LEARN COMPUTERS BY DOING

GW Students Develop Unique Course

In 1961, a data processing firm hired two George Washington High Students at $1.50 an hour, eight hours a day. Their job? "To think about computer programming to see how far high school students could go on their own imagination," says Irwin J. Hoffman, 2311 So. Krameria, a math teacher at GW.
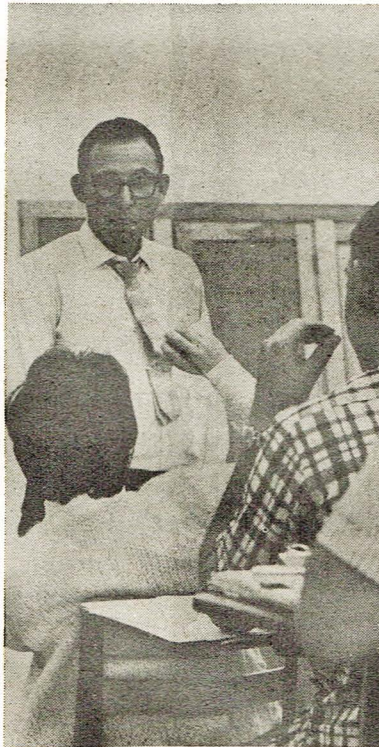
There, the imagination of high school students and their teacher has been far-reaching. Those two boys were members of a computer club which has evolved into a computer math course taught by Hoffman. The experimental class is making up a text for next year. In this unusual class, the kids learn from the teacher, from each other and from the computer.

"I'm always excited when kids are excited about learning. You help them by making the opportunity for them to learn. There were so many kids who were interested, it sort of became inevitable that we should offer the course."
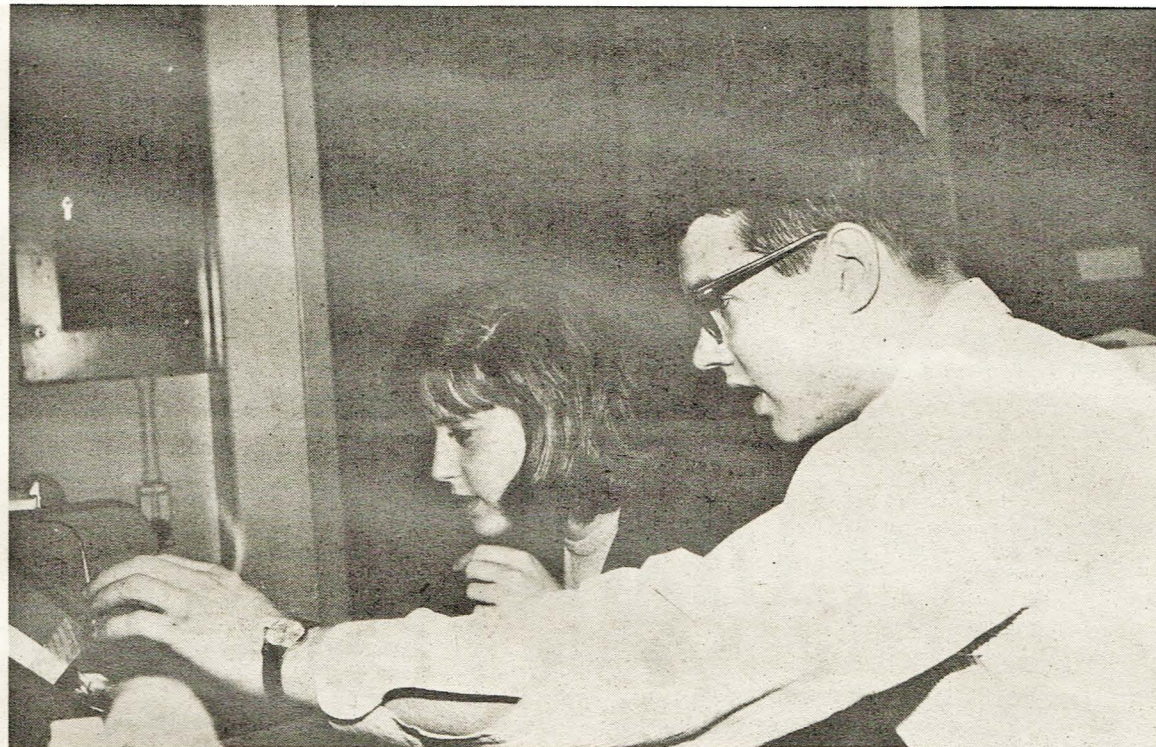
The student-developed computer math course may be the only one of its kind in the nation, Hoffman says. High school students, unfortunately, do not often get the chance to work with a computer. The few school systems that offer such courses usually send the programs to a college or university to be run. And nowhere does he know of a school system that owns a computer, as the Denver Public Schools does through the Emily Griffith Opportunity School.

