Team Matt Amatics

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Do the Types of Formative Assignments Affect a Student’s End of Chapter Score?

The Question

For our analysis, we decided to look at the influence that different formative problems have on a student’s end of chapter score. End of chapter scores let us see the grade of a summative assignment so that we can compare it with formative assignments. Our analysis explains what type of formative questions do well in predicting a students end of chapter score. This in turn tells us what types of formative assignments are influential on a student’s learning while using this course.

The Data

There are 10 types of formative assignments called lrn\_types in responses.csv: association, choicematrix, clozeassociation, forumalV2, imageclozeassociation, mcq, plaintext, shorttext, sortlist, and NA. NA was changed to “other”, and will be referred to as such moving forward. The data was then aggregated to create a student’s average for each lrn\_type. Next, each student was paired with the average of their EOC (end of chapter) score from checkpoints\_eoc.csv. We now have a data frame with the average score a student did on each lrn\_type and their EOC score. It should be noted that our analysis does not evaluate by course book used or chapter.

Correlation and Linear Models

Correlation coefficients were examined between lrn\_types and EOC score. Three lrn\_types had a correlation coefficient above .8, these are: association, mcq, and other. The remaining lrn\_types do not present strong correlation coefficients. Linear models were then created to predict EOC score by each lrn\_type individually. Again, association, mcq, and other presented stronger R^2 then the remaining lrn\_types. Association had an R^2 of 0.7097, mcq had 0.838, and other had 0.759. It is important to note that their p-values were <2e-16.

Scatter Plots

After this, scatterplots were made to show the relationship between EOC score and lrn\_type. It is clear to see that lrn\_types: association, mcq, and other have a positive relationship with EOC score. A student who does well on association, mcq, and other also do well on EOC assignments. The scatterplots that show the remaining seven lrn\_types tell a different story. They show us that irrespective of how a student did on them, their EOC score was unchanged. These results may be affected by how partial credit is applied to the grade.

Results

After analyzing the data, we have determined that lrn\_types: association, mcq, and other are significant in predicting how a student will do on the end of chapter (EOC) assignments. This tells us, that students who engaged in those formative assignments did better on the end of chapter questions compared to their peers who didn’t. The remaining seven lrn\_types: choicematrix, clozeassociation, forumalV2, imageclozeassociation, plaintext, shorttext, and sortlist were not significant in predicting how a student did on the end of chapter assignments. This leads us to think that those seven types are not beneficial to the student’s learning.