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Effect of inquiry-based computer simulation modeling on pre-service teachers' understanding of homeostasis and their perceptions of design features.

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Summary: This study investigated the effect of an inquiry-based computer simulation modeling (ICoSM) instructional approach on pre-service science teachers' understanding of homeostasis and its related concepts, and their perceived design features of the ICoSM and simulation that enhanced their conceptual understanding of these concepts. Fifty pre-service teachers participated in this study. A pre-posttest design was used to compare participants' understanding of homeostasis concepts before and after their interaction with the ICoSM. A perception survey was used to determine participants' perceived design features of the ICoSM and simulation that enhanced their conceptual understanding. Results show that ICoSM approach enhanced pre-service teachers' conceptual understanding of homeostasis and its related concepts. The ICoSM design features that enhanced their understanding of homeostasis were systematic lesson progression/cycle, context for knowledge generation, cause-and-effect investigations, and data gathering tools. The homeostasis simulation design features that enhanced their understanding included interactive and animated representations, data gathering tool, variable manipulation, and knowledge generation tool. These results have implications on science teaching and learning, computer simulation design, research, and teacher education.

Classification: M60 U70 D40

Keywords: inquiry-based learning; computer simulation; modeling; biology