How People Learn

Exercises Week 12

Q. 1 You have collected Likert scale data ranging from 1 (strongly agree) to 5 (strongly disagree) using the statement "I often find that I have been reading for class but don't know what it was all about". You wish to present the data graphically. What form of graphical representation would you use and why?

Q. 2 In addition to the data collected in Q 1, you have also collected data on what faculty the student is from. You want to graphically represent the data from Q.1 broken down by faculty. What form of graphical representation would you use and why?

Q.3 Using the data from Q.1 and Q2, you want to test if relationships found in the sample might be likely to be found in the wider population. What test would you use? Explain your choice.

Q.4 With respect to the test you have chosen for Q.3, you note that there are very few students who strongly agree with the statement from the SV faculty. Why might this be a problem? How could you be sure if it is a problem, and how might you resolve the problem (apart from collecting more data)?

Q. 5 You have collected data on student score on the Force Concept Inventory (scores range from 0 to 30) and on their grade (scores range from 1 to 6 in increments of 0.25). You would like to display it graphically? What form of graphical representation would you use, and why?

Q.6 What numerical statistic would you use to summarize the strength of the relationship between these two variables described in Q5. Are there circumstances in which it would be inappropriate to use this statistic?

Q. 7 You would like to graphically show how score on the Force Concept Inventory compares across different faculties. What form of graphical representation would you use, and why?

Q.8 You would like to test for the statistical significance of a difference in FCI score between the SV and the STI faculty. You have 20 respondents from SV and 30 from STI. The variance in the scores in each group is quite similar and the distributions look more or less normal. What significance test will you use (be as specific as possible)? Give a reason for your answer.

Q. 9 You find that in your sample as a whole (245 students), the average score using the Metacognitive Self-regulation Inventory is 3.5 (scored on a 1 to 7 scale, data is continuous). Other studies have found an average score of 4.1. You would like to test if the score in your population is significantly different from 4.1. What test would you use?

Q.10 You perform a Cronbach's alpha test on your 12 question Metacognitive Self-Regulation scale and get a result of alpha=0.733. What can you conclude from this about the reliability and/or validity of the scale?

Q.11 you tested some students on the Metacognitive Self-Regulation scale at the beginning of a term and tested the same students again at the end. You have included student IDs on both questionnaires and can therefore track a student over the semester. What test will you use to assess if there is a significant increase in the students' score on this scale over the course of the semester?