Promoting Meaningful Statistics Teaching: Task Analysis Professional
Facilitation Guide for 90-120 minute Session

The purpose of this Facilitation Guide is to provide materials and a structure for a short professional learning session that can support teacher learning about using meaningful statistical tasks. This guide includes time estimates and is intended to help your group synthesize important ideas from resources related to identifying, analyzing and adapting tasks that promote developing statistical thinking. While we have provided recommendations about materials that can be reviewed prior to meeting and suggestions about activities that can take place while your group is together, you and your colleagues can interchange as needed for your specific goals. We encourage you to engage in discussions and group activities that best meet your group's needs.

Complete Prior to Session:
It may be helpful for you and your colleagues to read and watch the following resources before you meet. The first two resources provide some background knowledge about the statistical investigation cycle and habits of mind.

1. Introduction to Statistical Investigation Cycle
   This 1-minute video features an expert in statistics education describing the phases in a statistical investigation.

2. Anchoring a Lesson in an Investigative Cycle
   This 3:45 min video of how 2 teachers anchor a lesson in the cycle.

3. Statistical Habits of Mind
   This brief reading describes statistical habits of mind and how they can be used in the four phases of a statistical investigation.

4. The Difference Between Statistics and Mathematics
   This brief reading can help you distinguish between two types of reasoning, statistical and mathematical.

Outline for a 90-120 minute Professional Learning Session

I. Identifying Similarities Between Statistics and Mathematics (20 minutes)
Facilitate a discussion with your colleagues (after you have read the brief reading about the differences between statistics and mathematics):

Mojica, G. F., Lee, H. S., & Azmy, C. N. (2019). Promoting Meaningful Statistics Teaching: Task Analysis Professional Facilitation Guide. Friday Institute for Educational Innovation: NC State University, Raleigh, NC. Retreived from https://hirise.s3.amazonaws.com/TaskAnalysisProfessionalFacilitationGuide.pdf

- What are the similarities and differences between statistics and mathematics?
- Why is it important to make this distinction?
- What role, if any, do your own experiences as a learner and/or teacher play in your perceptions of what it means to do statistics and mathematics?
- What are some of the challenges of teaching statistics within a mathematics curriculum? What strategies have you implemented to address these challenges?
- What excites you about teaching statistics?

II. Identifying Characteristics of Tasks that Promote Developing Statistical Reasoning (25 minutes)

A. Facilitate a discussion to share tasks that promote statistical reasoning that you and your colleagues are already using: Do you have a task that you use that promotes engaging in and developing statistical thinking? Describe the task and learning goals.

B. Watch a video of an expert panel discussing what makes a good statistical task. For the purpose of this discussion, we recommend focusing on 9:16 – 14:48 min. If you wish to also discuss the importance of inferential reasoning, you can watch the video in its entirety (14:51 min). https://youtu.be/FPIAhikyq5E
An additional video resource of a different expert panel discussing what makes a good statistical task can also be used: https://youtu.be/xG-5ockI7Tg

C. After watching the video, present the Considerations for Design and Implementation of Statistics Task (CDIST) Framework. Discuss the following: What features of tasks provide opportunities to engage in statistical reasoning?

III. Analyzing Statistical Tasks (45 minutes)

A. Consider the following set of tasks:
   1. Set 1: https://fi-esteem.s3.amazonaws.com/module1/part2/taskset1.pdf
   2. Set 2: https://fi-esteem.s3.amazonaws.com/module1/part2/taskset2.pdf
   3. Set 3: https://fi-esteem.s3.amazonaws.com/module1/part2/taskset3.pdf
   4. Set 4: https://fi-esteem.s3.amazonaws.com/module1/part2/taskset4.pdf

5. Set 5: https://fi-esteem.s3.amazonaws.com/module1/part2/taskset5.pdf

B. Choose one set (or more) of tasks to analyze.
C. Provide your group with the suggested list of discussion questions (below in E) after sets of tasks have been selected to help focus your analysis.
D. Using the CDIST Framework, analyze the tasks.
E. After analysis, discuss the following questions:
    1. What learning goal(s) could each task be used for students' learning?
    2. Is each task worthwhile to engage students in statistics through all or parts of an investigation cycle? Why or why not?
    3. Could each task promote productive statistical habits of mind? Why or why not?
    4. Does one task offer more or better opportunities to engage in and develop statistical thinking? Explain.
    5. In what ways could each task be improved to better engage students in statistical habits of mind and the four phases of an investigation? Explain.
    6. What other changes would you make to make the task more worthwhile? Why?

IV. Planning for Implementing New Ideas (30 minutes Optional)

Allow time for you and your colleagues to make plans for implementing new ideas/strategies in your classrooms in order to impact students' learning of statistics. You may want to adapt existing tasks that you already use or identify new tasks to implement. You may also want to design your own statistical tasks.

Citation for Resources

Lee, H. S., & Tran, D. (2015). Statistical habits of mind. In Teaching statistics through data investigations MOOC-Ed, Friday Institute for Educational Innovation: NC State University, Raleigh, NC. Retrieved from https://fi-courses.s3.amazonaws.com/tsdi/unit_2/Essentials/Habitsofmind.pdf

Tran, D., & Lee, H. S. (2015). Considerations for design and implementation of statistics tasks. In Teaching statistics through data investigations MOOC-Ed, Friday Institute for Educational Innovation: NC State University, Raleigh, NC. Retrieved from http://fi-courses.s3.amazonaws.com/tsdi/unit_3/CDIST.pdf

Tran, D., & Lee, H. S. (2015). The difference between statistics and mathematics. In *Teaching statistics through data investigations MOOC-Ed*, Friday Institute for Educational Innovation: NC State University, Raleigh, NC. Retrieved from https://fi-courses.s3.amazonaws.com/tsdi/unit_2/Essentials/Statvsmath.pdf

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Resources to Support Teacher Learning
ESTEEM: Enhancing Statistics Teacher Education through E-Modules (NSF DUE 1625713)
hirise.fi.ncsu.edu/projects/esteem

More resources to support teacher learning from Hub for Innovation and Research in Statistics Education (HI-RiSE) -- see Resources
hirise.fi.ncsu.edu

Professional learning opportunities (free) for educators
Place.fi.ncsu.edu

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