

**Teaching Statistics Through Data Investigations MOOC-Ed  
Professional Learning Community Guide**



*Hollylynn S. Lee & Jennifer N. Lovett*

**NC State University**

**Friday Institute for Educational Innovation**

## Teaching Statistics Through Data Investigations MOOC-Ed Orientation Facilitated Session

The purpose of this Facilitation Guide is to support your Professional Learning Community (PLC) meetings. Each unit within the MOOC-Ed has a separate guide. Use the facilitation guide designed specifically for the Teaching Statistics Through Data Investigations unit your team is working on. The guide is intended to help your group synthesize the ideas in the course and make plans for how to implement new strategies in your classroom in order to impact students' learning of statistics.

### **COMPLETE PRIOR TO SESSION:**

*Have participants watch the Orientation video and take the survey in the Consider Your Confidence in Teaching Statistics*

#### **I. Get Started:** (10 minutes)

*Discuss the following with your team to get them oriented to the course*

- This course focuses on introducing new ideas for teaching statistics. While there are opportunities to engage with statistical ideas, the course materials are not designed to directly teach statistics content.
- Review the course components and activities and develop a plan for how often the team will meet and what will be expected between team meetings.
- Review the suggestions for participating in course discussions. Note that there is a short video tutorial available that your team may find helpful if members need more guidance engaging in the discussion forums.

#### **II. Consider Your Confidence in Teaching Statistics**

*Have colleagues engage in the brief 44-item survey about their confidence to teach certain statistical topics. Have them record the confidence scores reported at the end of the survey. Then discuss the following:*

- *Make four number lines on the board with a scale from 1-6, one for Topics A, Topics B, Topics C, and Overall. Have teachers plot their confidence scores in each of the four areas. In general, how confident were we in each area? Do we notice any trends?*

#### **III. Meet Your Colleagues**

- Consider the map of where different course participants are located. How might this geographical diversity add to the discussions?
- Have members of your team introduce themselves in the forum. Read through

some of the other introductions. What similarities and differences do you notice in participants' background and teaching experiences?

#### IV. Tech Tools

Visit the tech tools page and explore the different technologies available there. Consider what you have access to in your local context and make some decisions about what tools may make the most sense to use for your group.

#### V. Earning a Certificate and Micro-credentials

Consider whether team members would like to pursue earning continuing education units (CEUs) by completing the requirements for a 20-hr (2.0 CEUs) Certificate of Completion *and/or* completing performance based assessments, called micro-credentials. The six Teaching Statistics Micro-credentials are portable and stackable. Once a participant has demonstrated a competency and earned a micro-credential, he/she will receive a certificate and a virtual badge recognizing this accomplishment.

Visit the Earning a Certificate and Micro-credentials page. If team members do not have time to read the page now, they should read this information on their own later. Throughout each unit, your team may want to reference this page in discussions around completing the 20-hr certificate and micro-credentials.

With your colleagues, highlight that there are many opportunities to earn CEUs by participating in this course. Note that you can earn CEUs by successfully completing any of the six Teaching Statistics Micro-credentials listed below, even if you choose not to complete the requirements for the 20-hr certificate.



Review the three ways that you can earn CEUs by participating in this course.

- Complete the course requirements for the 20-hour certificate; or
- Complete the course requirements for the 20-hour certificate, and complete any of the six micro-credentials (as few or many as you want); or,
- Complete any of the six micro-credentials (as few or as many as you want).

Review the requirements for the 20-hour Certificate of Completion. Review the overview of the *Understanding the SASI Framework* and *Statistics Task Design* stacks. Note there are three micro-credentials in each stack. Though your team is working together face-to-face, there are requirements that need to be completed in the online course platform in order for the system to track progress and issue a certificate.

Note that in the Demonstrate Your Learning section of Units 1-5, you will find important information about completing micro-credentials, as well as when you and your team should be ready to complete each of the six.

## **VI. MOOC-Ed FAQs**

Review some of the most commonly asked questions about engaging in a MOOC. In particular, please note that if you are participating as a team, every person on the team needs to register for the course.

## Teaching Statistics Through Data Investigations MOOC-Ed Unit 1: Considering the Possibilities of Teaching Statistics with Data Facilitated Session

The purpose of this Facilitation Guide is to support your Professional Learning Community (PLC) meetings. Each unit within the MOOC-Ed has a separate guide. Use the facilitation guide designed specifically for the unit your team is working on. The guide includes time estimates and is intended to help your group synthesize the ideas in the course and make plans for how to implement new strategies in your classroom in order to impact students' learning of statistics. We encourage you to engage in the conversations and group activities that best meet your group's needs.

