

Research Practice & Ethics

COMP9011

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Delivered To

MSc Software Architecture and Design

MSc Artificial Intelligence

MSc Information Design and Development

Week 6

- **Assignment # 1**
 - **Research Proposal (Practical Tips)**
 - Material Taken From Dr. Donna O'Shea Lecture Slides
- **IEEE Reference Guide**
- **IEEE and IEEE Societies**

Assessment



Course Work				
Assessment Type	Assessment Description	Outcome addressed	% of total	Assessment Date
Essay	The student will propose an initial research topic and will define some initial context behind the idea. In addition, the student will define some preliminary research aims and objectives. The student will then be expected to present their idea with the aim of effectively communicating the broad research topic and context.	1,2	40	Week 9*
Other	The student will develop the research proposal detailing fully the idea and relevant state of the art, aims, objective, methodologies, work plan schedule and ethical issues that need to be considered. The student may also be required to present their proposal.	1,2,3,4,5	60	Sem End*

* Check Canvas for updated dates.

Learning Outcomes



On successful completion of this module, the learner will be able to:

LO1	Develop a research proposal defining the project aims, objectives and research methodology that will be applied to the research project.
LO2	Review the current state of the art in the topic related to the proposed research outlining the contribution the research will make to the general field.
LO3	Evaluate the main research integrity and ethical considerations that need to be considered in the proposed project.
LO4	Develop a project schedule and plan that considers the identified research integrity and ethical considerations.
LO5	Communicate effectively the idea and contribution of the proposed research project.

Description



- **Stage 1**
- Worth 40%
- Due date* – **Firm Deadline**
- Student should have a clear initial research topic, motivation and context of research outlined and some initial research objectives.
- Students should use the latex template provided.
- A minimum of 5 references (strong) need to be included.

* Check Canvas for updated dates.

Research Proposal



- A well thought out proposal forms the backbone for the research itself, hence is one of the most important steps in conducting research.
- A research proposal needs to show;
 - How the proposed work fits into what is already known on the topic.
 - What new paradigm will it add to the literature.
 - Specifies the research question/objectives.
- Must be capable of convincing me of the credibility, achievability, practicality and reproducibility of the research design.

Research Proposal Contents



- A proposal typically has a number of prescribed sections:
 - Abstract
 - Research context and contribution to the research field
 - Research Aim
 - Research Objectives
 - Research Methodology
 - Work Plan
 - Ethical Issues

- Abstract (250 words)
 - Initial pitch of the idea and it sets the scene and puts the research in context.
 - It should be designed to:
 - Create interest on the topic.
 - What you want to do, what necessitates the study and your passion for the topic.

- Research Context
 - Refers to all the sources of scientific evidence pertaining to the topic of interest.
 - It is really important that you structure this section appropriately so that the reader can grasp the argument related to your study in relation to that of other researchers, while still demonstrating to your research that your work is innovative.

Research Proposal



■ Definitions

Term	Definition
Research Aim	A statement indicating the general aim or purpose of a research project. Normally a research project will have only one broad aim (or a limited number).
Research Objectives	Specific statements indicating the key issues to be focused on in a research project. In a typical research project there will be several research objectives defined.
Research Questions	An alternative to research objectives, where the key issues to be focused on in a key project are stated in the form of questions.
Research Hypotheses	A prediction of a relationship between two or more variables, usually predicting the effect of an independent variable on a dependent variable. The independent variable is the variable assumed to have causal influence on the outcome of interest, which is the dependent variable.

- **Research Aims**

- Refers to the main goal or overarching purpose of the research project.
- Sentence stating the aim of a project are usually brief and to the point.
- Broad and introductory, rather than specific and focused.
- Example:
 - To investigate factors associated with partner violence

- **Research Objectives**

- A research aim will normally be followed by a series of statements describing a projects research objectives.
- Research Objectives:
 - Indicate more detail on the specific research topics or issues the project plans to investigate.
 - Build on the main theme stated in the research aim.
- Normally a number of research objectives will be defined (two or three).
- It is good practice to put these in a numbered list so that they can be clearly identified later in the proposal.

■ Research Objectives Examples

1. To examine whether alcohol consumption is associated with increased partner violence.
2. To examine whether labour force status (employment, unemployment, not in the labour force) is associated with variations in the incidence of partner violence.
3. To explore differences between couples with an extended history of partner violence and couples, with only a brief, recent history of partner violence.

■ Research Questions

- In some situations, rather than stating the research objectives, research questions will be defined.
- Examples
 - Is alcohol consumption associated with increased partner violence?
 - Is labour force status (employment, unemployment, not in the labour force) associated with variations in the incidence of partner violence?
 - Are there differences between couples with an extended history of partner violence and couples with only a brief, recent history of partner violence?

