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Beyond plug and chug: an analysis of Calculus I homework.

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Summary: We investigate the nature of Calculus I homework at five PhD-granting universities identified as having a relatively successful Calculus I program and compare features of homework at these universities to comparable universities that were not selected as having a successful program. Mixed method analyses point to three aspects of homework that arose as important: structure, content, and feedback. Selected universities employed more varied homework structure, included more content emphasizing skills as well as solving novel problems, and provided higher amounts of and frequency of feedback to students. Students felt positively towards conceptually driven homework, but their feelings were mixed or negative regarding the logistical aspects of online and group homework assignments. We draw on *P. Herbst* and *D. Chazan's* [ZDM, Int. J. Math. Educ. 44, No. 5, 601–612 (2012; ME 2012e.00331)] adaptation of the instructional triangle and *G. Brousseau's* [Theory of didactical situations in mathematics: didactique des mathématiques, 1970–1990. Dordrecht: Kluwer (1997; ME 1998a.00152)] notion of the didactical contract to make sense of how homework is understood as an instructional resource by instructors and by students.

Classification: D45 D65 I15 C25

Keywords: post-secondary; calculus; homework; student reports; didactical contract; mixed methods
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