
UT/ITC Module 11: MSc Research Skills

Assignment 3: Argumentation and technical writing

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After completing this exercise you should be able to:

1. Structure an argument by outlining;
2. Write topic sentences for paragraphs;
3. Compose paragraphs;
4. Evaluate and improve your own technical writing.

1 Assignment

You have already selected a research topic. In **500 to 1000 words** (about one and a half to three A4 pages, 1.5-line spacing, not including title and references) explain its **importance**, leading to your **general objective**. This text can be directly used in the introduction section of your research proposal. The text should be a **tightly-written, logical, well-argued** justification of your chosen research topic, written in **proper technical English**. It should **convince** the reader.

In general you can not make such an argument without references to previous or similar work; these should be properly placed in the text (see Research Skills textbook Volume 2 §1.6) and properly formatted in a List of References (see Research Skills textbook Volume 2 §1.7); these skills were evaluated in Exercise 1 of this module but will again be graded here.

If you include in-text citations and a reference list, you must use the **APA-6th** citation and reference style.

2 Doing the assignment

First draft

Prepare your first draft by:

1. outlining the sections, sub-sections and paragraphs;
2. writing a topic sentence for each paragraph;
3. filling in the paragraphs to complete the thoughts;
4. read over and smooth out the style and overall story.

At this point, remove the section headings; in a short essay the paragraph structure should be sufficient to reveal the flow of the argument.

Review &
revise

Then review it yourself. These are the points on which the assignment will be graded:

1. Structure:
 - (a) Do the paragraphs follow a logical sequence?

2. Paragraphs:

- (a) Does each paragraph cover one main point?
- (b) Should paragraphs be split or combined?

3. Topic sentence and paragraph filling:

- (a) Does each paragraph begin with a topic sentence that could be read without the rest of the paragraph?
- (b) Do the other sentences add to the topic?
- (c) Are the other sentences in logical sequence?
- (d) Are connectives used as needed?

4. English:

- (a) Is the grammar correct?
- (b) Is the vocabulary correct? Should more general, specific, or precise words be used?
- (c) Is the punctuation correct?

5. Style:

- (a) Is the writing as concise as possible without losing meaning?
- (b) Does the writing take a consistent viewpoint towards the reader?

6. Meaning:

- (a) Does the essay say what you mean?
- (b) Does it tell a consistent story?
- (c) Does it convince the reader?

7. Citations and list of references:

- (a) Are all citations necessary?
- (b) Do the references refer to statement they are supposed to support?
- (c) Are more or different references needed?
- (d) Are the citations properly formatted (in this assignment, with the **APA-6th** citation style)?
- (e) Is the list of references properly formatted (in this assignment, with the **APA-6th** reference style)?

Final version

Revise the document accordingly. The final document should be ready for incorporation in your research proposal and thesis.

Only the final document will be graded, on the points listed just above. However, experience shows that if you attempt to write the final document directly, without following the outlining, first draft, and revision steps, you will fail the assignment, i.e., have a document that is not understandable, poorly-written, sloppy, with an unconvincing argument.

3 Required output

Identify yourself with your name, course, and ITC e-mail ID.

Submit the final document as an MS-Word document via the assignment in Blackboard, with your e-mail ID and exercise number as file name and the appropriate extension. For example, `y-p-ma_ex3.doc`. Please include your ITC e-mail ID and real name on the first page.

Assignments that are too short or too long will be graded 0 (zero).

4 Sample assignment

(adapted with permission from assignment of Yiwen Sun [NRM MSc 2011], Module 11 2010).

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Topic: Using long-term MODIS imagery to identify giant panda habitat

The giant panda (*Ailuropoda melanoleuca*) is one of the most endangered mammals in the world due to its small population size and continued decline of its habitat (IUCN, 2014). Its original range covered most of southern and eastern China, but by 1900 was restricted to the Qinling Mountains of Shaanxi province and along the eastern edge of Tibetan plateau in Sichuan and Gansu provinces. Even within this limited range populations have seriously declined.

Range restriction and population decline have been blamed on habitat degradation and fragmentation, mainly caused by human activities. Human population pressure leads to increasing demand for agricultural land and timber products. For example, in the Qinling Mountains 50 years of intense logging have severely limited giant panda habitat (Zhou & Pan, 1997). Further, suitable habitat is now mostly present only as isolated fragments.

