

Anatomy of a course.

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Section:

PERSPECTIVE

PROGRAM KEYS IN SUCCESS FOR WOMEN AND MINORITIES

Computers are transforming society, speeding through tasks and improving productivity. Spelling can be checked quickly, documents formatted for clarity, and papers readily drafted and revised.

In response to our technology-driven society, many schools now have computer literacy requirements: proficiency examinations or even courses that mandate extensive knowledge. Therefore, when a handful of determined administrators and faculty at Hunter College proposed adding a computer literacy course to the curriculum two years ago, the reasoning was clear. The course would provide fundamental computing skills to entry-level students, support their academic development, and portray science and technology in a more human context.

No one disputed the goal. Just the reality of achieving it. The challenge was to design a course to meet the unique needs of Hunter's students, and to help them succeed.

Computer literacy for all

Hunter had needed a computer literacy course for years. But with a computer science department already overburdened with more majors than staff members could teach, and a substantial adjunct faculty, no one felt it was realistic to begin one. Besides, two three-credit introductory courses were already available, including one for non-majors. That knowledge did not stop two determined administrators from embarking on a mission. Hunter's Provost Laura Struminger and President Paul LeClerc saw CSCI 100, as the course came to be known, as a badly needed first step in computer literacy for Hunter students, and recommended its creation.

Backed by the administration, a committee was formed to create and implement a course designed especially for entry-level students and those without previous computer experience, most of them women and minorities. Committee members included an associate provost, the director of the college computing facility, the director of the Academic Skills program (to answer remediation concerns), the director of the English Composition program, and the SEEK program director (a college outreach program for educationally and economically disadvantaged students with low high school grades but the potential to succeed in college). Also included were faculty representatives from the mathematics department and my department, computer science.

The program was mandated as a one-credit course, open to any matriculated student. It would be graded on a credit or no credit basis, without any proficiency requirements or prerequisites, and would fulfill no distribution requirement. A text was designated as the syllabus. Prospective enrollment after five years was estimated at 2,000 students annually.

As the representative from the department of computer science, I was delegated to get CSCI 100 underway. In exchange for release time from teaching a course for one year, I would manage the course's development and pilot its first year. My facilitator, Associate Provost David Lavallee, was responsible for procuring funding, cutting through red tape, and providing an all-college perspective on a course that was emerging as one of the largest ever offered at Hunter College.

Target: women and minorities

A senior college of the City University of New York, Hunter College is a four-year, co-educational, urban institution awarding baccalaureate degrees in the liberal arts and sciences. In the fall of 1991, Hunter had 18,854 undergraduate students of which 73.3 percent were female and 59.2 percent were minority (self-identified as black, Puerto Rican, other Hispanic, Asian or Pacific Islander, American Indian, or Native Alaskan). The age of the average student is twenty-six. Included in this group is a dedicated corps of senior citizens who enroll in or audit courses as space becomes available. Hunter students greatly value their education. They work hard to afford it and they want to succeed.

Shaping the course

I immediately hired a graduate student in computer science as a part-time course coordinator. Michael Georgopoulos is a fine instructor with good presentation

skills. He also possesses a solid academic background and political common sense. Much of CSCI 100's success is attributable to him. While shaping the course it became apparent to us both that the approved textbook was not a syllabus. It lacked sections on ethics, the role of computers in society, and electronic mail. The material covered was dense and too detailed.

Together we designed a syllabus and prepared the course materials. Under my guidance, the course coordinator gradually assumed responsibility for the production and dissemination of all course materials, which were completed before the semester began. They included the following:

- a master plan for distribution to administrators, a five-page outline of the course modules and their sequence
- detailed lecture notes for the instructors, including motivation techniques, strict time guidelines, and classroom materials
- an instructor's guide describing the course philosophy, expected instructor attitude, and department policies
- grading guidelines for the instructors
- a student syllabus, including a course description, requirements and expectations, and the grading policy
- an ethics handout for students, developed from research and university and college policy statements
- an electronic mail handout for students, designed to facilitate and simplify their work
- a library reference handout for students
- student homework assignments

The pilot program had five course sections: three during the day and two in the evening. The course coordinator taught one session to evaluate the curriculum material first-hand; two adjunct professors, Enercida Guerera and Nick Psarros, each taught two sessions. Both are good teachers with a genuine concern for students and substantial skill.

At mid-semester, I presented the course at a meeting of college deans. Their enthusiasm was remarkable; several even asked if they could take the course. It looked as if CSCI 100 would have a promising debut.

Publicizing the course

The new course was developed too late to be publicized through the college's normal channels. It was not included in the catalog or the course schedule for spring 1992, and no department yet required it. To publicize it, we designed flyers and distributed them throughout the school. Counseling staff and appropriate departments were also provided with publicity materials. Soon all five sections were fully enrolled. Several students were even turned away. CSCI 100, Introduction to Computer Applications, was clearly needed.

