Project Vision: An Integrated Approach To Information Technology Education

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Abstract

This paper describes a computer science/information sciences and technology curriculum. Specifically, Project Vision focuses on active, cooperative, student-centered learning that is supported by technology. The Project Vision curriculum has included: an opportunity for students to lease a notebook computer that is pre-loaded with a "standard image", i.e., software that is needed for most course work in the curriculum; supplemental instruction, i.e., seeking to increase retention by pro-actively creating a learning community atmosphere; instruction and practice in team based learning and problem solving; and integration with selected general education/liberal arts courses.

Keywords: Pedagogy, IS curriculum, active learning, cooperative learning, team-based learning, student-centered learning

1. INTRODUCTION

In the fall of 1997 the computer science department at Penn State York embarked on a new adventure—Project Vision (Penn State York Project Vision 1999). Project Vision (PV) is the 1995 brainchild of the Penn State Commonwealth College Royer Center for learning and Academic Technologies (Jack P. Royer Center 1999). The Commonwealth College, which serves a large population of location-bound undergraduate students, instituted these changes in response to the communities' demand for graduates who can work in teams, communicate effectively, solve open-ending problems and think critically (Deden 1998). Project Vision has now become the model at Penn State for new majors in business, health and human services and information sciences and technology (IST).

In terms of learning, Project Vision marks a fundamental change in classroom management. It transforms the nature of teaching and learning by leading and supporting a shift from heavy reliance on lecture-based instruction to a rich learning environment characterized by active, cooperative, student-centered learning (Deden 1998).

In terms of academic technologies, computers and computing technology are not only a topic of study in the IST/computer science programs at Penn State York, but also are a means of learning. A considerable amount of IST/computer science course material and communication among students and faculty is developed and exchanged through the intensive use of computers. The goal has not been to develop on-line courses. Rather, students experience "any time, any place" education (asynchronous or real-time) by participating in student cooperative learning groups at any time and any location that has an Ethernet (on campus) or phone connection.

2. CAMPUS DEMOGRAPHICS

Penn State York is part of the Penn State Commonwealth College. It is a commuter campus and has the largest enrollment in the Commonwealth College (Gogniat 1999). The campus offers an associate degree in IST and an associate degree in computer science in addition to offering the lower-division course work for baccalaureate degrees in IST and computer science. The department supports six full-time faculty and several part-time faculty (who teach some of the service courses). There are approximately 125 IST and computer science majors (associate + baccalaureate) in various stages of degree completion. In the past, 25-30 new full-time associate degree majors have been admitted each year. In the fall 1999, 50 freshmen associate degree IST majors (2IST) were admitted. Because of increased demand for the degree, 25

freshmen 2IST majors were admitted in spring 2000. Class size for IST and computer science is relatively small (25-30). A handful of general education courses are in the 50-100-student range. The campus has a mix of full-time/part-time students (46%/54%) and traditional-age/adult (age 24 or older) students (49%/51%) (Gogniat 1999).

3. DESCRIPTION OF THE PROGRAM

Penn State York has been successfully offering an associate degree in computer science (2CPSC) for over twenty-five years. The degree has routinely been modified to meet the needs of the local community and has articulated well into upper division programs leading to a baccalaureate degree at Penn State's upper division locations. Associate degree graduates typically obtain employment in applications programming, network administration, systems analysis, technical support or database support. Most graduates continue their education (normally paid by their employers) to the baccalaureate degree level.

Beginning fall semester 1999, 2CPSC began to be phased out and replaced by an associate degree in information sciences and technology (2IST). The 2IST degree smoothly articulates into a baccalaureate degree in information sciences and technology (4IST). The baccalaureate degree is offered at selected Commonwealth College campuses in addition to Penn State's main campus. A team of professionals from Penn State, business and industry has developed the IST associate and baccalaureate degrees. (IST Corporate Sponsors 1999). The 2IST program very closely resembles the basic structure and philosophy of 2CPSC/Project Vision at Penn State York (IST Associate Degrees 1999; IST Undergraduate Courses 1999).

4. INTERESTING ASPECTS OF THE PROGRAM

Unique to the 2CPSC and 2IST programs at Penn State York (through our Project Vision initiative) has been an opportunity for 2CPSC and 2IST majors to lease (dollar buyout leasing) an IBM ThinkPad® notebook computer. Working with IBM, the Commonwealth College has been able to offer affordable leasing programs. Our students have been strongly encouraged to lease a notebook computer; some students have been able to use their financial aid toward lease payments.

