

DECISION BASED LEARNING: A PEDAGOGY TO HELP UNDERGRADUATE STUDENTS PICK THE RIGHT STATISTICAL TEST

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INTRODUCTION

Collegiate introductory statistics courses may teach many statistical hypothesis tests but may provide relatively little instruction about how to know when to use which test. Decision based learning (DBL) is a promising technique for helping students understand when it is appropriate to use which test. This study aims to raise awareness of DBL and to determine if a web-based, interactive DBL tool (<https://www.decisionbasedlearning.com/>) would help students master the skill of matching the right statistical test to a given situation.

THE EXPERIMENT

Two sections of an introductory statistics course were taught by the same teacher. One section was assigned to use [decisionbasedlearning.com](https://www.decisionbasedlearning.com/) to improve their ability to match a given scenario to the correct statistical test. These DBL exercises were used as unit reviews in preparation for the unit exam. The other section served as a control group and did not use DBL. The experiment was repeated the next semester, but with a different set of exam questions. The size of each class ranged between 23 and 45 students. The difference in percent of students answering a question correct in the DBL versus non-DBL class served as the main response measure. The difference in percentage answering correct was analyzed for 35 questions. Overall exam scores were also analyzed.

CONCLUSION

Students who used DBL performed better than those who did not on the 35 exam questions specifically designed to assess a student's ability to choose the appropriate test for the situation. On average, students that used DBL got these types of questions correct 4% more often than non DBL students (p -value = .007). The DBL students performed better on 70% of the questions.

As one might expect, comparison of overall test scores was more of a mixed bag. However, on the cumulative final examination, the DBL group performed slightly better than the non DBL group with marginal significance (p -value = .04).

This study illustrates how DBL can be useful in teaching students when a particular test is appropriate and when it is not. It is exciting to contemplate the many applications to which DBL can be applied across the statistics curriculum. Use of DBL in online classes is especially promising because online teachers are not able to informally teach the decision tree like instructors for face-to-face classes do.