Meet the students

The semester began with a full enrollment of 100 students, twenty in each of the five sections. They were the pioneers: curious, courageous, and sometimes fearful.

"I think computers make adults very nervous so they forget to listen," one student confided. A returning student, a competent and accomplished career woman, told me that technology so intimidated her she had not been able to purchase a VCR. After several weeks in class, flipping the orange "on" switch to the computer still frightened her, she admitted. She harbored a lurking suspicion that it might "blow up."

Yet, coupled with the students' fear was a deep desire to succeed in our technological society.

"I do not have a clue about computers and wish to learn."

"I'm computer illiterate."

". . .I want to be more valuable. . ."

These were a few of the reasons students gave for enrolling in the course. An analysis of the class indicated that about 7 percent were graduate students and another 7 percent non-matriculated, with the remainder divided equally among first-year students, sophomores, juniors, and seniors. Between 75 and 80 percent were female. Among them, 32 percent had no previous computer experience, 48 percent considered themselves weak in computer knowledge, 17 percent said they had average computer skills, and 3 percent considered themselves experts. We soon learned that the obstacles these students had to overcome involved far more than youth or computer anxiety.

Many of the students also lacked basic skills in mathematics and English. Hunter requires every student to pass four proficiency examinations, ideally on entry. Except for CSCI 100, every course in computer science specifies passing grades on all these tests as a prerequisite. Eleven percent had not yet passed Hunter's proficiency examination in mathematics, 17 percent had not yet passed the proficiency examination in reading English, 15 percent had not yet passed the examination in English composition, and 33 percent had not yet passed the examination in science.

Teaching CSCI 100

CSCI 100 instructors are young, fairly inexperienced, and paid at adjunct rates. We ensure high-quality instruction by doing much of the design and detail work for them. As a result, the materials we provide the instructors are both supportive and deliberately rigid. They are paid to be great teachers, and they respond in kind.

The entire CSCI 100 staff meets regularly during the semester. This group provides support to the instructors as they grow into their jobs, and helps unify our approach to issues and monitor progress. Everyone finds these meetings reassuring and empowering. As an organizational device, and as a human resource tool, they are invaluable.

"Introduction to Computer Applications" is a hands-on course. Each section meets once a week for two hours in an all-college laboratory classroom with one computer for each student. Students are expected to use the machines and the software we provide during class and for homework. The instructor's machine has software that can seize, manipulate, and then release the students' screens, so that demonstrations and diagrams are clearly displayed and keyboard distractions are minimized.

No student receives credit for CSCI 100 without a demonstrated mastery of the material. Homework accounts for 40 percent of the final grade. Assignments are due at the beginning of each section meeting. Late homework submissions are not accepted for credit. Sixty percent of the final grade comes from the final exam, an open-book practicum in which students are asked to construct a document using a broad range of applications. During this two-hour test, students are expected to extract instructions from an electronic mail file, look up resources in a computerized library catalog, construct a graph from a spreadsheet program, import graphics and text into a word processing program, and format a fairly elaborate document. The passing grade is 70.

Summarizing her experience in the course, one student wrote, "I would recommend this class to friends, but only with the understanding that they have to work extremely hard, especially if they do not have access to a computer other than the lab's."

While 9 percent of the students said they devoted less than two hours a week for CSCI 100 homework, 39 percent said they spent two to four hours per week on this course alone. The median is about four hours a week. Most students think this is too much work for a one-credit course; we do not. We know that the only way to learn the material is to practice.

Impact of a course

As students begin to "understand what I'm doing with these machines for the first time ever," they are transformed. Long before the semester ends nearly everyone writes papers with the word-processing application. Many students request and receive extended access to electronic mail after the semester ends. One student sent her instructor an electronic message to celebrate an event related to the course. She had earned \$9 per hour as a temporary employee, but in April, long before the course ended, she applied for a new job and got it. She told her prospective employer that she knew how to use spreadsheet and word-processing applications and proved it by scoring 85 percent on the employer's test. She now earns \$16 per hour. Another student reported that she demanded and received a substantial promotion at work as a result of her newly acquired skills.

The finishers

During CSCI 100's first semester, seventy-four of the original 100 students completed the course. Sixty-three received credit, eight did not, and three audited. Seventy-four percent of those who finished were female and the ethnic mix was unchanged. At mid-semester, their comments were exultant:

"I feel like I'm catching up with the world a little."

"Despite some frustration, I'm really having fun here and look forward to lots more."

". . .even though I do not understand English very well. . . I look forward to coming to this class every week."

"I now have some knowledge of computers. Thanks."

At the conclusion of the course, 24 percent rated their computer knowledge as weak, 69 percent said they were average, and 7 percent described themselves as experts.

