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Pargas, Roy; Reba, Marilyn; Breazel, Ellen; Khan, Taufiqar; Viktorova, Irina; Desjardins, John

Using biomedical applications in touch and ink mobile apps to engage and retain STEM students in calculus.

Hammond, Tracy (ed.) et al., The impact of pen and touch technology on education. Cham: Springer (ISBN 978-3-319-15593-7/hbk; 978-3-319-15594-4/ebook). Human-Computer Interaction Series, 323-328 (2015).

Summary: With support from three Hewlett-Packard Awards and a 4-year NSF-CCLI Grant, the Department of Mathematical Sciences at Clemson partnered with Computer Science to develop and implement pen technology in Engineering Calculus I. Our goals from 2006 to 2011 included personalizing instruction in large active-learning classrooms, reducing the DFW rate through in-class active learning and the analysis of errors in inked submissions. Our current focus, via a 2011NSF-TUES grant, is to motivate interest in calculus by immersing students in bioengineering and biomedical applications, and then converting ideas from these experiences, again with the help of Computer Science, into interactive touch and ink “mobile apps” for both Apple iPad and Android tablets. Beginning in Fall 2011 and continuing into 2013, students with STEM majors can enroll in four (1 credit hour) creative inquiry modules on epidemiology, orthopedics, heat propagation in the human body, or radiology. These modules are taken in parallel with the freshman and sophomore calculus curriculum. Students create presentations on the content in these modules, which include a pedagogical component. We ask them how best to convey the information within a touch and ink environment, so as to engage and clearly convey the connection with calculus. We will present brief descriptions of each module’s content, student responses and performance, and how we are developing ink and touch mobile apps with the help of students both in mathematics and computer science.

Classification: U75 M65

Keywords: interactive mobile apps; non-mathematics majors; active learning; calculus; tablet PCs
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