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Improving student learning in calculus through applications.

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Summary: Nationally only 40% of the incoming freshmen Science, Technology, Engineering and Mathematics (STEM) majors are successful in earning a STEM degree. The University of Central Florida (UCF) EXCEL programme is a National Science Foundation funded STEM Talent Expansion Programme whose goal is to increase the number of UCF STEM graduates. One of the key requirements for STEM majors is a strong foundation in Calculus. To improve student learning in calculus, the EXCEL programme developed two special courses at the freshman level called Applications of Calculus I (Apps I) and Applications of Calculus II (Apps II). Apps I and II are one-credit classes that are co-requisites for Calculus I and II. These classes are teams taught by science and engineering professors whose goal is to demonstrate to students where the calculus topics they are learning appear in upper level science and engineering classes as well as how faculty use calculus in their STEM research programmes. This article outlines the process used in producing the educational materials for the Apps I and II courses, and it also discusses the assessment results pertaining to this specific EXCEL activity. Pre- and post-tests conducted with experimental and control groups indicate significant improvement in student learning in Calculus II as a direct result of the application courses.

Classification: I15 D45 C75 C95
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