**Activity 26: Reflection workbook**

**Purpose of this assignment:** The goal of this notebook is to help you reflect upon your writing and research process, help you self-correct, and most importantly help you develop metacognition: an understanding of your own thought processes. The work you put into this notebook will directly improve your research manuscript.

**How does it fit within the entire project?** This notebook is critical to helping you throughout the semester. It is critical that you complete it when prompted (see below) so that you can use the reflection to improve each section of your project and, eventually, your research manuscript.

**Tasks required:** Answer the questions below.

**Estimated time:** An average of 30 to 45 minutes per section.

**Deliverable:** Complete the different sections of this reflection workbook below according to the timeline provided. The notebook will be graded on the following dates: [dues dates]

**Group work or individual work?** Individual work

**Notes to instructor:**

* Several of the questions used in this handout were derived from the framework provided by the Association of American College and Universities VALUE rubrics (<https://www.aacu.org/value-rubrics>).
* Others are taken from or modified from the Framework for Information Literacy for Higher Education developed by the Association of College & Research Libraries: <https://www.ala.org/acrl/standards/ilframework>
* The exact structure of the notebook should be adapted to the structure of the whole CURE. Because it is meant to be discipline/topic-relevant, it should also be modified to better match the specific CURE implemented.

**Table of contents of workbook**

Framework I ……………………………………………………………………………………... 1

Framework II …………………………………...……………………………………………….. 4

Material and Methods I ………………………………………………………………………….. 6

Data Collection I ……………………………………………………..………………………….. 7

Data Collection II …………………………………………………….………………………….. 9

Data Analysis ……………………………………………………………………..……………. 10

Material and Methods II …..…………………………………………………………..……….. 12

Figures and Tables I ………………………………………………………………..………….. 13

Figures and Tables II ……………………………………………...………………..………….. 14

Results I ……………….………………………………….………………….……..………….. 17

Results II ……………….………………………………….…………………………..……….. 19

Discussion I ……………….……………………………….…………………………..……….. 21

Discussion II ……..……….……………………………….……………………..…………….. 22

Introduction ……………….……………………………….………………………..………….. 23

**Framework I**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you develop the framework of your project and reflect on your mind mapping exercise.

*Questions 1a and 1b:* What do you already know about the topic? What do you need to explore further? Be specific.

[Enter your answer here]

*Question 2:* What is the scope of your research? Be specific.

[Enter your answer here]

*Question 3:* What is the existing knowledge or assumptions about your topic? List several specific elements.

[Enter your answer here]

**Framework II**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you revise the framework you developed during your framework class meeting and articulate the significance of your work.

*Question 1:* What is the dialogue or debate surrounding your topic? Think about any disagreement and any outstanding question in particular.

[Enter your answer here]

*Question 2:* Have you sought a variety of perspectives? Have you consulted the [xxx], [xxx], and [xxx] literature?

[Enter your answer here]

*Question 3:* For whom is this project being developed? Provide details on the audience of your final manuscript. What stakeholders are likely to be interested in this work? How will your work be communicated to its audience? Think about format of the paper and its sections.

[Enter your answer here]

*Question 4:* What will your research enable (future analyses and investigations)? Be specific about possible follow up studies.

[Enter your answer here]

**Material and Methods I**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you select your dataset, develop the approach you will take to analyzing those data, and reflect on your documented problem solutions exercise.

*Question 1:* Who else has done such analyses? Provide specific citations so you can consult them later.

[Enter your answer here]

*Question 2:* What analyses have published articles employed? Look at the material and methods as well as the figures. (Look at your Bibliography assignment for help)

[Enter your answer here]

*Question 3:* What other analyses would be helpful as follow-up analyses?

[Enter your answer here]

**Data Collection I**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you plan your data collection.

*Question 1:* What data (that you need) already exist? Have any data already be published in the peer-reviewed literature? Make sure to check supplementary information files. What about as part of online databases? Insert below the references for all data sources and the details of the sample size / nature of the sample they include.

[Enter your answer here]

*Question 2:* Based on your reading of the literature, your questions/hypotheses, and your answer to question 1, what is the nature and size of the sample you need to collect yourself? Be as specific as possible in describing your data collection goals. Include the nature of the variables and their source.

[Enter your answer here]

*Question 3:* Describe the method by which you will be collecting these data. Essentially, write a DETAILED protocol for your data collection. Include all necessary supplies and equipment.

[Enter your answer here]

**Data Collection II**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you plan your data collection.

*Question 1:* Collect data from a small subsample of your expected dataset. Make a note of the amount of time involved in the process. Based on this information, calculate the total amount of time that will be involved in the data collection process. Schedule this effort now to meet the deadline(s) of your project.

[Enter your answer here]

*Question 2:* Did you encounter any problem with data collection? Does the protocol you wrote for question 3 (Data Collection I) need to be revised based on your pilot data collection?

[Enter your answer here]

**Data Analysis**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you reflect upon your data collection and initiate your data analysis.

*Question 1:* What is your final sample size? Are there data that could not be collected after all? Are all analyses that you had planned feasible given the actual data collected?

