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Faculty Perceptions of A Calculus Reform Experiment at A Research University

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Faculty Perceptions of A Calculus Reform Experiment at A Research University: A Historical Qualitative Analysis.

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From 1999 through 2004, the mathematics department at Research University experimented with using a reform text, Hughes-Hallett et al.'s Calculus, to teach the undergraduate calculus sequence. A historical qualitative analysis was undertaken involving three linked case studies to determine, from the perspective of the professors in the classroom, the success of the experiment in reform. Three professors, one a self-identified reform advocate, one an arch-traditionalist who vehemently opposed reform, and one who professed himself to be in between, gave insight into the results of the switch and the departmental atmosphere that led to the return in 2004 to a more traditional calculus instruction. The results of these case studies include a picture of a department in transition, trying to better serve its students but having difficulty adjusting to the changes in instruction.

adjusting to the changes in instruction coincident with reform. Each of the participants admitted using the textbook as little more than a delivery vehicle for homework assignments; none of the participants changed their lecture style or teaching methods to respond to the demands of the reform movement. Calculus reform's founders and those who have inherited the movement and brought it into the 21st century advocated technological exploration, real world applications, group projects, and conceptual understanding. Each one of the participants admitted to applying some of these in their teaching style, but each in turn rejected other tenets of the reform movement as unusable, or unwieldy. As the department did not change any other aspect of calculus instruction at the university other than the text used, this experiment could have been dismissed as naïve, insincere, or half-hearted. But in fact, the department may have benefited indirectly from the move by even the more traditional texts they embraced post-reform, as all participants acknowledged that even traditional texts now contain elements of reform themselves. However, the case studies analyzed in this research would indicate that any reform effort conducted in a research university should expect to meet some resistance of the type exposed at this university. Anyone attempting to reform the teaching of calculus at their college can benefit from reading the

perceptions of these professors and addressing them, either with seminars and research that can convince faculty that a change is needed, or at the very least by adjusting curricular structure and pacing so the reforms have a chance to succeed. Also, educational researchers could benefit greatly from a nationwide qualitative/quantitative research focus on the acceptance of calculus reform at mainstream colleges and universities that do not have a vested interest in proving the reforms a success to maintain funding levels. Finally, those education researchers interested in the perception of college math professors at research institutions could further analyze how those professors' perceptions could impede or enhance efforts at reform, and how those perceptions differ from those predominant at teaching-focused institutions.

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Leslie Aspinwall, Professor Directing Dissertation; Marcy Driscoll, Outside Committee Member; Ken Shaw, Committee Member; Elizabeth Jakubowski, Committee Member.

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