A Brief History of Computers, Computing in Education, and Computing in Philadelphia Schools

The history of technology in the classroom gives one pause. Too often, inflated promises have been followed by a burst of enthusiasm and partial implementation and then by discouragement and despair, broken morale and broken machines (Tyack & Hansot, 1985, p. 35).

There was a time when electricity was a novelty; something to be harnessed, to be understood. With time, not only did mankind harness electricity and understand it, but electricity became a mainstay of modern society. Today we cannot imagine our lives without light bulbs, refrigerators, and all the wonderful appliances that run on electricity. Similarly, there was a time when the telephone was a toy for the wealthy in their homes. Only the very well off could afford one of those “contraptions.” Why would the hoi polloi have a need for a telephone at home? Again, with time, not only did the hoi polloi have a need for the telephone in the home, but phones became self contained (i.e., didn’t need an operator as a mediator), smaller, and portable with the advent of the modern 21st century cell phone. But cell phones
too rely on electricity; and as with electricity, we cannot imagine our lives without the telephone in all its forms.

Electricity was a major force in the development of the modern computer. Today’s modern computer has a long and distinguished history, but less for microcomputers in classrooms in general and specifically in the School District of Philadelphia. This chapter is divided into three parts. The first section will provide a brief history of computing from early efforts at calculating machines, to ENIAC in the 1940s through the sophisticated machines and wireless technology used in the early 21st century. The second section will provide a brief discussion of computers in schools, and the last section will provide an introduction to computers in the Philadelphia schools.

A Brief History of Computers

While some take the history of computing all the way back to the abacus (Sharp, 2005, p. 3), or to Blaise Pascal’s calculating machine from 1642 (Provenzo, Brett, & McCloskey, 1999), this book will begin with the Difference Engine and Analytical Engine developed by Charles Babbage in 1835 (Spencer, 1992a). Selected computing milestones will be presented, leading to the powerful microcomputers used today.

Charles Babbage began a critical examination of logarithmic tables used to make calculations accurate while at Trinity College, Cambridge, in 1810. He dreamed of a machine that could do these types of calculations, thus making them easier to complete. In 1822, Babbage designed what he called the Difference Engine, considered to be the first automatic calculating machine, specifically constructed for preparing mathematical tables. His second invention was the Analytical Engine, the first universal automatic calculator. This machine had all the components of a modern general purpose digital computer with memory (1,000 words of 50 digits each), control (via sequences of punched cards), arithmetic unit (addition and subtraction done in one second), input (via punch cards), and output (via punch cards or printed copy). Unfortunately, both of Babbage’s machines were mechanically flawed (Provenzo, et al., 1999, p. 25). He was 100 years ahead of his time in terms of sophistication of technology available to him. In any event, Babbage is considered the grandfather of modern computing.

Herman Hollerith took a job with the U.S. Census Bureau in 1879. During the next few years he became preoccupied with trying to solve the mammoth “problem of automating the tabulation work of the census” (Spencer, 1992b, p. 490). His Tabulating Machine, developed after 1884, was an amazing machine that allowed sensing of holes through electrical contacts, which then allowed the cards to be easily sorted into pockets in a sorting box, then to be sorted by hand. With Hollerith’s Tabulating
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