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# Supplement to Program Level Assessment Report

Data was collected from the course STAT 4850. The instructor assigned scores of 0, 1, 2, or 3 based on performance on homework problems throughout the semester which assessed the SLO *Students will apply statistics to analyze data sets*. In previous years, the following data collection procedures were observed:

1. Students across multiple classes were asked one question. The questions were not the same across the classes, though the SLO measured was the same.
2. Students at different levels who were in the same class were asked the same question.

Method 1 has the advantage of getting a lot of data about a lot of different things. It has the downside of being hard to interpret, as the difficulty of questions is not consistent across the courses. Method 2 has the advantage of directly assessing whether more advanced students in the program have better mastery of the SLO.

However, both methods share a common disadvantage. It is impossible to understand the *within student* variation of skill in an SLO. By repeated measurement on the same student, we can begin to understand the variance in outcome scores that students have. For example, before this survey, we would not have known whether each individual student would have a distribution similar to that of all the students, or whether students each have their own distribution. It seems more likely that each student would have their own distribution, and this instrument can allow us to see what those distributions look like.

We start with the overall distribution of scores.

## Assessment of SLO 2

Most answers received a score of 3

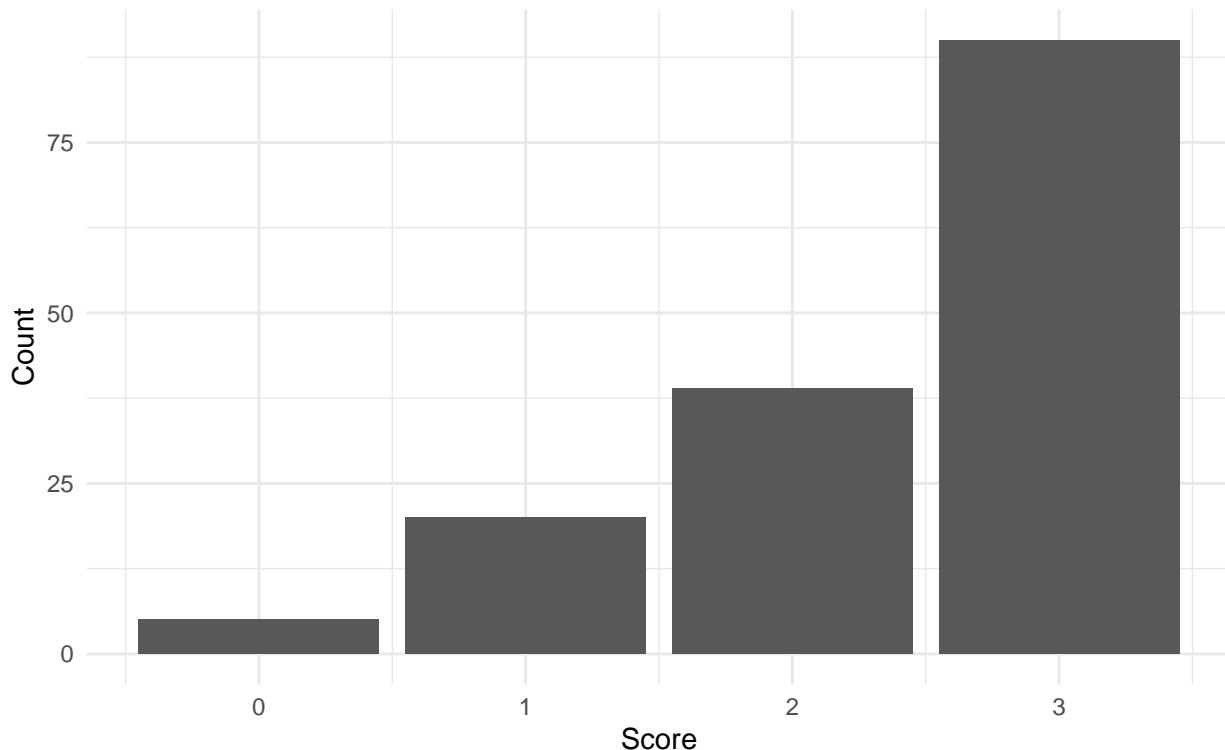


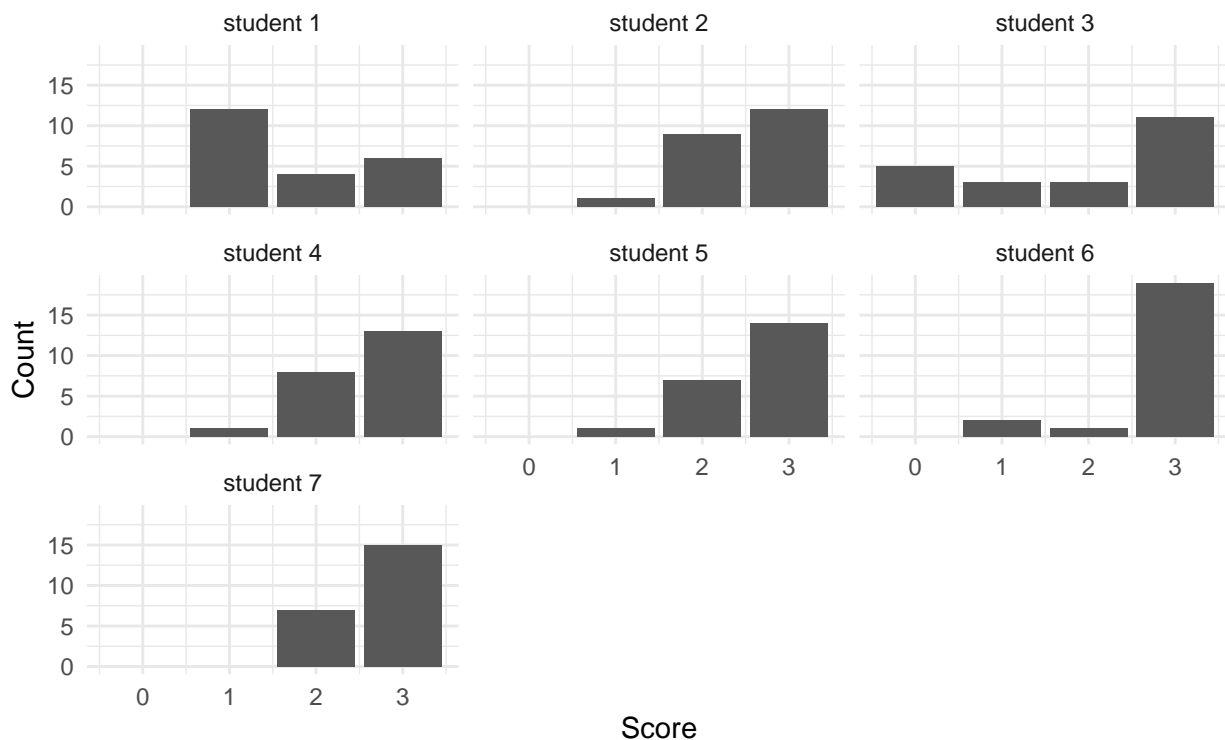
Table 1: Table of Scores on SLO 2

score	count
0	5
1	20
2	39
3	90

Now, we break it out by student:

## Assessment of SLO 2

### Substantial differences between students



We see that three of the students (2, 4, and 5) roughly follow the overall trend, while the other four students seem to be different. Students 6 and 7 both have a higher proportion of 2's and 3's overall, and Student 3 had all of the 0's<sup>1</sup>. Student 1 had most of the scores of 1. This plot paints a different picture than the first one. It seems that most students are getting the SLO, but Student 1 and perhaps Student 3 need help.

We also present the same data in table form.

Table 2: Table of Scores on SLO 2 by Student

student	zero	one	two	three
student 1	0	12	4	6
student 2	0	1	9	12
student 3	5	3	3	11
student 4	0	1	8	13

<sup>1</sup>Student 1 did not turn in any work for those 5 problems, despite being given unlimited time to finish. It is not clear whether the student was unable to do the problem at all, or whether there was a different reason the work was not submitted.

student	zero	one	two	three
student 5	0	1	7	14
student 6	0	2	1	19
student 7	0	0	7	15

Though it seems pretty clear that the distributions of the students are different, we also performed a  $\chi^2$  test of homogeneity with simulated  $p$ -values both with and without the 5 zero scores. In each case, we conclude ( $p < .0005$ ) that the distributions of the scores depend on the student.