L-Università ta' Malta
Faculty of Information & Communication Technology
Department of Artificial Intelligence

**Common issues with MSc AI dissertations**

Abstract:

Explain what problem you tackled; why you tackled it; how you tackled it; how you evaluated it (including whether you used a standard approach); what significant results you obtained; whether it worked; what your significant contribution is. If your contribution turns out to be not that significant (or didn't work) say so - don't try to disguise it!

Introduction:

Similar to the abstract but provide more detail. In particular, what are your aims and (measurable) objectives (by the way, 'reading relevant literature' and 'doing research' are not objectives that you need to specify!)? What are your major contributions? Summarise how you evaluated your approach and what significant results you obtained (ideally, include a comparison to the state-of-the-art, if possible. If it is not possible, briefly explain why and provide a cross- reference to the section where you give a full explanation). Did your approach work?Again, don't try to disguise any shortcomings of your approach. If you are able to explain why there are shortcomings it could still be a valid contribution.

The objectives should be measurable objectives that you managed to evaluate. You are assessed on the objectives you evaluated, and the dissertation is the evidence that you properly researched, devised a solution, and evaluated your solution scientifically to support the claims that you make about your objectives. If, when you started the work, you had one or objectives but, for some reason, you didn't manage to tackle them, do not list them as objectives. Rather, include them as future work.

Objectives are best expressed as statements rather than questions, or, if they are expressed as questions, then the question should not be open ended. E.g., rather than writing 'How can I solve the problem?' or 'Can I solve the problem?' write 'To solve the problem by adding water' or 'Is adding water a better solution to the problem than adding salt?'

The introduction should include a short description of your solution, evaluation methodology, and significant results - ideally compared to the state-of-the-art. You should also provide a critical statement of success.

Background and Literature Review:

In the literature review, you are describing prior work that is most relevant to your work. The background is really just a brief overview of the domain (and perhaps other domains) to contextualise the literature review. In the review, you must compare and contrast relevant prior work. Technical details of the approaches should be covered in your Methodology chapter if and only if they are relevant (i.e., you need to highlight significant differences between your approach and prior approaches, or you're building upon (extending/modifying) a prior approach).

Although it is possible for a dissertation to not contain ‘background’ material, dissertations should always have a literature review.

Do not discuss your approach in the literature review.

Ideally, only peer-reviewed publications (books, conference/journal papers, etc.) should be cited (i.e., not Wikipedia, YouTube, etc.). If you *do* need to cite a web site then first check if the web site has a citation policy (and use it) otherwise visit, for example,

https://www.mendeley.com/guides/web-citation-guide for the correct way to refer to them. Please remember that web sites are *not* generally peer-reviewed. You should use them *only* if you cannot get the information you need from a peer-reviewed publication (because it doesn't exist in a peer-reviewed publication, not because you cannot be bothered to look for it and read it!).

Methodology:

Your methodology should build upon work that you've described in the literature review, so provide appropriate cross-references to the literature review.

Do not introduce papers that influence your approach unless you have already discussed them in the literature review.

If you are extending the work of others (e.g, re-implementing a published approach, so that you can modify it) ensure that you carefully explain the division between the prior work and your modification.

If you are re-implementing a prior approach (rather than using an existing implementation) you must test it to ensure that you get results similar to the originator's original results. Otherwise, you could have a bug in your implementation that could affect the results of your modification. Evidence that the re-implementation works correctly (i.e., reproduces results published in a peer-reviewed paper, on the same dataset) should be included in your methodology.

Evaluation:

If there are standard evaluation practices and/or metrics for your domain, describe them, citing relevant sources. If possible, use them to evaluate your approach. If it isn't possible to use them, provide a valid justification.

If there are no standard approaches, but others have previously evaluated their approaches using one of a variety of published means, you should use one or more of them that are suitable for your approach.

You should only use a novel evaluation approach under extraordinary circumstances. In this case, you should give details about why none of the previously used approaches are suitable, and what you did to ensure that your novel approach is free from bias, fair, and re- usable/reproducible by third-parties.

If there are gold standard datasets that you can use to evaluate your approach, use them (remember to cite them in accordance with the provider's citation policy).

Resist the temptation to create your own dataset, unless you have also evaluated your approach using one or more standard datasets. Otherwise, you will either not be able to compare your results to other approaches, or else you will need to re-implement one or more existing approaches (and show that they have been properly tested - they produce the same results as the published results with the same datasets) so that you can compare results on the novel dataset. Alternatively, if implementations of prior approaches are available for general use, run them against your dataset to compare results. Remember to discuss prior approaches in the literature review and evaluation chapters.

If you must create your own dataset, ensure that its construction is valid (i.e., you have constructed the dataset using valid techniques) and make it available for re-use by third-parties. Ideally, you will also obtain or re-implement state-of-the-art systems so that you can run them against your dataset so you can compare results (ensuring that you show that they work properly in the Methodology chapter).

There are alternative ways of utilising novel datasets and making claims about any results that you obtain from them. First, use your approach on a standard dataset (a dataset that has previously been used for evaluation purposes for which there are published results). Evaluate your approach on this dataset. Then explain how the novel dataset is related to the standard dataset and present your results on the novel dataset. If you have constructed the novel dataset, make it publicly available so that in the future others will be able to compare their results to yours.

Avoid making claims like 'My approach is 82.5% accurate, which is very good' or even 'My approach is 55% accurate which isn't particularly good' if you have nothing to compare your results to. To be able to judge whether an approach is 'good' or 'bad' you need something to compare to (in which case it will be 'better' or 'worse'). It might be that the state-of-the-art can achieve 99.9% accuracy (in which case your 82.5% is not particularly good) or only 45% accuracy (in which case your 55% is pretty good by comparison).

