**Bottleneck Lesson Plan- Variance**

**PSYCH 200 Elementary Statistics in Psychology, 200, primarily psychology majors but some other humanities majors require it as well.**

Briefly outline your answers to the following:

1. **The bottleneck—What are students unable to do?**

students get confused between and within especially when doing an ANOVA

1. **Mental Action—What mental actions does the expert perform to get past the bottleneck?**

detect and compare results from between and across two groups on a particular variable

1. **Model the thinking—What analogy will you use to model these mental actions?**

compare results of growing tomatoes in gardens in 2 neighborhoods. Did the results differ across the two neighborhoods? Or was there more difference across all of the neighborhoods combined?

1. **Practice and Feedback—How will the students practice these mental actions? How will they receive feedback to make improvements?**

Make up several scenarios (rain levels in different cities and test scores on xxx). Ask students to list what is being compared/tested and what would show if the results showed across or between differences.

- Faded worked-out worksheets—give at least one problem/homework in which a variabililty problem is partially worked out. Leave more of the problem unsolved/explanations incomplete as students gain experience.

1. **Motivation—What will I do to hold students accountable and disrupt ritual ways of learning?**

Due to math phobia, for the first several weeks of the course, most lessons are explanatory and do not involve numbers.

1. **Assessment—How will I assess student mastery of the mental actions?**
* Students invent an experiment to highlight variation. What would vary? How would we know if it was stronger across both the two treatments rather than across just one

Prepare a brief summary of the results of the pre- and post CATs—including, if possible, some quantities. What inferences can you draw from the data? For example, “On the pre-test, 33% were able to do XXX, while on the post-test, 57% did XXX and 22% still could not. These results show a 24 improvement, though about one-fifth of the class are still struggling with XXX.” Or “The majority of students correctly answered 5 of the 8 test questions on the bottleneck concept.”

1. **How will you share what you learned?**

 In a paper with Joan.