

USCOTS 2023



We can all picture an "ideal" environment for learning to communicate with/about data.

If your reality is different - e.g., online classes or large sections - you can leverage technology to facilitate three key types of communication.

- Student to student
- Students to instructor
- Instructor to students

Leveraging Educational Technology to Support Communication with/about Data

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Student to student



- Weekly synchronous meetings
- Opportunities to build relationships
- Small group work using breakout rooms
- Collaborative data analysis and software practice using shared screens
- One Socrative submission per group

Students to instructor

2. Can you find a confounding variable helps to explain the association between smoking and FEV in this sample?

Explain how it fits the definition of confounding by describing the associations you find in JMP (including the direction of the associations). Don't just rely on speculation.

Hide Answers Show Names 10/11 Students Answered

Age and FEV correlation suggests that the older a person is, the greater FEV. Additionally, since smoker tend to be older, age can be a confounding variable.

The confounding variable is age. Age is associated with smoking and FEV. The younger you are, the lower your FEV.

Age and gender are, perhaps, confounding variable which help to explain the association between smoking and FEV in this sample. While the association between smokers and non-smokers for FEV values apparent, the difference age and gender make is strong.

Gender is a confounding variable between smoking and FEV. Females have a lower FEV and a lower amount of smokers

One confounding variable could be how much a smoker may smoke. A smoker could produce a higher FEV output if they only smoke a small amount. This could be explained by the graph built because the upper 50 percent of smokers have a higher FEV output than non-smokers.

Age is a potential confounding variable because most smokers are older and FEV tends to increase with age.

Age, considering how younger people tend to smoke less than older people, the FEV for younger people could also be seen as lower

Age is a confounding variable because a higher age relates to a higher FEV and a higher likelihood of being a smoker.

One confounding variable that helps to explain the association between smoking and FEV in this sample is age. JMP graphs showed a strong positive association between both smoking and age and FEV and age.

- Free for students: no subscription, no clicker
- Moderately priced for colleges: \$179/instructor account/year
- Both multiple choice and free response questions
- Quizzes with multiple questions
- Real-time monitoring of students' progress (even if they haven't submitted the quiz yet)
- Optional immediate feedback on multiple choice or short answer questions

Instructor to students

FEV Data were collected on 654 youths ages 3 to 19 years, an age period during which much physical development, such as increase in lung capacity, takes place. The objective was to analyze the relationship between smoking status and forced expiratory volume (FEV, measured in liters). FEV is a measure of strength of a person's lungs -- the maximum volume of air a person can blow out in the first second; higher numbers are better.

1. Describe the association between being a smoker and FEV in this sample.

- There is a higher FEV value for smokers. Smokers have a higher FEV, on average.
- Based on the graph, we can tell that being a smoker is associated with a larger FEV because the median FEV for a smoker is higher than the median FEV for a non-smoker.

2. Can you find a confounding variable that helps to explain the association between smoking and FEV in this sample? Explain how it fits the definition of confounding by describing the associations you find in JMP (including the direction of the associations). Don't just rely on speculation.

- Age is a potential confounding variable because most smokers are older and FEV tends to increase with age. *Explicit connections to both explanatory and response

3. Which is more strongly associated with FEV: Height or Age? How do you know?

- Height has a stronger association with FEV. The line of best fit between height and FEV is steeper than the line of best fit between age and FEV. *Careful when comparing slopes, because units may be different
- Height is more strongly associated with FEV since there is a stronger positive correlation between Height and FEV. *Correlation accounts for slope and spread of the points around the line. Points closer to the line → Stronger correlation/association.

4. Which is more strongly associated with FEV: Gender or Smoking? How do you know?

- Smoking is more strongly associated with FEV. Comparing box and whisker plots, the difference in mean medians between the FEVs of smokers and non-smokers is larger than the difference in mean medians between the FEVs of males and females.

- One easy-to-share document that communicates instructions and records class discussion in real-time.
- Multiple students responses can be reviewed in large group discussion (copy-pasted from Socrative)
- Text editing tools to show instructor feedback that addresses both conceptual understanding and precision of communication



Any given instructional strategy can be supported by a number of contrasting technologies (old and new)...

