**Activity 16: Deliverable Tutorials**

**Notes to instructor:**

* The purpose of the assignment is to help [students] understand what constitutes a good [section of deliverable (e.g., introduction)] section, how it is organized, and how to approach writing it.
* The task required always consists of completing the handout. The activity is usually done in class with frequent conversations with group members and the entire class, possibly in a thin-pair-share format.
* The example papers chosen should fit the topic of the CURE.
* The work involves the instructor sharing their writing from past or current projects. This assumes that the CURE is relevant to the research program of the instructor and therefore applies most directly to researcher-driven CUREs.
* By sharing their own writing, the instructor opens themselves to critique from students and actively engages them in the collaborative and constructive process of peer-review.
* Students should be introduced to best practices on the sharing and distribution (or lack thereof rather) of unpublished research prior to the activities.
* Select the appropriate set of questions for the section from the options provided below.

**Step-by-step:**

[For all section except the introduction]: Our work today will be divided into three steps:

1. Read and analyze the [section of deliverable (e.g., material and methods)] from a published study.
2. Draft the [section of deliverable (e.g., material and methods)] section for a project that [the instructor] is working on.
3. Compare the draft produced in class to the one written by [the instructor].

[For the introduction]: Our work today will be divided into three steps:

1. Read and analyze the introduction section of a published study.
2. Identify key elements of the introduction of your paper.

**READING AND ANALYZING:**

We will be first reading the material and methods section from the following article: [Full reference for the article formatted according to the guidelines the students will have to follow in their main written deliverable, if applicable, or a standard/classic publication outlet in the field]

1. First, read the abstract below so you are familiar with the research project as a whole: [Insert here the full abstract of the article].
2. The following pages show the [section of deliverable (e.g., introduction)] section of the [author(s) of the paper the students are reading] paper. Use it to answer the questions starting on page [number] of this handout.

Questions [for material and methods]:

1. Identify the different sections of the material and methods of this paper (hint: look at headers and subheaders).
2. Use a highlighter to identify key components of each of the sections you identified (no more than one or two sentences should be highlighted).
3. For each section you identified, use a bullet point list to summarize the key elements you highlighted. For example, if you highlighted the following: “… from one to six specimens from each of 34 species from the …”, this would be the sample size and distribution.
4. Compare your list with your classmates. Edit accordingly.
5. Make a note on your list of the information that is presented in the form of figures, tables, and appendices.
6. Be prepared to present your lists to the whole class.

Questions for [results]:

1. Identify the information presented as text, figures, or tables.
2. How is the results section of this paper divided? (Hint: look at headers and subheaders).
3. Use a highlighter to identify key components of each of the sections you identified (no more than one or two sentences should be highlighted).
4. For each section you identified, use a bullet point list to summarize the key elements you highlighted. For example, if you highlighted [“… from one to six specimens from each of 34 species from the …”, this would be the sample size and distribution].
5. Compare your list with your classmates. Edit accordingly.

Questions for [discussion]:

1. How is the discussion of the paper organized? (Hint: look at headers and subheaders).
2. Choose a sub-section of the discussion: how is the information organized? Make sure to address the following elements: summary of the findings of the paper, putting them in the context of the literature, supporting those findings with other data, considering the limitations of the findings, and articulating their significance to the [scientific] community.
3. Answer the question above for a different section.
4. How is each of the elements of a discussion you discussed above communicated to readers? Once again, answer this question for two different subsections/topics of the discussion. Make sure to explicitly go over the structure of the text.
5. Compare your list with your classmates. Edit accordingly.

