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In a paper in the College Mathematics Journal, Czarnocha, Dubinsky, Loch, Prabhu and Vidakovic discuss the re-discovery of a rather unexpected intuition, pertaining to the area under a curve using the method of Riemann sums, demonstrated by some students of calculus. In addition to the standard idea, held by some students, of approximating the area by sums of rectangles inscribed under the given curve, other students in the experimental group saw the area as a sum of line-segments from the abscissa to the curve. A historical study of the concept of the area under a curve reveals that the image held by students corresponds in its general outline to the viewpoint presented by Archimedes in the Method, Cavalieri in the Geometria Indivisibilibus and John Wallis in Arithmetica Infinitorum. We will compare the standard Riemann approach to the Wallis approach for the problem of finding the area under a curve. We will then introduce a technique modified from the Cavalieri ratio and Wallis' techniques to illustrate the mathematical techniques and their visual representations displayed by our students. Finally we will present an instructional sequence which integrates both, Riemann with Cavalieri-Wallis approaches to the problem of finding the area under some irregular curves. (Received September 15, 2000)