Elementary Preservice Teachers' Conceptions of Variability

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Abstract:

My current research focuses on the following three research questions:

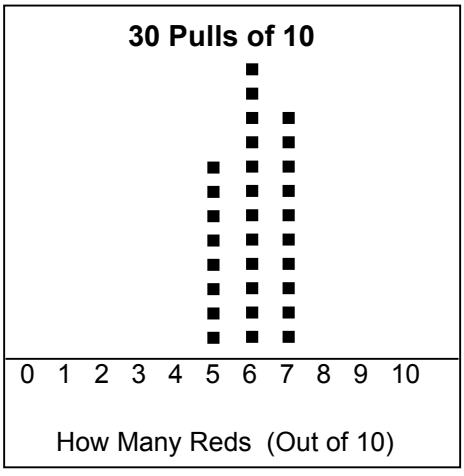
[1] What are the components of a conceptual framework that help characterize Elementary Preservice Teachers' (EPSTs') thinking about variability?
[2] How do EPSTs' conceptions of variability before an instructional intervention compare to those conceptions after the intervention?
[3] What tasks are useful for examining EPSTs' conceptions of variability in the contexts of sampling, data & graphs, and probability?

So far, collective results from survey data, interview data, and class observations have been used to describe components of an *evolving framework* useful for examining EPSTs' conceptions of variability. The three main *aspects* of the framework address how EPSTs reason in expecting, displaying, and interpreting variability. Each of the three aspects is further defined by different *dimensions*, which in turn have their own constituent *themes*. The depth in describing the evolving framework is a main contribution of this research.

What follows are three representative tasks that have been used to explore EPSTs' conceptions of variability. There is one task for each of the three contexts of sampling, data and graphs, and probability situations.

Sampling

Matt took his class to the candy container (100 Candies = 60 Red and 40 Yellow). Then he left the room. When he came back, the class claimed to have pulled 30 samples each of size 10, with replacement. They showed Matt this graph, supposedly based on their data:



Which of the following do you think is *most* likely ? Put a check mark next to it.

___ Matt's class just made up these results

___ Those are the actual results of the class samples

___ No one can have much confidence if the results are made up or not.

Explain why you think this is the most likely.

Data & Graphs

Suppose the newspaper says a movie is starting at 4:00pm. You show up at 4:00pm, but after the previews and advertisements are done, the actual movie starts at 4:20 pm! I'll call this the movie *Wait-Time*: The difference between the advertised time and the actual time the film starts.

To investigate movie wait-times, a class goes to twelve different movies at the Royal Theater and twelve different movies at the Minnow Theater. They gather the data shown (at right):

Data: (Movie Wait-Times in Minutes)

Royal Theater

7.0	7.0	7.0	11.5	10.0	11.0
7.5	7.5	13.0	14.5	13.0	11.0

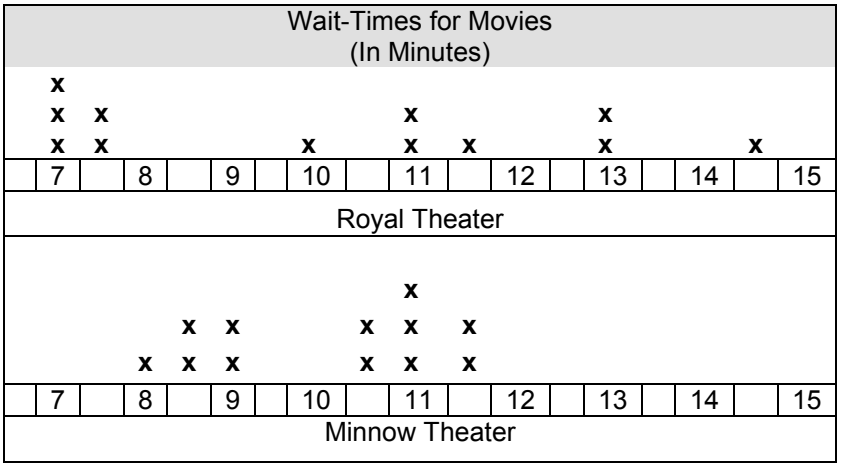
Mean = 10.0 min.
Median = 10.5 min.

Minnow Theater

8.0	8.5	8.5	9.0	9.0	10.5
10.5	11.0	11.0	11.0	11.5	11.5

Mean = 10.0 min.
Median = 10.5 min.

One student in class argues that there's really no difference in the Wait-Times of the two Theaters, since the averages are the same. Do you agree? Explain why or why not.



Probability

For homework, Mr. Blair asked each student in his class to toss a die 60 times and keep track of how many times each of the 6 sides came up. Shown are the results turned in the next day by four students.

Only one of these students actually rolled the die. The other three students just made up their results before class. What do you think is *most* likely?

	Riki	Lynn	Lee	Pat
Side that came up				
1	7	10	10	2
2	12	11	10	15
3	6	10	10	10
4	9	10	10	28
5	14	9	10	1
6	12	10	10	4

___i) Riki really rolled it ___ii) Lynn really rolled it
___iii) Lee really rolled it ___iv) Pat really rolled it
___v) No one can say. Any of the 4 students is equally likely to have really rolled it.

Explain your reasoning.