### COMPLETE PRIOR TO SESSION:

*Watch the video from your instructor, engage with all materials in the Essentials, and watch the Learn From Experts video(s). Individuals may also engage with the Dive Into Data and Investigations before the session, or you could choose to do those together and extend the time allotted.*

### I. BIG IDEAS: (10-15 minutes)

*Facilitate a discussion with your colleagues to consider what they are learning about the following big questions (posed in the video from your instructor)*

- What is statistics?
- What can students do with data?
- How do we expect students to reason if they have a conceptual understanding of statistics?

If the group wants to discuss the Essentials and Experts video, consider the following prompts:

*Statistics for All reading*

- What does the author (Shaughnessy) suggest about statistical reasoning, its importance, and its place in curriculum?

*Video of students using Gapminder:*

- What about the Gapminder Video intrigued you most?

*Video of Jane's Age problem*

- What was the teacher's role in posing this problem?
- How did students' engage differently in using data to make a claim?

*Focusing on the Experts:*

- What struck you about the Expert's definition of statistics and emphasis on using real data?
- How does this compare with your previous experiences teaching and learning statistics?

## II. DIVE INTO DATA: (10-20 minutes)

*This data experience uses the Gapminder bubble chart shown in the Essentials video. The Gapminder tool includes a lot of data gathered from The United Nations, World Bank, and other agencies that includes measures for things like poverty, life expectancy, income, education level, and child mortality.*

*If participants have not already engaged in this activity, allow 10 minutes for them to explore the specific task posed on the Dive Into Data page. If you have already completed this activity individually prior to coming together, share your strategies and responses to the question, **“How does the wealth of a nation affect the life expectancy of the nation across the world?”***

- What surprised you about your experience exploring this data?
- How did having a rich context for the data impact your engagement and reasoning?

If interested, encourage participants to download the [pre-made lesson plan](#) they can use with students.

It is possible to [upload your own data](#) to use in this tool if participants are interested.

## III. INVESTIGATION: (10-20 minutes)

*Complete the investigation and discuss the following.*

- How do the eight assessment items differ from your previous experience with learning and being assessed in statistics?
- Choose 3-4 of the items and discuss as a group how teachers responded to these items and how students typically respond (in the PDF document in Part 2 of the Unit 1 Investigation).

OPTIONAL:

- The LOCUS project website has many sample items made available for the public. Work in small groups and [go to the website](#) to explore. Be sure to look at some of the constructed response items. These may be very helpful as assessments in your classrooms.
- The online LOCUS assessments are available for free to use. Anyone can register for an account and then give the assessments to students. Have one person in your group register for an account and explore the different options for using a 23-item, 30-item, or 50-item test. Make plans for how this assessment can be used in your schools to assist you in formative and summative assessment of students' understanding in statistics.

#### IV. REFLECTION & NEXT STEPS (5 minutes)

- Point out the Extension Resources, specifically two classroom-ready lesson plans.
- What is exciting you about teaching statistics with real data? What have you started formulating for how you might implement ideas and resources from this unit in your practice?
- For the next meeting, consider bringing a statistics lesson plan or worksheet that you have used in the past or would like to use with students, to reflect on at the meeting.

#### V. FORUM DISCUSSIONS

What ideas or issues emerged in the discussion forums this past week?  
What would our group members like to contribute in the forums to hear the ideas/opinions of others?

#### VI. MICRO-CREDENTIALS

Determine if team members would like to pursue earning CEUs by completing the requirements for a 20-hr (2.0 CEUs) Certificate of Completion **and/or** completing micro-credentials.

Visit the Demonstrate Your Learning section of this unit. If team members do not have time to read the page now, they should read this information on their own later. Team members may also want to visit the Earning a Certificate and Micro-credentials page on their own. Although you will not be ready to participate in micro-credentials until you have completed Units 1 and 2, this is a good time to review some important information about completing micro-credentials.

As in the Orientation section of this Facilitation Guide, highlight that there are many ways to demonstrate your learning and earn recognition through this course that can be applied towards CEUs through your own local educational agency. Remind your team that one way to demonstrate your competency with ideas presented in the course and apply them to your educational practices is to engage in micro-credentials which can allow you to earn CEUs, in addition to **or** without the 20-hr Certificate of Completion.

