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guide
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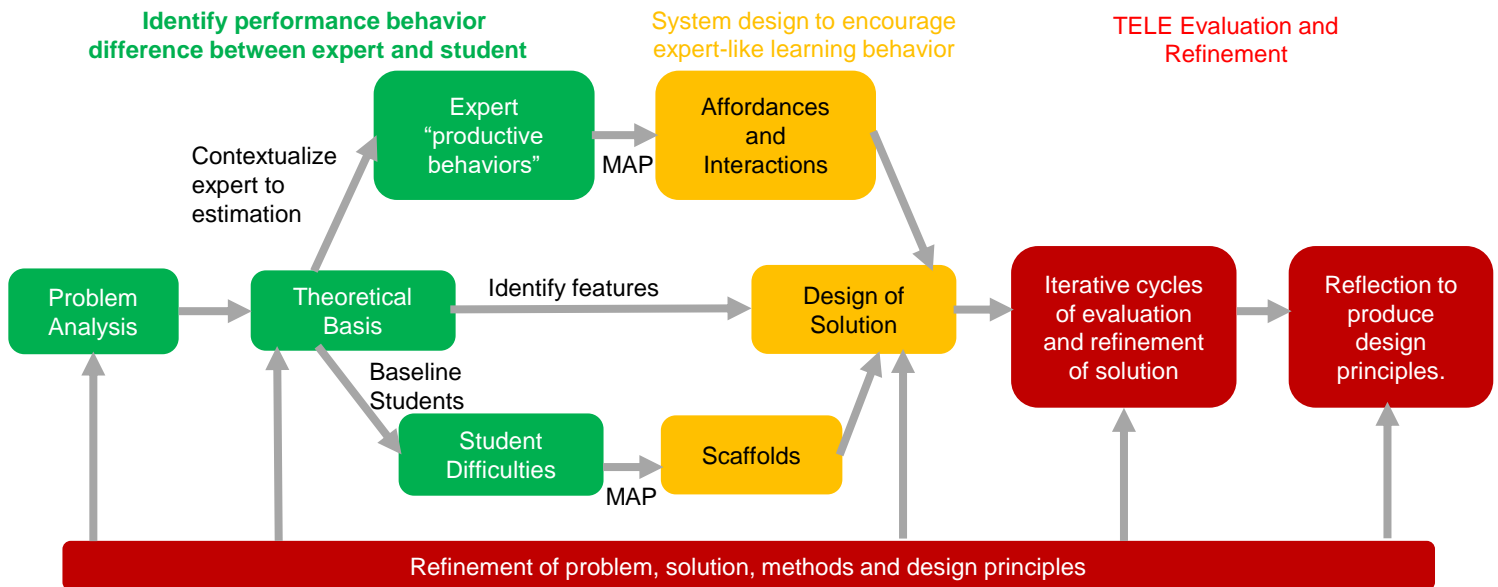
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A Technology-enhanced Learning Environment (TELE) for developing engineering estimation skills

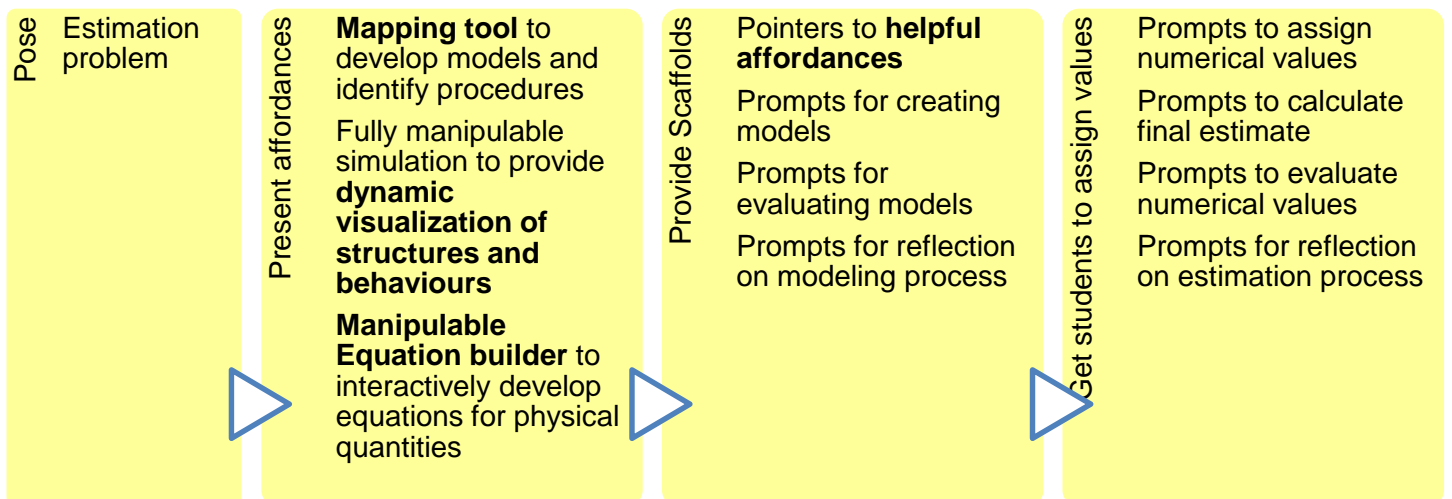
keywords Engineering estimation, design-based research, expert studies, technology-enhanced learning environments

