Reflective Synthesis — Research Methods & Professional Practice

Student: Ketan Dileep Mone

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Introduction

This reflection marks a significant transition in my academic journey—shifting from practitioner experience in cybersecurity and design strategy to the disciplined world of academic research. Entering this module, I viewed research as linear data collection. Through twelve weeks of guided study, seminars, and self-led analysis, I began to appreciate it as a cyclical and reflective process—one grounded in ethics, epistemology, and continuous improvement.

This reflective synthesis demonstrates my learning journey throughout the Research Methods and Professional Practice module, aligning with the University of Essex Online e-portfolio requirements. The reflection uses Rolfe et al.'s (2001) "What? / So What? / Now What?" model to analyse how my understanding of research design, ethics, and statistical reasoning has evolved, how this shaped my professional development, and how I intend to apply these insights to my future dissertation and consulting work. Drawing upon both academic and industry literature—including Dawson (2015), Berenson et al. (2020), and BCS (2021)—the synthesis illustrates how I developed a holistic appreciation of research as a structured, ethical, and iterative process that bridges theoretical knowledge with practical application. The reflection concludes by identifying transferable competencies—ethical awareness,

methodological flexibility, and analytical rigour—that now guide my academic and professional decision-making.

What? — My Learning Journey across Units 1–12

This module reshaped my view of research in computing—from applying techniques mechanically to engaging in *systematic inquiry grounded in philosophy, ethics, and context.*

In **Unit 1**, I examined the scientific method and the difference between deductive and inductive reasoning. Deduction moves from universal premises to specific conclusions, while induction generalises from observation (Anderson & Hepburn, 2020). Understanding these frameworks clarified why diverse research approaches coexist. Ethics emerged as foundational: the **Menlo Report's** four principles—respect, beneficence, justice, and respect for law/public interest—underpin trustworthy computing research (Finn & Shilton, 2023). Paired with the **BCS Code of Conduct (2021)**, ethics became integral to validity rather than a compliance task.

Unit 2 refined my ability to formulate researchable questions. Guided by Dawson (2015), I narrowed my initial interest in IoT security into a focused literature review: *How can cybersecurity frameworks for IoT balance technical protection with ethical governance?* I learned to define inclusion criteria and document bias-reduction methods.

Unit 3 introduced research philosophy—ontology, epistemology, and axiology (Saunders, Lewis & Thornhill, 2023). Recognising my pragmatic stance, I adopted *mixed methods* to combine statistical generalisation with interpretive depth.

Units 4–5 translated theory into *data-collection practice.* I compared case studies, interviews, and surveys, balancing depth against breadth (Priya, 2021; Wohlin, 2021). Designing a questionnaire forced attention to bias, order, and clarity—aligning with Brace (2013) and the BRM (2018) design model.

Units 6–7 covered *quantitative methods.* Using **Berenson et al. (2020)**, I explored descriptive and inferential statistics. I learned that statistical soundness depends as much on data quality and assumption checking as on the chosen test.

In **Unit 8**, I studied *data visualisation.* Microsoft (2023) and the *Financial Times (2023)* demonstrated that clear charts communicate evidence ethically. Visualisation thus became part of methodological integrity.

Unit 9 focused on *validity and reliability*. I planned pilot testing and inter-rater reliability to ensure rigour.

Unit 10 strengthened *academic writing*. Preparing my **Research Proposal Presentation** clarified the link between literature, questions, and data.

Finally, **Units 11–12** connected research to professional practice. Through a CPD matrix, I mapped skills like data ethics and risk management to employability. Using **PMBOK 7e (PMI, 2020)** and **APM (2023)**, I built a risk log and change-control plan, reinforcing governance as part of research integrity.

So What? — Shifts in Understanding and Professional Behaviour

From technique to philosophy.
I previously treated methods as interchangeable. Understanding the "research onion" (Saunders et al., 2023) revealed that methodology arises from worldview. Accepting this enhanced coherence and transparency.

Ethics as quality.
The Menlo Report and BCS reframed ethics as a quality criterion. Transparent consent and fair sampling improve credibility (Finn & Shilton, 2023; BCS, 2021).

Measurement literacy.
Statistical training cultivated discernment. I learned to contextualise numbers rather than chase significance (Berenson et al., 2020). Awareness of variance and error now guides my cybersecurity analyses.

Reflexivity and bias.
Qualitative analysis required recognising personal assumptions. Negative-case analysis and audit trails enhanced reliability (Allsop et al., 2022).

Communication clarity.
Ethical presentation extends to data visuals. Misleading graphs distort perception; clear annotations build trust (Microsoft, 2023; FT, 2023).

Industry alignment.
Corporate frameworks such as **PMBOK**, **McKinsey (2023)**, and **IBM (n.d.)** linked academic research to governance and AI ethics. Integrating these bridged scholarship and professional accountability.

Collaborative learning.
Peer reviews and seminar interactions nurtured constructive critique and improved analytical confidence.

Confidence as a researcher.
Academic writing evolved from rigid reporting to *structured storytelling*—defining a gap, justifying method, and positioning contribution.

Now What? — Application and Future Development

Dissertation strategy.
My planned *mixed-methods* study on IoT governance will triangulate statistical and thematic evidence to design a resilience framework.

- **Data collection:** Semi-structured interviews (8–10 participants) and open datasets.
- **Reliability:** Pilot instruments, compute Cronbach's α, and apply inter-rater checks.
- **Analysis:** NVivo for thematic coding; SPSS/Python for quantitative analysis.

Ethical assurance.
I will follow **Menlo (2012)** and **BCS (2021)** principles—layered consent, pseudonymisation, and storage compliant with the UK Data Protection Act 2018.

Measurement discipline.
Pre-registration will separate exploratory from confirmatory analysis. Reporting effect sizes and confidence intervals ensures transparency.

Visual transparency.
Charts will follow **FT (2023)** and **Microsoft (2023)** standards—proportional scales and clear data provenance.

Project management.
Using **PMBOK-style** risk and change logs (PMI, 2020; APM, 2023), I will manage milestones through a Gantt chart, echoing Nicholas & Steyn (2020) on iterative control.

Continuing professional development (CPD).
Three key priorities:

1. *Qualitative rigour* — advanced NVivo and thematic-analysis training.
2. *Quantitative depth* — refresher on statistical modelling and power analysis.
3. *Responsible AI* — integrating ethical frameworks for human-centred design (Correa et al., 2023; McKinsey, 2023).

Knowledge dissemination.
I aim to publish practitioner-oriented papers on ethical IoT risk governance, translating academic work into applied cybersecurity frameworks.

Personal reflection.
Balancing study with consulting sharpened self-management. Recorded seminars fostered discipline; peer feedback reinforced collaboration. Regular reflection helps detect cognitive bias early.

Long-term impact.
This module established my foundation for *evidence-driven ethical leadership* in cybersecurity. By merging critical thinking, methodological rigour, and transparency, I can contribute to secure, ethical digital transformation across industries.

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