programmed commands. In robotics, children learn as they do in programming: the stages of a procedure must be identified and then transmitted to a machine. However, unlike programming, the programmed task is carried out by a machine built by the child. The child constructs it, and the program, to carry out certain tasks for which it was designed. And unlike programming, the result is produced by the child not on the computer, but by way of the computer.

This type of approach is developed fully on the secondary level, when it is extended to what has become known as Computer-Aided Design, or CAD. Using CAD, students can learn how microcomputer techniques can be used as work instruments in making plans, patterns, industrial drawings, graphs and in various publishing applications.

In all these Educational Computer Applications (ECAs), the computer is a tool. It must clearly be understood that the computer does not automate the learning process, but enables children to learn in a different manner by using a machine to produce school work. Microcomputers will transform the use of the instruments presently available to students in the same way that pens and pencils did when they replaced the slate. The content of what is learned and the concepts that prepare them for life will not lose their priority. The microcomputer brings a change in the medium for writing and reading. As someone has said, it is a type of "thinking pencil".

The use of microcomputers in schools will assist in conceptualizing and will add to the interest of learning
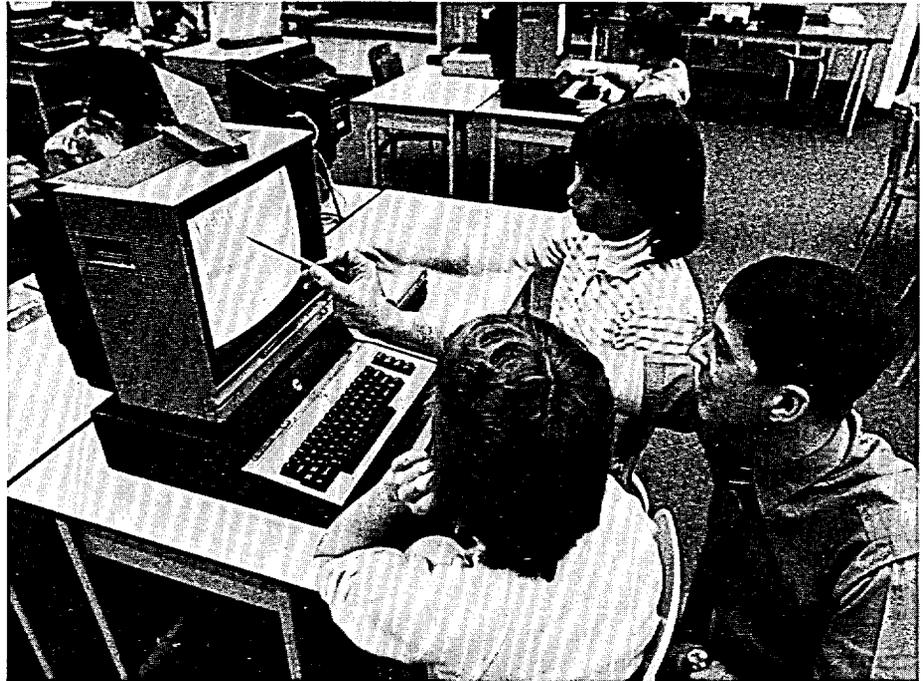
basic subjects such as history, French, geography, mathematics and science. No, HAL will not be taking over the class. As in *A Space Odyssey*, the captain will always be in control of the computer. This is the role for which the teachers are preparing today's children. After all, in 2001, today's children will be the captains of our spaceship □

Dr. Benoit Dubuc
Professor
University of Quebec at Chicoutimi

Eloquent figures

Number of students per machine at primary and secondary levels

The 10 Canadian provinces in 1985:

Manitoba	1/27
New Brunswick	1/34
Alberta	1/35
Ontario	1/38
Quebec	1/52
British Columbia	1/55
Saskatchewan	1/55
Nova Scotia	1/58
Prince Edward Island	1/88
Newfoundland	1/105

Taken from *L'Actualité*, June 1987