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Components of the project proposal

Introduction

As you are aware, each team is required to prepare a project proposal for submittal. A proposal is an introduction to a study. The proposal explains the reasons for conducting the study, the data to be used, the approach, including specific GIS techniques, and expected results. This proposal should be comprehensive and include all of these aspects. Below are some descriptions of the specific components.

Remember this is a scholarly piece of work. Grammatical and spelling errors should be avoided. If you have questions about presentation or basic writing principles please refer to Northey, M., D.B. Knight, and D. Draper 2012 Making Sense in Geography and Environmental Sciences: A Student's Guide to Research and Writing. Toronto, Ontario: Oxford University Press.

Formatting notes

Please also ensure that **your pages are numbered**, and that you supply a **title page, table of contents**, and a complete **list of references**. If you use any diagrams or figures to illustrate your potential study area or method of analysis from other sources, please also provide references for them. Do not provide a title on the figure itself; instead, provide the figure title/description as a caption (i.e. no double-titling). Tables should be captioned above the table, while figures should be captioned below the figure.

Structure of the Proposal

The ideas presented here are for your assistance and guidance. Certainly if you have any comments or questions, please do not hesitate to ask myself or the TAs; we are here to help and want you to be successful. **GOOD LUCK!** ☺

Title

- Develop a concise and informative title.
- Indicate using GIS/spatial analysis/etc. and the study area in your title.

Problem Context

- **Three components**:
    - Problem definition and significance of the research problem;
    - State of knowledge and **research gaps**; and
    - Importance of GIS applications in your research project.
- **You need to review pertinent literature to support your discussion**. *Please note that these subheadings are for you to organize your thoughts, not necessary to list them in your writing*.
- This section should start from a general context, not necessarily in relation to your specific study area yet. Give a description of the research problem and its significance.
- Give **a critical overview** of the state of knowledge in the field. Important questions that you should address include the following: What are the main concerns in the problem area? What considerations or variables are important?
- State of knowledge is a structuralized review of pertinent literature in the problem area. You don't need to get into details of each reference. Instead, you should **put them into categories (or themes) and discuss them accordingly**. The discussion will set up a basis for you to identify research gaps.
- Discuss the barriers to analysis that have existed in the past, e.g. what research gaps exist in knowledge and understanding in the problem area?
- You should justify **how a spatial dimension (variables) has been incorporated** into the research problem and the importance of GIS applications to your research topic such as conservation, environmental protection, and planning or policy issues.
- Be careful with the logic of your discussion. Don't scatter the same discussion in different paragraphs.

Purpose of the Research

- This is an unambiguous statement that sets out the overall aim of your project. **Preferably you can use one sentence to describe your purpose of research**. Indicate using GIS and be consistent with your title.
- Don't use references in this section. Remember that *why* you are doing this study should already be described in the problem context.

Research Objectives

- There should be **between 3 and 5 objectives**. If you have more than this, your study is either too complex, or you are providing too much detail for your steps.
- The objectives state what your study will accomplish and how.
- Objectives may begin with such terms as:
  - To define
  - To identify
  - To use
  - To apply
  - To assess
  - To establish
  - To consider
  - To develop
  - To create
- The easiest way to display these specific objectives is to number them and provide **a single sentence** to state each one.
- Pay attention to the sequence of your objectives.
- Don't use references in the section.

Study Area

- Give a basic description of the study area (only provide pertinent information). Justify the significance of the research question in the study area.
- This section should also include a map showing the location of your study area in a regional context, such as the province of Ontario or the State of Illinois, and you may wish to provide a display map (boundary and key land features) of your study area. **Please don't use other people's maps**; you should be able to create these yourself using the GIS software.
- Maps need to have basic elements such as scale, an indication of north, a legend and the source of the data used. Pay attention to the colours and balance of your map. Look at professional examples for ideas.
- Don't create a map with too many features or categories. For example, for a map to show the landuse pattern in a county in Illinois, you should combine similar landuse classes together (e.g. urban land includes low, medium, and high density urban land).
- **Maps are listed as Figures** and numbered sequentially as they appear in the text. They should be inserted into the text and not added to the end of your document.
- You may wish to mention things like area, location relative to other regions and centres, population, land cover, land use, topography, or anything else you determine pertinent –and that demonstrates (or explains, eludes to) why this study area was chosen over other areas.

