Case Study #1

Jonathan Fredericks is a senior member of the Math faculty at Central Colorado Community College, where for many years he has taught introductory calculus. The class is large because it is a prerequisite for several programs in the sciences. Unfortunately, this course has a longstanding problem with student retention: 45% of students fail or drop the course each semester, and many actually change majors because of the difficulty they experienced.

Dr. Fredericks takes great pride in preparing lectures that clearly explain key concepts and the underlying rationale of equations, which he writes on the board as he describes them. Students take notes and try to capture the equations and his comments while Dr. Fredericks speaks. Periodically he asks the students if they are following along, and he regularly asks if they have any questions. Students seldom ask many questions in class, which is unfortunate because their test results reveal they often do not understand principles well enough to solve similar equations on their own.

Students are given homework assignments, designed to compliment and reinforce class demonstrations. These assignments are turned in at the beginning of each class, a process that takes several minutes and is inevitably the source of questions about grading policy and excuses for late work. Dr. Fredericks wishes there were a more efficient way of distributing and collecting the homework assignments.

Dr. Fredericks likes students, but has for many years felt a great deal of frustration by their rates of failure in his courses. He enjoys the topic he teaches, and takes pleasure in what he describes as the beauty and elegance of mathematical principles. Occasionally he encounters a student who “gets it,” but more often he finds that his students just want to memorize the steps required to pass the exams. To encourage enthusiasm for the topic, he invites students to come talk to him during office hours (Monday and Friday from 10:00 to 11:00 AM), and he makes a point of staying a few minutes after class to answer questions.

Student evaluations have included comments like, “Why do I need to understand the ‘slope of a tangent line’ when my goal is to work in forestry?” Other comments include, “I have trouble staying awake in class,” and “I work each morning until noon and commute to campus for afternoon/evening classes. Isn’t there some way I could talk to the professor outside of office hours?” Although Dr. Fredericks is nearing retirement, he nevertheless remains committed to making the course the best it can be and to helping students to succeed.