With the notebook computer, students can connect to the Penn State backbone on campus from the Vision Studio (a lounge area with 25 Ethernet connections) and Technology Classroom (50 Ethernet connections) and can dial in to the campus modem bank from anywhere there is a phone connection. Our technicians pre-load the system with a standard set of applications that are used in the 2CPSC and 2IST programs. As part of the lease agreement, our technicians provide technical support for the original hardware and software as needed.

We distribute notebook computers to students during a special orientation session a week prior to the start of fall semester classes. Students use their notebook computers during lecture class periods for electronic information access (as part of classroom instruction), for planned cooperative hands-on activities, and to facilitate labs "on the fly." Students, who do not have a notebook computer, watch, listen to and take notes form the instructor's demonstrations during lecture periods.

Fall semester of 1999 marked the third iteration of notebook computer leasing to our Project Vision student cohort. At least fifty percent of the PV student cohorts have taken advantage of the leasing opportunity. Our assessments, taken from students who have leased a notebook computer for their first two semesters, show that 61% of the students believe they have greatly benefited from leasing the notebook computer (Figure 1). Sixty-one percent of the students would definitely recommend that future Project Vision students take advantage of the leasing opportunity (Figure 2).
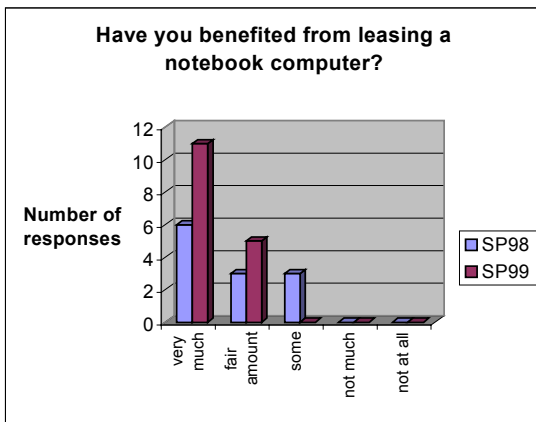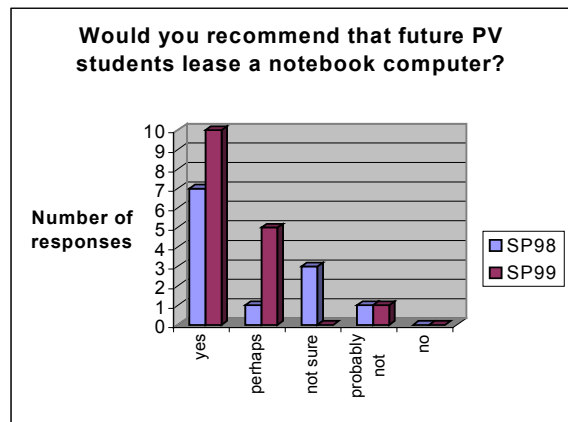

Figure 1

Figure 2

A second unique aspect of our Project Vision program is the use of student supplemental instruction leaders. In two-year colleges, up to half of the entering freshmen class will drop out by the end of the first year (Gardner 1997). Supplemental instruction (SI), funded through a Perkins Grant, is a pro-active approach to increasing retention by creating a learning community atmosphere. Second year students are employed in IST and computer science core courses as study group leaders, peer tutors, and role models for first year students.