Questions for [introduction]:

1. Identify the following elements in the introduction you are reading. Note that they are not always presented in the same order as they are below.
   1. Background information: This provides the reader with the context and knowledge necessary to understand the study system and the importance of this work by grounding in a big picture (for the study) issue.
   2. Problematic / Question(s): This states explicitly what big question or issue the work sets out to explore.
   3. Hypothesis (-es): The introduction states (best done explicitly) the hypothesis (-es) tested in the study.
   4. Motivation and significance of study: It is important to explain the significance of the work for the [scientific] community at large including our understanding of the study system, big picture questions in [field of research], possible applications, relevant future applications to other systems, etc.
   5. Setup of study: The introduction should preview the structure of the rest of the paper and set the stage for the reader by giving an overview of the work accomplished.
2. Compare your work to that of your teammates. Make necessary edits.
3. Answer the following questions:
   1. How is the introduction of the paper organized? Are the elements described above in a particular order or are they woven together? Give details.
   2. Are certain elements of the introduction provided to reader in the form of tables or figures? If so, which ones? If not, could some of the information have been provided in such formats? What info specifically?
   3. Compare your answers to the questions above with your teammates. Edit accordingly.

**DRAFTING:**

For the [material and methods]: Below is some basic information on a research project that [the instructor] is working on. Use it to draft a mock material and methods section. Do NOT look at the rest of this handout. Note that I am having you focus on just a couple sections of the material and methods section. I am not asking you to understand the details of the research or provide any references (other than those given to you). I simply want you to create a **narrative** of the content (not a full-on material and methods section). I have somewhat organized the information so it would not be overwhelming.

For the [results]: A good results section will be written around high quality figures. The text should explain the entirety of the figure, highlighting the critical points, and provide associated statistical information. Below are two figures from a research project on [topic] that [the instructor] is working on. Use it to draft a mock results section. Do NOT look at the rest of this handout. Note that I am having you focus on just two figures and therefore only part of the entire results section for this paper.

For the [discussion]: A good discussion section will summarize the findings of the paper, put them in the context of the literature, support those findings with additional data, consider the limitations of the findings, and articulate their significance to the scientific community. Below are the text and figures/tables associated with the results section of a paper published by [the instructor]. Use it to draft a mock discussion section. Do NOT look at the rest of this handout.

[For all section except the introduction]: **COMPARING:**

Below is a draft of (a portion of) the text that [the instructor] wrote for this paper. Read the text below and reread your own writing. Answer the following questions:

- What information was your [material and methods, results, or discussion] section lacking (besides details I had not provided you with the info for)?

- Are there any elements missing in the text of [the instructor]?

- What are the critical elements of a [material and methods, results, or discussion] section you can identify in the text below and the paper we looked at together earlier?

- What would you need to do to transform the text you wrote earlier into something like the text below?

[For the introduction]: **REFLECTING:**

1. Let’s start the process of writing the introduction for your paper. ON YOUR OWN, take NO MORE THAN 5 MINUTES and jot down a few bullet points for each of the elements of the introduction in the table below. This time limit will force you to focus on the essential elements.

|  |  |
| --- | --- |
| **Background information** |  |
| **Problematic / Question(s)** |  |
| **Hypothesis (-es)** |  |
| **Motivation and significance of study** |  |
| **Setup of study** |  |

1. Compare your table with your teammates. Fill out the table below with the consensus of your group. It will likely be more thorough than the one above because of the time limit I imposed.

|  |  |
| --- | --- |
| **Background information** |  |
| **Problematic / Question(s)** |  |
| **Hypothesis (-es)** |  |
| **Motivation and significance of study** |  |
| **Setup of study** |  |

1. ON YOUR OWN, focus on the Background information. Expand upon each of the bullet points, transforming each of them into two sentences that summarize the key point you want to make. For each set of sentences, provide at least one supporting reference to the literature.
2. ON YOUR OWN, focus on the Motivation and significance of the study. Expand upon each of the bullet points, transforming each of them into two sentences that summarize the key point you want to make. For each set of sentences, provide at least one supporting reference to the literature.
3. AS A GROUP, write below the most up-to-date version of your Problematic / Question(s).
4. AS A GROUP, write below the most up-to-date version of your Hypothesis (-es).
5. AS A GROUP, go over your answers to questions 3 and 4. Combine your answers into two sets of sentences (between 5 and 8 sentences each) and references (a minimum of 3).