If you have not done so, review the three ways that you can earn CEUs by participating in this course, including the value of each micro-credential. If you have previously reviewed this with your team, they may benefit from a quick reminder.

- Complete the course requirements for the 20-hour certificate; or
- Complete the course requirements for the 20-hour certificate, and complete any of the six micro-credentials (as few or many as you want); or,

- Complete any of the six micro-credentials (as few or as many as you want).

Review the overview of the *Understanding the SASI Framework* and *Statistics Task Design* stacks, if you have not done so. Note there are three micro-credentials in each stack. Team members may also benefit from a review if this was previously introduced in light of your participation in Unit 1.

Remind your team that although you are working together face-to-face, the requirements for completing micro-credentials need to be completed ***individually*** in the online course platform in order for the system to track submissions and issue a certificate/badge upon successful completion. Individual team members can submit their responses from a link in the Demonstrate Your Learning section of this unit, when ready.

## Teaching Statistics Through Data Investigations MOOC-Ed Unit 2: Engaging in Statistics Facilitated Session

The purpose of this Facilitation Guide is to support your Professional Learning Community (PLC) meetings. Each unit within the MOOC-Ed has a separate guide. Use the facilitation guide designed specifically for the unit your team is working on. The guide includes time estimates and is intended to help your group synthesize the ideas in the course and make plans for how to implement new strategies in your classroom in order to impact students' learning of statistics. We encourage you to engage in the conversations and group activities that best meet your group's needs.

### COMPLETE PRIOR TO SESSION:

*Watch the video from your instructor, engage with all materials in the Essentials, and watch the Learn From Experts video(s). Individuals may also engage with the Dive Into Data and Investigations before the session, or you could choose to do those together and extend the time allotted.*

### I. BIG IDEAS: (10-15 minutes)

*Facilitate a discussion with your colleagues to consider what they are learning about the following big questions (posed in the video from your instructor)*

- What is a statistical investigation?
- What are statistical habits of mind?
- What is the difference between mathematics and statistics?
- What are the features of tasks that can engage students in statistics?

If the group wants to discuss the Essentials and Experts video, consider the following prompts:

#### *Statistical Habits of Mind*

- How can developing statistical habits of mind help you and your students use and apply statistics and statistical thinking?

#### *The Difference between Statistics and Mathematics*

- What are differences and similarities between statistics and mathematics? Why does it matter that we make a distinction?

#### *Statistical Analysis to Rank Baseball Players*

- What about the video intrigued you most?

#### *Written Statistics Task Guide*

- Analyze the lesson or worksheet that you brought to the meeting using the statistics task guide. What components of the lesson or questions posed to students could be improved that would better engage students in statistical habits of mind and the four phases of an investigation?

*Focusing on the Experts:*

- After listening to the Experts' discussion on statistical investigations, how does that compare with your previous experiences teaching and learning statistics?
- What struck you about the Experts' discussion of how mathematics and statistics are different?

## **II. DIVE INTO DATA: (10-20 minutes)**

*This data experience uses data with two free online tools, TUVA and CODAP. The TUVA interactive graph includes data about movies from two animation film studios, Pixar and Dreamworks, to explore their budget, profits, ratings, and release dates. The CODAP tool allows you to explore a data set of 300 randomly sampled vehicles to investigate fuel economy in the city and highway, types of transmissions, whether a vehicle is a hybrid, annual fuel cost and number of cylinders using an interactive table and graphs. If participants have not already engaged in this activity, allow 10 minutes for them to explore the specific task posed on the Dive Into Data page. If you have already completed this activity individually prior to coming together, share your strategies and responses*

- What surprised you about your experience exploring these data with these online graphing tools?
- How did having a rich context for the data impact your engagement and reasoning?

If interested, encourage participants to explore other preloaded data sets from [TUVA](#) and [CODAP](#). You can also use your own data sets with both tools. Teachers can register for accounts at these two sites and then upload their own data sets.

## **III. INVESTIGATION: (30 minutes)**

*Choose to either analyze the set of 3 tasks for middle school, or the 3 tasks for high school, or both. For each task, discuss the following questions.*

- What learning goal(s) could this task be used for students' learning?
- Is this task worthwhile to engage students in statistics through all or parts of an investigation cycle?
- Could this task promote productive statistical habits of mind?
- What would you change about this task to make it more worthwhile? why?

