**Github portfolio link:**
**https://github.com/LisaDuschek/e-portfolio-research-methods-and-professional-practices**

# Module Reflection – Lisa Duschek

## *Research Methods and Professional Practice*

This module featured two main deliverables:

- ***Literature Review:*** participants were asked to choose a topic from a list of provided, available subjects to conduct a thorough literature analysis, demonstrating their ability to critically assess and review existing literature on a given topic, present their key findings and evaluate existing research gaps.

- ***Research Proposal Presentation:*** this presentation aimed at deepening the module's participants' understanding and knowledge of literature review, designing research and choosing and evaluating research methodologies

Other subjects covered in group peer discussions and formative activities and exercises included statistical analysis in Excel (or Libre office) and discussing the topics of code of ethics and professional conduct and a case study discussion about the accuracy of information regarding the former.

While I have done literature research, research design and academic paper writing in the past, I have not done so around computing or artificial intelligence yet. My previous work has been in social sciences and law, so familiarizing myself with literature, academic conduct and research methods in computer science was not only valuable, but also offered new insights and perspectives I had not previously considered.

For my ***literature review*** I chose the topic of emergency services app development, looking at how technology facilitates crisis response by enhancing connectivity and providing access to up-to-date data. The feedback received from my tutor pointed out areas where I could do better, especially with regard to the breadth and precision of my analysis. Although my literature study showed that I understood the subject, it was pointed out that several of the sections were shallow and that the hesitant language I used made my arguments less forceful. For instance, more assured claims backed by particular studies should have been used in favor of expressions like "may be based on research."

This feedback showed me that, in contrast to the more general talks typical of the social sciences, my literature review lacked the critical engagement and comparative analysis frequently sought in research reviews, especially those in technological disciplines and computer sciences. While technical reviews like this one benefit from targeted, in-depth study of fewer research to promote a comparative, debate-based framework, literature reviews in the social sciences may contextualize topics in a more general way.

Looking forward, I plan on using these insights in my Master's project by carefully examining fewer sources, closely comparing results, and steering clear of ambiguous wording. I'll make sure that every component enhances critical analysis by explicitly relating study findings to real-world applications. I want to improve the academic rigor and useful insights in my future work by emphasizing an organized, debate-oriented approach.

For the ***Research Proposal***, I chose to focus on my planned Master capstone project. This project is closely tied to a real-life project I am currently working on in my day-job as a machine learning engineer for an international mapping NGO. It is called "AI-Based Decision Support System for Shallow Well Irrigation in Subsistence Agriculture". Until now, this project has heavily focused on GIS-based technology and research and my task over the next months will be to cooperate with geological, hydrological and agricultural experts to successfully incorporate

the existing data, statistical models and domain expertise into machine learning models for shallow groundwater predictions.

I noticed early on how the abilities I acquired in the Research Methods and Professional Practice module have significantly influenced how I approach the capstone project. The transition from GIS to AI necessitated a different approach, and this module gave me the foundations to comprehend how to organize an AI research project, carry out a thorough literature review and apply different research methodologies to my topic of choice. One of the most important things I learned was how to analyze and synthesize material critically (especially due to the feedback received), which helped me build a solid theoretical framework for AI applications in water resource management. I improved the accuracy and applicability of my work by learning to concentrate intently on particular studies that support the goals of my project rather than taking a too wide approach.

In terms of methodology, I decided to use a mixed-methods approach covered in this module, which I believe will be helpful for gathering and analyzing data for my research. I hope this approach will help me in handling both technical and end-user centered elements by combining quantitative data analysis with qualitative input, particularly from stakeholders like farmers and hydrologists. This strategy, along with the module's insights on risk management and ethical issues, has improved the project's research design.

Last but not least, this module's insights on timeline planning gave me food for thought which was needed to establish reasonable and achievable project goals, guarantee steady advancement, and be able to adjust when difficulties emerge. All things considered, I really do believe that these abilities have improved my methodology and given me the ability to carry out research that is both rigorous and pertinent, providing a strong basis for finishing my capstone project successfully.

Lastly, the learning and practicals on ***statistical analysis in Excel***, gave me a great opportunity to expand my existing knowledge as I had mostly worked with Python

and R for statistical analysis before. Excel's usefulness for rapid, easily accessible analysis was highlighted while basic principles were reinforced through the use of summary measures, hypothesis testing, and visualizations. These exercises helped me gain a better knowledge of statistical inference methods and taught me how to use Excel's capabilities for tasks like t-tests and descriptive statistics calculations. My technology stack grew as a result of this experience, giving me greater flexibility in how I approach data analysis on various platforms in the future.