United Nations
Educational, Scientific and
Cultural Organization

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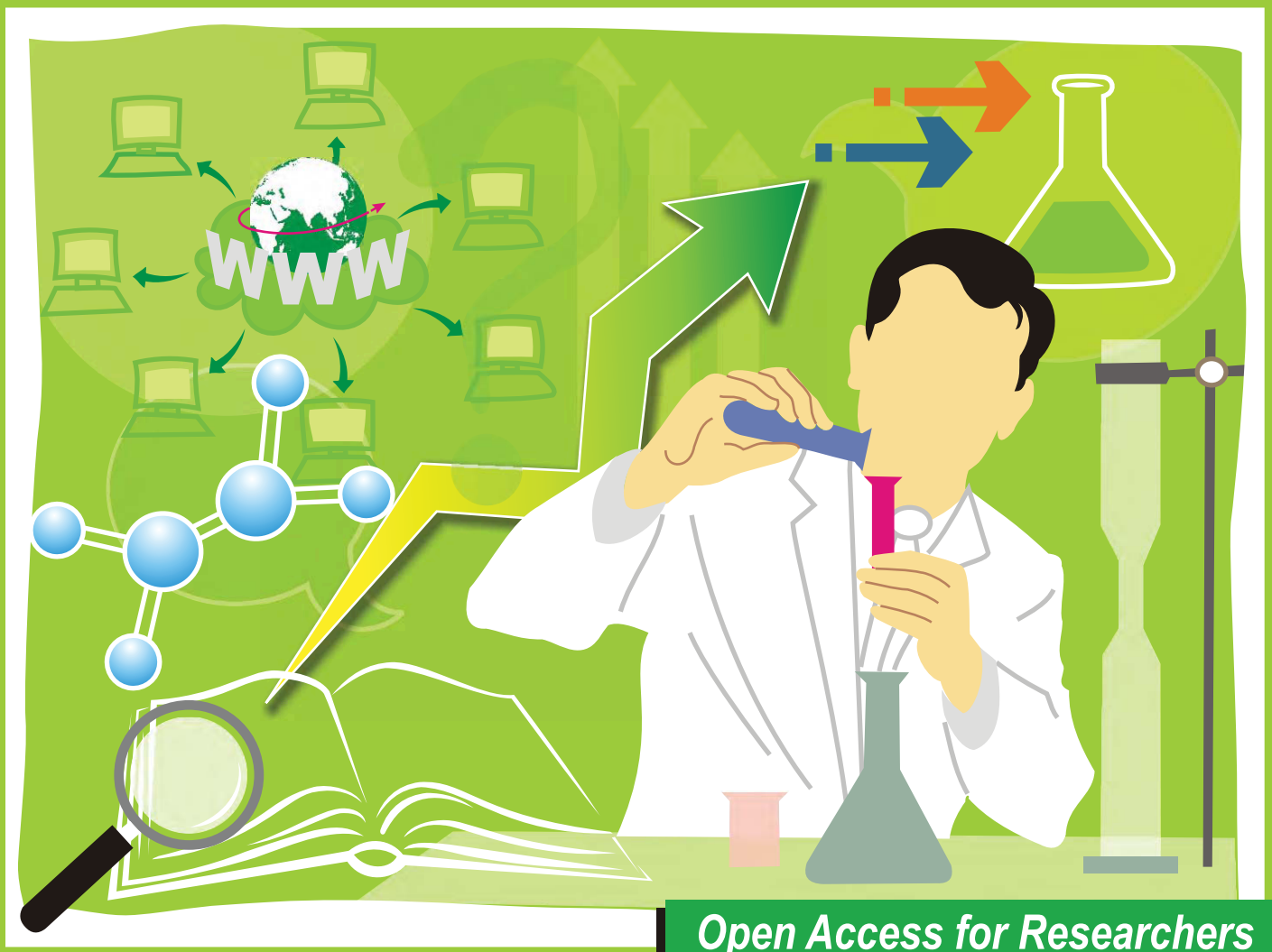
Scholarly Communications



Open Access for Researchers

United Nations
Educational, Scientific and
Cultural Organization

Scholarly Communication

Module

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Scholarly Communication

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MODULE INTRODUCTION

Researchers, scholars and scientists main business is scholarly communication. We communicate about our work to others, as we push the boundaries of what we know and the society knows. We question established notions and truths about science. We share our findings with others, and in a way that is popularly known as scholarly communication which emerged with the publication of first journal in 1665. However, the term gained popularity only in the 1970s, as access to peer reviewed and scholarly communication became difficult. This module has four units covering introduction to scholarly communication, peer reviewed journals, electronica journals and databases and the Serials Crisis. At the end of this module, the learner is expected to be able to:

- Explain philosophy, mission, and objectives of scholarly communication
- Describe the process of scholarly communication
- Identify different channels of scholarly communication
- Discuss the dysfunctioning of the scholarly communication

In **Unit 1**, *Introduction to scholarly communication*, we have discussed different aspects of scholarly communication – particularly its genesis, importance and ethics of academic publishing, and different communication channels available in academic publishing. Some of these channels are commonly described as primary sources as they provide first-hand testimony or direct evidence concerning a topic under investigation. Historically, scientific journals were initiated by learned societies and other scholarly communities for reporting results of concluded research works or scientific discoveries. Now many for-profit publishers have started publishing research journals.