The dropouts

During its first semester, fifteen students failed CSCI 100 because they never appeared in class or stopped attending after a few meetings. Eleven dropped out later in the semester or did not take the final exam. The eight students who took the final and did not receive course credit included three men and five women. The men had devoted minimal effort to the course. Two were senior citizens and the third was a part-time undergraduate student in his thirties who was a mathematics or science major. The five women included three part-time students who worked full-time and two full-time students who worked part-time. Two of the women were upper-class humanities and arts majors, one was a teenage sophomore, another was a senior humanities and arts major, and the last one was a first-year student.

Compared to the original enrollment, a disproportionate number of the students who failed had not yet passed the proficiency examinations. Fifty percent lacked certified basic skills in mathematics, 25 percent in reading English, 25 percent in English composition, and 38 percent in science. It is important to note, however, that many other students who lacked one or more proficiency certifications had successfully completed the course.

Unsuccessful students have a variety of problems. They lack basic academic skills, do not pay attention, lack note-taking skills, and do not or can not read the textbook. The course requires a measure of self-discipline and dedication. Students lacking these traits along with basic comprehension skills should not be expected to succeed at this course.

The summer program

Three sections of CSCI 100 ran during a seven-week summer session in 1992. Each session met twice weekly during a slightly extended summer session. The students maintained the accelerated schedule, and once again the enrollment represented a cross section of the Hunter student body. Eighty-five percent of this class received credit for the course; one student unofficially withdrew, and four failed.

The Students who failed were all women. Two had great difficulty with English and two were ill-prepared, and inattentive.

Growth and the future of CSCI 100

CSCI 100 now enrolls 1000 students annually, 400 each semester and 200 more in the summer. The course coordinator's job is now full-time. Even with twenty sections and ten instructors, CSCI 100 continues to educate Hunter students successfully. We proudly report that it continues to retain its female and minority students proportionate to their registration in a science course. The statistics on and enthusiasm from the current 1000 students match those described here for the first 100. Our students tell us they would register for CSCI 100 even if it met for three hours instead of two.

Extending the course to 2,000 students annually will require 100 sections in each calendar year. Hunter continues to open additional computer laboratories to support both CSCI 100 instruction and the needs of our newly skilled students. We are videotaping an expert teacher to help train incoming instructors. Scale changes things, but I am confident that we can maintain the quality and success of the course.

Possibilities for expansion are plentiful. We are considering alternative scheduling and offering the course as an adjunct to the college preparatory initiative for high school students in New York City. One section per semester is planned for faculty and administrators only, supplemented with material on Internet and additional scholarly research tools.

The options are nearly limitless. But one fact is certain. Any course whose students request more classroom time than credit is doing something right.

PHOTO (BLACK & WHITE): Yee Han Siu, a student in Hunter College's 'Introduction to Computer Applications'

PHOTO (BLACK & WHITE): Professor Susan Epstein and Deborah Carrion

PHOTO (BLACK & WHITE): Sismi Ruiz (left) and Wynel Barthelemy

PHOTO (BLACK & WHITE): Lu Gui Xiang (left) and Yee Han Siu

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By SUSAN L. EPSTEIN

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### **LESSONS LEARNED**

CSCI 100 evidenced many of the problems that every university course faces, but we learned valuable lessons in creating and implementing this course.

Students like ours may be fearful, but they are bright and ambitious. They want to learn and they will go to great lengths to do so.

Teachers are the most important resource in this course. The average instructor for this course should have a bachelor's degree in computer science, enthusiasm, resourcefulness, and clarity of expression. The instructor must also be supportive in the classroom and able to field questions and encourage learning.

The course coordinator is essential to the program's success. Such a coordinator smoothes the path for both students and instructors by continually monitoring the syllabus and the progress of each section, and regularly revising curriculum and procedures.

Funding this course is expensive. It demands a low student-teacher ratio. Hardware and software must be continually upgraded to keep pace with commercially available products.

Textbooks available are often so expensive and heavy students are reluctant to purchase them or bring them to class. The text should function as a reference, not a primary instructional tool. We had to create materials to meet our needs.

Student advocacy becomes everyone's job. Laboratory aides are sometimes insensitive to the fears of computer users unlike their typical, science-major patrons. Student feedback is often constructive.

Uniformity is also essential in a course of this scale. It controls and supports the staff and protects the students. Very little policy making should be left to the individual instructor.

Supervision is key. CSCI 100 demands extensive supervisory time and space from the department. Someone must service add-drop requests, hold office hours,

duplicate and distribute materials, prepare the homework and the final exam, hire and supervise the instructors, select textbooks and monitor new technology.

High-quality facilities are important. Every student needs to work individually on modern, well-maintained equipment.

Administrative support, both moral and financial, greatly smoothed CSCI 100's development.

We learned not to underestimate technophobic students. They were fearful but hardworking and capable of learning.

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