Summarizing the Body of Knowledge:
Research Methods and Professional Practice

University of Essex, Master of Science, Cybersecurity

Introduction

Culminating the formal instruction phase of the MSc Cybersecurity Program, the RMPP module presents the opportunity to apply the whole of previous module learning in a setting much like one would experience in academic or professional research settings. Success in this module is closed correlative to grasp and performance in the prior course subjects. As the associated reflective writing assignment is constrained by word limits for grading purposes, this partner document is provided for non-instructor readers who may be interested in the full scope of the body of knowledge acquired throughout the module rather than just the highlights presented by the reflective essay. While this document is likewise a summary, the absence of a word limit ensures that primary target areas of learning are described, and a list of key artifacts are referenced as available within the e-Portfolio.

Module Syllabus and Learning Objectives

Below is a bulleted summary of the 12 units comprising the module and the primary objectives of each unit. (RMPP_PCOM7E, 2022)

Unit 1 Scientific Investigation and Ethics

This unit sets the stage for the remainder of the module by introducing the types of scientific methods for conducting research. It explains inductive and deductive reasoning and the strengths of each for a given project scenario. Finally, the module examines in detail the ethics of research in general: Respect; Beneficence; Justice; and Law and the Public Interest. An in-depth review is also presented of the ACM code of Ethics and the BCS Code of Conduct.

- Understand the elements of the scientific method
- Differentiate between inductive and deductive reasoning
- Grasp and apply ethics as they apply to your area of research

Unit 2 Research Questions, the Literature Review and the Research Proposal

- Conduct a literature search, critique the literature and present a literature review
- Understand how to form research questions and proposals to create a project.
- Recognize the characteristics of an appropriate research project

Unit 3 The Research Method

- Understand the different research methods.
- Know which data collection methods are related to each method of research.
- Have some idea which of these would be suited to your area of research.

Unit 4 Case Studies, Focus Groups and Observations

- Understand how to carry out each of these data collection methods.
- Know which method would be suitable, if any, for your investigation.
- Consider the type of data you would obtain.

Unit 5 Interviews and Survey Methods

- Understand how interviews and surveys fit into research and whether either or both of these might be useful for your investigation.
- Understand how pre- and post-testing can be used in research.

Unit 6 Questionnaire Design

- Differentiate between a good questionnaire and a poor one.
- Design a questionnaire to obtain the responses you will need for your investigation.
- Understand how the data obtained can be analyzed.

Unit 7 Validity and Generalizability in Research

- Understand how the concepts of validity, generalizability and reliability affect your investigation and the design of your research method.
- Consider how to analyze and present the results you obtain from your investigation and how they will enable you to answer your research question.

Unit 8 Inferential Statistics

- Identify the different levels of measurement.
- Produce measures of location and spread.
- Perform appropriate hypothesis tests.

Unit 9 Analyzing Qualitative Data

- Understand the different types of analysis and how they may be useful for the data you have collected.
- Understand the different charts available to present the different types of data you have obtained.

Unit 10 Research Writing

- Understand how to structure a dissertation and how to prepare yourself for the writing.

Unit 11 Professional Development – The e-Portfolio

- Provide necessary reflection for the completion your learning loop.
- Complete the Professional Skills matrix and ensuing action plan.

Unit 12 Project Management and Managing Risk

- Define and explain the concept of project management.
- Demonstrate an appreciation of project life cycles and methodologies.
- Appreciate some of the technologies/software needed to support remote collaboration.
- Understand and explain how projects can be impacted by risk and uncertainty.
- Prepare a risk management plan.
- Appreciate how to control risk and manage project change effectively

Artifacts Highlights

The following list of artifacts are linked from the main module page and can be viewed as sample work.

- Unit 1 - personal reflection on review of an ethics case study
- Unit 7 – Literature Review – Implementing ML in Criminal Profiling – Reviewed within the context of the ACM code of ethics
- Unit 8 – Outline of MSc Project Proposal (for summative review)
- Unit 8/9 – Inferential Statistics worksheets. Final data outputs for exercises 8.1B, 8.3D, 9.2E
- Unit 10 – Powerpoint presentation on proposed research project and dissertation topic.
- Unit 10 – Transcript for above presentation (references are included in transcript, presentation contains only citations)
- Unit 12 – Skills Matrix