Unit 2, *Communicating with Peer Review Journals*, covers two important academic publishing channels, namely peer reviewed journals, conferences and their proceedings. This Unit also highlights different methods and procedures of peer reviewing for publishing primary literature emanated from research studies. The peer reviewing is essential for validating quality of research findings conveyed by researchers, which are subject to fulfilment of ethical standards and appropriate research design, sampling and other methodological issues.

In **Unit 3**, *Electronic journals and databases*, we have discussed the emergence of electronic journals in academic and research environment due to wide proliferation of information and communication technologies (ICT) in research communications and academic publishing. Scientific communities and scientific communications from the global South are getting substantive attentions through adaptation of electronic journals and electronic academic databases in the process of research communications.

In **Unit 4**, the *Serials Crisis*, we discuss the cost of peer reviewed publications and the problems faced by researchers in developing countries. The focus of this unit is on highlighting the problems and discusses possible solutions including the emergence of open access as one of the solutions. Open access journal publishing helps in mitigating some of the problems associated with serials crisis.

UNIT 1 INTRODUCTION TO SCHOLARLY COMMUNICATION

Structure

1.0 INTRODUCTION

In an academic research environment, scholarly communications become central part of the process of deliberations. Scholarly communications are carried out using certain channels of communications by scholars and academicians. Most important ones are scholarly journals, conference proceedings, research monographs, dissertations, research reports and personal memoirs. Internet now provides much easier and instant means of connection. Social media is a boon for any type of communication.

The learned societies – the formal institutions representing scientific and think tank communities – are primarily responsible for initiating scholarly journals in their respective subject areas, where members can communicate their results of scientific research and get valuable feedbacks from readers of these journals or fellow members of these learned societies. Since the mid-twentieth century and later, learned societies have started collaborating with for-profit publishers – for achieving global outreach, global readership and global authorship. ICT-enabled environment helps in global outreach of scholarly literature, more rapidly than earlier print-only era. Scholarly communications got enormous impetus when scholarly literature becomes globally and instantly accessible through online mode in the globalized societies.

This unit is part the Module titled “Scholarly Communications”. In this unit, the genesis of scholarly communications is briefly discussed, followed by overviews and paradigms of scientific revolutions, scientific culture and scientific scholarship.

1.1 LEARNING OUTCOMES

After reading this unit, you are expected to be able to:

- Describe genesis of scholarly communications;
- Discuss the roles of learned societies to initiate information dissemination and academic publishing;

- Identify different kinds of primary sources as medium of scholarly communication;
- Explain the process of scholarly communications in academic research; and
- Critique scientific revolutions and scientific culture in academic research.

1.2 OBJECTIVES OF SCHOLARLY COMMUNICATIONS

The scholarly communication is the process of sharing, disseminating and publishing research findings of academics and researchers so that the generated academic contents are made available to the global academic communities. A research paper is a standard way of presenting one's research findings against certain research questions, based on scientific methods of experimentations, observations and data analysis. So, an author, or a group of authors, prepares a manuscript for submitting to a scholarly journal, where s/he articulately narrates his scientific experiments, research methodologies, key findings and conclusions to communicate how some significant contribution has been made in the body of knowledge. Submitted paper in a scholarly journal usually goes through rigorous peer review process before it gets accepted. The paper reviewers are drawn from the subject experts and practitioners in a specialized area matching a submitted paper. Peer reviewing is seen as a key quality control mechanism for a reputed journal to keep it amongst the best in its subject field. Thus, many reputed journals have very high rates of rejection in order to accommodate many good papers with brilliant ideas and novelty.

The journal *Science* published by the American Association for the Advancement of Science (AAAS) informs "Because of the stiff competition for space in the journal, *Science* now accepts less than 7% of the original research papers submitted. Most submissions are evaluated by the staff editors and our Board of Reviewing Editors for potential significance, quality, and interest. … About 80% of submitted manuscripts are rejected during this initial screening stage, usually within one week to 10 days."

1.3 HISTORICAL PERSPECTIVES OF SCHOLARLY COMMUNICATIONS

Scholarly communications historically had been driven by the learned societies and their member communities around the world to publish findings of their research inquiries and scientific discoveries. The learned societies were the main promoters and publishers of scholarly journals. The first sets of learned societies were established in different European countries in the seventeenth and eighteenth centuries around the periods of European renaissance. These were predominately named as the Royal Societies, as they received patronage from the monarchies and their respective governments. Each learned society launched a periodical for disseminating the results of research of their society members and other scholars. Scholarly periodicals of the learned societies,

often called as 'Transactions' or 'Proceedings', were published at regular intervals to incorporate scholarly works or academic inquiries by their respective member scholars. Many of these members were actively engaged in academic discourses. Their interactions through academic meetings helped in deep understanding and shaping up of contemporary subject fields. These 'Transactions' were multi-disciplinary in nature, encouraged scholars in different disciplines to understand each other's scholarly research outcomes. The presented papers in Society's academic meetings sometimes incorporated in these 'Transactions' for wider circulation amongst the members of a learned society. Text Box 1 depicts the scope of learned societies in India, which is similar to scientific societies in other countries.