The Chinese government has long recognized the threat to this iconic species, identified world-wide as a symbol of China and indeed of world-wide conservation, thanks to the WWF logo (WWF, 2014). Finally in the year 2000 a ban on logging in giant panda habitat was put into force. This provides an opportunity to protect the panda's habitat, but it is unrealistic to prohibit logging over wide areas. Thus it is necessary to provide conservation planners with a reliable map showing the most suitable habitats.

The most important determinant of habitat suitability for giant panda is the presence of bamboo (*Bambuseae* genera) as the dominant understory vegetation. The giant panda spends 14 to 15 hours a day eating bamboo, thus bamboo cover is the single most important factor in giant panda habitat evaluation (Viña *et al.*, 2007). Therefore, identifying the spatial distribution of understory bamboo has direct relevance for giant panda conservation planning.

Conventional methods for assessing the status of understory bamboo use ground survey, which are costly and labour-intensive. For instance,

3000 people were involved in the first Chinese national panda survey (1974-1977), and the third national panda survey (1999-2002) cost more than US\$2M. In addition, the results of these ground surveys are in general incompatible (Wang, 2009), due to different survey extent, sampling intensity and sampling methods, so that they can not easily be used to assess spatial and temporal changes of giant panda habitat. Thus it seems natural to attempt a remote sensing approach, both for cost-effectiveness and consistency of outputs.

Although remote sensing is a well-established tool for mapping vegetation across large areas and over time, its application to mapping giant panda habitat has not been very successful. This is mainly because understory vegetation, in this case bamboo, can not be easily identified on satellite imagery due to the interference of overstory canopies.

Some researchers have tried to compensate for this by assuming a relationship between overstory (dense forest) and understory bamboo (Loucks *et al.*, 2003), but this relation is not consistent across regions or even at different times of the year. Other researchers have attempted to overcome this difficulty with advanced classification algorithms. For instance, Wang (2009) classified a single Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) image into three understory cover classes by integrating a neural network and a GIS expert system with imagery, obtaining a marginally satisfactory result ($\kappa = 0.60$). However, over large spatial extent, single-imagery analysis is limited by the availability of cloud-free images.

An alternative approach to map understory bamboo is the use of phenological characteristics derived from a time series of images (Tuanmu *et al.*, 2010). This is based on the fact that bamboo has a different seasonal pattern than overstory vegetation, so that forest with bamboo understory should exhibit a different temporal pattern. This can be revealed either with principal components or time-series analysis.

Time-series of high temporal resolution remotely sensed imagery are increasingly available; one outstanding platform is the Moderate Resolution Imaging Spectroradiometer (MODIS) from NASA (NASA, n.d.). Time-series have two main benefits. First, they reduce the problem of cloud cover, since their short repeat time enables the analyst to find a representative image for a given time period. Second, the fine-resolution time series (e.g., decadal) is well-suited to studying the temporal dynamics of land cover, including phenology.

Thus, it seems that it should be possible to analyze long time-series of MODIS imagery to find known panda habitat (from existing ground survey) in the Qinling Mountains, and then use the discovered relations to predict potential habitat in unsampled areas of the mountain range, from the same imagery. This can be used to optimize conservation management based on the logging ban.

(743 words)

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5 Grader's notes on the sample assignment

What makes this a “perfect” essay? It meets all the requirements of §2; in particular:

1. The **flow of paragraphs** shows a logical sequence:
 - (a) from background to environmental problem,
 - (b) then to technology problem,
 - (c) and finally to the research problem the student is trying to solve.
2. The essay then discusses the proposed approach and expected results, also with a good and logical flow.
3. Each paragraph has a strong **topic sentence**, and the **filling sentences** nicely add to the argument, in a logical sequence, so the paragraphs are **coherent** (dealing with one topic).
4. There is a good use of **connectives** to show links, sequence, or importance.
5. **References** are used appropriately to back up the argument, and are well-integrated in the text.
6. English grammar, usage and spelling are correct – in this case European (British) spelling was used, but American spelling is also acceptable.
7. All of this leads me to understand the issue, its importance, and the approach the student proposes to take – i.e., she has **communicated** with me.