Research Approach

- This is the body of your proposal and perhaps the most difficult section to write.
- Usually there is brief introduction, followed by the explanation of **how you will achieve each of your stated objectives** (using relevant literature to support your approach).
- Link research approach closely with your objectives:

  Objective 1: … factors/variables …

  Discussion…

  Objective 2: … GIS …

  Discussion...

  Objective 3: Evaluate …

  Discussion…

  (and so on if there are 4 or 5 objectives…)

- In one of the objectives you will define variables/factors that define the decision problem. Please **give a clear justification of these variables /factors with literature**. For example, for the slope factor when siting a landfill, you need to write one or more sentences to explain that a medium slope is preferable because a flat area has drainage problem but a high slope area will increase construction costs.
- Of course at least one of your objectives will discuss the type of GIS analysis you intend to conduct. That may be overlay analysis, weighted MCE, cost surface, a variety of others, or a combination of a few methods. Make sure that you **demonstrate these approaches using literature**, why you have selected a certain analysis, on what criteria you will be basing your analysis, and why. Also mention how you are going to conduct the analysis (order of analysis, possible weights for different variables/factors). For example, in illustrating a **multi-criteria GIS** application, you need to have a few sentences to explain the variables involved (I assume that you justified the variables already), how data are prepared to form the criteria (e.g. scale from 1-100), and how the weights are justified.
- In GIS model implementation, issues of data quality, conversion techniques, and analysis need to be clearly stated so that you and your reader know how your study is to be conducted and some of the limitations.
- You may **use tables to list the variables/factors or details of GIS approaches**. Tables are also numbered sequentially and always have titles (provided in the caption). **When you use a table you still need to discuss the contents of the table and interpret it in your text.**
- All equations must be given in proper equation format with sequence numbers.

Data Needs

- You will need to glean this information from the Metadata for GIS layers.
- It will probably be easiest to organize the following information in a table format.
- You should include:
  - The layer name, such as Depth to Water Table, and Digital Elevation Model.
  - The source, including the name of the organization and from what type of data the layer was derived from (satellite, aerial photographs, maps etc.). ***An online data repository (i.e. Scholar's GeoPortal) is often NOT the source of the data. Would you list the McLaughlin Library as the publisher of a journal article?***
  - The scale of the data (that it was digitized/created at, not what you are displaying it at). This could be listed as an actual scale (ie. 1:25,000), horizontal resolution, cell size, etc.
  - The year the data were created.
  - A brief description of the data.
- You may briefly describe your GIS approach (or model) and then discuss how GIS data will be used in your research project (e.g. how GIS layers will be used to prepare data for variables in your model).
- It is appropriate to suggest the limitations that data presented, for example that certain information was not available, so you used another criterion to represent a certain factor, or that the scale was too small.
- **You may use a table to list the data layers**. However, explanations in text are still necessary.
- Make concise tables and put one table in the same page. If you need to separate one table into two or more pages, you should list table items on each page and use the same title with "Continued" in the bracket.

Expected Results

- Describe the expected final results or products (what they are, and how they can be used, and so on).
- Your results are analytical output, not just maps. The maps are simply a means to help convey the output message ('a picture is worth a thousand words').
- Include your GIS framework/model as one of your outputs.
- **Make a connection between the expected results and the problem context**.

Work Plan

- You should include **a time line** and identify **who is responsible for what tasks**. You need to have a clear allocation of these tasks. You will find this helpful, as you and your partners will have a breakdown of responsibilities/tasks.
- Please note that **it is time consuming** to convert the raw data into a suitable format for your GIS analysis.
- Please schedule enough time to improve your writing of project report.
- Posting you results on the web will take a while.

Group work

Please remember to support your partners and share information as you go through the analysis. For a group project such as this, you will need to find a balance between working together and delegating individual tasks. Past experiences have shown that conducting all of your work together or almost all of your work separately is inefficient and increases the overall work load. Make sure that you take good notes and records of what you've done and why, and communicate frequently with your partners. This will help avoid confusion.

References

- References give validity to your work.
- List all works cited, and use a consistent format.
- A minimum of 15 references from refereed journal articles is required. You may also use whatever additional resources you require (e.g. books, book chapters, conference papers, web sites, etc.).
- Citation of web sources: Follow the same reference style like articles. You should put the web addresses in your reference list. Treat a .pdf version of an article that you download from a refereed journal as a regular journal article, not a web source.