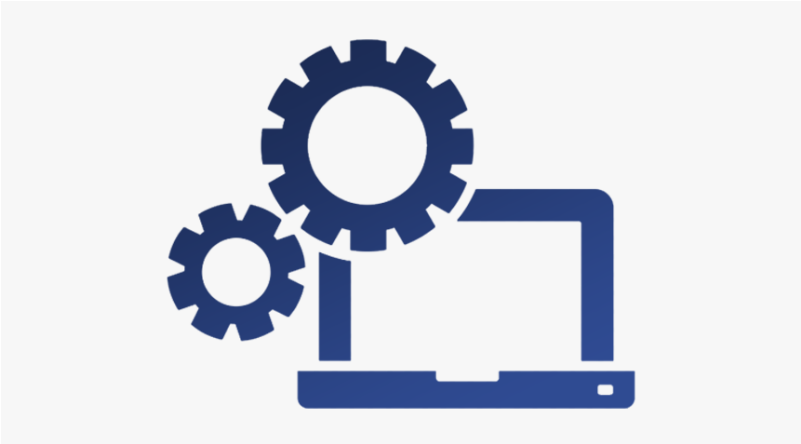

Writing a Research Paper and Writing a Research Proposal

CS609 RM (2022) (Oct 3, Oct 10)

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Agenda

- Research (M Tech Dissertation, PhD work)
- Research paper (publishing)
- Research proposal (for seeking external/internal funding)

Research paper
(For whom? And Why?)

- Any one who wants to publish
- Why publish?
- To validate research/experimentation results
- To appraise/to disseminate
- To get other's opinion
- To improve upon existing methods/approaches
- To revoke/retire obsolete methods/systems
- And many more… (populate next slide through audience interaction)

Why publish?

- Helps you in understanding your research problem well!!
- help you clarify your goals for the research, will help you in reviewing and interpreting your own data and force you to compare your work with that of others
- gives you important feedback on the validity of your research approach
- can provide insight on next steps for advancing and interpreting your work

Why publish?

- building on the body of knowledge that exists in your field
- helps advance your career – academic appointment and career promotion
- helps establish you as an expert in your field of knowledge
- provides evidence that helps in the evaluation of merit of research funding requests (proposals)

Where to publish? Publishers in CSE

ACM Cambridge University Press De Gruyter Elsevier Emerald Frontiers Hindawi ICST	IEEE IET IGI Global Inderscience INFORMS Ingenta IOS Press Liebert Open Access MDPI MIT Press	Old City Publishing Oxford University Press SAGE Publications SIAM Springer Taylor & Francis Thomson Reuters Versita Wiley World Scientific

Science Citation Index (SCI) and SCI extended (SCIE)

- The journals indexed under this database is considered to be the world's leading journals of science and technology, because of a rigorous selection process through expert peer reviews
- Major area classification - Artificial intelligence, data science, machine learning, computer vision, deep learning, cloud computing, computer security, image processing, data mining, data visualization, CNN, Fuzzy logic, and Theoretical computations and more…

ACM

- **ACM COMPUTING SURVEYS**
- **Communications of ACM**
- **ACM JOURNAL ON COMPUTING AND CULTURAL HERITAGE**
- **ACM JOURNAL ON EMERGING TECHNOLOGIES IN COMPUTING SYSTEMS**
- **ACM SIGCOMM COMPUTER COMMUNICATION REVIEW**
- **ACM TRANSACTIONS ON …**

ACM transactions…

- ALGORITHMS,
- ARCHITECTURE AND CODE OPTIMIZATION,
- AUTONOMOUS AND ADAPTIVE SYSTEMS,
- COMPUTATIONAL LOGIC, COMPUTER SYSTEMS,
- COMPUTER-HUMAN INTERACTION,
- DATABASE SYSTEMS, KNOWLEDGE DISCOVERY FROM DATA,
- DESIGN AUTOMATION OF ELECTRONIC SYSTEMS,
- EMBEDDED COMPUTING SYSTEMS,
- GRAPHICS, INFORMATION SYSTEMS,
- INTERACTIVE INTELLIGENT SYSTEMS,
- INTERNET TECHNOLOGY, PRIVACY AND SECURITY THE WEB
- MODELING AND COMPUTER SIMULATION, MULTIMEDIA COMPUTING COMMUNICATIONS AND APPLICATIONS, PROGRAMMING LANGUAGES AND SYSTEMS, RECONFIGURABLE TECHNOLOGY AND SYSTEMS, SENSOR NETWORKS, SOFTWARE ENGINEERING AND METHODOLOGY, STORAGE,