Some of the oldest scholarly journals around the world are identified below:

- *The Journal des Sçavans* was the earliest academic journal published in Europe. Its first issue was released on 5th January 1665. It was founded by Denis de Sallo, adviser to the Parliament of Paris in France. It is presently published as the *Journal des Savants* (ISSN: 0021-8103).
- *The Philosophical Transactions of the Royal Society* (Phil. Trans.) was the second earliest academic journal published in Europe by the Royal Society of London. Its first issue of the first volume was released on 6th March 1665. It is presently published in two separate parts, namely, the *Philosophical Transactions of the Royal Society A: Mathematical, Physical, and Engineering Sciences* (ISSN: 1364-503X), and the *Philosophical Transactions of the Royal Society B: Biological Sciences* (ISSN: 0962-8436).
- *The American Journal of Science* (AJS) (ISSN: 0002-9599), founded in 1818, was the earliest scientific journal published in the United States. It has been published continuously since 1818.
- *The Asiatick Researches, or Transactions of the Society Instituted in Bengal, for Inquiring into the History and Antiquities, the Arts, Sciences, and Literature of Asia*, was the earliest scholarly journal published in Asia published by the Asiatic Society, India. Its first volume was released in 1788. It is one of the oldest scholarly journals published from the global South. It is presently published as the *Journal of the Asiatic Society* (ISSN: 0368-3303).

Text Box 1: Scope of Learned Societies in India

"Starting from 17th century the societies played significant role in the launching and nurturing periodicals. In the beginning the scope of the societies was general. For example Royal Society of London (1662), Accademia dei Lincei, Rome (1603) etc. were devoted to the promotion of learning in general. The same situation is observed in India as well. The scope of the Asiatick Society was very broad and not restricted to any particular subject. The societies that sprang up during the three to four decades following the foundation of the Asiatick Society (1784) were also general in scope."

Source: Sen, B.K. (2002). Growth of Scientific Periodicals in India (1788-1900). *Indian Journal of History of Science*, 37(1), S1-46.

1.4 FOUNDATIONS OF SCIENCE AND SCHOLARSHIP

Since the nineteenth century, the scholarly communications have been transacted through conferences, books and the scientific periodicals launched by the scientific societies, national science academies and other learned communities. These scientific societies were membership-based and principally supported by the individual contributions of the scientific members. Century old scientific societies are largely non-profit institutions, engaged in creation and dissemination of scientific research. Of late, most of these societies have transferred their journal publishing ventures to the for-profit publishers or business enterprises. Whereas, many other scientific societies still retain their journal publishing activity to primarily engage with qualitative science dissemination and to provide cross-subsidy into their research and training activities. Many of the world's distinguished scientific journals are surviving for more than a century. So are the scientific societies. They have made deep impact on scientific inquiries, advancement of knowledge, and growth of subject areas. Many of them have facilitated the formation of new scientific disciplines. In the era of online publishing, many of them command higher attention of scientific communities than the newer journals. Table 1 shows a list of some distinguished scientific journals around the world. Some of these journals, although started as non-profit publishing venture, have transformed them into marketable and profitable products of profit-making corporate publishers. On the other hand, some other scientific journals in the list have remained with the non-profit societies. Their market visibility has been raised remarkably due to publishing high quality research papers, global authorship and global readership. These academic journals also have increased online and social media presence for outreaching to worldwide audiences.

These academic journals essentially capture frontiers of science and scholarship. They provide wider avenues of interactions, academic discourses, knowledge creation and knowledge enrichment. Many of these journals led to development of subject specific journals with narrower focus. Some of these journals were bifurcated or trifurcated into different parts or sections to disseminate research findings in more specific subject areas. Delivery mechanism of journal contents was also changed in the late twentieth century. In addition to print edition of academic journals, online editions of these journals were introduced during this time (i.e., late 20^{th} century) to make electronic or online delivery of journal issues and journal articles through electronic journal gateways and journals' own websites. With this introduction of online delivery, the scholarship became more reachable and instantly accessible to the worldwide audience than earlier times.

