

1116-97-1212 **J. Alfredo Jimenez*** (jaj4@psu.edu), Penn State Hazleton, 76 University Drive, Hazleton, PA 18202. *Integrating Calculus I for Deeper Conceptual Understanding*. Preliminary report.

Two particular new approaches that have been rather successful in my calculus I class: (1) Deeper conceptual understanding. (2) Integration of knowledge. For years I struggled with the problem that the definite integral, The Fundamental Theorem of Calculus, and Applications come late into the semester and students do not have enough time to develop a deep conceptual understanding of these topics. The solution, as often happens, is quite simple: start teaching these concepts early on. This has allowed me to place greater emphasis on the conceptual understanding of the definite integral. In addition, I have seen two positive outcomes: students who have taken calculus in high school are quickly introduced to new concepts and ideas. Students who have not taken calculus, this approach is more challenging, but those who are committed, they do as well as those who have taken calculus.

As a byproduct, I have now given the same treatment to the derivative. While introducing limits and continuity as complementary concepts to the two central concepts of calculus. The result is that I now teach these four concepts in an integrated fashion. The class then turns into an exploration of how these concepts can be applied in different context. (Received September 17, 2015)