

Past→Present→Future: The Place-and Case-for History in the Information Technology Curriculum

PK Ebert

pkebert@mail.maconstate.edu

Jacton Opiyo

jopiyo@mail.maconstate.edu

Macon State College

Division of Information Technology

100 College Station Drive, Macon, GA 31206

478-757-7088

Abstract

Often, Information Technology (IT) curricula omit addressing historical context of technological developments. When they occur, these omissions often are defended with one of three justifications: 1) IT can be taught, understood, and applied without benefit of any historical context; 2) IT instructors are not professional historians and, therefore, are not qualified to teach history; or 3) There is not enough time in a typical IT curriculum to teach history as well as technological applications. Rejoinders to each of these justifications educe a roadmap for including the study of historical context at all levels of study in the typical IT curriculum.

Introduction

Even if we could convince students that the things we teach are indeed useful, why should that make it interesting to them? We have sold Information Technology short by presenting it only as "the art of science", since the mere utility of a subject does not necessarily generate any excitement for it. For many the excitement comes from the creative, artistic aspect of the subject, and its intellectual fascination.

Another serious drawback to the traditional IT approach is that it deprives students of the sense that Information Technology is a process. On a small scale, modern textbooks and typical methods of instruction fail to illustrate the way the pioneers and inventors actually struggled as they thought out and worked on technological devices and ideas. On a larger scale, IT students are deprived of the long-term process by which a theory/device emerges from struggling with one or more central problems, often over many centuries. These processes, however, are the very things that IT students need to understand. No wonder that so many people, even those who have had a fair amount of Information Technology in college, are incredulous when one tells them that, yes indeed, there is a lot of research going on in present day Information Technology, and that this is what really makes Information Technology tick. They have only seen a seemingly petrified structure, with no remaining trace of its creative human origins, and all at least 100 years old.

Too often, IT curricula do not include information on and discussions of the historical contexts that influenced—and were influenced by—information technology development. Arguments offered in defense of omitting history from the IT curriculum can be summarized in three broad reason categories: No Relevance (IT can be taught, understood, and applied without benefit of any historical context.); No Competence (IT instructors are not professional historians and, there-

fore, are not qualified to teach history.); No Time (There is not enough time in a typical IT curriculum to teach history as well as technological applications.). Thoughtful analysis leads to the conclusion that none of these broad reasons should justify omitting historical context from the IT curriculum.

No Relevance

IT owes much to the work of predecessors, not just in the obvious way, but as an ongoing source of inspiration for contemporary research: There are still many insights to be found in the work Turing, and even as far back as Abacus. For novelists, poets, painters, or philosophers such observations would be old news, since their disciplines have long recognized the importance of studying the original work, techniques and perspectives of classical masters. And in so doing, they are never removed from an understanding of how people have struggled, and have created works of art. Young artists thus see themselves as part of a creative tradition. Unfortunately, too many IT educators have lost this sense of tradition in the discipline. Ironically, much of this loss can be blamed on the dazzling explosion of Information Technology in this century. It is time to step back from our accomplishments and recapture a historical perspective.

In the last century, remarkable developments in IT illustrate the inextricable interweaving of technology and social structure. From Marconi at the beginning of the 20th Century to "chads" at the end of the 20th Century, to live broadcasting of the attack on Iraq, understanding information technology requires understanding social order, and vice versa.

Marconi said of his wireless communication experiment of December 12, 1901, "The result meant much more to me than the mere successful realization of an experiment. . . . I now felt for the first time absolutely certain that the day would come when mankind would be able to send messages without wires not only across the Atlantic but between the farthest ends of the earth." (Rhodes, 1999, 32)

Steve Erwin of Judicial Amendment Coalition, Inc. says of the 2000 presidential election, " The 2000 Presidential Election in Florida was a major disaster that made us the laughing stock of the entire world, almost created a Constitutional crisis, still has many questioning the legitimacy of Bush's presidency, and has others claiming that the election was decided by a Republican Supreme Court." (Erwin, 2002)

And, Walt Zwirko of The Freedom of Information Center notes that journalists embedded with troops during the U.S. attack on Iraq have changed world perception dramatically: ". . . the reporters, photographers and cameramen, far from the Central Command briefing center in Qatar, provide an element that was absent in coverage of Operation Desert Storm in 1991, when war reporting was subject to strict military censorship and the Pentagon limited the images of conflict to successful attacks on enemy targets." (Zwirko, 2003)

Alternative forms of information technology hang in relational vacuum without an understanding of their progressive development and historical contexts.