Table 1: Publisher's Status of Distinguished Scientific Journals around the World

Name of the Journal	Publishing Since	Society/ Publisher	ISSN	Publisher's Status
Aeronautical Journal	1897	Royal Aeronautical Society	0001-9240	Non-Profit
American Journal of Science	1818	American Journal of Science	0002-9599	Non-Profit
Analyst	1876	Royal Society of Chemistry	0003-2654	Non-Profit
Belgian Journal of Botany	1862	Royal Botanical Society of Belgium	0778-4031	Non-Profit
Journal of the American Chemical Society	1879	American Chemical Society	0002-7863	Non-Profit
Journal of the Royal Society of Medicine	1907	Royal Society of Medicine	0141-0768	Non-Profit
Nature	1869	Macmillan	0028-0836	For Profit
Physical Review	1893	American Physical Society	1050-2947	Non-Profit
Proceedings of the National Academy of Sciences (PNAS)	1915	National Academy of Sciences of the United States of America	0027-8424	Non-Profit
Science	1880	American Association for the Advancement of Science (AAAS)	0036-8075	Non-Profit
Scientific American	1845	Scientific American Inc.; Macmillan	0036-8733	For Profit

1.5 THE PROCESS OF SCHOLARLY COMMUNICATIONS

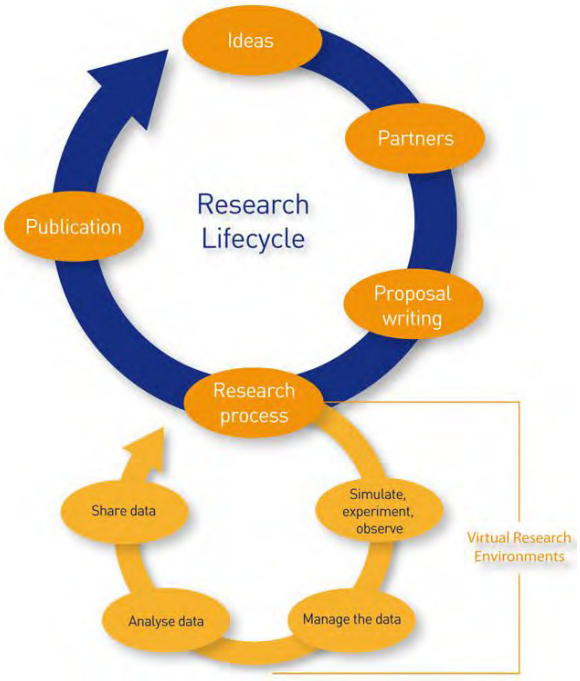

Figure 1: Research Lifecycle diagram, proposed by JISC, United Kingdom
Source: www.jisc.ac.uk/whatwedo/campaigns/res3/jischelp.aspx

Scholarly Communication

The scholarly communication is only a small component of a larger Research Lifecycle. The researchers engaged in advancement of knowledge through participating in collaborative scientific research projects, more specifically plan their research in consultation with their research partners, funders and institutional research team. Initially, a group of researchers nurtures research ideas, which are fine-tuned by their research partners and other team members. Then they write a well-structured research proposal and submit to a research funding agency. The funder selects a research proposal for funding, subject to fulfilment of the funder's broader criteria and scope. Funder may insist modifying certain aspects of a research proposal to suit their funding objectives, obligations and budgetary limitations. After acceptance of a research proposal, then the research process starts in virtual research environments – in active participation with the collaborative institutions and other research partners. Each partner institution may initiate a specific and well-defined component of the research work. Coordination of all research components is done by the research director or principal investigator in active participation with all project leaders of different components. A typical research process involves certain activities for research data generation, namely, Simulate, Experiment and Observe. In social science research, field work is usually undertaken for research data generation through observation or simulation. Then the research process intrinsically involves in management of generated data, data analysis and data sharing. Here, the research director and team leaders are involved in report writing, and communicating findings of the collaborative research work. This research team may choose any of the scholarly communication channels – such as journals, conference proceedings and research monographs – to disseminate results of research to a larger audience. The research team is also responsible to produce high quality report for communicating to the funding agency and other stakeholders responsible for initiation of any follow-up research activities. The generated or collected research data also requires preserving for future reuse or reutilization in follow-up research projects. Then the Research Lifecycle reiterates for solving some of the related research problems and advancing frontiers of knowledge. Figure 1 shows a Research Lifecycle diagram, universally applicable to scientific research paradigms.

