Supporting Conceptual Modeling: Bridging the Gap between Learner and System

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Abstract

This research focuses on how effective help can be provided in Interactive Learning Environments for modeling. This help should increase learners' understanding of the model formalisms and subsequently of the subject matter. To this end, DynaLearn is expanded with explanations which shed light on how its underlying reasoning engine functions. Firstly, it is investigated how learners process the model cognitively. Additionally, the different types of explanation that benefit DynaLearn are identified based on instructional design research. Modeling errors that are common in DynaLearn are also considered. Based on the insights that follow from these sections, the explanations are designed. The four strategies (‘what’, ‘why’, ‘why not’ and ‘how’-explanations) used to battle learners' misunderstanding of the reasoning engine are examined in terms of design choices and their implementation. The explanations are evaluated in three-fold; by testing the scope of the explanations, their technological effectiveness and their usability. The explanations help correct all identified modeling errors and offer a full coverage of all model configurations. Students are satisfied with the working of the display of the explanations, but request the content of the explanations to be extended to also cover instructions on how to navigate DynaLearn's interface and how to fix modeling inconsistencies. In future research, DynaLearn's explanations should be extended to further meet these students' wishes.