- We turn to writing now - today we look at writing the proposal.
- Tomorrow's class (Friday, 09:30) will be a workshop on Aims & Objectives.
- Don't forget we still have online tutorials: sign up on Canvas.
- In this presentation, Slides 2-XX are from the Newcastle University Writing Development Unit

CSC3031: Research and Project Skills

Project Skills: Preparing your Proposal

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Preparing your Proposal

1. The Elements of Project Proposals
2. The CSC3031 Proposal section by section
3. Writing Your Proposal

Through this class we will refer to the three examples of proposals available in Canvas. Remember that these were done for a slightly different module and at a slightly later point.

In a later class we'll discuss how we assess proposals and dissertations.

What's in a Proposal?

Project Proposals, large or small, tend to contain:

- **A Title**
- **The Motivation and Rationale:** motivation for the project, leading to …
- **The Top-level Aim and Objectives**.
- **Background:** what knowledge, technology do we start from?
- **The Plan:** how will we tackle it?
- In competitive proposals (but not in CSC3031) there will often be:
  - Resource Requirements, detailing time, effort, equipment, services, finances.
  - "Track Record" of the applicant: why the proposer is qualified to undertake the work.
  - Specific questions, e.g., likely impact of the project.

The CSC3031 Proposal Structure

Section	Content	Guide Length
Motivation	Why is the project worth doing? What is the problem it is trying to solve? Which need is being addressed?	~1pg
Aim and Objectives	What will the project try to accomplish? Which key objectives will need to be achieved in order to realise the overall aim?	
Background	A table summarising key background sources and their relationship to the project.	~1.5pg
Diagrammatic Work Plan	A diagram (e.g. Gantt chart, timeline) detailing how the project will be carried out, e.g. which activities/tasks will be carried out when.	~1.5pg
Brief explanation of the work plan	An explanation of the structure of the plan and top level potential risks.	
References	A list of references used so far. This must include all sources used in the background section), correctly cited.	No limit

Proposal: Title

- Clear and concise
- Don't use acronyms unless you're confident they are very commonly understood.

Examples:
- 'A Sign Language Translator'
- 'Using the Tumble Simulator to Improve Teaching in Computer Architecture'
- 'Visualization to Explain Different Aspects of Machine Learning'

Proposal: Motivation & Rationale

- Sets the scene for the project.
- Includes:
  - **Context:** Place your project in its larger technical or social setting.
  - **Problem:** The challenge your project addresses.
  - **Rationale:** What you will do to address this challenge.
- The examples have these elements.
- Let's look at Example Proposal 1. Take a moment to read the Motivation and Rationale section.

Proposal: Motivation & Rationale

The Context :
Communication is an essential part of our society and when it is hindered, we need to be able to provide solutions to ensure the inclusivity of all people. …

The subject being addressed

The Problem:
Currently a number of different technologies are used for the translation of a variety of different sign languages, which achieve their core functionality to varying levels of success. The main issue with most of the applications and devices is …

The weakness of current technology …

The Rationale:
In my project, I intend to produce an application, which will allow someone who has never used sign language before to learn how to communicate with someone who uses British Sign Language (BSL)...

The proposed approach …

Proposal: Motivation & Rationale

Tip: Make the subsections explicit by using subheadings. Make it easy for the reader to see that you have thought logically about the structure.

The Context :
Communication is an essential part …

The Problem:
Currently a number of different technologies are used for ….

The Rationale:
In my project, I intend to produce …

Proposal: Motivation & Rationale

Tips: Use evidence from the literature to support claims for importance, e.g.,

'The need for this type of technology becomes integral for people's lives as we move towards a more digitally ubiquitous living environment. This is especially true since the total number of people of all ages in the UK with deafness is so large.'

The need for this type of technology becomes integral for people's lives as we move towards a more digitally ubiquitous living environment. This is especially true since the total number of people of all ages in the UK with deafness ranging from mild to profound is 9 million (1 in 7 of the population). [1]
…
[1] - Disability Resource Centre (2018). UK Statistics & Facts.
https://www.disability.co.uk/sites/default/files/resources/UKStatistics%26Facts.pdf

Clearer basis for checking the claim.

Proposal: Aim and Objectives

We discussed Aims and Objectives in Week 1 (Lecture 2).

- Aim: identifies at a high level what you are hoping to achieve.
- Objectives: SMART descriptions of specific tasks

At the end of the project (in the final dissertation), you'll use the aim and objectives to guide your own reflection and evaluation of what you've achieved.

Look at Example Proposal 3 ...

Proposal: Aim and Objectives

Objectives

1) Research and identify three different aspects of machine learning that can be introduced via the visualization. These aspects would be the selected on a priority basis keeping in mind all the basic concepts every individual should know about machine learning.
2) Design a visualization that explains the key steps of machine learning and decision by making a website using HTML5, JavaScript, and relevant libraries (e.g. processing or d3.js) The model should focus on simplicity and should be approachable to everyone.
3) Authorize that the chosen algorithm doesn't support as much bias in decision making to avoid inaccuracy in the results.
4) Train the model rigorously to produce results on basis of training data. This would ensure that the users understand the underlying concept of machine learning.