SI leaders are responsible for attending the scheduled core class, taking notes and assisting instructors with activities during class. In addition, SI leaders are required to hold weekly study group sessions and may tutor individual students as needed. In spring 1998 and spring 1999 freshmen students, who were eligible to participate in SI for one year, were surveyed to assess the effectiveness of SI. Thirty-five percent of the students polled in 2IST and 2CPSC core courses regularly attended SI (Figure 3); 52% believed that SI had significantly contributed to their understanding of course material (Figure 4).
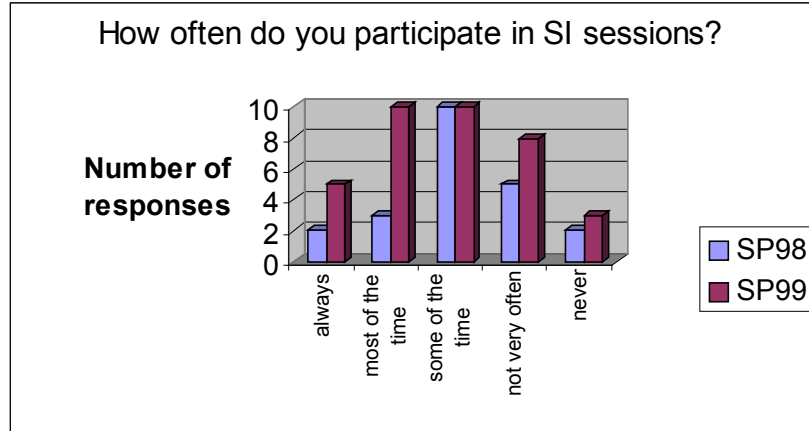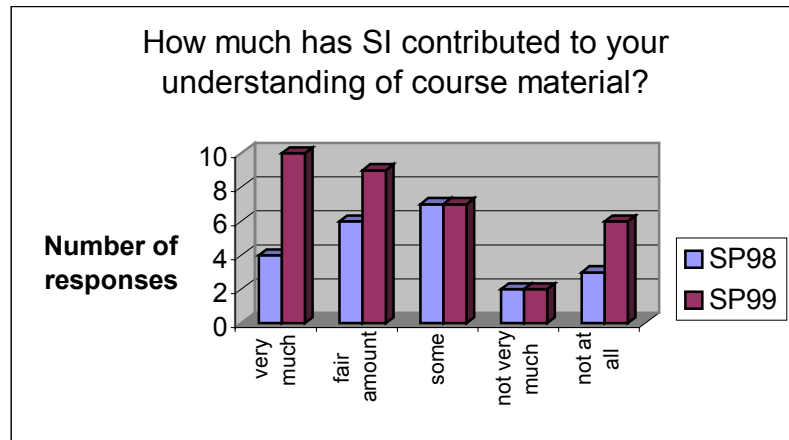

Figure 3

Figure 4

The faculty selects SI leaders. Ideal SI leaders are patient, friendly, self-motivated, able to motivate others, team spirited, well rounded and involved in campus activities. SI leaders must have earned above average grades in IST and/or computer science course work and must appreciate the value and understand the applicability of the liberal arts courses required for completion of the degree.

In their first semester all Project Vision students take a first year seminar course. As a part of the first year seminar, students receive instruction in cooperative/team based learning techniques following the Johnson and Johnson model (Johnson 1991). At the end of the first semester, students practice cooperative learning techniques by participating in a team project. Beginning with the second semester, students are required to participate in team projects in all PV courses.

Students were surveyed at the end of their second semester (spring 1998 and spring 1999) to determine the effect team based learning had on their mastery of course material and to self-assess their team skills. Eighty-four percent of the students believed that team based learning had a positive effect on mastering the material for the course (Figure 5). Eighty-three percent of the students thought that they possessed above average team skills at the end of the semester (Figure 6); at the beginning of the semester this figure was 59% (Figure 7).
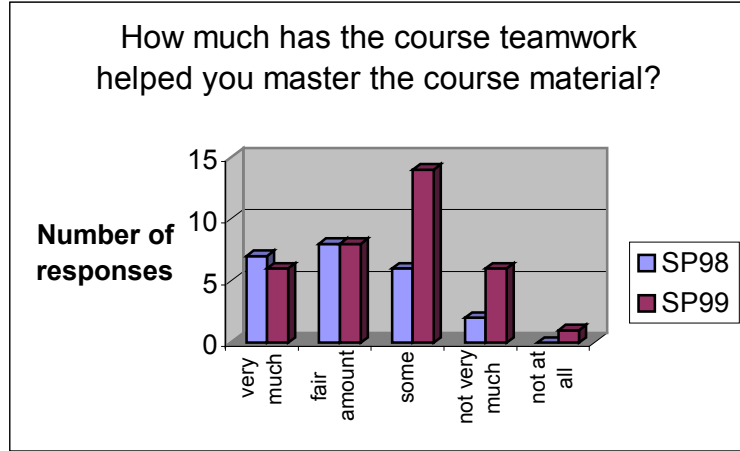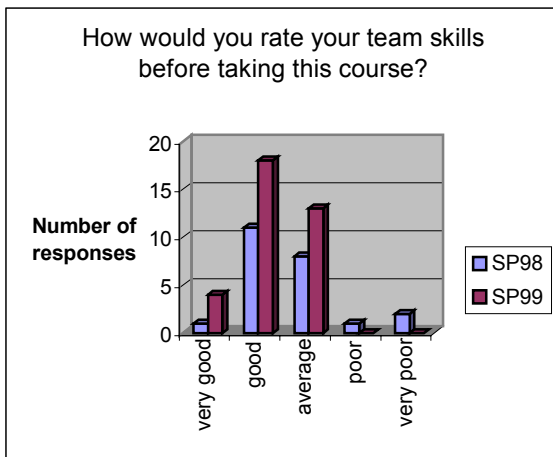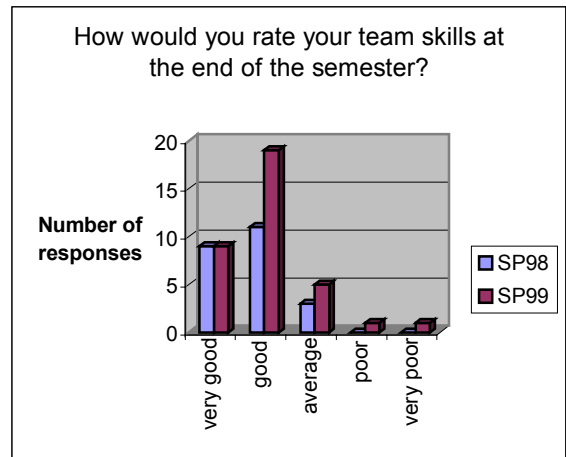