1.5.1 Different Channels of Scholarly Communications

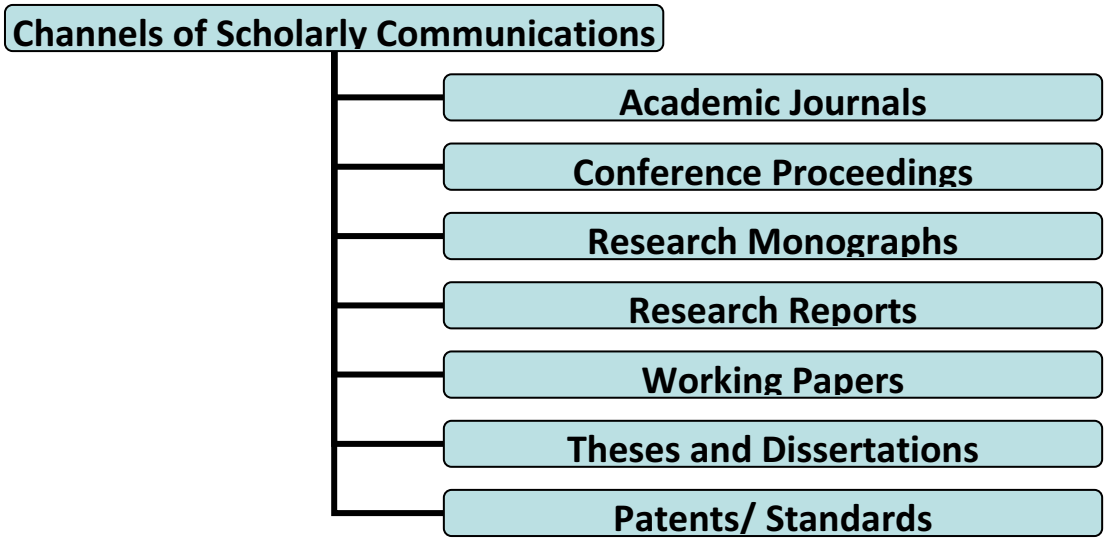

Figure 2: Scholarly Communication Channels

There are many avenues of scholarly communication available to researchers. The most popular channel of scholarly communication is scholarly periodicals. This periodical publication channel is well respected within scientific communities for their high level of academic impact, credentials, quality assurance, accessibility, and outreach potentials.

The scientific conferences are considered as a good avenue for reaching out to expert communities in an interactive mode to get feedbacks on presented research papers. Conference papers may be published before or after the conference. Nowadays, many conferences are co-publishing presented conference papers in online proceedings, available with commercial publishers' knowledge gateways. Some conference organizers are even collaborating with academic journals to publish special issues, selecting certain number of high quality papers presented in the respective conference. In social sciences and humanities disciplines, a research monograph is considered as an effective publishing channel for a research project. Books or monographs are considered as non-ephemeral items having long-standing impact within a community of researchers.

Research monograph is also a good option for publishing results of research. In some books, collections of chapters written by different authors are considered, where each chapter is a kind of research paper depicting certain amount of results of a research work.

Research reports and project reports are formal mode of research communication to record and disseminate research results to funding agencies and other stakeholders involved in the research process. In some countries, public-funded project reports are made available in public domain through online open access.

Theses and dissertations are formal mode of academic research communication to record and disseminate research results of doctoral and master's level research studies, undertaken by enrolled students in higher educational institutions and universities. In some countries, public-funded doctoral dissertations are made available through institutional or national repositories of electronic theses and dissertations (ETD). In India Shodhganga[1] project of the INFLIBNET Centre is one such national system.

Working papers are a type of scholarly papers to communicate findings of research in progress. Working papers help the researchers in getting qualitative and timely feedbacks for making certain changes in research design or analysis of generated data.

The patents are vehicle of protection of intellectual property rights emanated from scientific projects or scientific discoveries. A new product or process or technique derived from a scientific research work, which has certain applications for the betterment of human life, is patentable and inventors can claim it as their intellectual property by registering it with patenting authorities by following certain legal procedures.

[1] http://shodhganga.inflibnet.ac.in/

All these channels of scholarly communication are popularly known as primary sources or original sources or primary literature. Figure 2 gives an indicative list of primary sources of information. Primary sources are indexed in global or national indexing and abstracting (A&I) databases, which are also popularly known as alerting service. Science Citation Index[2] (SCI), produced by Thomson Reuters, is an example of secondary source of information connecting to recently published primary literature.

Figure 3 gives a list of types of papers published in academic journals. Most predominant types are research papers, review papers, research communications or short communications. Some academic journals include feature articles based on theme of a special issue. Other regular types of articles are book reviews, opinion or commentary papers, perspectives or insight papers, news or views, and conference reports. In many journals, editorial is regularly published to express editorial points of view on certain aspects related to journal specific issues or research environment or some current issues in general.

