Reflective Essay – Research Methods and Professional Skills Module

ePortfolio: https://gpessoaamorim.github.io/portfolio/#research_methods

1. Introduction

This final module offered an opportunity to consolidate the technical, analytical, and research skills acquired throughout this PgDip while strengthening my understanding of the professional and ethical dimensions of computing and data science. Guided by Rolfe et al.'s (2001) reflective model and Gibbs' (1988) learning cycle, I describe the module outcomes (WHAT), analyse their meaning (SO WHAT), and outline how I will apply them (NOW WHAT).

Although the module was intellectually stimulating, it coincided with an extremely demanding period in my professional life. Managing several complex projects limited my ability to follow the weekly rhythm. This was frustrating, as I value consistent engagement, but I made significant efforts to catch up on all materials and assignments. Despite the pressure, I completed the module successfully and deepened my understanding of research methodology, statistics, and professional practice.

2. Activities performed and learning outcomes ("WHAT")

The module combined practical and theoretical components focused on statistical analysis, research design, and professional development. Core activities included statistical hypothesis testing in Excel, exploration of Power BI, a literature review, and a research proposal. I also completed the Professional Skills Matrix to assess strengths and plan development goals.

The Excel hypothesis-testing exercises were a valuable conceptual refresher. Although I usually work in R, performing *these tests in* Excel manually reinforced the logic of statistical inference and its potential role as a teaching tool.

Exploring Power BI was particularly rewarding. I had previously experimented with R Shiny and Plotly, but these require considerable coding and debugging. Power BI offered a more intuitive way to produce interactive dashboards and narrative analytics. I now plan to handle data wrangling in R, visualisation in Power BI, and integrate machine-learning models developed in Python (skills refined throughout this degree) to create explainable, dynamic analytics for my organisation.

The literature review and research proposal were equally meaningful, allowing me to integrate knowledge developed across the PgDip. My chosen topic (applying machine learning to medication safety) had materialised throughout the programme, and I had even considered pursuing it further in an MSc. Completing it in this final module felt like a natural culmination, combining clinical insight from my medical background with data-science rigour and ethical awareness.

Finally, the Professional Skills Matrix highlighted strengths in statistical reasoning, programming autonomy, and communication, while identifying development areas such as advanced Python, Git, and Power BI proficiency, helping my reflect on priority areas for personal development.

3. Personal reflection on learning journey ("SO WHAT")

This module tested not only my technical capabilities but also my resilience and time management. Balancing professional responsibilities with academic deadlines required

discipline and adaptability. Although I initially felt discouraged about falling behind, the experience ultimately strengthened my perseverance and independence.

Revisiting the fundamentals of statistical inference reminded me that expertise relies on conceptual clarity, not just computational skill. Using Excel rekindled the logical discipline of early research training and reinforced confidence in explaining results with accuracy and transparency.

Discovering Power BI was creatively transformative. I was struck by how quickly I could produce professional visualisations compared with R Shiny or Plotly. Its accessibility and integration features opened new possibilities for communicating analytical insights to stakeholders, bridging a gap between technical analysis and business interpretation in my work.

Developing the research proposal was both challenging and rewarding. The topic had evolved across previous modules on AI, data mining, and applied statistics, and shaping it into a complete study design created a sense of closure and continuity. The project integrated my background in medicine, health data science, and AI into a single research vision and reaffirmed my enthusiasm for interdisciplinary work.

A particularly valuable new learning area was qualitative and mixed-methods research. Having worked mainly with quantitative data, I appreciated how qualitative approaches can contextualise numerical findings—such as exploring clinician trust in AI systems. This broadened my methodological perspective and will inform future project design.

Overall, this module reinforced that learning is cumulative and iterative: even under pressure, progress emerges through reflection, persistence, and purpose.

4. Learning and changed actions ("NOW WHAT")

The lessons from this module have several tangible applications to my professional practice. A key outcome is my plan to integrate Power BI into my workflow as a core tool for visualisation and reporting. I will perform data cleaning and transformation in R, embed predictive models developed in Python, and deploy the outputs through interactive dashboards that enable transparent, real-time analytics. This will help me communicate results more effectively to non-technical stakeholders while maintaining the rigour expected in data science.

I am also committed to advancing my Python and Git proficiency through structured learning and consistent application in ongoing projects. These tools are essential for collaborative data science, ensuring version control, reproducibility, and scalability in complex workflows.

Equally important is the consolidation of my statistical practice. The module reinforced the need to apply inferential principles—such as assumption checking, effect size estimation, and uncertainty quantification—across all stages of analysis. Embedding these within predictive modelling ensures results remain interpretable, reproducible, and trustworthy.

This reflective process has also encouraged me to think more broadly about research design. I intend to develop mixed-methods projects that combine quantitative analysis with qualitative exploration, particularly around clinician engagement, user trust, and decision-making in AI adoption. Integrating these complementary methodologies will generate more holistic and actionable insights.

Finally, the module reinforced the importance of reflection as an ongoing professional habit. Regularly assessing my progress, identifying skill gaps, and translating insights into action has

proven invaluable for sustained growth. Completing this module—and the entire PgDip—brought pride and fulfilment, reaffirming my ability to balance demanding professional commitments with academic rigour and reminding me that self-reflection and perseverance are central to lifelong learning.

5. Conclusion

This module served as the capstone of an enriching and challenging academic journey. Despite competing priorities at work, I engaged deeply with each assignment and emerged with renewed technical and methodological confidence. Through revisiting statistics, exploring Power BI, and developing a research proposal that had evolved throughout the PgDip, I have both consolidated and expanded my skill set.

I now approach data science as an integrated discipline that merges methodological rigour, technological innovation, and reflective awareness. Going forward, I will continue applying these insights in my role as a data scientist—combining R for data management, Python for modelling, and Power BI for accessible stakeholder communication. This integrated approach reflects not only what I have learned but also how I have grown: as a reflective, adaptable, and ethically grounded professional committed to advancing the responsible use of data in healthcare and beyond.

References:

Gibbs, G. (1988) Learning by doing: A guide to teaching and learning methods. Oxford: Further Education Unit. Oxford Polytechnic. Available at: https://www.scirp.org/reference/referencespapers?referenceid=478921 (Accessed: 17 April 2025).

Rolfe, G., Freshwater, D. and Jasper, M. (2001) Critical Reflection for Nursing and the Helping Professions: A User's Guide. Palgrave MacMillan.