MENTORING SPARK

Quick ideas to light up your doctoral conversations.

ADAPTIVE PROBLEM-SOLVING

LEVEL 1: FRAMING THE PROBLEM

LEVEL 2: MAKING MEANING

LEVEL 3: DESIGNING YOUR APPROACH

SOLUTIONS FOR STUDENTS

Students and advisors may have a gap between expectations of what is a satisfactory response to a technical request. Is it providing the data, or is it providing recommendations based on analyzing the data? There may also be a gap on the detail required with the request. These gaps, if left unchecked, can result in frustrations, including during the thesis-writing process.

This ***Spark*** is intended to help students think about their analysis, critical thinking, and argument skills, and to provide tools for moving from providing data to also providing the *meaning* of the data, and subsequent suggested next steps based on the data.

FACULTY FYI

This ***Spark*** examines the transition from framing a problem to understanding what data are needed to solve the problem. Adaptive problem-solving can be thought of as a process, and can help students become more independent researchers. This allows advisors to request information (results) based on increasingly higher level *(less defined, less task-like)* requests.

> *Adaptive problem-solving can be thought of as a process and can help students become more independent researchers.*

ACTIONS FOR FACULTY

- Be purposeful in discussing the advancement from reporting data to evaluating and synthesizing *(making sense of)* the data.
- Provide guidance, or a resource, to help students with knowing what makes a good *"lab book."* By lab book, we mean a way to document items such as noting how critical information is captured for future reference, knowing of any preferred templates to use, or knowing how much detail regarding assumptions should be captured. Consider including what is not good, or what does not tend to work *(and why)*. Consider having a student close to graduating actively mentor a new student on the research team.

CONTINUED ...

A RESOURCE FROM:

RISING DOCTORAL INSTITUTE

Dissertation Institute

Use this QR code to access this and other *Mentoring Spark* tip sheets:

DIGGING DEEPER

- Examples of a simple research charter statement/project forms. Consider developing a tailored tool – sufficiently customized to support the group *(i.e., not a generic "Google-searched/AI" form)*.
- The research charter tool should include basic project information *(e.g., researcher, project name, timing, purpose, etc.)* and project expectations *(ideal outcomes, data collection method, analysis technique, justification for method and technique)*.
- Review examples for documentation, such as a *"lab book"* template, or Lessons Learned database.

Please visit the RDI Mentoring Sparks website for examples and links to these tools and resources!

EXERCISES FOR STUDENTS

1. Have the student fill out a research plan charter document **for an existing project.** Discuss how easy or hard it was to gather all the information needed. Discuss if any concerns *(technical, cost, skill set needed, etc.)* arose during the process of filling out the form.
2. For a research project the student is involved with, ask the student to think of two ways to analyze data or propose two ways to obtain data. Then have them present their argument, with claims on why each method is valid *(argument)* and why their preferred method is preferred *(argument)*.
3. Using a real data set, practice presenting just the results, then a three-minute pitch on the *meaning* of the results, followed by what actions can be taken based *on* the results. Discuss with those listening *(advisor, research group, or both)* your confidence level and areas of uncertainty for each part.

REFLECTION & NEXT STEPS

- **Faculty:** Consider a conversation on how the student might improve their adaptive problem-solving skills, and how current knowledge can be transferred to different situations.
- **Student:** Consider how you transfer your technical problem-solving skills to other situations.

For more information: www.therisingdoctoralinstitute.com/sparks/

ACTIONS FOR FACULTY

- Help students to evolve in their analysis skills by helping them understand what evaluating their data requires, and ways to present/justify a decision on the ***meaning of the data***. Discuss how the transition to making meaning of the data moves a student from a *"technician"* to a researcher.
- Discuss the three key elements of an argument: **claim, reasons**, and **evidence,** and how that process provides a structure for a logical, persuasive, and effective argument. Have students practice presenting their requests, arguments, and/or data using the ***"claim, reasons, evidence"*** format.
- **GOAL Setting:** Agree on a goal for the student related to making meaning of data. The tools below may help to establish the goal. As a suggestion, the goal may be written in a manner that the student needs to provide a method to solve a problem, and either justify the method being used or provide a comparison of several methods.

> *Consider how you transfer your technical problem-solving skills...*

This document series was supported by the National Science Foundation under grants No. 2029796, 2029784, 2029782, and 2029785. Any opinions, findings, and conclusions or recommendations expressed in this material do not necessarily reflect the views of the National Science Foundation.