#### IV. REFLECTION & NEXT STEPS (5 minutes)

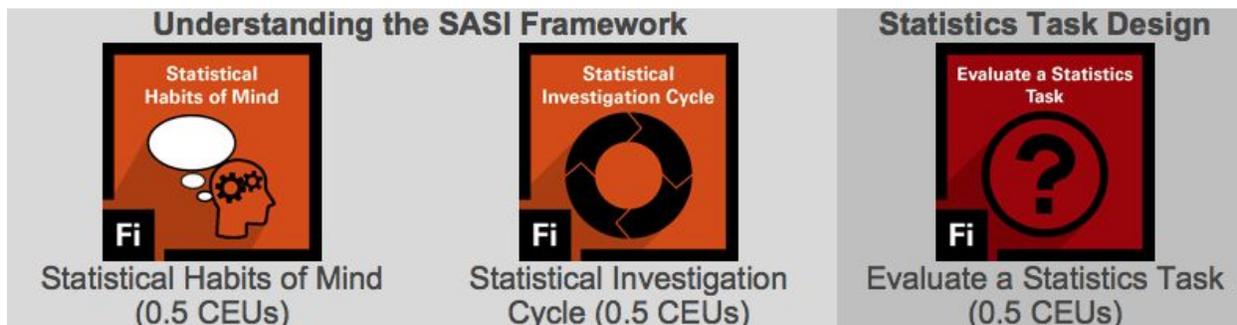
- Point out the Extension Resources, specifically Mathematical Practices through a Statistical Lens, the lesson plans, and Suggested Resources for Difficult Topics (lots of great links that can assist you and your students in learning some difficult statistics topics).
- What is exciting you about considering Statistical Habits of Mind when designing lessons for your students? What have you started formulating for how you might implement ideas and resources from this unit in your practice?

#### V. FORUM DISCUSSIONS

What ideas or issues emerged in the discussion forums this past week?  
What would our group members like to contribute in the forums to hear the ideas/opinions of others?

#### VI. MICRO-CREDENTIALS

If any team members are planning to complete micro-credentials, you are now ready to demonstrate and apply your learning by engaging with the micro-credentials listed below.



**Before** submitting any responses, ask team members to do the following:

- Visit the Demonstrate Your Learning section of this unit, where important information about completing micro-credentials and when they are ready to be completed is provided.
- Review the resources provided for building understanding relating to each specific micro-credential.
- Review the questions and scoring rubric for each respective micro-credential.

Though your team is working together face-to-face, the requirements for completing micro-credentials need to be completed **individually** in the online course platform in order for the system to track submissions and issue a certificate/badge upon successful completion. Individual team members can submit their responses from a link in the

Demonstrate Your Learning section of this unit.

If team members are not successful in completing a micro-credential on their first attempt, encourage them to revisit unit resources and review feedback provided by scorers to revise their responses and resubmit. It may take some individuals multiple attempts to earn a certificate/badge for specific micro-credentials, while others will be successful on their first attempt.

## Teaching Statistics Through Data Investigations MOOC-Ed Unit 3: Introducing Levels of Statistical Sophistication Facilitated Session

The purpose of this Facilitation Guide is to support your Professional Learning Community (PLC) meetings. Each unit within the MOOC-Ed has a separate guide. Use the facilitation guide designed specifically for the unit your team is working on. The guide includes time estimates and is intended to help your group synthesize the ideas in the course and make plans for how to implement new strategies in your classroom in order to impact students' learning of statistics. We encourage you to engage in the conversations and group activities that best meet your group's needs.

### COMPLETE PRIOR TO SESSION:

*Watch the video from your instructor, engage with all materials in the Essentials, and watch the Learn From Experts video(s). Individuals may also engage with the Dive Into Data and Investigations before the session. Individuals may also engage with the Dive Into Data and Investigations before the session, or you could choose to do those together and extend the time allotted.*

### I. BIG IDEAS: (10-15 minutes)

*Facilitate a discussion with your colleagues to consider what they are learning about*

*Unit 3 big ideas:*

- Why is it important to think about how students' reasoning in statistics develops in sophistication?
- How might a focus on developing statistical habits of mind for each phase of a statistical investigation help in developing students' sophistication with statistical ideas?

If the group wants to discuss the Essentials and Expert videos, consider the following prompts:

#### *SASI Framework*

- Discuss the organization of the framework. Do you notice any alignment (or misalignment) with ideas organized in the framework and what is currently in your curriculum for statistics?

#### *Illustrating the SASI Framework*

- How did the examples in the video help to illustrate how students may approach a task at the three different levels in each phase of an investigation? If needed, watch segments of the video together to further discuss. For example, focus on the Analyzing Data phase and watch the

explanation of students' work from 10:19- 11:49 in the video.

