

## THE COMPUTER IN A TECHNICAL SCHOOL

In a school of technical instruction like ours, for the past ten years the computer has been an integral part of the environment of both the teachers and the students. Today it is considered as a familiar and indispensable working tool. Certainly, the continual development of the performance of the computer (memory capacity, interfaces, and peripherals, software) still largely leaves open the research into the utilization and exploitation of this powerful instrument.

It is therefore, not possible to give all its multiple uses within a technical school in detail. We must therefore limit ourselves to a few particular areas:

- ★ Teaching with the I'C.A.E.;
- ★ administrative management;
- ★ research in the field of industrial production.

### Computer assisted education (C.A.E.)

The principles of C.A.E. were defined a few decades ago by the innovators who had already perceived the various uses which could be made of a computer for programmed and individualized instruction. The appreciation given it today depends on the various results, notably in the function of the spheres of application for which it is considered. In certain apprenticeship programmes in high technology (piloting of planes, trains, or other complex machines, etc.), in the updating of already highly-qualified adults, completely conclusive results are obtained because the enterprises concerned make use of the available materials and software which allow them to derive the best results from the computer apparatus.

In the school, it is often entirely different for, in spite of pin-pointed results and isolated enthusiasm, the complete conversion of the teaching staff cannot yet be seen, at least in the second scholastic cycle. Many reasons can be found for this: Insufficient knowledge of computer concepts, insufficient apparatus available, the too rapid evolution of materials, the absence of standards; all that has impeded the creation of a convincing computerization. More serious, because here it is a question of a more durable structural reason, we are forced to conclude that the school organization is too rigid and poorly adapted towards an instrument which is designed to introduce individualization, freedom and thus flexibility.

What has happened at Baronnerie, in the C.A.E. since 1977, well enough illustrates these tendencies and these limitations. The first teaching program-

mes created according to the IMAGO system of the University of Louvain, functioned on a computer of moderate strength which relied upon teletype terminals. The arrival of micro-computers with cathode screen, which were more flexible, more attractive, have progressively led to the abandonment of the big system and the programmes have been translated into BASIC language. The equipment in a network room has allowed a more rational utilization and many classes have been able, in the course of the past few years, to benefit by the C.A.E.. The interest of the students has not stopped over the course of the years: pedagogical effectivity has proven difficult to measure; still, the conviction is strengthened that for students who are falling behind in the ordinary courses, the computers help them to catch up with the others.

However, the problems mentioned above are quickly met with: the modernization of material, acquisition or creation of software of high pedagogical quality, the adaptation of locations and structures for an optimal utilization of the C.A.E..

Still, the biggest disquietude is not in that area: if in technical teaching the micro-computer has found a place as a useful working tool in industrial trades, in other areas, teachers and students often look upon it as a simple gadget, if they do not relegate it to the rank of a foolish toy. There we have an annoying psychological wrinkle which will not very easily be smoothed out. And, perhaps the most sophisticated equipment will become so inexpensive that it will finally allow C.A.E. to leave its small-scale groping to attain the industrial quality which alone will allow it to arrive at a medium of instruction to rival school manuals and professional software. The micro-computer has been the victim of a galloping and anarchical evolution. What would have happened to the movie-making industry if it had known in a space of five years the technological upheavals which it has weathered in a half-century? What would have happened with phonograph records if no standards had been adopted? It would be truly regrettable if a pedagogical aid which is performing so well as is the computer should be neglected or reduced to minimum use, but I think that such a thing is highly improbable.

### 2) School administrative management

Our society is becoming more and more complex and the administrative support is becoming more and more important. Consequently, beginning with the initial step of counting the number of students, the computer has proven to be indispensable in order to avoid the fastidious tasks of classifying, printing circulars, addressing envelopes, keeping track of grades, not to mention invoices.

By the establishment of a bank of school information including:

- ★ an index of students;
  - ★ an index of former students;
  - ★ an index of schools of origin;
  - ★ an index of enterprises accepting our graduates;
- those in charge of the establishment have rapid

access making correspondence with parents and external organizations easy.

Not having the proper equipment adapted to our needs, it was necessary to conceive of software implanted in micro-computers and small autonomous system, all of which were compatible with one another, so that they could use the same tiny discs as informational support.

From now on, each service (accounting, secretariat, direction of studies) will make use of micro-computers with a system adapted to its needs. It is incontestable that, despite the inconveniences inherent in technical limitations, the computer in the field of management has contributed to the pronounced betterment of the operations of the establishment.

Beginning with this year, a telecommunication system is functioning from 2000 hours in the evening until 0600 hours in the morning and is connected with a central station in Paris, thus permitting us to rapidly exchange information among the technical schools of France. Certainly, the telex is not something new, but the special thing in this case consists in the interconnection among the various schools in such a way that banks could be set up and adapted to the needs of technical schools, with the various items either in the field of pedagogy, applied research, or administration.

### 3) Research applied to production

In our school we provide the initial training of higher technicians (two years after the baccalaureate) and the continued training of more advanced students (three years after the baccalaureate) in the fields of Electronics, Electrotechnology, Production, and Mechanical Manufacturing. More than the others, the teachers of various technological specialities were very quick to realize the possible applications of the mini-computer in the fields of Process Management and Production Management, thanks to the terminals connected with the micro-computers.

The parallel development of production machines operated by remote control and by micro computers has allowed for the orientation of applied research towards the flexibility of production through the realization of a flexible unity.

The flexibility in production corresponds to:

— a capacity to treat a great number of different items;

— the power to absorb variations of the rhythm of production and ought to lead to a minimization of delays in production and to an optimization of the rate of use of machines at the central plant.

To bring into focus this flexible unity of production generated by the computer, a multi-disciplinary team of research teachers has worked hard for two years, the research being oriented towards the following fields:

#### 1. Computerization

★ interface between machines remotely controlled and the computer,

★ automatic modification by programmes by the Mini 6, example: management of tools used.

★ elaboration of programmes and software at the command of these machines.

★ focusing on the software of running all the machines and robots by computer.

#### 2. Assisted Production and Assisted Design

★ Bringing into focus the production design programmes starting from software;

★ setting up indexes of scales and tools;

★ management of stocks on hand, management of production helped by the computer.

#### 3. Automatism and the Use of Robots

★ management and bringing the system for conveying goods up to date;

★ automatic cleaning of parts before control;

★ automatization of controls;

★ automatic loading and unloading on machines by an electrical command coming from the factory center;

★ dimensional control of parts without contact.

Such a realization allowed the developing of ties with the enterprises of the S.M.I. (Small and Medium Industries) confronted with these problems of computerization of production and of not disposing of tools and men too often.

Such a research allowed for the mobilization of the teachers and the students of the school and allowed the enterprises to discover the technical realities hidden behind the myth of the computer.

### Conclusion

Is not certain whether or not the introduction of the computer into teaching was not too rapid and, at the same time, too precocious (in the elementary school and above all in the nursery school in France at present) for, beyond the laudable concern about adapting to the modern technical world, would it not be necessary to launch a research into a substitution which is less dramatic to overcome all the evident educational deficiencies.

Certainly, in a vocational school like ours, technical culture tends to become dominant but it is situated too much on the periphery to answer the fundamental needs of man. Despite their attraction, the calls to progress are not sufficient to motivate the younger generations however well anchored they may be in an ever more technical civilization. We must prove our realism and humility in our research into computer use in our instruction. We must, in effect, rediscover or maintain our educational qualities which for more than two centuries, thanks to the principles of Lasallian education, have been a guideline for those youths who are seeking points of reference.

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