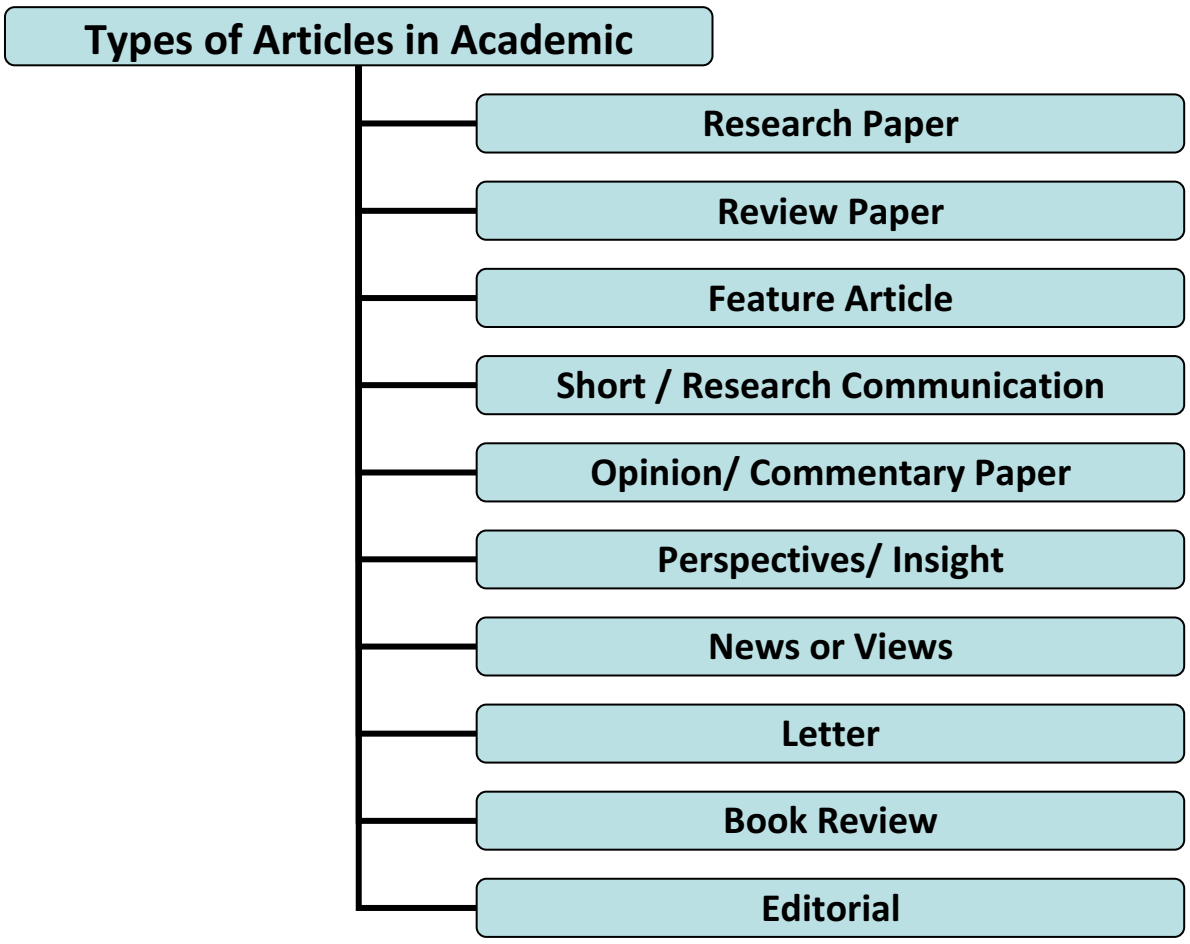

Figure 3: Types of Papers Published in Academic Journals

[2] http://science.thomsonreuters.com/cgi-bin/jrnlst/jloptions.cgi?PC=K

1.6 PRINCIPLES AND PARADIGMS OF SCIENTIFIC CULTURE AND SCHOLARSHIPS

During the European Renaissance period, spanning the 14th to 17th centuries, the western science met the modernity and a new dawn of scientific inquiries was established, based on principle of logical reasoning, evidence and generalization. During the post-Renaissance period, we saw the emergence of modern science, which is popularly known as the scientific revolution. The scientific revolution was marked by the developments in scientific disciplines, such as mathematics, physics, astronomy, biology, human anatomy and chemistry. The scientific revolution was also marked with formation of modern scientific laws and principles, such as Kepler's laws of planetary motion, Newton's laws of motion, and Newton's law of universal gravitation. The scientific revolution brought transformed views and interactions between nature and society, as well as, science and society. The scientific culture brought a new set of values for understanding the world, new philosophical insights, and redefined the goals of enquiry.

The scientific scholarships in modern times helped in formation of the scientific temperament, culture and scientific establishments in western countries and their colonies. Scientific establishments, in participation with scientific communities and the state, initiate much focused innovative scientific research programmes to stimulate scientific progress in the world. The scientific communities nurture a common platform for professional developments of scientific researchers. They are also very instrumental in bringing out different ethical principles, professional standards and best practices of scholarly research.

There are many international standards and guidelines available for good governance of scientific research around the world. Scholarly communication, being essential part of the scholarly research process, has certain international standards and principles. Examples of few international standards are namely,

i) Standards and Operational Guidance for Ethics Review of Health-Related Research with Human Participants, prepared by World Health Organization (WHO), 2011;

ii) Universal Declaration on Bioethics and Human Rights, adopted by UNESCO, 2005;

iii) International Ethical Guidelines for Biomedical Research Involving Human Subjects, prepared by Council for International Organizations of Medical Sciences (CIOMS) and WHO, 1993;

iv) International Standards of Responsible Publication for Authors and Editors, prepared by the Committee on Publication Ethics (COPE), 2010.

Text Box 2 provides international standards of responsible publication for authors and editors, as prepared by the Committee on Publication Ethics (COPE) – an international scientific community for promoting integrity in research publications.

Text Box 2: International Standards for Authors and Editors

For Authors (*Responsible Research Publication: International Standards for Authors*)

The research being reported should have been conducted in an ethical and responsible manner and should comply with all relevant legislation.

Researchers should present their results clearly, honestly, and without fabrication, falsification or inappropriate data manipulation.

Researchers should strive to describe their methods clearly and unambiguously so that their findings can be confirmed by others.