### *Consideration for Design and Implementation of Statistics Tasks*

- How can the SASI framework be used to guide your instructional planning and formative assessment of students' thinking?

### *Focusing on the Experts:*

- After listening to the Experts' discussion on designing statistical tasks, how does that compare with statistical tasks that you have previously used in your classroom?
- What struck you about the Chris Franklin's discussion of the development of the mean?

## **II. DIVE INTO DATA: (10-20 minutes)**

*This data experience uses a simulation to collect data about unknown probability distributions. The simulations are available in Fathom, TinkerPlots, StatCrunch, and GeoGebra. If participants have not already engaged in this activity, allow 15 minutes for them to explore the specific task posed on the Dive Into Data page. If you have already completed this activity individually prior to coming together, share your strategies and responses.*

- What strategies did you use when exploring this simulation?
- How did having a goal of making a recommendation impact your engagement and reasoning?

### *Connecting to the SASI framework*

- What learning goal(s) could this task be used for students' learning?
- Is this task worthwhile to engage students in statistics through all or parts of an investigation cycle?
- How could this task promote productive statistical habits of mind?
- What would you change about this task to make it more worthwhile? why?

If interested, encourage participants to [download the PDF](#) to use the task with their students.

## **III. INVESTIGATION: (20 minutes)**

*Watch and discuss the two animated videos of students' work in the investigation and discuss the following questions.*

*Video 1: Working with a dynamic simulation tool ([link to video](#))*

Consider how the following could have impacted students' work on the die simulation

- Searching for bias in die
- Choosing their own sample size
- Observing dynamically changing graphs
- Needing to support claims with data
- Recommending a fair die company

*Video 2: Multiple levels of sophistication ([link to video](#))*

- There were three pairs of students shown in this video, all investigating the same die company. How would describe the statistical reasoning within each pair of students?
- Using the SASI framework, hypothesize levels of statistical sophistication at which these students were working.
- How did the choice of graphs, sample size, and statistical techniques influence how well students could support their claim?

#### IV. REFLECTION & NEXT STEPS (5 minutes)

- Point out the Extension Resources, specifically the lesson plans, which include the Human Body Task used in the *Illustrating the SASI Framework* video..
- What is exciting you about considering the SASI Framework when designing lessons for your students? What have you started formulating for how you might implement ideas and resources from this unit in your practice?

#### V. FORUM DISCUSSIONS

What ideas or issues emerged in the discussion forums this past week?  
What would our group members like to contribute in the forums to hear the ideas/opinions of others?

#### VI. MICRO-CREDENTIALS

If any team members are planning to complete micro-credentials, you are now ready to demonstrate and apply your learning by engaging with the micro-credentials listed below.



If team members did not complete the following micro-credentials at the end of Unit 2, remind them that they are ready to do so: Statistical Habits of Mind, The Statistical Investigation Cycle, and Evaluate a Statistics Task.

**Before** submitting any responses, ask team members to do the following:

- Visit the Demonstrate Your Learning section of this unit, where important information about completing micro-credentials and when they are ready to be completed is provided.
- Review the resources provided for building understanding relating to each specific micro-credential.
- Review the questions and scoring rubric for each respective micro-credential.

Though your team is working together face-to-face, the requirements for completing micro-credentials need to be completed **individually** in the online course platform in order for the system to track submissions and issue a certificate/badge upon successful completion. Individual team members can submit their responses from a link in the Demonstrate Your Learning section of this unit.

If team members are not successful in completing a micro-credential on their first attempt, encourage them to revisit unit resources and review feedback provided by scorers to revise their responses and resubmit. It may take some individuals multiple attempts to earn a certificate/badge for specific micro-credentials, while others will be successful on their first attempt.

**Teaching Statistics Through Data Investigations MOOC-Ed**  
**Unit 4: Delving Deeper into the Investigation Cycle**  
**Facilitated Session**

The purpose of this Facilitation Guide is to support your Professional Learning Community (PLC) meetings. Each unit within the MOOC-Ed has a separate guide. Use the facilitation guide designed specifically for the unit your team is working on. The guide includes time estimates and is intended to help your group synthesize the ideas in the course and make plans for how to implement new strategies in your classroom in order to impact students' learning of statistics. We encourage you to engage in the conversations and group activities that best meet your group's needs.

