Collaborative Learning with Technology for Entry-Level Mathematics

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Grant Number: DUE–9452421

With the help of its ILI award, Carthage College has created a collaborative learning technology classroom and adjoining laboratory, both furnished with a network of Power Macintosh computers. The physical layout of the classroom and the class activities have both been planned to foster particular pedagogical principles and goals for the entry-level college population.

The faculty of the Carthage Department of Mathematics has been working for some time to articulate pedagogical principles for its two entry-level populations, the general education clientele and the calculus population. As principles and goals have emerged from this work, it is clear that the two groups have far more in common than not. Thus, the PI of this project became determined to view the entry-level population as continua of students, of abilities and of needs. In fact, part of the project would be to foster relationships not only between the students of each class but also between the two groups of students.

Carthage was in a good position for this project because of the development of its Applied Mathematics course, based on the COMAP text For All Practical Purposes, and taught as the "standard" general education clientele for those students not needing the technical skills of trigonometry and analysis and not placing into calculus. With this course well in place (each fall there are three sections each of Applied Mathematics and Calculus I), the department was in a position to take advantage of the strengths and positive characteristics of the students enrolling in it.

The classroom furnished by the project is designed so that: 1) when the attention of the students is on the material being presented at the board or projected on the front screen, no computers or other equipment come between the student and the material/instructor; 2) when the class works at the computers, it does so collaboratively in groups of three; and 3) the physical movement between all-class and small-group work is simple and efficient.

The laboratory in which students work on projects is designed, by the shape and the layout of the computer stations to facilitate either individual or group work.

Through this project, all classes in Applied Mathematics, Calculus I and Calculus II now:

• integrate presentation of material and collaborative student work, both with and without technology;

• use real-world problems and data throughout;

• investigate open-ended problems in which decisions are made about, and on the basis of, mathematical results;

• incorporate written projects which present the results of computer-based solutions;

• become aware of each other’s subject matter and work.