RENSSELAER'S STUDIO PEDAGOGY

The defining characteristics of studio classes are an integrated lecture-laboratory format, a reduced amount of time allotted to lecture; a technology-enhanced learning environment, collaborative group work and a high level of faculty-student interaction. The studio environment historically has employed activities, computer tools, multimedia materials and expensive instrumentation that allow students to actively participate in their own learning and to construct scientific knowledge. A high priority is placed on allowing students to learn directly from their interactions with the physical world through hands-on activities. At the time of its initial incorporation in physics courses at Rensselaer in 1994, this approach had several advantages over the traditional lecture-recitation-laboratory method:

- ***Learn and Apply:*** Studio eliminated the time separation between the students' hearing the information and applying it in laboratory. The original Studio concept allowed for approximately one hour of lecture and homework discussion, which was immediately followed by an activity where students solved paper-and-pencil problems, investigated computer simulations, or conducted hands-on experiments.

- ***Access to Professors:*** The entire class was taught and supervised by a Ph.D. faculty member. Previously, the professor-in-charge had contact with the students only through the lecture portion in which the entire enrollment met in a large lecture hall. Recitation (discussion) and laboratory classes, where student-instructor interaction was more easily fostered, were taught by teaching assistants (TA's); some of whom had a poor grasp of English, thus making them less approachable. Studio offered students a far greater opportunity to interact one-on-one with the professor.

- ***Instrumentation Potential:*** User-friendly, computer-controlled instrumentation and data analysis techniques have revolutionized the way measurements are made. Studio instrumentation allowed nearly instantaneous comparison between theoretical predictions, simulations, and actual experimental results.[i]

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[i]. Cummings, K. and T. French. 200I. Development of a Problem Solving Assessment Tool for Introductory Physics Students, Proceedings of the National Physics Education Research Conference, (200I).