Tracking and Influencing Concepts of Proof

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Anecdotal remarks and somewhat quantifiable data lead us to believe there are moments in a student's Mathematical development which can lead to or indicate a change in the perception of, or comfort for, proofs. We attempt to identify and record these moments in the contrasting situations of a first-semester calculus course and a third-year course in Discrete Mathematics. In this preliminary research report, we attempt to track changes in understandings of, roles of, reasons for, and comfort levels with proof via video-taped interviews which are ethnographic in spirit – interviews unfold with minor direction on our part except when comments which we think are interesting are encountered. The interviews begin by asking the students to comment on strategically chosen results which are proved in class or solved in a homework assignment; for example, the "Product Rule" in the calculus course and the "cocktail party problem" in the Discrete Math class. Briefly, the strategy behind choosing the proofs for interview fodder is couched in our idea of what the proofs or problems represent: ways to verify a claim which is "known" to be true – all of the students in the calculus class are familiar with the "Product Rule" – or as a way to deal with a large number of cases at once – an exhaustive case-by-case consideration of the cocktail party problem would require examining $2^{15} = 32,768$ circumstances.

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