- Note that, for each objective you can see how to assess the extent to which it has been achieved.
- A good approach is to identify deliverables (the concrete things you will you build or write) .
- Tip: number your objectives for ease of reference.

Proposal: Background

At this stage, this is just a list of sources that you have explored so far. For each, a short description and a reason for its relevance to your project.

Let's look at Example proposal 2 ...

Proposal: Background

Background	
Resource	Info
'What Makes Teaching Software Architecture Difficult?' [1]	*Description:* This paper discusses the results attained by researchers attempting to show the difficulties and challenges faced when teaching Software (Computer) Architecture and how it differs from other fundamental Computer Science topics. The aim is for educators to be able to use what is discussed to improve the way the topic is taught and find different approaches for this. *Reason:* This paper sums up a lot of the issues faced when teaching Computer Architecture; which is what I'm looking to discuss and improve as part of my aims and objectives. It further validates my motivation for the project as well as gives me an idea on what is useful for both academic staff and students in its teaching.

- Description covers the content of the source – what it claims to offer.
- The Reason explains why it contributes to the aim and objectives of the project.
- The title of the source is just given in the table, but the full reference is cited here.

Proposal: Background

Tips:

- **How many sources?** It depends on the project!
  - If very few, you may need to explain why in a note in the proposal
  - If a lot, check that they each bring something unique to your planning.
- **Each background reference should have a purpose, e.g.,**
  - To give context and motivation, e.g., an industrial report that explains the scale or significance of a problem.
  - To help you make technical decisions: descriptions or comparisons of technologies or tools that you may use.
  - To review an entire field, e.g. a literature review describing limits of current technology.
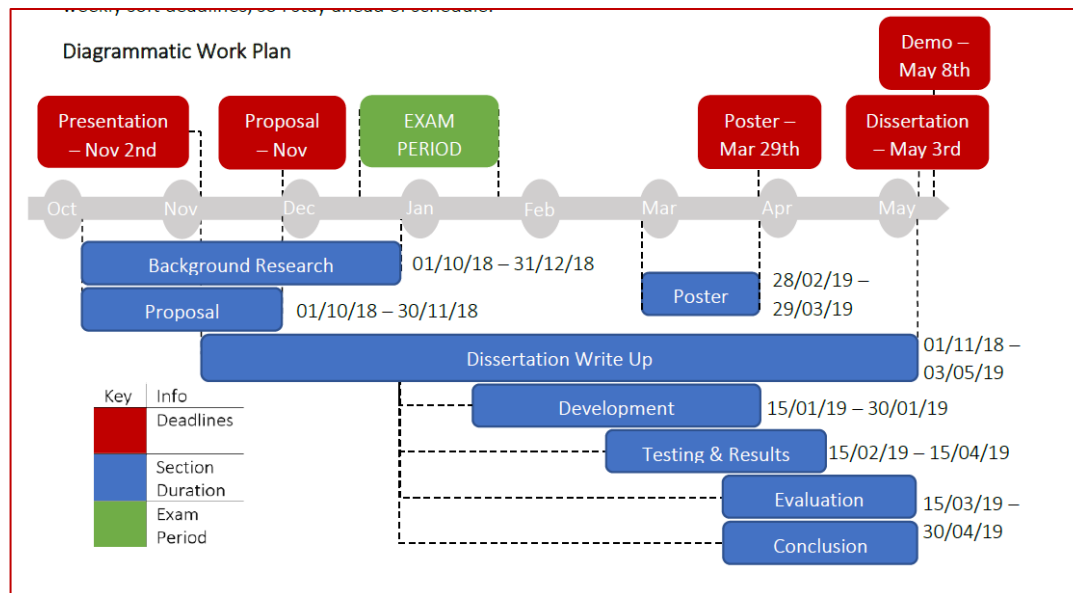
Proposal: Background

Tips:

- **Struggling to know where to start with the knowledge base?** Ask your supervisor for starting points, perhaps consider each separate element of your draft aim and objectives.
    - o In searching for content, review Emily's lecture on literature search (Week 2, Lecture 8)
    - o We'll have drop-in classes to help with this too, especially in Week 4.

Proposal: Work Plan & Explanation

We're looking for evidence of planning, not a complete plan and risk register. Our example proposals show different approaches. Don't over-work this because it will need to change as your project evolves.

Proposal: Work Plan & Explanation

The explanation of the work plan should contain:

- An overview of your task decomposition: where in the plan your objectives are covered
- If relevant, mention any decision you have made about development processes (waterfall, agile, iterative)
- An informal description of top risks and risk management (not a full risk register).

Proposal: Work Plan & Explanation

The work plan explanation from Example 1.

