The Impact of Virtual Dissection on Engineering Student Learning and Self-Efficacy

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The Impact of Virtual Dissection on Engineering Student Learning and Self-Efficacy

Christine Toh, Connor Disco, & Dr. Scarlett Miller

Background and Motivation

Product dissection activities are widely practiced in engineering education and recent efforts have sought to develop and utilize virtual dissection tools, little data exists on how these tools impact the learning process. Therefore, this study investigates the impact of virtual dissection on student learning and self-efficacy to understand the effects of virtual dissection tools for enhancing engineering instruction.

Experimental Design and Methodology

20 first year engineering students were assessed for learning and self-efficacy before and after a dissection activity, consisting of 4 conditions.

Student Learning

A 2-way repeated measures MANOVA: F(4, 13) = 2.35, p > 0.11; Wilk’s Λ = 0.58.

Students were learning through dissection, but no significant difference was found between the physical and virtual dissection conditions.

Conclusion

Virtual dissection results in the same student learning as physical dissection, but increases in self-efficacy are reduced in students who perform virtual dissection. Future research should focus on the development of more interactive virtual dissection interfaces in order to refine and enhance virtual dissection environments in engineering education.

Student Self-Efficacy Gains

A 2-way repeated measures MANCOVA: F(10,5) = 5.91, p > 0.03; Wilk’s Λ = 0.08.

There was a significant difference in self-efficacy between the physical and virtual dissection conditions. (gender and semester standing as covariates)

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