Figure 5

Figure 6

Figure 7

5. FACULTY AND CAMPUS COMMITMENT

In spring 1996, two of the Penn State York computer science faculty were awarded Project Empower grants (Project Empower 1999).   Project Empower is a competitive Commonwealth College program that awards faculty members released time, Instructional Development Specialist (IDS) support, and the use of a notebook computer to facilitate technological and pedagogical innovation in one segment of a course. Project Vision builds on Empowered courses to engage faculty in full-course development and delivery (Deden 1998).

In subsequent iterations of Empower, additional computer science and a few general education (arts, humanities, English and speech communications) faculty were awarded Empower grants. By spring 2000, all 2CPSC courses, all 2IST courses, one section of The Art of the Cinema (arts), one section of Iberian Civilization (humanities), and one section of Effective Speech were taught in Vision mode and were offered exclusively to 2CPSC/2IST students. In addition, one 2IST course was co-taught by IST and arts faculty. There are plans for one section of Freshmen Composition to be taught in Vision mode beginning in spring 2001.

Campus administrative commitment to Empower/Vision has included providing one course released time for each Empowered faculty member, providing each full-time IST/computer science faculty member with an IBM ThinkPad®, guaranteeing a class size of no more than twenty-five students, hiring an IDS, hiring a PV coordinator, setting up and scheduling Empower/Vision classes in the Technology Classroom, providing a technology resource room where faculty can collaborate, experiment with new technologies and prepare course materials, and providing a Vision Studio for student use.

6. CONCLUSION

At Penn State York, Project Vision encompasses learning and academic technologies. It embraces active, cooperative, student-centered pedagogy and fosters a learning community atmosphere within our 2CPSC and 2IST cohorts. The learning community atmosphere is supported by academic technologies. As a result of combining learning with academic technologies, Project Vision seeks to concentrate on the "whole student." Graduates not only are technically prepared to enter the work force, but also they have learned how to communicate effectively (orally, in writing and electronically) and to work productively in teams.

7. REFERENCES

Deden, Ann. Jan 1998. "Computers and Systemic Change in Higher Education." *Communications of the ACM*, Vol. 41, No. 1, pp. 58-63.

Gardner, John N. and Jewler, A. Jerome. 1997. *Your College Experience, 3rd Edition*, Wadsworth.

Gogniat, Don, 7 Dec 1999, "Enrollment Highlights Fall Semester, 1999." Campus memo.

11 Aug 1999. "IST Associate Degrees: Description." http://www.ist.psu.edu/04-Curriculum/Programs/01-Associate_Degrees/Index.html

11 Aug 1999. "IST Corporate Sponsors: Industry Partners in the Development of IST." http://www.ist.psu.edu/06-Partnerships/01-Industry/02-Corporate_Sponsors/Index.html

11 Aug 1999. "IST Undergraduate Courses." http://www.ist.psu.edu/04-Curriculum/Courses/01-undergraduate_Courses/Index.html

11 Aug 1999. "Jack P. Royer Center for Learning & Academic Technologies." http://www.clat.psu.edu

Johnson, David W., Johnson, Roger T. and Smith, Karl A. 1991. *Active Learning: Cooperation in the College Classroom*, Interaction Book Company.

11 Aug 1999. "Penn State York Project Vision." http://www.yk.psu.edu/~sg3/pv/index.htm

11 Aug 1999. "Project Empower." *Jack P. Royer Center for Learning & Academic Technologies*. http://www.clat.psu.edu/projects/empower.html