



Introduction

RECENT applications of science and technology have beneficently transformed almost every facet of our lives. We use the telephone to talk to loved ones who are far away. High-fidelity recording gives us a choice of fine music beyond the means of the most powerful kings of former years. The car and plane revolutionize transportation. Refrigeration improves our winter diet, while automatic heating keeps our homes comfortable. The sewing machine, vacuum cleaner, washing machine, disposal, and dishwasher reduce drudgery in the home. Power machinery replaces the muscle of horse and man on farm and assembly line. New methods, materials, and products permeate industry; the typewriter, dictaphone, and computing machine streamline the office. Since 1900, the tragedy of the death of children during the preschool years has been reduced sixfold.

Compared with these enormous strides, our educational system has been slow in using the technical advances of science to transform its practices. We believe that education can meet the enormously increased demands placed upon it only by making a concerted effort to catch up with the scientific and technical advances which have revolutionized other areas of our lives.

The main purpose of this report is to show how some of the acute problems of education can be solved by the much wider use of the new methods of graphic communication. We urge, however, that imagination also be used to create other new solutions to teaching problems.

A promising beginning has already been made by alert teachers. Phonograph records are helping to teach foreign languages, and tape recorders enable students of public speaking to hear how they sound to others. Eye-movement cameras are being used to diagnose bad reading habits and projection devices to cure them. We believe that a great variety of other useful methods can be invented and should be widely employed.

An enormous amount of old-fashioned drill is absolutely necessary to master some of the basic units of elementary education—e.g., addition, subtraction, multiplication, division, spelling, and reading. But this drill does not need to be administered by old-fashioned methods. It has long been known that immediate knowledge of results—promptly rewarding correct responses and promptly correcting errors—is extremely important. Thus, each student would learn best if he had his own private tutor, a luxury only the wealthy can afford. As a challenging article by Skinner (1954) points out, however, it is easily possible to construct a recitation device which gives each student the benefit of individual arithmetic drill with immediate reward and correction. Children love to operate this apparatus. We believe it can speed learning and save time for studying different subjects by other methods.

With ingenuity and imagination, it should be possible to construct other types of tutoring devices to improve drill in many subjects. By transferring the burden of drill to the machine, the teacher can be freed for more important roles—planning learning sequences, solving special problems, and giving personal guidance to each pupil. The prestige of any profession increases as the effectiveness of its techniques improves.

Imaginative people, who know the problems of education, the principles of learning, and the potentialities of scientific technology, should review each of the fundamental elements of the curriculum to see whether or not some radically novel and superior way of teaching it can be invented. Although this report is limited to graphic communication, the attempt to help education to catch up with the advances in other areas of life should cover the whole range of modern technology and science.