**COMPLETE PRIOR TO SESSION:**

*Watch the video from your instructor, engage with all materials in the Essentials, and watch the Learn From Expert video(s). Individuals may also engage with the Dive Into Data and Investigations before the session, or you could choose to do those together and extend the time allotted.*

***NOTE: This unit is packed full of essentials, videos, and an extended Dive into Data and Investigation. Consider breaking the materials and discussions up into 2-3 team meetings. If you do this, be clear about what you want teachers to engage with on their own before each meeting.***

**I. BIG IDEAS:** (10-15 minutes)

*Facilitate a discussion with your colleagues to consider what they are learning about big ideas in Unit 4*

- Why is it so important to engage students in all four phases of a statistical investigation? Does every lesson have to include all four phases?
- A big focus in this unit is learning to use a large messy data set that has many cases and many variables. Why should we engage students in using such data? What challenges may occur when using large data sets?
- Have you used the Census at School website and data in your classrooms? What excites you about the potential of this online resource for collecting and accessing data?

If the group wants to discuss the Essentials and Expert videos, consider the following prompts:

*Pose & Collect*

*What makes a good question?*

- How did this reading add to your understanding of statistical questions and ways to assist students in posing statistical questions?

### *Types of Data Variables*

- How could you use this video, or other videos from the Statistics Learning Centre, in your teaching?

### *Measurement*

- How could the measurement guide be used with your students?

### *Gummy Bears in Space*

- What measurement and data collection issues arose when students were doing this gummy bear experiment? How could you engage your students in a similar task to discuss measurement issues?

### *Analyze & Interpret*

#### *Examples of Analyzing and Interpreting from Census at School*

- What takeaways did this resource provide to help you consider how to use Census at School survey questions and data to meet certain objectives in your curriculum?

#### *Guidelines for Analysis and Interpretation when Comparing Distributions*

- Comparing two sample distributions is an excellent way to engage students in developing key ideas about distributions and engage them in an investigation that leads to informal inference. What aspects of this teaching guide do you find the most insightful?

#### *Fitting Lines to Data*

- This resource is part of a larger collection of resources that are available for free to use with your students (or to enhance your own statistics learning). View the student and faculty guides. Use the guiding questions on p. 13 of the Student guide engagement with the video content. How well does this video and the guides present the statistical content related to analyzing bivariate data? How could you use this resource with students?

#### *Census at School in an Ireland Classroom*

- When watching this video, what did you notice about how the teacher set up and probed students' thinking? How did the Census at School data contexts allow for interesting ways for students to engage in a statistical investigation?

### *Focusing on the Experts:*

- What struck you about the experts' opinions of the affordances and constraints of using technology with a statistical investigation?

- In the two extra videos of the experts engaging with technology tools to explore data, what did you learn about the ways different representations can be used to examine data?

## **II. DIVE INTO DATA: (will vary depending on if you engage together)**

*This data experience provides an opportunity to explore a Census at School project website and consider how to pose and answer questions from data collected by this large internet-based project. If participants have not already engaged in this activity individually, you may consider asking them to explore a Census at School website before the meeting and then engage together with a common technology tool that is available in your setting to explore the specific tasks posed on the Dive Into Data page.*

### *Pose & Collect*

- *Engage in and discuss the questions on the Dive into Data page. Perhaps have small groups of teachers work together to agree on statistical question(s) they wish to pursue using the Census at Schools data.*

### *Analyze & Interpret*

- For many teachers, this may be a first experience using a large messy data set. Choose the best way to access the data for your group given the three options on the Analyze & Interpret tab on the Dive Into Data page.
- Give each group of teachers time to discuss and analyze their data. Be sure to attend to measurement issues in the data, make choices of how to deal with any issues you observe, As you work on your analysis, consider the aspects of statistical sophistication and habits of mind in the SASI Framework.
- Give teachers an opportunity to present their work and justify any claims they are making to answer their posed statistical question. Did any additional questions emerge as they were working on the data?

### *Summary:*

- What surprised you about your experience exploring this realistic data set?
- How did having a rich context for the data impact your engagement and reasoning?

## **III. INVESTIGATION: (20 minutes)**

*Watch and discuss the two animated videos of students' work in the investigation and discuss the following questions. The students are using data from Census at Schools and are focused on issues related to the survey questions about modes of transportation and how long it takes students to get to school.*

### *Video 1: Pose & Collect*

- How do the students take their knowledge about the context into account when formulating and refining their statistical question?
- How does the nature of the question change as they discuss with each other?
- What variables in the dataset should students use to answer their question?
- What measurement issues might emerge in their work as they investigate their final question?