How to teach engineering estimation?

Engineering and science presents ill-structured problems to its practitioners and students e.g.
Can a AA battery run a toy laptop for 8 hours?
Can a human heart run a wine opener?

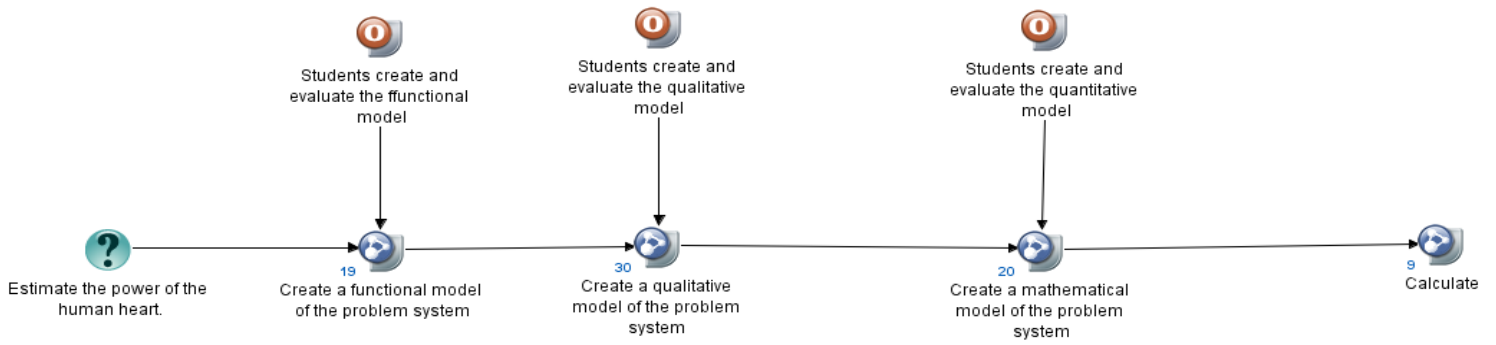


Diverse interactive features in a coordinated system enable learning of estimation

