Final Report for e-Portfolio including reflective (*Research Methods and Professional Practice*)

Student name: Koulthoum Flamerzi
Student ID: 32768

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e-Portfolio Digital Report

Research Methods and Professional Practice module digital e-portfolio (hosted at https://kflamerzi.github.io/koulthoum-portfolio/)

Reflective Commentary: Research Methods and Professional Practice

This commentary reflects on my learning trajectory across the Research Methods and Professional Practice module. Each session presented key elements of research design, data handling, ethical considerations, and professional growth, all underpinned by hands-on assignments and group dialogues. These activities deepened both my analytical and my professional competencies. Below, I summarise the insights gained from each module segment, drawing on evidence collected in my e-portfolio.

Unit 1: Introduction to Research Methods and Ethics in Computing

This unit provided foundational knowledge about research methods and the distinction between inductive and deductive reasoning (Walliman, 2018). Through the reflective activity on ethics in generative AI, I was introduced to the complexities of privacy, bias, and accountability in digital technologies. The task encouraged me to connect ethical frameworks with my professional responsibilities, particularly around transparency and data usage. Understanding ethics from a legal and social standpoint broadened my view of how computing decisions affect individuals and society (Correa et al., 2023). I now consider ethics not as a standalone topic but as a necessary lens through which all technical decisions must be filtered.

Unit 2: Research Questions, Literature Review, and Proposal

During this unit, I gained the skill of converting wide-ranging research interests into sharp, actionable questions and structured proposals. Examining well-crafted questions revealed to me the need for precision, narrow focus, and direct relevance to the computing field. Through peer feedback I polished my draft questions and ensured that they meet disciplinary expectations (Bryman, 2016). The literature review roadmap and the proposal templates kept my thinking organised and directed toward coherent research paths. Critiquing prior studies trained me to interrogate underlying assumptions and to spot unexplored areas, developing an increasingly analytical frame of mind.

Unit 3: Methodology and Research Methods

This unit clarified how to match research aims with suitable methodologies and methods of data collection. I disentangled qualitative, quantitative, and mixed methods and explored research philosophies such as positivism and interpretivism (Creswell and Creswell, 2018). I recognised that philosophical coherence is essential for a consistent research trajectory from question formulation to data interpretation. By examining a range of research proposals, I appreciated the array of possible designs and observed how methodological choices directly influence results. This understanding now guides my choices in class projects and prepares me for future work where I may contribute to data strategy and research design.

Unit 4: Case Studies, Focus Groups, and Observations

Here, I took a close look at qualitative research methods. Through a careful examination of case studies, focus groups, and participatory observation, I considered the timing and rationale for each method (Babbie, 2020). While my focus remains on quantitative approaches, actively weighing qualitative choices broadened my ability to track user behaviour and attitudes, particularly in usability tests and studies of AI adoption. I was drawn to focus groups for their capacity to surface diverse stakeholder views, and I intend to incorporate them in future UX and HCI studies.

Unit 5: Interviews, Surveys, and Questionnaire Design

This unit clarified the dual-edged nature of data-gathering instruments. I learned that a survey constructed without attention to wording, sequence, or sampling can yield artefacts that misguide interpretation or, worse, violate ethical standards. The Cambridge Analytica scandal loomed large in my reflections (Deckard, 2023); it crystallised how data can erode civic trust when care is forsaken. I took these lessons into the design of my own questionnaire, prioritising clarity, impartiality, and ethical safeguards. The process sharpened my research acumen and my ability to communicate, skills that I consider essential for a future in user research or product development.

Unit 6: Quantitative Methods – Descriptive and Inferential Statistics

This unit significantly advanced my confidence with numbers and my fluency in statistical methods. I computed means, medians, modes, standard deviations, and ranges, then reflected on what each value reveals about the underlying data (Saunders, Lewis and Thornhill, 2019). For the first time, I could clearly distinguish between data distributions and levels of measurement. Continued practice sharpened my familiarity with Excel and R, which I know are prerequisites for any data-focused career. By mastering these descriptive techniques, I can now spot early patterns in datasets, a habit I even carry into everyday discussions and decisions.

Unit 7: Inferential Statistics and Hypothesis Testing

In parallel, I encountered inferential methods such as confidence intervals, probability distributions, and p-values. I ran hypothesis tests using t-tests and learned to weigh each result against a standard of statistical significance (Creswell and Creswell, 2018). Analyzing real datasets turned abstraction into practice and enabled me to draw conclusions firmly grounded in evidence. By examining Type I and Type II errors, I recognized the fine balance we strike between the dangers of false positives and false negatives. These insights will guide me in future tasks ranging from A/B testing to evaluating machine learning models and conducting calculations in scientific research.

Unit 8: Data Analysis and Visualisation

This unit zeroed in on effective data presentation. I examined a variety of visualisation techniques, learning to match each one to the task at hand: bar charts serve categorical data, while histograms illuminate continuous distributions (Walliman, 2018). More importantly, I

started thinking of visuals in terms of narrative: I no longer see a chart as a brute force illustration but as a storyteller that steers the audience's interpretation. Crafting dashboards and summary visuals now feels like a core competency, particularly in contexts where I must relay findings to non-technical partners. I have developed a habit of asking whether a visual clarifies or clouds the underlying message.