Researchers should adhere to publication requirements that submitted work is original, is not plagiarised, and has not been published elsewhere.

Authors should take collective responsibility for submitted and published work.

The authorship of research publications should accurately reflect individuals' contributions to the work and its reporting.

Funding sources and relevant conflicts of interest should be disclosed.

For Editors *(Responsible Research Publication: International Standards for Editors)*

Editors are accountable and should take responsibility for everything they publish.

Editors should make fair and unbiased decisions independent from commercial consideration and ensure a fair and appropriate peer review process.

Editors should adopt editorial policies that encourage maximum transparency and complete, honest reporting.

Editors should guard the integrity of the published record by issuing corrections and retractions when needed and pursuing suspected or alleged research and publication misconduct.

Editors should pursue reviewer and editorial misconduct.

Editors should critically assess the ethical conduct of studies in humans and animals.

Peer reviewers and authors should be told what is expected of them.

Editors should have appropriate policies in place for handling editorial conflicts of interest.

Source: http://publicationethics.org/resources/international-standards/

1.7 LET US SUM UP

In this Unit, you have learnt about different aspects of scholarly communication – particularly its genesis, importance and ethics of academic publishing, and different communication channels available in academic publishing. Some of these channels are commonly described as primary sources as they provide first-hand testimony or direct evidence concerning a topic under investigation. There is also existence of secondary sources. Indexing and abstracting services are usually a kind of secondary sources helping the academic researchers in literature search and discovering primary literature available in academic journals and other worthwhile research literature. Historically, scientific journals were initiated by learned societies and other scholarly communities for reporting results of concluded research works or scientific discoveries. Now many for-profit publishers have started publishing research journals. The emergence of interactive online databases and online gateways of primary literature marks arrival of personalized web-based services for disseminating scholarly literature to global researchers, institutions and prospective authors.

1.8 CHECK YOUR PROGRESS

1) Who is the publisher of the journal 'Science'?
   a) American Association for the Advancement of Science
   b) National Academy of Sciences of the USA
   c) Scientific American Inc.
   d) Macmillan

2) Who is the publisher of journal 'Nature'?
   a) American Association for the Advancement of Science
   b) National Academy of Sciences of the USA
   c) Scientific American Inc.
   d) Macmillan

3) Which is NOT a not-for-profit publisher?
   a) Macmillan
   b) American Association for the Advancement of Science
   c) National Academy of Sciences of the USA
   d) Royal Society of Chemistry

4) Which is NOT the for-profit publisher?
   a) Macmillan
   b) Springer
   c) Wiley
   d) Royal Society of London

5) What is the rejection rate against submitted manuscripts in 'Science' journal?
   a) About 7%
   b) About 93%
   c) About 80%
   d) About 20%

ONLINE VIDEOS TUTORIALS

There are a number of video tutorials available on topics discussed in this Unit. Some of the tutorials were developed by the reputed institutions, libraries and scientists. Now, you can learn more about how to become an active researcher contributing primary research literature and how you would be involved in communicating research as an author to your fellow scientists, researchers and scholars.

- *Advice to Young Scientists: Do Important Science!*(MARTIN RAFF) **Video**[3]
- *Communicating Science* (EUGENE GARFIELD) **Video**[4]
- *Defining Scholarly Communication* **Video**[5]
- *Do's and Don'ts in Research Communications* **Video**[6]
- *Good Practice In Communicating Research* **Video**[7]

[3] http://www.webofstories.com/play/martin.raff/5
[4] http://www.webofstories.com/play/eugene.garfield/72
[5] http://www.youtube.com/watch?v=8aybpzHLZuo
[6] http://www.youtube.com/watch?v=cXO2zN9OL3g
[7] http://www.youtube.com/watch?v=Ck3wa8Pu7L0

ANSWERS TO CHECK YOUR PROGRESS

Unit 1
(1) a, (2) d, (3) a, (4) d, (5) b

Unit 2
Q6. (a) iii, (b) iii, (c) ii, (d) i.

Unit 3
(6) c, (7) b, (8) c, (9) c.

Unit 4
Q.(6) ii, (7) iii, (8) i, (9) iv, (10) ii.

GLOSSARY OF TERMS

Term	Definition
Academic Conference	It is a meeting for academicians and researchers to present and discuss their work. Together with academic or scientific journals, conferences provide an important channel for exchange of information between researchers.
Academic Database	It is a database of bibliographic records, an organized digital collection of references to published literature, including journal and newspaper articles, conference proceedings, research reports, patents, books, etc.
Academic Journal	It is a peer-reviewed periodical in which scholarship relating to a particular academic discipline is published. Academic journals serve as fora for the introduction and presentation for scrutiny of new research, and the critique of existing research.
Article Processing Charges	A central mechanism for funding Open Access (OA) scholarly publishing, by charging a fee from authors willing to publish in an OA journal.
Bibliographic Database	It is a database of bibliographic records, an organized digital collection of references to published literature, including journal and newspaper articles.
BRICS Countries	A group of emerging countries belong to broad category of developing countries. Represented countries are Brazil, Russia, India, China and South Africa.
Citation	It is a reference to a text or part of a text identifying the document in which it may be found.
Citation Index	It is a bibliographic tool in print or electronic format that lists all referenced or cited source items published in a given time span.