### *Video 2: Analyze & Interpret*

- How do the students deal with the “messy” data? What role does context play in this process?
- How does the dynamic technology tool help them make sense of the data?
- What statistical habits of mind did you see the students engage in when analyzing data and interpreting their results?

## **IV. REFLECTION & NEXT STEPS (5 minutes)**

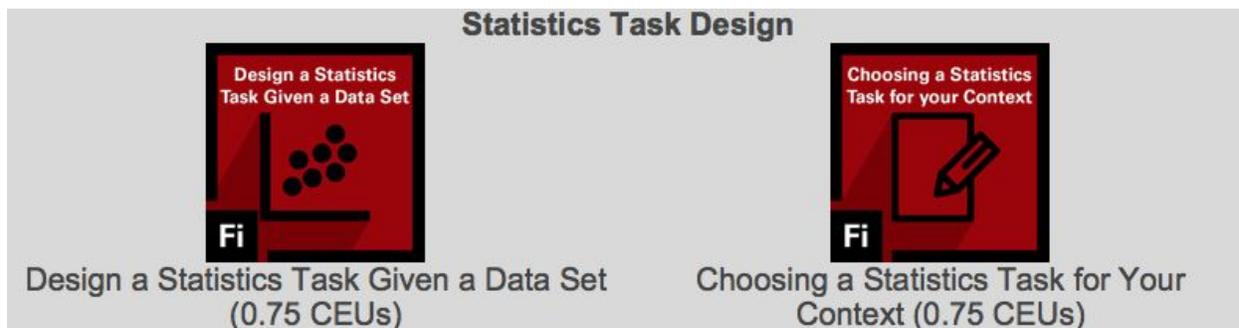
- Point out the Extension Resources, specifically the lesson plans and the Collection of Statistical applets.
- What is exciting you about incorporating technology to engage students in realistic messy data sets when designing lessons for your students? What have you started formulating for how you might implement ideas and resources from this unit in your practice?

## **V. FORUM DISCUSSIONS**

What ideas or issues emerged in the discussion forums this past week?  
What would our group members like to contribute in the forums to hear the ideas/opinions of others?

## VI. MICRO-CREDENTIALS

If any team members are planning to complete micro-credentials, you are now ready to demonstrate and apply your learning by engaging with the micro-credentials listed below.



If team members did not complete the following micro-credentials at the end of Unit 2, remind them that they are ready to do so: Statistical Habits of Mind, The Statistical Investigation Cycle, and Evaluate a Statistics Task. If team members did not complete the following micro-credentials at the end of Unit 3, remind them that they are ready to do so: Levels of Sophistication in Statistical Thinking.

**Before** submitting any responses, ask team members to do the following:

- Visit the Demonstrate Your Learning section of this unit, where important information about completing micro-credentials and when they are ready to be completed is provided.
- Review the resources provided for building understanding relating to each specific micro-credential.
- Review the questions and scoring rubric for each respective micro-credential.

Though your team is working together face-to-face, the requirements for completing micro-credentials need to be completed **individually** in the online course platform in order for the system to track submissions and issue a certificate/badge upon successful completion. Individual team members can submit their responses from a link in the Demonstrate Your Learning section of this unit.

If team members are not successful in completing a micro-credential on their first attempt, encourage them to revisit unit resources and review feedback provided by scorers to revise their responses and resubmit. It may take some individuals multiple attempts to earn a certificate/badge for specific micro-credentials, while others will be successful on their first attempt.

## Teaching Statistics Through Data Investigations MOOC-Ed

### Unit 5: Putting it All Together

#### Facilitated Session

The purpose of this Facilitation Guide is to support your Professional Learning Community (PLC) meetings. Each unit within the MOOC-Ed has a separate guide. Use the facilitation guide designed specifically for the unit your team is working on. The guide includes time estimates and is intended to help your group synthesize the ideas in the course and make plans for how to implement new strategies in your classroom in order to impact students' learning of statistics. We encourage you to engage in the conversations and group activities that best meet your group's needs.

#### **COMPLETE PRIOR TO SESSION:**

*Watch the video from your instructor, engage with all materials in the Essentials, and watch the Learn From Experts video(s). Individuals may also engage with the Dive Into Data and Investigations before the session.*

#### **I. BIG IDEAS:** (10-15 minutes)

*Facilitate a discussion with your colleagues to consider what they are learning about big ideas in this unit.*

- What are the most salient aspects of what you have learned in this course? How is this helping you create a vision of how to move your practice forward in teaching statistics?
- What are interested in learning more about with regards to teaching statistics?

