SP - (15806) - MODEL-BASED AND NARRATIVE ASSESSMENTS ELICIT DIFFERENT IDEAS ABOUT EVOLUTION BY NATURAL SELECTION

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Short Abstract
Narrative responses are commonly used in assessments, but models are increasingly being represented. Features of student-constructed models can provide insights into thinking and reasoning that are not captured in multiple choice or narrative responses. However, little is known about whether the two modes of response are equivalent in terms of eliciting students' ideas. In this study we explored the influence of response mode on the content of students' explanations about evolution by natural selection. We asked students in two sections of a large-enrolment university introductory biology course to respond to prompts about evolution by natural selection by constructing both a model and written narrative. We used qualitative content analysis to develop a rubric for analysing the content of student responses. Responses were binned into levels of scientific plausibility that reflect inclusion of key concepts, naïve ideas, and threshold concepts that have been reported in research on evolution learning. Using mixed ordinal logistic regressions and mixed logistic regressions we assessed the probability of the mode affecting the presence and plausibility of the concepts. We found that mode influenced the content of responses in various ways. Students' narratives were more likely to include some key concepts (Differential survival/Limited resources $p<0.001$) but were also more likely to contain naïve ideas ($p<0.001$). Students' models, however, were more likely to include the threshold concept of probability ($p<0.001$). Other key concepts, such as heritability, were elicited no more frequently in narratives or models. Our findings suggest that mode of response can bias interpretation of students' understanding of evolution by natural selection. Incorporating multiple modes of assessment has potential to generate a more holistic view of students' understanding and may promote greater transfer by requiring students to think and reason across contexts.