

End of Module Assessment 2: e-Portfolio Submission Reflective Section

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Introduction

For this reflective piece, I will follow the Rolfe et al (2001) reflective model, which is structured around three key questions: What? So What? Now What? (See Figure 1). In brief, 'What' refers to describing the event and context, 'So What' involves analysing and interpreting the significance of the event, and 'Now What' focuses on applying what has been learned from this experience into future actions or development.

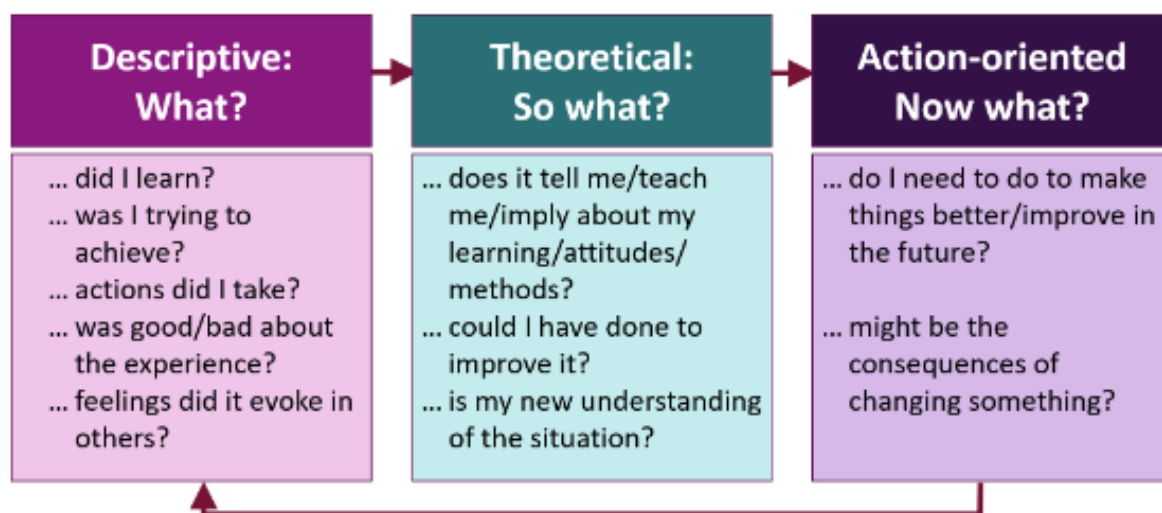


Figure 1: Rolfe et al.(2001) Reflective Model

The Machine Learning (ML) module aimed to provide me with a conceptual and practical understanding of the underlying theories and practices involved in ML. The key programming language used for the module was Python and I gained experience using Google Colab, Visual Studio Code, and Jupyter Notebooks as tools to help learn about, build, design, evaluate and deploy ML models. At every stage I considered the legal, social, ethical and professional issues faced by ML engineers and understood the applicability and challenges of different datasets in ML. In reflecting on this module, I am primarily trying to evaluate my own learning and explore the challenges I overcame. I am also trying to emphasise the significance of integrating ethical considerations into technical learning that is specifically important for ML professionals (Saltz et al, 2019).

What? The activities undertaken

My specific roles and contributions to projects throughout this module include the drafting of technical ML reports from Unit 6 as part of a team. I was responsible for

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ensuring the results of the data analysis and ML were written in a technically accurate and accessible manner for the intended audience. I specifically enjoyed developing and applying my collaborative skills by gaining feedback from team members throughout and reflecting on this when I received feedback from my tutor. One area I gained an enhanced understanding of here is the importance for cross-disciplinary collaboration, especially between technical and non-technical team members with domain expertise in a specific ML project (Pournaras, 2017).

In Unit 11, I developed a complete CNN for object recognition and went through the entire process of preparing the packages, data processing, model development and architecture selection, tuning, evaluation, and output visualisation. I had to draw on learning and understanding from several of the other Units including the seminars, lecturecasts, and suggested and wider reading. Here, I highlighted my technical application of the knowledge I gained from these Units to produce a coherent presentation.

My final project output from Unit 11 was significantly more advanced than initial proposals and development from earlier Units (e.g. Unit 6). I feel like I demonstrated significant progression in my understanding between these two timepoints. I am fundamentally proud of this journey I've undertaken.

Some specific challenges I faced were learning to programme from scratch, collaborating with a team alongside a full-time shift pattern rota as an NHS doctor, and ensuring I integrated additional reading with the core teachings throughout each module. To help address these, I tried to remain organised and set myself realistic deadlines, as well as keep frequent communication with team members via slack channels, for example.

So What? Emotional Response and Analysis

Working through activities and projects in this module initially elicited a range of emotions from insecurity and fear, to doubt and an element of excitement. I must confess I was a total novice when it came to computer science and machine learning. A recent literature review of computer science education among adult learners demonstrated high motivation but even in young adults, insecurities arising from knowledge gaps of how computers fundamentally work tend to hold learners back (Agbo, 2024). I reflected on the importance of resilience and adaptability when facing technical challenges and feel better equipped to implement these qualities in future projects at work and in further learning (Burns, 2020).

My actual learning experience did involve some fear about my knowledge gaps initially, but as I learned more and went through the module, fear subsided into confidence and then enjoyment as I was able to see my new understanding in action when programmes I had understood produced the desired output. This was true for all Units but especially when I considered my final project in Unit 11 and compared it to earlier Unit submissions. As I grew with confidence and competence, my experience as a development team member became richer and richer and I felt like I was able to make more meaningful contributions to group work (Chang et al, 2024). This significantly impacted my professional and personal development by allowing me to demonstrate and experience self-efficacy in my learning, which felt especially

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fulfilling (Bernacki et al, 2015). The artefacts listed in my e-portfolio demonstrate clear evidence of learning and progression that I feel very proud of.

Now What? Changed actions based on learning

From this module, I developed a greater capacity for perseverance and adaptive problem-solving as an adult learner. I developed new skills, specifically around articulating and applying the ethical, legal, social and professional issues around using ML in real-world contexts as evidenced throughout my e-portfolio and assignments. Underpinning this, I can identify new technical understandings and skills in terms of Python programming and technically designing ML architectures and evaluating their performance on a range of datasets.

There is nothing quite like the feeling of seeing successful application of new knowledge and running a model that actually works, and that you actually understand. I now plan to apply this new knowledge to further professional development opportunities and actual projects at work and beyond. I also supervise a range of students at different levels both undergraduate and postgraduate and look forward to sharing my new understandings with them and develop new projects together.

Conclusion

This reflective exercise has specifically highlighted to me the progress I have made both from a technical and ethical standpoint when it comes to applying ML technologies in the real-world. This knowledge will be especially important as I move forward in my career as an Academic Neurosurgeon, with a passion for using data and ML to improve care for patients. I believe that combining technical competence with strong ethical and legal grounding is an essential trait to any good ML professional.

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