If the group wants to discuss the Essentials and Expert videos, consider the following prompts:

*Teacher Engaging Students with the Cycle of Statistical Investigation*

- How does the teacher make the cycle of a statistics investigation explicit for students? What could be done in your own classrooms?

*LinkedIn Data Scientist Talks Statistics*

- How could you use this video, and the This is Statistics website, with your students to get them excited about careers that use data and statistics?

*How Statistics Teaching has Changed over the Last 10 Years*

- What did you learn about how statistics teaching has changed? How did this reading help you in creating a vision for how you can change your own teaching of statistics?

*Focusing on the Experts:*

- What struck you about the experts' hopes for the future of statistics education?
- What pieces of advice from the experts will you implement into your classroom?

## **II. DIVE INTO DATA: (20-30 minutes)**

*This data experience you have the chance to explore websites with real data. If participants have not already engaged in this activity, allow 10 minutes for them to explore the specific task posed on the Dive Into Data page. If you have already completed this activity individually prior to coming together, share your strategies and responses.*

- What data set(s) did you find that you thought would be of interest to students?
- What ideas do you have for a lesson using this data? How does the lesson fit into your curriculum?

## **III. INVESTIGATION: (10-20 minutes)**

*Complete the investigation by completing the confidence survey and discuss the following questions.*

- In what ways has your confidence changed for teaching statistics?
- How did your experiences during this course impact your confidence?
- How could you help a fellow educator become more confident in teaching statistics?

## **IV. REFLECTION & NEXT STEPS (5 minutes)**

- Point out the Extension Resources, specifically the Against All Odds site and the student created projects and parodies.
- How can you continue to work together to make changes across courses and grades that you teach so that students can have strong experiences that help to develop their levels of statistical sophistication?

## **V. FORUM DISCUSSIONS**

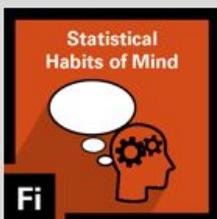
What ideas or issues emerged in the discussion forums this past week?

What would our group members like to contribute in the forums to hear the ideas/opinions of others?

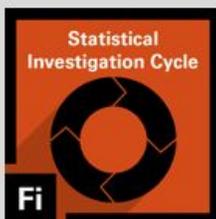
## VI. MICRO-CREDENTIALS

If any team members are planning to complete micro-credentials, it is not too late to do so! Summarize the following for your team:

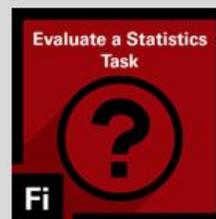
### Ready to complete after Units 1 and 2:



Statistical Habits of Mind  
(0.5 CEUs)

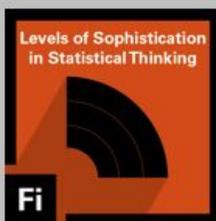


Statistical Investigation  
Cycle (0.5 CEUs)



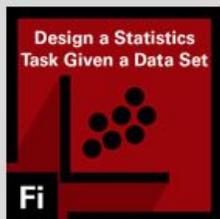
Evaluate a Statistics Task  
(0.5 CEUs)

### Ready to complete after Unit 3:



Levels of Sophistication in  
Statistical Thinking  
(0.5 CEUs)

### Ready to complete after Unit 4:



Design a Statistics Task Given a Data Set  
(0.75 CEUs)



Choosing a Statistics Task for Your  
Context (0.75 CEUs)

**Before** submitting any responses, ask team members to do the following:

- Visit the Demonstrate Your Learning section of this unit, where important information about completing micro-credentials and when they are ready to be completed is provided.
- Review the resources provided for building understanding relating to each specific micro-credential.
- Review the questions and scoring rubric for each respective micro-credential.

Though your team is working together face-to-face, the requirements for completing micro-credentials need to be completed ***individually*** in the online course platform in order for the system to track submissions and issue a certificate/badge upon successful completion. Individual team members can submit their responses from a link in the Demonstrate Your Learning section of this unit.

If team members are not successful in completing a micro-credential on their first attempt, encourage them to revisit unit resources and review feedback provided by scorers to revise their responses and resubmit. It may take some individuals multiple attempts to earn a certificate/badge for specific micro-credentials, while others will be successful on their first attempt.