IEEE

- IEEE ACCESS
- IEEE-ACM TRANSACTIONS ….
- IEEE ANNALS ….
- IEEE COMMUNICATIONS SURVEYS AND TUTORIALS
- IEEE COMPUTER ARCHITECTURE LETTERS
- IEEE DESIGN & TEST
- IEEE INTELLIGENT SYSTEMS
- IEEE INTERNET OF THINGS JOURNAL
- IEEE MICRO
- IEEE MULTIMEDIA
- IEEE NETWORK
- IEEE Security & Privacy …

Springer, Sage and Elsevier

- ACTA INFORMATICA
- AD HOC & SENSOR WIRELESS NETWORKS
- ADVANCES IN COMPUTERS
- ARTIFICIAL INTELLIGENCE FOR ENGINEERING DESIGN ANALYSIS AND MANUFACTURING
- ADVANCES IN
- ELECTRICAL AND COMPUTER ENGINEERING, Software, Mathematics of Communications, Applied AI, Applied Softcomputing, AUTONOMOUS AGENTS AND MULTI-AGENT SYSTEMS, Big data, COMPUTATIONAL COMPLEXITY, COMPUTER-AIDED DESIGN, COMPUTER ANIMATION AND VIRTUAL WORLDS, COMPUTER STANDARDS & INTERFACES…

Is there a standard format of research paper?

- Benchmark format, Template
- May be different for different branch/area of research (e.g. Math, Physics, Science, Engineering, Management, Medicine, …..)
- Different different templates by publishers, journals, consortium, professional organizations/bodies, conferences

Research paper format

- Title
- Author name(s), Affiliation, e-mail address
- Abstract (broad overview of the paper, research question and the significance)
- Introduction (what problem your study is attempting to solve, study's significance and originality, organization of paper)
- Background (What has inspired to take on this study? What has previous research/solutions stated about this topic?)

Research paper format (cont.)

- Gap analysis (of existing approaches)
- Proposal and Methodology (how are you trying to address/attack the problem, your proposal/design, what improvements and how, qualitative or quantitative methods?)
- Experimentation, Results, Comparisons (State your findings, provide data, improvement over others)
- Conclusion (summary and why your findings are significant)
- Appendices
- References

Research Proposal

- Specific format?? For PhD proposal, for funding request, for sponsored project
- Different formats with funding agencies
- EU, EPSRC, DST, Indo-Norway, Indo-Japan, Indo-USA

Research Proposal (generic)

- Title. Tentative title for your intended research. ...
- Abstract. The proposal should include a concise statement of your intended research of no more than 100-200 words. ...
- Research Context. ...
- Research Questions. ...
- Research Methods. ...
- Significance of Research. ...
- Bibliography

Research Proposal (PhD)

- Title
- Purpose of a research proposal (problem statement)
- Introduction
- Literature review
- Research design and methods
- Implications and contribution to knowledge
- Research schedule
- (Equipment/software requirement, Budget requirement)
- Reference list

Research schedule

- to include a detailed timeline of the project, explaining exactly what you will do at each stage and how long it will take.

Research phase	Objectives	Deadline
1. Background research and literature review	•Meet with supervisor for initial discussion •Conduct a more extensive review of relevant literature •Refine the research questions •Develop a theoretical framework	Dec 2022
2. Research design planning	•Design questionnaires •Identify online and offline channels for recruiting participants •Finalize sampling methods and data analysis methods	March 2023

Introduction

- Introduce the topic
- Give background and context
- Outline your problem statement and research question(s)
- ===
- Who has an interest in the topic (e.g. scientists, practitioners, policymakers, particular members of society)?
- How much is already known about the problem?
- What is missing from current knowledge?
- What new insights will your research contribute?
- Why is this research worth doing? (E.g. Airbus – goals for the next model of aircraft – improve fuel efficiency, noise reduction, less carbon emission, better UI, better amenities (legroom, entertainment, WiFi etc.) - more comfort for passengers, more easy to fly (for pilots, ATC))

Literature review

- Compare and contrast: what are the main theories, methods, debates and controversies?
- Be critical: what are the strengths and weaknesses of different approaches?
- Show how your research fits in: how will you build on, challenge, or synthesize the work of others?

Research design and methods

Research type

- Will you do qualitative or quantitative research?
- Will you collect original data or work with primary or secondary sources?
- Is your research design descriptive, correlational, or experimental?

What tools and procedures will you use (e.g. surveys, interviews, observations, experiments) to collect and analyze data? Why are these the best methods to answer your research questions?

Implications and contribution to knowledge

- Improving processes in a specific location or field
- Informing policy objectives
- Strengthening a theory or model
- Challenging popular or scientific assumptions
- Creating a basis for further research

Design, Implementation and Operational details (Tech. Stack)