The poster demonstration will include a sample of the online active learning course exercises that are used with the collaborative digital imaging workstations, views of the student digital imaging stations in biology courses and professional development workshops, selection of student projects using digital imaging, and results of professional development evaluation and assessment of student success.

The Biology Department at Suffolk County Community College (SCCC), Ammerman Campus has made a commitment to incorporate learner-centered methodology in morphology based biology courses by expanding the use of computer technology in the classroom and incorporating collaborative learning exercises with a focus on active learning strategies to improve student learning, performance on science examinations and course completion rates.

Many biology courses have a significant morphology-based component involving microscopy. Individual microscopic study isolates students, promotes feelings of competitiveness, and discourages collaborative learning. Using funds from a two-year National Science Foundation, Course, Curriculum & Laboratory Improvement-Adaptation & Implementation (NSF- CCLI A&I) grant the Biology Department at SCCC has incorporated digital imaging equipment and group morphology exercises to allow students to examine, document, quantify, and analyze structures in an investigative-based context. By using digital imaging equipment instead of individual microscopes, the revised lab exercises encourage positive interdependence in morphology studies. Using classification of histology rather than memorization provides an effective active learning strategy.

When students are using individual microscopes instructors have reported difficulty in trying to reach every student to answer questions or to verify that structures have been identified correctly. Class viewing of histology imaging received positive faculty and student comments, however, use of a single, computer set-up within a classroom exceeds the group size recommended for effective collaborative learning, and promotes a “spectator syndrome” in the classroom. To increase collaborative learning, we used imaging workstations where small groups (3-5) of students work together to view microscopic images on a monitor. When students are isolated at individual microscope stations they have limited peer input to determine if they are viewing the correct structure. By working in small groups, collaborative learning of morphology is enhanced. Instead of the inaccurate student drawings frequently produced in morphology-based exercises, the digital imaging workstation captures and prints student-generated microscope images for labeling, an effective learning technique. By using a computer with Internet access in the workstation, images are posted to a course Web site for future study.

In cooperative learning, students are encouraged to work together whenever possible outside of class. As with most commuter colleges, students at SCCC have difficulty collaborating with classmates outside of class. By using course websites this barrier to collaborative learning is lifted, and serves as an effective way to use distance learning in a traditional course. Recent studies found that online morphology has been an effective learning strategy and students who received
online histology instruction significantly out-performed their peers lacking this form of instruction.

Digital imaging equipment alone will not solve the problem. Professional development in using digital imaging equipment and incorporating collaborative learning exercises is an essential component of this project. After meeting with the biology faculty and conducting a baseline evaluation, twenty-two full-time and part-time faculty members attended a minimum of 15 hours of training in writing collaborative learning exercises, the educational use of digital imaging in science labs, and strategies for designing and implementing course web pages to provide a support system within the department. Digital imaging is now being incorporated into eight biology courses at SCCC.

To determine if the course web site and collaborative digital imaging exercises used in biology classes provide an environment for active learning enabling students to construct the criteria to classify histology, and enhancing student understanding of histology a combination of qualitative and quantitative analysis methods were used. To assess the higher-level skills and other effects often affected by technology, the evaluation included students' performances of complex tasks requiring students to demonstrate knowledge, apply skills, and illustrate their thinking processes and provide a forum for reflection and self-evaluation. In addition to student success on standardized exams, student opinions were collected to determine patterns in attitudes towards collaborative imaging and active learning. Preliminary results in Anatomy and Physiology and Embryology courses indicate that digital imaging is an effective method to teach morphology.