This all began in 1960, with a club formed when students became interested after hearing Bob Albrecht from Control Data Corporation lecture. Hoffman made arrangements for Albrecht to teach Saturday mornings, then for students to go one night a week to use one of the firm's computers.

After about three years, the Control Data facilities became too busy to allow time for the students. Then Hoffman and the school arranged with Opportunity School to send down some of the students, and with the Burroughs Corporation and Denver University for $750 worth of free time a week at the DU computer center. Now the DU program has been expanded and offered to every high school in the area.

Meanwhile, the computer enthusiasts at GW were winning national recognition with top entries in contests for original computer programs. The few student later lectured to a convention of math teachers! The principal then, Rolliff Wright, was so interested he had Hoffman explain the club to the superintendents in charge of secondary schools last fall. They in turn were so excited that, "cutting through all red tape," they authorized a course on an experimental basis for two years.

Then Hoffman and his computer fans really had a project. Although he has completed most of the work for a doctors degree in math teaching at DU, Hoffman says, "The problem was that I had never had computer programming in college --just those five years of putting kids and computers and ideas and enthusiasm together--so I had to learn it." He took charge of a study hall, for which he chose two boys who really knew computers, two who had been in the club and had had some experience and four without experience, "to see the learning rate." They put together this year's course.

"Imagine teaching without a textbook a course you have never had! It consumes all my time." In class and out, Hoffman is helped by two student assistants, Walter Rassback, 140 Jersey, and Bob Jardine, Park Hill. "Every day Rassback and Jardine and myself sit down at lunch and plan the day's learning experiences."

In class, Hoffman explains the assignments and answers questions, or refers them to Bob or Walter. They take turns at lecturing. There are some 50 students in the two sections of the class. Most are "math-oriented." They include "some of the brightest in the country, and some of the most average, too." Two GW math teachers also are taking the course; they'll be ready to help teach when it's offered as a regular course.

Hoffman challenges his students with special projects, and they respond. Last week, for instance, he announced four problems. There will be no grades, just the reward of personal achievement for those who finish first. The next day, students had written programs and were punching out cards on the schools two keypunch machines.

But as assistant Bob Jardine points out, "You can't really learn in class unless you go to the computer and run off your programs." Bob and Walter, incidentally, are considered such promising students that DU and Burroughs allow them unlimited runs at the DU computer center. The other GW students also may send programs to be run at DU.

Hoffman has high praise for DU and Burroughs for making the time available. "They have the most marvelous philosophy of let's

Students learn in Hoffman's class (left) and in lab, where Bev Simmons punches cards for one of Bob Jardine's programs (right).

THE • Students Develop Course

let the kids learn if the time is not being sold." He's afraid, though, that as the DU center gets busier with commercial assignments it may have to curtail student use. And "No school system, not even Denver, can afford to buy a $1,200,000 computer." By then, he hopes for special communications system from GW to the opportunity school lab, or more computer time from some other source.

At Opportunity School (each student is assigned six two-hour labs a semester), labs seem almost fun. Students gather around the printer as the cards feed into the computer. Usually the program doesn't run the first time. They make corrections. When it does run, even before, they're writing new programs.

"These kids don't need anybody to ride herd on them. They are amazing. They can teach each other better than I could," says Larry Costa. He is in charge of the math science programming class at Opportunity School. In it, students from GW and other Denver high schools learn programming by the "hands on" method. "You can't hurt a computer, so it's quite safe to turn inexperienced people loose and let them learn by themselves."

The Denver Public Schools system has its own IBM 1440 computer. It was caught in the 1965 flood, and when it was given to the school, it was covered with two inches of mud. Costa, with computer maintenance students, turned a hose on it; then they put it back together.

What, exactly, do the computer math students learn in labs and classes? First, Hoffman explains, a skill which saves them time and grief when they get to college. Harley Feldman, 796 So. Glencoe, a computer club member back for vacation from the Illinois Institute of Technology, says, "The freshmen up there (taking computer programming) went out of their minds. They were spending three hours a night on a one-hour course."

Second, they get a different understanding of mathematics than in other courses because the use of the special compiler language involves so much abstraction. (The computer math course, however, cannot be taken instead of math courses, but must be taken in addition to them.) Some students, like Beverly Simmons, 150 Forest, use it to "help solve involved homework, where it's real easy to make an arithmetic mistake. The computer doesn't usually make mistakes."

Third, even if they don't become scientists, they will be better executives because they know what a computer can do.

And fourth, they can use computer programming to get a good job, whether or not they go to college. Most of his students plan to attend college. Two of the computer club members now are working their way through college doing computer programming.

In their excitement with the class, the students learn to explain it to others. Not always just to students, either. Bev Simmons and Hoffman recently explained to the GW PTA in simplified form how they would program a computer--to scramble an egg.

From all of this, some students learn something more, an enthusiasm for teaching. Assistant Bob Jardine wants to be a math teacher, like Hoffman. Bev Simmons puts it this way, "Mr. Hoffman has so much enthusiasm that I find myself enthusiastic like he is." She plans to teach math, too.