Unit 9: Validity and Generalisability in Research

The unit also refined my ability to assess research quality. It unpacked internal and external validity, reliability, and generalisability (Bryman, 2016). While studying these concepts, I considered how sample size, research design, and precision in measurement converge to bolster or weaken credibility. I applied these reflections directly to my literature review and research proposal, sharpening my source selection and my own experimental design. I have come to value pilot tests and the formulation of precise, operational definitions as twin safeguards for replicability and rigour.

Unit 10: Research Writing

This unit gave me hands-on techniques for putting together academic documents. I learned to keep a good mix of clarity and depth, to build arguments that hang together, and to weave in citations smoothly (Babbie, 2020). Feedback on my draft proposal sharpened my paragraph structure, improved flow, and ironed out inconsistencies. I also practised the Harvard referencing style so much that it no longer feels like extra work. I feel much surer now about writing formal pieces—this will pay off for my dissertation, for grant applications, and for any reporting I will need to do in a tech career.

Unit 11: Going Forward – Professional Development and e-Portfolio

This unit shifted the focus to reflection and goal setting. I completed a Personal Development Plan (PDP) and Professional Skills Matrix, identifying growth areas such as time management and confidence in qualitative methods. I also recognised strengths in collaboration and ethical reasoning. Creating the e-portfolio itself was a valuable process—it helped me curate and communicate my academic identity. I now have a living document that demonstrates my learning journey and is useful for job applications, interviews, and networking with peers.

Unit 12: Project Management and Risk

In the closing unit, we focused on steering research projects with Gantt charts, risk matrices, and collaborative platforms. I grasped the phases of the project life cycle and the distinctions between Agile and Waterfall approaches. Drafting a simple risk management plan revealed the value of foreseeing hurdles and preparing fallback options. I now see how unaddressed uncertainty can disrupt progress, and I appreciate the need for pre-emptive planning. I can apply these insights straight away in my MSc capstone, and they will also guide me in any future position that centers on project-driven technical work.

Conclusion

The Research Methods and Professional Practice module has been a pivotal and enriching part of my academic experience. It guided me through the entire research continuum—from developing meaningful research questions to crafting methodologically sound and ethically responsible studies. Each segment of the module added distinct value, sharpening my technical skills and enhancing my critical appraisal ability.

A highlight of the module was its sustained emphasis on ethical, legal, and social dimensions of research. By examining current dilemmas such as data misuse and the implications of generative AI, I internalised the necessity of accountability and openness in computing practice. This perspective will be crucial as I engage with sensitive data and autonomous systems in my career.

The curated e-portfolio functioned as both a learning repository and a professional artefact. It compelled me to synthesise my learning systematically while demonstrating my capacity for critical reflection and clear communication of complex research topics, whether in written form or oral presentation.

As I prepare for my MSc capstone project and the research roles that will follow, I will carry forward competencies in data analysis, hypothesis testing, and project design developed in the module. Overall, it has furnished me with a robust basis for ethical, rigorous research, positioning me for sustained professional growth in computing.

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Reflective Report

Learning Journey and Activities (WHAT)

Prior to this module, my understanding of research was very superficial and mostly concerned with theoretical concepts. I did not have much knowledge about designing any research or applying formulated methodologies. From Unit 1, I learned about the scientific method's core principles, including inductive and deductive reasoning (Anderson & Hepburn, 2020). This unit also made me appreciate the role of logic in formulating hypotheses and ethics in responsible inquiry. The introduction of the Menlo Report and BCS Code of Conduct brought forth the considerations of ethics in computing research.

In Formulating Research Questions in Unit 2, my focus shifted to developing proposals. At first, I struggled trying to condense broad interests into research topics. Participating in exercises and discussions with peers helped me obtain the skill to transform abstract concepts into concrete objectives. Knowing how to conduct and organize a literature review also enabled me to identify knowledge gaps and sharpen my research focus (Boza, 2022).

Units 3 to 5 were pivotal in shaping my methodological thinking. I explored research philosophies and design, discovering the distinctions between exploratory and descriptive research (Saunders et al., 2012). I also learned how ontological and epistemological views shape a researcher's decisions. By Unit 4, I was applying this to data collection methods such as case studies, interviews, and focus groups. I learned to evaluate advantages and disadvantages, for example, case studies provide depth while surveys provide breadth.

Units 6 to 8 were focused on quantitative analysis. These were more advanced sessions on familiar statistical concepts. I learned how to determine confidence intervals and perform hypothesis testing on simulated data through the application of descriptive and inferential methods. I was also introduced to some principles of data visualization and learned about the use of visual instruments, such as dashboards, for effective communication of findings (Microsoft, 2023).