[Enter your answer here]

*Question 2:* What software programs or technological support will you need to analyze data? Which analyses will require technical assistance?

[Enter your answer here]

*Question 3:* Do your data need to be formatted in a particular way or a particular file format to be visualized/analyzed? Is any data manipulation necessary prior to analyses?

[Enter your answer here]

*Question 4:* List all analyses in the order that they are going to be undertaken associating the necessary data every time.

[Enter your answer here]

**Material and Methods II**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you outline your material and methods section.

*Question 1:* What are the different subsections of a material and method section in similar studies? Make a bullet-point list for a few (two or three) different publications.

[Enter your answer here]

*Question 2:* Think about the following “classic” elements of a material and methods section. For each of them, provide a one sentence explanation of what you would include in your Material and Methods section to cover it.

Sampling (size/nature)

Data acquisition/sources

Data manipulation (standardization/normalization)

Analyses (software/nature/parameters)

[Enter your answer here]

**Figures and Tables I**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you design the figures that will be part of your paper.

*Question 1:* What is the nature of the data you will be presenting to your readers? How many figures/tables will you need to represent these data? Make a numbered list of the figures/tables in your paper and the data they will represent.

[Enter your answer here]

*Question 2:* Based on the exercise we did in class and your readings, what broad category of figures would effectively represent these data?

[Enter your answer here]

**Figures and Tables II**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you refine your figures for the paper.

*Question 1:* Pick a published article that published a similar analysis to the one you are proposing for your own paper. Observe carefully the corresponding figure and compare it to your proposed figure (in Graph Predictions activity). How do the two differ?

Provide the complete reference for the paper selected as part of your answer and upload a PDF of it on the shared folder.

You should do this for each figure included in your project. This may mean that you will have to select more than one published paper. Use the boxes below as appropriate.

[Enter your answer here]

[Enter your answer here]

[Enter your answer here]

[Enter your answer here]

[Enter your answer here]

*Question 2a:* As you read the results section of the published papers you selected for *Question 1*, what information is provided by the authors in the form of tables? Is all of this information provided in one of your tables? Make sure to check references to supplementary information/tables.

[Enter your answer here]

*Question 2b:* As you read the results section of the published papers you selected for *Question 1*, what information do you find yourself wondering about or do you wish was provided but is not? Is all of this information provided in one of your tables?

[Enter your answer here]

**Results I**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you outline your results section.

*Question 1:* Choose two to three relevant papers from the primary literature. Make sure to provide the references for these papers and upload PDFs of them on the shared folder. How have they organized their results section? Did they go analysis by analysis? Question by question (lumping different analyses addressing the same question for example)? Any other structure?

[Enter your answer here]

[Enter your answer here]

[Enter your answer here]

*Question 2:* Based on your answers to the first question, outline your own results section. Make sure to include a justification for your decision.

[Enter your answer here]

*Question 3:* Look at the peer-reviews you have received and the comments from Jonathan. How have you modified your material and methods to address these comments? How would you modify the outline you sketched out above to preemptively address some of the structural and conceptual issues raised by reviewers on other sections of your paper?

[Enter your answer here]

**Results II**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you reflect upon your results and how they shape your paper.

*Question 1:* How do your results differ from published data? What is novel about your results? Are they surprising or expected (i.e. matching predictions)? Make sure to cite each paper you reference and upload a PDF of that paper in the shard folder.

[Enter your answer here]

*Question 2:* Result sections must always reference relevant information including relevant statistical test results, tables of data, figures of the analyses, etc. List below every claim you make in your results section (in an abbreviated fashion) and next to it how you will demonstrate its validity to your reader.

[Enter your answer here]

**Discussion I**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you bring to the forefront the most critical points of your research for the discussion section of your paper.

*Question 1:* What is the significance of your work in three bullet points? This is NOT a summary of your results but a suite of statements summarizing WHY those results are important (to research, the [scientific] community …)

[Enter your answer here]

*Question 2:* What point of view might be missing? This may be a point made from the literature that you are not addressing or an obvious alternative hypothesis you do not mention.

[Enter your answer here]

**Discussion II**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you package your paper as an attractive narrative that guides your readers through the research.

*Question 1:* How do your findings contribute to your initial hypothesis? Write below your hypothesis and a sentence for your discussion section that explicitly addresses it.

[Enter your answer here]

*Question 2:* What is the next step in this line of inquiry? Do NOT think about simply increasing the sample size. Propose at least two new analyses, questions, or specific expansions of the framework of the project.

[Enter your answer here]

**Introduction**

Complete between [xxx] and [xxx]

Purpose: The goal of these questions is to help you develop the introduction section of your paper.

*Question 1:* Pick three papers from the primary literature. For each paper, provide the reference and upload a PDF on the shared folder. Detail below the structure of the introduction of each article including the different elements we discussed in class.

[Enter your answer here]

[Enter your answer here]

[Enter your answer here]

*Question 2:* How does the structure of the different papers differ? Note that I would like you to focus on the organization of the introduction specifically. Are those differences linked to the pitch/approach/structure/nature of the whole paper? Which of the three published studies is your work most similar to? Does your paper represent a hybrid approach instead?

[Enter your answer here]