No Competence

If it were just a matter of informing our students that "all this comes from somewhere", then the usual remedy of offering a course on the history of Information Technology (and maybe making them take it) might at first thought seem enough. But such courses tend to marginalize and eviscerate the very subject matter they champion, generally talking about Information Technology without actually doing Information Technology

Neither will it suffice simply to add historical biography or commentary to Information Technology courses since, while such add-ons may provide a human dimension to the subject matter, they shed very little light on Information Technology. Instead, it is necessary to integrate firmly the study of original pioneers and inventors/inventions into all IT courses, presenting these sources to motivate the modern technologies they have spawned. Study of original inventions of the past is essential in order to understand where the subject came from, how it is currently evolving, and where it might go. As the mathematician Abel noted, "It appears to me that if one wants to make progress in Information Technology, one should study the masters and not the pupils." (Calinger, 1994, iii)

According to the staff of the History News Network (HNN), the majority of people responsible for studying and writing history are not trained historians (HNN Staff, 2003). Indeed, HNN argues, historians are observers of reality. The best historians are often those people who do not think of themselves as historians, but, rather, as reporters of observed reality.

Richard Vinen maintains that "The best history is written by non-historians" because non-historians have no hidden agenda (Vinen, 2001). Vinen quotes George Orwell (author and political satirist), Bernard Cohn (anthropologist), Teresa Toranska (choreographer), and Zdenek Mlynr (political reformer), among others, to illustrate his point that the most accurate historical descriptions come from people not interested in writing history.

Both Edgar Governo's "Historian of things that never were" web site (Governo, 2003) and David Kosalka's "Historian Underground" web site (Kosalka, 2002) emphasize the value of proletarian approaches to history. Even the Smithsonian Institute encourages everyone to be his own historian (Smithsonian Institute, 2003). And, our personal favorite history, Hawking's *A Brief History of Time*, is the work of a remarkable man who, challenged by Lou Gehrig's disease, must communicate with the world through a computer and voice synthesizer.

If all of these non-historians have found the means to consider history in their various worlds, surely the typical IT professor can handle it as well.

No Time

During the past few years, many schools have used a course on perspectives on the history of computing with a wide variety of students: undergraduates from different disciplines at all levels. The results have been extraordinary. Students begin to view Information Technology in a new way, and also see themselves differently in relation to it. Information Technology is no

longer a collection of arcana, unrelated within and unconnected to anything without, but becomes a whole, an artform.

So how can one use history in IT teaching? Certainly almost every invention is built upon a succession of preceding ideas. And as one goes back along this chain, the motivation for a problem which started the journey becomes ever clearer, with several works in the chain often standing out as milestones on the road toward our present knowledge. By working through these original inventions which discuss and solve, or attempt to solve, antecedent problems, students discover the roots of modern solutions, ideas, and concepts, even whole subjects. They also see the obstacles that earlier thinkers had to clear in order to move ahead, and thereby gain insight into current technologies and how to approach them.

Then why not read a modern text that lays out this grand scheme? Why study history? For two reasons. First, by including history the students are brought as close as possible to the experience of inventions, without an intermediary interpreter. They see and feel the tenacity, the false starts and triumphs of its practitioners, the salient leaps which revolutionize fields and lead the way to the next cycle of tumult and passage.

The second reason is more subtle and perhaps derivative of the first, but profound nonetheless. When students are exposed to the historicity of inventions they are initiated into the way Information Technology is practiced: through research, publication, and discussion. So students too should read papers from their edge like the Turing test by Alan Turing. Students can then research in a combination of individual work, small groups, and whole class exploration, after instructors preface student reading with an overview and alert them to particularly difficult parts. Discussion gradually will spread to the whole class which then reconstructs the argument, ponders the consequences of the result, and asks "Where do we go from here?" This emulates in large part the dynamic of research in Information Technology. Students understand that instructors believe in them enough to ask them to confront the sources as we would, and their response to this faith is manifest in the heightened intensity of their motivation and study, and in the spirit that drives their work.