In Unit 9, I learned about validity, reliability, and generalizability, which I now consider to be crucial in producing meaningful research that can be replicated. These concepts stand in stark contrast to my previous academic undertakings, where such notions were ignored. The last unit to complete was researching writing, and I hope to use the guidance provided to properly structure my documents starting with my dissertation.

Finally, units 11 and 12 were geared toward professional development and project management. In creating an e-Portfolio, I was able to reflect on my entire academic journey. In addition, learning about project risk and change control helped me think more strategically in terms of planning and execution.

Challenges, Emotions, and Growth (SO WHAT):

The first week of this module was very overwhelming to me. the first thing I could describe is research philosophy is pretty vague. Trying to understand paradigms was really challenging because I could not connect them to real world project decisions. Along similar lines, there is a certain degree of precision that is required to form research questions, and I could not adapt to that.

Starting from unit 3, things began to improve. The purpose of methodology is to make provisions for proper flow: I also learnt the importance of each step, which made me appreciate the process more. When I was developing a research proposal, I felt that for once, I was able to take charge of my academic work. After that point, I found myself to be more engaged.

The quantitative parts posed another emotional challenge. Even with some basic knowledge of statistics, applying certain concepts was entirely new to me. When I attempted a basic t-test, I did it incorrectly and I was not feeling motivated at all. With proper tutor feedback, I managed to grasp the right logic and by unit 7, I was performing tests and interpreting p-value results correctly (LaMorte, 2018).

Documenting my emotions in my e-Portfolio was a part of my reflection activity. Remembering my academics made me reflect on my struggles alongside my successes, and that gave me immense satisfaction. It was a reminder that reflecting on mistakes can create avenues for profound understanding.

Skills Gained and Future Applications (NOW WHAT)

Both technical and transferable skills of this module were helpful. Specifically, I can now:

- Create coherent and ethical research questions
- Create research strategies based on philosophical beliefs
- Conduct literature reviews and critique research to determine gaps
- Provide justification for selected data collection methods
- Apply descriptive and inferential statistical techniques
- Evaluate data and create effective visualisations of findings
- Prepare well-structured, clear, and academically sound proposals and reports

My soft skill targets have also improved:

- Critical thinking: Approaching sources and data as an inquisitive thinker.
- Communication: Mastering clarity and structure through presenting research verbally and via written form.
- Time management: Prioritising tasks effectively after completing iterative tasks as well as maintaining my e-Portfolio.
- Ethical awareness: Contemplating rights, risks, and responsibilities of all research activity.

Both in educational and work settings, skill mastery comes in handy. Implementing these concepts within the module is beneficial when performing tasks like assessing software, drafting policies, or designing UX tests.

Professional Development Plan (PDP)

Goal	Action Steps	Resources Needed	Timeline	Success Criteria
Deepen understanding of qualitative coding	Enroll in course on NVivo and thematic analysis	NVivo software, course (e.g., FutureLearn)	1 month	Ability to code and interpret interview transcripts
Improve academic writing for dissertation	Review previous proposal and seek supervisor feedback	Academic journals, Grammarly, tutor guidance	Ongoing	Draft with coherent argument and logical structure
Gain project management certification	Register for PRINCE2 or Agile foundation training	Course access, time for study	3 months	Passing certification exam

Skills Matrix

Skill Area	Before Module	After Module	Evidence
Research Design	Limited	Competent	Completed proposal draft and peer reviews
Ethics in Computing	Unfamiliar	Aware and confident	Menlo-based ethical form for mock project
Data Collection Methods	Basic	Informed and strategic	Case study and interview mock planning
Quantitative Analysis	Insecure	Proficient	Hypothesis testing using example datasets
Data Visualisation	Novice	Practical	Created bar charts and interpreted dashboard outputs
Academic Writing	Developing	Clear and structured	Final proposal submission
Reflective Thinking	Superficial	Deep and purposeful	Weekly e-Portfolio entries and peer engagement
Time and Task Management	Reactive	Organised	Unit-by-unit progress tracking and milestone review

Assessment of Learning Outcomes and Evidence

Every single unit aided in developing a more complex understanding towards research.

• Units 1-3: Provided the ethical and philosophical framework.

• Units 4-5: Created a technical skill in the design of data collection.

• Units 6-8: Strengthened statistical literacy and visualization skills.

• Units 9-10: Advanced skills in ensuring data accuracy and reporting.

• Units 11-12: Stimulated self-evaluation concerning professional practice and managed associated risks.

My annotated reading notes, alongside proposals and ethics forms, serve as artefacts through which I can demonstrate a breadth and depth of theory application.

Conclusion

In all honesty, this module has been the more meaningful and extensive experience I have had so far academically. It wasn't limited to equipping me with research competencies, but instead focused on shaping me into a more reflective, ethical, and well-informed professional. The blend of technical teaching and holistic personal growth received has not only readied me for my MSc project, but also for my future undertakings. With the newfound skills and knowledge acquired, I feel prepared to undertake self-directed research, make substantial contributions to my field, and continually advance as a learner and practitioner.

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