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Comparing the Use of Daily Writing Tasks with Interviews and Course Exams as Assessments of Students' Understanding of the Derivative. Preliminary report.

This study compares the use of open-ended writing tasks with interviews and traditional calculus assessments to assess students' understanding of the concept of the derivative. I designed this study to test my hypotheses: Students can be taught to write what they would otherwise say during an interview, and daily, focused writing assignments can provide a continuous source of data that are qualitatively different from that obtained from written, in-class tests. The data for this study consists of 14 students' responses to (a) two interviews, (b) writing tasks, and (c) in-class exams. An example of a writing task is, "What does the derivative have to do with limits and vice versa?" The theoretical framework for the data analysis depicts the derivative as a ratio, as a limit, and as a function, each of which may be referenced as a recognition, as a dynamic process, and as a static object. Also, each reference can be coded in any of four representations: numeric, graphical, symbolic, and concrete. The framework also allows for the coding of theorems and other results regarding differentiable functions and includes methods for coding the quality of students' discussions of theorems and their use of examples. Data analysis is both qualitative and quantitative. (Received September 14, 2000)