> **Overview**
>
> The chart highlights the core stages of my development process for this project over the course of the next year. This starts with the research stage, which covers my first two objectives as I am initially researching a variety of existing applications. From these applications and from my group research I will be able to identify a number of different requirements, which will allow me to develop a high quality application. The implementation stage covers the development of individual functionality for my final prototype in a logical progression. As you can see from the highlighted dependencies on the chart, each phase builds upon the previous phase, to allow for a well-organised development structure. The development phase of the project will cover the remainder of the objectives for the project, which will also be the most intensive part of the overall assignment.

- There is a clear phased structure here.
- The mapping to objectives is clear.

Proposal: Work Plan & Explanation

The work plan explanation from Example 1.

Risks and Contingencies

In the Gantt chart, (see figure 1) I decided to highlight non-project tasks, as these will have an indirect effect on my time allocated to work. These tasks include holidays, coursework deadlines and other similar factors. All of my tasks around these times have been specifically formed around these dates so I have a good understanding of my other commitments.

A Risk that I have identified in my project is the dependencies on each phase during the implementation stage. Any delays caused by one task may then lead onto causing delays for the rest of the task that are depended on the first one. If this occurs, it could sufficiently hinder my agenda and put me behind schedule causing a knock on effect. My contingency plan is to skip minor tasks such as a detailed UI design and concentrate on the core functionality of the application i.e. sign translation.

- Risks are identified informally
- For each risk it's clear how it has been addressed.
- Note that you will have fewer on-project tasks to consider.

Proposal: References

- The References section must include references for all the sources that you cited in the Background section plus any further sources that you cite elsewhere in the proposal.

- References should follow an established standard, but we are not concerned which.
  - Probably the most common are IEEE (numeric) and Harvard (Author, Date)
  - Style sheets are available at https://libguides.ncl.ac.uk/managing/referencing_styles

Proposal: References

References

[1] - Galster, M. and Angelov, S. (2016). What makes teaching software architecture difficult?. *Proceedings of the 38th International Conference on Software Engineering Companion - ICSE '16.* [online] Available at: https://dl.acm.org/citation.cfm?id=2889187 [Accessed 26 Oct. 2018].

[2] - Otero, R. and Aravind, A. (2018). Teaching Computer Architecture Labs using a MCU Platform. *Proceedings of the 23rd Western Canadian Conference on Computing Education - WCCCE '18.* [online] Available at: https://dl.acm.org/citation.cfm?id=3209651 [Accessed 30 Oct. 2018].

[3] - Tlili, A., Essalmi, F., Jemni, M. and Kinshuk (2015). An educational game for teaching computer architecture: Evaluation using learning analytics. *2015 5th International Conference on Information & Communication Technology and Accessibility (ICTA).* [online] Available at: https://ieeexplore.ieee.org/document/7426881 [Accessed 31 Oct. 2018].

[4] Crossen, J. (2018). *jessecrossen/ttsim.* [online] GitHub. Available at: https://github.com/jessecrossen/ttsim [Accessed 26 Nov. 2018].

- If you access a web resource, give the date.
- Use sources that are likely to stay consistent (unlike many purely-online sources).
- Use peer reviewed material where possible.

Proposal: Form

Page Limit: Four pages of A4 plus the References

Font size: 11pt throughout

Style

- Keep the writing style formal, so as to focus on the content and not the author.

- Avoid "I", "me" and personal content. If you have some personal professional objectives, keep them separate in a "personal objectives" list.

Writing Your Proposal
CSC3031

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Refining your aims and objectives

- Think about the short presentation you will give about your project. What questions might your audience have for you and in what order might they logically raise these questions?

- This technique can help your refine your ideas about your project and help you write your proposal,

Refining your aims and objectives: questions to address

- What is your project about?

- What aspects does your project focus on?

- What are you going to do?

- What question will you answer?

- What problem does it solve?

- Why does it need answering/solving?

- How will you build and draw on existing work/research?

Making a start: freewriting

- Set a timer for 20-30 minutes and jot down your responses to the questions on the previous slide

- Don't worry if you can't answer some of them –this just shows you where you need to develop your thinking a little bit

The Proposal Planner Tool

The Proposal Planner takes you through everything from identifying a topic to narrowing down a specific question to assessing feasibility. It can also really help refine your thinking. Check it out here: https://www.ncl.ac.uk/webtemplate/ask-assets/external/quiz-proposal-planner/v1.0.1/index.html

Developing your writing

- Freewriting will help you make a start but you'll probably find that your draft needs some development so everything is clear to the reader and your project is presented in a thorough and convincing way.

- Again, thinking about what questions your reader might have for you can help.

Developing Your Writing: The Challenge Read Technique

Look at each point/sentence your write. Could the reader come back at you with a question that you need to answer in order to provide a full explanation?

The Challenge Read: possible questions

- Why?
- How?
- Why is that important?
- What does that mean?
- How do you know?
- So what?
- How is that reference relevant to your research?
- Why are you telling me this?

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