Concept Models show the Impact of the COVID-19 Disruption on Students’ Cognitive Structures in a Statistics Course

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Students in a statistics course made concept models throughout the course. Previous studies suggest that making concept models is a useful way for instructors to assess learning. The growth and changes of these student-constructed models may serve as an indicator of how a student constructs and organizes their cognitive structure. But, little is known about how much impact the Covid-19 disruption has had on a student’s cognitive restructuring in STEM courses. Therefore, we ask the following research question: What factors best explain the changes in the student-made models about statistics as representations of their cognitive structure? To address this research question, we analyzed concept models from three assessment points and two quarters of the same course, one taught before the Covid-19 disruption and the other during the Covid-19 disruption, to estimate the impact that the distributions had on their cognitive structures. After converting the 180 student model into graphs, we calculated the number of concepts in each model to build a linear model to compare a quarter taught before and during the major disruptions. First, we created a box and whisker plot that shows model growth across two different quarters, pre and during, and then we created a model to explain how the disruption term influenced the rate of concepts being added to student models at three different assessment points of the course. Our preliminary results revealed that students in the emergency online environment added concepts to their models at a significantly slower rate. Future directions and limitations will be discussed. This work is important because it helps teachers and professors understand how college students are learning in different environments.