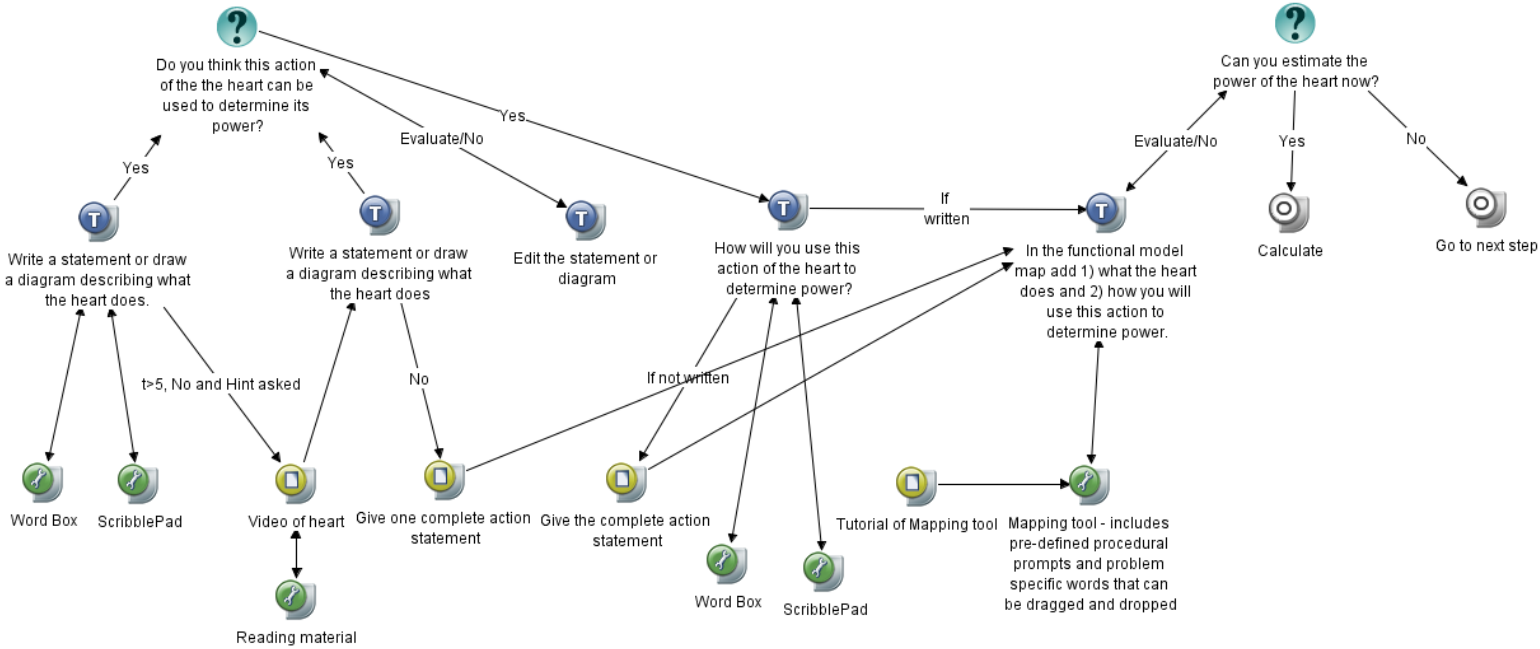


Learning Design of the TELE

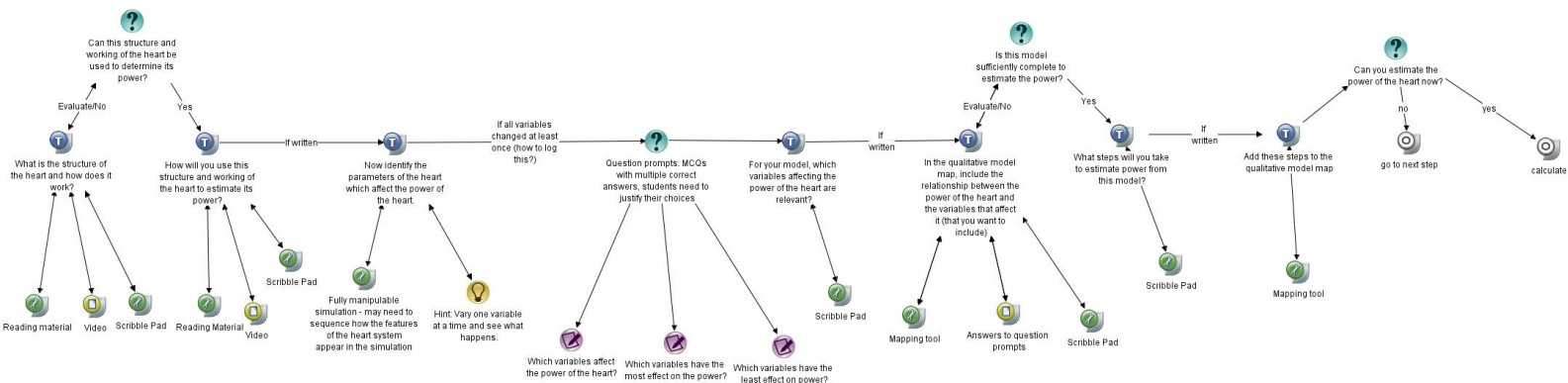
Overview of the learning design



Learning design of Task – “Create functional model”



Learning design of Task – “Create qualitative model”



Selected Publications:

1. Kothiyal, A., Murthy, S. & Chandrasekharan, S. (2016). “Hearts Pump and Hearts Beat”: Engineering Estimation as a form of model-based reasoning. In The 12th International Conference of the Learning Sciences ICLS 2016 (to appear), The International Society of the Learning Sciences
2. Kothiyal, A. & Murthy, S. (2015). “Exploring Student Difficulties in Divide and Conquer Skill with a Mapping Tool”, In The 23rd International Conference on Computers in Education: Workshop Proceedings (pp. 271-276). Asia-Pacific Society for Computers in Education
3. Kothiyal, A. (2015) Supporting Engineering Students' Estimation Skill using a Collaborative Digital Learning Environment. In The 11th International Conference on Computer Supported Collaborative Learning CSCL 2015, vol. 2, pp. 949-951, The International Society of the Learning Sciences
4. Kothiyal, A., Rajendran, B., & S. Murthy. (2015) Delayed Guidance: A teaching-learning strategy to develop ill-structured problem solving skills in engineering. In *Learning and Teaching in Computing and Engineering (LaTiCE), 2015 International Conference on.* IEEE.

