. Learning the results of previous research is the essential known purpose of reviewing the literature.

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