If your comparative results are not particularly good, or none of your approaches worked, you should explain why. The explanation is the contribution to knowledge that you're making.

Conclusion and Future Work:

The conclusion (about your work) should come before future work (NB: the departmental guidelines need to be updated to reflect this).

Avoid making strong claims that are not totally supported by your results.

Avoid conjecture (e.g., 'If I had done this instead of that, I would have obtained better results'). If you didn't do it, you cannot make any claims about it. You can, however, put it into 'Future Work' as something to investigate.

Appendices:

Please remember that the examiners are not obliged to read the appendices. Information that you rely on in your dissertation, or that is crucial to support your argument, should be placed into the appropriate chapter in the dissertation.

Anything that is placed in an appendix should be appropriately referred to from the main body of the dissertation, in much the same way as you would refer to a figure, diagram, equation, or table (otherwise your examiners/readers will not know that it is there).

By convention, appendices are identified by letter (A, B, C, D…). Don't organise them into a chapter (e.g., Your last chapter should not have sections Appendix A, Appendix B, etc.).

If you have published papers:

If you have authored published papers on the basis of your dissertation, congratulations. By all means include the abstracts in an appendix and provide a *complete* reference for each publication (i.e., as though it was listed in your References section). If a paper has been submitted for publication but has not been accepted by the time you submit your dissertation, indicate that it is 'submitted for publication'. If it is accepted for publication by the time of your viva, inform the Board of Examiners during the viva. If it has been accepted by the time you submit your dissertation but not yet published write 'to appear' instead of the year of publication. Only articles that have been or will be peer-reviewed should be provided in the appendix.

Style and Organisation:

Provide a List of Acronyms.

To improve readability, chapters should start with an introduction and end with a summary (except for Chapter 1 which ends with a chapter overview of the rest of the dissertation).

If sentences start with a citation, then the author names should be given first. E.g., Don't write "[15] is an example …"; write "Attard [15] is an example …".

Similarly, if a sentence starts with a reference to an equation, the sentence should start with the word Equation. E.g., "(2.2) is used to calculate…" should be "Equation (2.2) is used to calculate…".

Ensure that opening and closing single and double quotation marks are pointing the right way!

Always refer to figures, diagrams, tables, and equations from the text, but do not use the words "above" and "below" when you're referring to them. If they are on a page more than one page away from the reference, then include the page number too. For example, you might have a figure in the literature review that you refer to again in the methodology chapter. Include the page number (in the literature review) with the reference to the figure in the methodology chapter (e.g., Fig 2.3, pg. 24).

Language:

Spell-check and proofread dissertations before submitting them for assessment. The members of the Board of Examiners do not appreciate being used as a spell-checker and grammar checker!

Be consistent with British English spelling or American English spelling, and do not mix UK/US spelling. However, if you're quoting someone (i.e., putting what they wrote into quotation marks), use whatever spelling they used, even if the original text contains a spelling mistake.

Commonly occurring errors include misusing 'where' and 'were'; 'it's' and 'its'; 'their' and 'there'; 'effect' and 'affect'; incorrect use of commas, colons, and semi-colons; failing to capitalise proper nouns like 'Internet' and 'Google'; mixing present and past tense in the same sentence.

References:

References should always be complete. The complete list of authors should be given, per source (i.e., do not use 'et al.' in the References section). Ensure there is a date of publication (or use n.d. for 'no date'). Details of the publications in which papers appear, the publishers, and page numbers should be given.

If you use datasets, ensure that you refer to them as the originators/providers of the dataset request. Some originators provide a 'Citation Policy' on the Web site.

If you include a publication in your References Section, examiners assume that you have read it. If there is a primary source but you have only read a secondary source that cites the primary source, then do not include the primary source in your references section, but when you refer to the work in your text mention the primary source. In this case, your in-line citation should read '(as cited by [secondary source])'. You should always try to read the primary sources, but sometimes this isn't possible. For example, the secondary source mentions a conversation with the primary source, or is unpublished communications with the primary source, or the primary source is out of print and the library does not have a copy. In your text, ideally mention why you were unable to read the primary source (e.g., "In his unpublished communication with Attard [cite the publication that reports Attard's communication], Bezzina claims…").

Do not mix referencing styles.

In-line citation:

All claims should be substantiated, either by cross-referencing the section in your dissertation that contains the evidence, or by citing a source that supports the claim.

Figures, equations, diagrams, tables, etc., that you copy into your dissertation should be cited (in the caption in the case of figures, diagrams, and tables, and in the text in the case of equations). If you modify the figure, etc., then write 'adapted from' before the citation.

Let's say you read a paper written by Attard and Attard quotes from a paper written by Bezzina (i.e., in Attard's paper, text written by Bezzina is placed inside quotation marks and Attard cites Bezzina). Assume that you too want to include Bezzina's quoted text in your dissertation. In this example, Bezzina is the primary source (the source that contains the original claim), and Attard is the secondary source (the source that reports the claim made by somebody else). Assuming that you have read both sources, the correct way to cite the quotation is ([B] cited by [A]) (where A and B are the citation numbers of Bezzina's and Attard's papers respectively). Similarly, if Attard paraphrases a claim made by Bezzina and you want to paraphrase what Attard wrote about Bezzina you must make it clear. In this case you might write something like 'Attard claims that Bezzina… [A]'. The only time you can cite [B] directly is if you have actually read [B]!

Please ensure that you paraphrase properly. Including a sentence written by someone else in your dissertation, without using quotation marks, and changing one or two words is not paraphrasing.

<u>The Review Paper:</u>

The student's name should be the only name appearing as the author of the Review Paper. The supervisor's name should not appear as a co-author. Supervisors can be acknowledged (in 'Acknowledgements') but this is not a requirement.