■ Research Hypothesis

- Are predictions of a relationship between two or more variables.
- Data is gathered and analysed statistically to see whether the results support the hypothesis or not.
- It is important to note that even if a research hypothesis is supported by statistical analysis, it does not necessarily confirm that the independent variable causes the differences observed in the dependent variable.
- Establishing causation requires rigorous research designs, such as experimental designs, and more than one case study.
- In general, hypotheses are used only in quantitative research, not in qualitative research.
- Some proposals will present hypotheses instead of research objectives, while others present a combination of research objectives and hypotheses.

- **How to develop and write good research aims?**
- Good, clear statements indicate a projects research aims, objectives or questions.
- They tend to emerge slowly, after considerable thought, and take time to develop and finalise.
- To need to understand previous literature in the area before you will be able to come up with good research aims.
 - When reviewing published articles on research topics similar to the one you are planning, look at how the authors phrase their research objectives.

■ Example Research Questions

1. Does students' fruit/vegetable intake vary between schools and does this between school variation remain after adjusting for the student composition of schools?
2. Are school-level effects consistent across different measures of fruit/vegetable intake?
3. Does school availability influence intake of fruit/vegetables among boys and girls differently?
4. Do students from homes with low availability consume more fruit/vegetables if enrolled in schools with high availability of fruit/vegetables versus schools with low availability?

■ Common Errors When Writing Research Aims

- Clarity and precision of research aims and objectives can be reduced in a number of ways:

1. Collapsing all the information into a single paragraph.

- “This project aims to investigate factors associated with partner violence and in particular whether alcohol consumption and labour force status (employment, unemployment, not in the labour force) is associated with increased partner violence, and whether there are differences between couples with an extended history of partner violence and couples with only a brief, recent history of partner violence.”

■ Common Errors When Writing Research Aims

2. Phrasing them in a vague or ambiguous manner.

- This project aims to investigate partner violence and:
 1. Alcohol consumption in couples with a history of partner violence.
 2. The labour force status of couples engaged in partner violence.
 3. Couples with an extended history of partner violence and couples with only a brief, recent history of partner violence.

■ Common Errors When Writing Research Aims

3. Mixing objectives and Questions

- This project aims to investigate factors associated with partner violence. More specifically, it aims to:
 1. Examine whether alcohol consumption is associated with increased partner violence.
 2. Is labour force status (employment, unemployment, not in the labour force) associated with variations in the incidence of partner violence?
 3. Are there differences between couples with an extended history of partner violence and couples with only a brief, recent history of partner violence?

■ Common Errors When Writing Research Aims

4. Confusing research objectives with project objectives/research methodology.

- This project aims to investigate factors associated with partner violence.
 - **Objective 1:** To examine whether alcohol consumption is associated with increased partner violence.
 - **Objective 2:** To complete face-to-face interviews with a purposive sample of 10 couples with a history of partner violence by 20 September 2010.
 - **Objective 3:** To present the final results of the study to a meeting of representatives of key stakeholder groups in December 2010.



- Founded in January 1, 1963
- Focus: Electrical, Electronics, Communications, Computer Engineering, Computer Science and Information Technology
- Members: 420,000+
- www.ieee.org
- IEEE Member Grades
 - Student/Graduate Student Members
 - Members
 - Senior Members
 - Fellows
 - Life Fellows

- Aerospace and Electronic Systems Society
- Antennas and Propagation Society
- Broadcast Technology Society
- Circuits and Systems Society
- Communications Society
- Computational Intelligence Society
- Computer Society
- Consumer Electronics Society
- Control Systems Society
- Dielectrics and Electrical Insulation Society
- Education Society
- Electromagnetic Compatibility Society
- Electron Devices Society

- Electronics Packaging Society
- [Engineering in Medicine and Biology Society](#)
- Geoscience and Remote Sensing Society
- Industrial Electronics Society
- Industry Applications Society
- Information Theory Society
- Instrumentation and Measurement Society
- [Intelligent Transportation Systems Society](#)
- Magnetics Society
- Microwave Theory and Techniques Society
- Nuclear and Plasma Sciences Society
- Oceanic Engineering Society
- Photonics Society

- Power Electronics Society
- Power & Energy Society
- Product Safety Engineering Society
- Professional Communication Society
- Reliability Society
- Robotics and Automation Society
- Signal Processing Society
- Society on Social Implications of Technology
- Solid-State Circuits Society
- Systems, Man, and Cybernetics Society
- Technology and Engineering Management Society
- Ultrasonics, Ferroelectrics, and Frequency Control Society
- Vehicular Technology Society



- ComSoc provides a premier international forum for global industry professionals with a common interest in advancing all communications technologies including terminals, computers, systems, and operations; transmission media networks; new content/delivery methods; layout; protocol; and architecture.



- IEEE Computer Society is the world's leading organization of computing and information technology professionals with the computing community's primary source for relevant and dependable data. Membership provides access to 33 magazines and transactions, 9,000+ conference publications, 225 international conferences, 3,500 self-paced courses and more.



