

MICROCOMPUTERS IN EDUCATION

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A Microcomputing degree? You have got to be kidding! No, this is precisely what is being suggested by the publisher of a leading microcomputer magazine [1]. Furthermore, a college in New Hampshire is looking into this possibility, and it is liable to meet with much popular support. After all, there are more microcomputer systems in the "real world" than there are IBM 370's. But why a college degree?

Have we gotten too involved in our academic research at the university level to notice what has been happening at the elementary school level? As leaders in computer science education, maybe we have concentrated too long on the junior college, two-year college, four-year college and university curricula. It is now time to think out a complete role for computer science education because "I am anxiously awaiting the day when these kids are college freshmen and they walk into their computer science course with ten years of programming already under their belts at age eighteen." [3]

The basic philosophy suggested in [1] has for the most part been accomplished at Loyola University in the last four years. We have slowly built up an impressive microcomputer lab for the Department of Mathematical Sciences, but we do not offer a microcomputing degree. Our degree offering is a B.S. in Computer Science and we have adhered to the ACM curriculum guidelines [4]. Our microcomputer lab is certainly well equipped to handle both our computer science majors and our mathematics majors with interests in computer science. We started in 1976 with a SOL-20 from Processor Technology. We then added a PET 2001, an APPLE and finally a Model I TRS-80 level II. From this beginning we have grown to two SOL-20's, two TRS-80 level II's, three APPLE II's and a TRS-80 Model II. On loan from TANO Corporation (a New Orleans firm) we have an OUTPOST 11 and from ECLECTIC we expect to be receiving a new PET with dual drives and printer.

Each system in the lab is capable of communicating with Loyola's academic computer system, an HP3000 Series III. Thus, the typical computer science major will be introduced to a number of different microcomputers and a minicomputer system sometime during his or her tenure. This semester the course in Data Structures is making use of both the HP3000 and the TRS-80 Model I with minifloppy drive. Computer Graphics is using the APPLE II's and papers are being written using the text editor on the SOL-20.

At the beginning of these endeavors, we realized that we needed to do more than just educate our majors and service the university. In December of 1976, we also began preparing a proposal for the National Science Foundation (NSF) to assist mathematics teachers in becoming computer literate. The NSF Mathematics Teacher Development Program (5) was funded for 1977-78, 1978-79 and now 1979-80. It has shown some signs of success, but the real indication of its worth will only be known after these eighth graders enter college. The program itself deals with teachers who teach from grades 5 to 12.

In early 1978, we made some attempts to introduce the APPLE into use at the kindergarten level, but we did not meet with much success. The problems were funding and inability of top school administrators to realize the applicability of microcomputers in the school program at that level. We did, however, develop some software for this project. Using the color graphics and playing paddles of the APPLE, we produced some "Sesame Street"-like games and cartoon animation, but without funding we could not carry these ideas very far. We are pleased to note some success in this activity by Professor Robert Taylor, Teacher's College Columbia University [8].

Also in 1978, we saw the need for the education of the adult community in the Greater New Orleans Area. We decided to

offer a continuing education program with the TRS-80 microcomputer system. So far we have made use of only the Department of Mathematical Sciences' resources, but to teach a continuing education course to forty-eight people on two systems would be folly. Radio Shack was contacted and twenty-five TRS-80 systems were on loan to the department for this first effort [6]. The audience was varied and gave us the view of the future we had missed up to that time. There was the nine year old boy who programmed loops around his father, the CPA; there was the family--a husband, wife and thirteen year old son; there were doctors, dentists and lawyers; there was the sixty seven year old ex-furniture store owner who wanted to do something agter retiring. This proved so successful, we offered the course again that same year. In 1979, we expanded our offerings in continuing education to include the beginners course and a new course for non-beginners [7]. Some of these same ideas have been applied to do-it-yourself courses for parents and their children [2].

All of these programs and projects have been accomplished in a patchwork fashion to meet needs. In the 1960's there was no need to worry about teaching topics in computer science to an eight year old. The hardware was just not in the school environment; college was the first cost-effective environment where computer science could be taught. Today, five year old children are becoming computer oriented with hands on experience using microcomputers and eight year olds are writing their own programs. Yet we don't have a recommended curriculum for our children that will map out their progress through their early academic years--kindergarten through twelfth grade.

Is it not about time for computer science education to take its place with reading, writing and arithmetic? Who can take the lead in accomplishing this? What forum has the foresight to see the eventual crisis if students are to first confront computer science education in college? As a virgin academic field, can we learn from the past mistakes of Mathematics and English or in twenty years will we be pondering "Why can't Johnny read and write good programs?"

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