Copyleft	An arrangement whereby software or artistic work may be used, modified, and distributed freely on condition that anything derived from it is bound by the same conditions.
Creative Commons license	It is one of the several public copyright licenses that enable the free distribution of an otherwise copyrighted work. A CC license is used when an author wants to give people the right to share, use and build upon a work that they have created.
Database	It is an organized collection of data held in a computer, especially one that is accessible in various ways.
Gateway	It is a device used to connect two different networks, especially a connection to the Internet.
Gold Open Access	A term to describe when authors provide open access by publishing in an open access journal.
Green Open Access	A term to describe when authors provide open access by self-archiving their journal articles in an OA repository.
Hybrid Journal	It is a kind of journal which itself is not fully open access, but authors may pay a sum of money to make their articles open access. This type of open access articles is called "Gold OA". This is also known as hybrid open access journal.
Indexing & Abstracting Service	It is an alerting service that provides bibliographic data and abstracts of new and latest research.
Inter Library Loan	A service whereby a user of one library can borrow books or receive photocopies of documents that are owned by another library.
Least Developed Country	A country that, according to the United Nations, exhibits the lowest indicators of socioeconomic development, with the lowest Human Development Index ratings of all countries in the world.
Patent	It is a set of exclusive rights granted by a sovereign state to an inventor or their assignee for a limited period of time, in exchange for the public disclosure of the invention.
Peer Review	It is the evaluation of work by one or more people of competence to the producers of the work. It constitutes a form of self-regulation by qualified members of a profession within the relevant field.
Primary Sources	They provide first-hand testimony or direct evidence concerning a topic under investigation. They are created by witnesses or recorders who experienced the events or conditions being documented.
RSS Feed	It uses a family of standard web feed formats to publish

	frequently updated information: journal contents, blog entries, news headlines, audio, video, etc.
Scholarly Journal	It is the same as academic journal.
Scopus	It is the world's largest abstract and citation database of peer-reviewed literature.
Secondary Sources	In scholarship, a secondary source is a document or recording that relates to or discusses information originally presented elsewhere. An indexing & abstracting database is a kind of secondary sources, so are annual reviews in the field.
Serials Crisis	A term to describe the exponential increase in subscription cost of many scholarly journals.
Symposium	It is an academic meeting for researchers to present and discuss their work.
USB Flash Drive	A data storage device that includes flash memory with an integrated Universal Serial Bus (USB) interface.
Web of Science	It is the world's second largest abstract and citation database of peer-reviewed literature.

LIST OF ABBREVIATIONS

A&I	Indexing and Abstracting
AAAS	American Association for the Advancement of Science
ACM	Association for Computing Machinery
ACS	American Chemical Society
AICTE	All India Council for Technical Education
APC	Article Processing Charge
BRICS	Brazil, Russia, India, China and South Africa
CD-ROM	Compact Disc Read-Only Memory
CIOMS	Council for International Organizations of Medical Sciences
COPE	Committee on Publication Ethics
DOAB	Directory of Open Access Books
DOAJ	Directory of Open Access Journals
DOI	Digital Object Identifier
E-Science	Electronic Science
ETD	Electronic Theses and Dissertations
FAQ	Frequently Asked Questions
HINARI	Health Internetwork Access to Research Initiative
HSS	Humanities and Social Sciences

I&A	Indexing & Abstracting
ICSU	International Council for Science
ICT	Information and Communications Technology
IEEE	Institute of Electrical and Electronics Engineers
ILL	Inter Library Loan
INASP	International Network for the Availability of Scientific Publications
INDEST	Indian National Digital Library in Engineering Sciences and Technology Consortium
ISBN	International Standard Book Number
ISSN	International Standard Serial Number
JCR	Journal Citation Reports
JOL	Journals Online project
LDCs	Least Developed Countries
M-Science	Mobile Science
OA	Open Access
OAJSE	Open Access Journals Search Engine
OASPA	Open Access Scholarly Publishers Association
OCS	Open Conference Systems
OhioLINK	Ohio Library and Information Network
OJS	Open Journal Systems
OpenDOAR	Directory of Open Access Repositories
OSS	Open Source Software
PKP	Public Knowledge Project
Q&A	Questions and Answers
R&D	Research and Development
RSS	Rich Site Summary or Really Simple Syndication
SANLiC	South African National Library and Information Consortium
SCI	Science Citation Index
SciELO	Scientific Electronic Library Online
STM	Science, Technology and Medicine
TOC	Table of Contents
ToC	Table of Contents
UGC	University Grants Commission, India
UNESCO	United Nations Educational, Scientific and Cultural Organization
USB	Universal Serial Bus

WAME	World Association of Medical Editors
WHO	World Health Organization
WoK	Web of Knowledge
WoS	Web of Science

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