- CIS is a network of pioneers interested in nature inspired problem-solving including neural networks, evolutionary algorithms, fuzzy systems, and hybrid intelligent systems. CIS researchers, professionals, and practitioners provide insight into the development of Big Data and the Internet of Things.

IEEE Computer Society Technical Committees



- Source: <https://www.computer.org/communities/technical-committees>
- Applications and Services

Applications & Services

Business Informatics and Systems (TCBIS)

Liangzhao Zeng (chair)

The Technical Committee on Business Informatics and Systems aligns business intelligence, information science, and computer engineering into an engineering science for businesses.

Applications & Services

Cloud Computing (TCCLD)

Ching-Hsien (Robert) Hsu (chair)

The Technical Committee on Cloud Computing promotes research, education, and industry in cloud computing.

Applications & Services

Computational Life Sciences (TCCLS)

Paolo Soda (chair)

The Technical Committee on Computational Life Sciences advances computational methods and tools for modeling and analysis of life science problems, especially biology, medicine, and healthcare.

Applications & Services

Learning Technology (TCLT)

Maiga Chang (chair)

The Technical Committee on Learning Technology promotes Advanced Learning Technologies and other tech that can dramatically improve learning.

Applications & Services

Services Computing (TCSVC)

Michael Goul (chair)

The Technical Committee on Services Computing advances a cross-discipline community about the science and technology of bridging the gap between business services and IT services.

Data Science

Data Engineering (TCDE)

Erich Neuhold (chair)

The Technical Committee on Data Engineering examines the role of data in the design, development, management, and utilization of information systems.

Data Science

Intelligent Informatics (TCII)

Yiu-ming Cheung (chair)

Technical Committee on Intelligent Informatics deals with tools and systems using biologically and linguistically motivated computational paradigms, such as artificial neural networks, fuzzy logic, data mining, Web intelligence, and VR.

Data Science

Multimedia Computing (TCMC)

Mei-Ling Shyu (chair)

The Technical Committee on Multimedia Computing addresses all aspects of hardware and software systems that bring about the synchronization of different media: audio, video, text, and animation.

Data Science

Pattern Analysis and Machine Intelligence (TCPAMI)

Bryan Morse (chair)

The Technical Committee on Pattern Analysis and Machine Intelligence addresses pattern recognition, artificial intelligence, expert systems, natural language understanding, image processing, and computer vision.

Data Science

Semantic Computing (TCSEM)

Philip C-Y Sheu (chair)

The Technical Committee on Semantic Computing addresses matching of semantics of computational content to that of naturally expressed user intentions.

Data Science

Visualization and Graphics (VGTC)

James Ahrens (chair)

The Technical Committee on Visualization and Graphics promotes research in computer graphics, visualization, and virtual reality, as well as their application to science, engineering, business, and the arts.

Hardware

Computer Architecture (TCCA)

Josep Torrellas (chair)

The Technical Committee on Computer Architecture delves into the architecture (integrated hardware and software design) of general- and special-purpose computers.

Hardware

Microprocessors and Microcomputers (TCMM)

Jose Renau (chair)

The Technical Committee on Microprocessors and Microcomputers addresses the architecture, design, and application of microprocessors and microcomputers, as well as sponsors the Hot Chips and Hot Interconnects conferences.

Hardware

Microprogramming & Microarchitecture (TCuARCH)

Wen-Mei Hwu (chair)

The Technical Committee on Microprogramming & Microarchitecture addresses all aspects of microarchitecture, including high-performance and low-power processors (superscalar, VLIW, and so on), and memory hierarchies.

Hardware

Very Large Scale Integration (TCVLSI)

Anirban Sengupta (chair)

The Technical Committee on Very Large Scale Integration addresses the interactions of VLSI design, including system-level design, logic-level design, circuit-level design, and semiconductor processes.

High-Performance Computing

Distributed Processing (TCDP)

Cheng-Zhong Xu (chair)

The Technical Committee on Distributed Processing addresses the technical aspects of specifying, designing, implementing, and evaluating distributed computing systems.

High-Performance Computing

High Performance Computing (TCHPC)

Manish Parashar (chair)

The Technical Consortium on High Performance Computing advances high-performance computing networking, storage, analysis concepts, technologies, and applications.

High-Performance Computing

Parallel Processing (TCPP)

Anne Benoit (chair)

The Technical Committee on Parallel Processing acts as an international forum to promote parallel processing research and education, as well as sets up technical standards.

High-Performance Computing

Rebooting Computing (TFRC)

Tom Conte / Elie Track (chairs)

The Task Force on Rebooting Computing promotes novel ways to restart computer performance scaling and encourages holistic approaches that redefine computing.

Networks

Computer Communications (TCCC)

Andreas Reinhardt (chair)

The Technical Committee on
Computer Communications
promotes those systems that
integrate computing functions
and telecommunications facilities.