Conclusion

What relevance does this approach have to the typical current undergraduate IT curriculum? IT courses often have required material that needs to be "covered" for use in the next course down the line. These requirements should not—and need not—stand in the way of providing real intellectual motivation for the material at hand. Students can benefit in both understanding and motivation from seeing firsthand the building of the first computer, the creation of the first computer company, the naming of the first computer programmer, the struggles of Babbage, investigating the History of Calculating which is rich in its appearance and can be inspected from many different angles.

There is in fact a vast supply of sources that illustrates and brings alive almost every concept taught to students at any level. If resource materials are carefully chosen, history of information technology can be accessible to and highly enriching for both students and instructors. Excellent original sources can be found on websites.

References

- Bergeron, B. (2002). *Dark ages II*. Saddle River, New Jersey: Prentice Hall.
- Calinger, R (Ed.) (1994). *Classics of mathematics*. Saddle River, New Jersey: Prentice Hall.
- Davis, K. (2001). *Don't know much about[®] the universe*. New York: HarperCollins.
- ECHO: Exploring and collecting history online. Retrieved February 17, 2003 from the World Wide Web: <http://echo.gmu.edu/>.
- Erwin, S. (2002). 2002 election. Retrieved February 17, 2003 from the World Wide Web: <http://www.judicialamendment.com/2000Election.html>.
- Ferguson, K. (1991). *Stephen Hawking: Quest for a theory of everything*. New York: Bantam Books.
- Fukuyama, F. (1992). *The end of history and the last man*. New York: Avon Books.
- Governo, E. (2003). Historian of things that never were. Retrieved April 20, 2003 from the World Wide Web: <http://www.mts.net/~arphaxad/history.html>.
- Henderson, B. (Ed.) (1996). *Minutes of the lead pencil club*. Wainscott, New York: Pushcart Press.
- HNN Staff (2003). 2002: Year of the scandal. Retrieved February 17, 2003 from the World Wide Web: <http://hnn.us/articles/1176.html>.
- Kosalka, D. (2002). Historian underground. Retrieved February 17, 2003 from the World Wide Web: <http://www.lemmingland.com/under.htm>.
- Lee, J. (2002). "The machine that changed the world." Retrieved February 17, 2003 from the World Wide Web: <http://ei.cs.vt.edu/~history/TMTCTW.html>.
- Lessig, L. (2002). *The future of ideas*. New York: Random House.
- Moore, M. (1996). *Downsize this!* New York: HarperCollins.
- Moore, M. (2001). *Stupid White Men*. New York: HarperCollins.
- Negroponte, N. (1995). *Being digital*. New York: Random House.
- Owen, D. (2002). *Hidden secrets*. Buffalo, New York: Firefly Books Ltd.
- Rayner, E., & Stapley, R. (2002). *Debunking history*. Phoenix Mill, England: Sutton Publishing Ltd.

Rhodes, R. (Ed.) (1999). *Visions of technology*. New York: Simon & Schuster.

Robbins, J. (Ed.) (1999). *The pleasure of finding things out: the best short works of Richard P. Feynman*. Cambridge, Massachusetts: Perseus Publishing.

Sagan, C. (1996). *The demon-haunted world*. New York: Random House.

Santayana, G. (1924). *The life of reason or the phases of human progress: reason in common sense*, 2nd Edition. New York: Charles Scribner's Sons.

Sclove, R. (2001). *Democratic politics of technology: the missing half*. Retrieved February 17, 2003 from the World Wide Web: <http://www.loka.org/idt/intro.htm>.

Smithsonian Institute (2003). "You be the historian," National Museum of American History, Hands on History Room. Retrieved March 21, 2003 from the World Wide Web: <http://americanhistory.si.edu/hohr/>.

Swade, D. (2000). *The difference engine*. New York: Penguin Putman.

Vinen, R. (2001). *A history in fragments: Europe in the 20th century*. London: Little, Brown.

Zwirko, W. (2003). *Embedded journalists' reporting questioned*, The Freedom of Information Center. Retrieved April 9, 2003 from the World Wide Web: <http://foi.missouri.edu/jourwarcoverage/embeddedj.html>.