

Fall 2007 LDC Exam Results –Statistics

This brief report describes how well fall 2007 BUS 302L students performed on their *first* take of the statistics exam. These results offer some insight into which of the top ten concepts junior-level business students find most difficult.

Roughly 1,007 students enrolled in BUS 302L during the fall 2007 semester. Table 1 contains the top ten concepts for statistics. Table 2 provides a breakdown of the LDC exam by topic number and level of question difficulty.

Table 1. Top Ten Concepts in Statistics

Topic Number	Statistics Concept
1	Calculate and interpret standard deviation, variance, mean, median, and mode. Summarize the data using appropriate graphical (includes histograms, bar charts, box plots) and numerical (includes standard deviation, variance, mean, median, and mode) methods.
2	Perform a one-population test of hypotheses, and make the correct decision and interpretation.
3	Calculate a confidence interval for mean and proportion, and interpret results.
4	Calculate a regression equation, make proper interpretation of coefficients, and graph it.
5	Understand the concept of expected value and know how to calculate it.
6	Decide what distribution (binomial, normal, t) to use given the situation.
7	Understand what a p value is.
8	Understand how variation creates uncertainty.
9	Understand the distinction between population and sample.
10	Understand what types of statistical analyses are appropriate for use on qualitative data (as compared to the types of analyses that are appropriate for use on quantitative data).

The third and fourth columns in Table 2 indicate the number of student responses and the percentage of responses that were correct. For example, row one shows that students answered 955 questions on topic 1 with a level one difficulty *and* that 53.3 percent of those answers were correct.¹

The level of question difficulty is determined by the systems and operations faculty who developed the exam questions. There seems to be consistency between what faculty and what students consider to be difficult. Table 2 shows a lower percentage of correct responses for the more difficult questions (with the exception of topics 9 and 10).

¹ Recall that each LDC exam has 16 questions and only 10 topics. Thus, it is possible for the number of student responses to be greater than the number of students who took an LDC exam.

Table 2. LDC Statistics Results by Topic and Question Difficulty

Topic Number	Question Difficulty	Number of Student Responses	Correct Answers (percent)
1	1	955	53.3
1	2	665	48.9
2	1	862	47.5
2	2	758	42.3
3	1	164	50.5
3	2	646	40.9
4	1	220	62.2
4	2	590	50.2
5	1	621	49.4
5	2	895	45.9
6	1	204	47.0
6	2	1,416	37.2
7	1	250	45.5
7	2	560	34.5
8	1	89	63.6
8	2	721	45.4
9	1	255	46.3
9	2	1,365	55.3
10	1	107	41.0
10	2	1,617	57.5

The LDC exam results are also displayed by topic only in Table 3. Overall student performance is fairly poor on the statistics exam. For example, the percentage of correct answers by topic range from a high of only 56.5 percent to a low of 37.9 percent.

Table 3 indicates that student performance is highest on topic 10 with 57 percent of the questions answered correctly. Students appear to have the greatest difficulty on topics 6 and 7 where they answered less than 40 percent of the questions correctly.

A p chart was used to investigate whether the percentage of correct answers differs significantly among the topics. The results are shown in Figure 1. The p chart reveals that 48.0 percent of all questions on the statistics exam are answered correctly. However, topics 6 and 7 are significantly below this overall percentage, while topics 4, 9, and 10 are significantly above it. Topics 1, 2, 3, 5, and 8 vary from the overall percentage but the differences are not statistically significant.

If the LDC exam questions are a fair indicator of student knowledge, then lower-division statistics instructors may need to devote more time to topics 6 and 7.

Table 3. LDC Statistics Results by Topic Only

Topic Number	Number of Student Responses	Correct Answers (percent)
1	1,620	51.5
2	1,620	45.1
3	810	42.9
4	810	53.5
5	1,516	47.4
6	1,620	38.5
7	810	37.9
8	810	47.4
9	1,620	53.9
10	1,724	56.5

Figure 1. P Chart of the Percentage of Correct Answers by Topic

