

**Stoll, C. (1995). *Silicon snake oil: Second thoughts on the information highway*. New York: Doubleday, \$22.00, 247pp. (ISBN 0-385-41993-7)**

Reviewed by Eli T. Vestich

Snakeoil is defined as any of various substances or mixtures claimed to have miraculous curing capabilities without regard to their medical worth or properties. When proponents of communications and educational technologies speak of endless opportunities and educational experiences, are they offering society a "silicon snakeoil?" These are questions asked in the latest book by Clifford Stoll. *Silicon Snake Oil: Second thoughts on the information highway*, is Clifford Stoll's critique of the Internet, or as Vice President Gore called it, the information superhighway.

Clifford Stoll is somewhat of an enigma in the world of computer science. Heralded as a computer security expert and astronomer, he is known as the man who tracked and caught a German spy ring operating over the Internet. In the summer of 1986 Stoll, a Berkeley graduate student, was employed by the Berkeley computer center. Stoll's first assignment was to track down a seventy-five cent accounting error. It was this accounting error which would lead Stoll on the trail of German computer hackers attempting to steal sensitive military information for the KGB. In the following year, with little or no help from government agencies, Stoll tracked and baited the hackers so that the authorities could have enough evidence to make arrests. Stoll has served as a computer security consultant for the Federal Bureau of Investigation, Central Intelligence Agency, and the National Security Agency. The story of the German computer spy ring is documented in Stoll's first novel, *The Cuckoo's Egg*.

Stoll professes to love his on-line community, yet he is very passionate that the Internet and educational technologies are leading us away from sound educational practices. As technology educators, should we be concerned that sophisticated technological advances may be separating the teachers from the students?

Stoll writes in a very conversational prose which is well suited to emphasize his passion for his ideas. He makes a clear statement that the world on the Internet is a technological fabrication which he fears is being substituted for reality. He compares interactive fantasy role playing games, designed to simulate adventuring into dangerous treasure filled caves and catacombs, to an actual caving expedition where the dangers and treasures are real. Stoll describes the excitement of crawling through actual caverns utilizing his senses and physical stamina, tools rarely used in a computer simulation. He introduces the

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Eli Vestich is a Senior Instructor in the Department of Industrial and Engineering Technologies at Shawnee State University, Portsmouth, Ohio.

reader to a Chinese astronomer who, using trigonometry tables and twelve abacuses, performs complex astronomical calculations by hand. Due to the inaccuracies of ancient Chinese astronomical records the astronomer had to take meticulous care in developing a method to compensate for the variance in the accuracy of ancient astronomers. Stoll is humbled when he attempts to expedite the astronomer's efforts by plugging data into his laptop, when he realizes that due to the nature of the problem, his number crunching machine is worthless. He draws an analogy between USENET and CB radio and compares how each has made a transformation from a communication system to a venue for vilification and profanity. Stoll describes how a perfectly legitimate discussion on Internet bulletin boards can quickly turn into "flame wars" where the individuals trade insults in a manner normally described as libel. With no effective methods of policing the Internet, these situations are increasingly more common and tend to interfere with a valid use of the medium. The USENET is an example which Stoll often uses to describe how a communication system with tremendous potential is wasted on the Internet. He criticizes a failed distance learning program that could have better spent their seven million dollars on teachers and books. Ultimately, Clifford Stoll feels that computers are frustrating, prone to obsolescence, costly, and a distraction to real learning.

Stoll's use of slang and casual tone may be a distraction to readers who prefer formal scholarly work. However, Stoll's tone may be deceptive and could cause one to underestimate the depth of his analysis. Based upon his experience with the networks, Stoll makes many valid points. He argues that teachers should not be so seduced by the virtual world of technology such that they forget that they have real students with real lives and real questions requiring real answers. Stoll also argues that school administrators have a tendency to become overly enthusiastic about bringing computers into the classroom, and he wonders why? The costs of computers do not solve the problems of covering the costs of salaries, books, or paper. Likewise, books, pencils, and paper don't have a street value. Computers and their accessories on the other hand, are routinely stolen from schools. Stoll questions whether proponents of the high-tech classroom have thoroughly examined their position. He argues that when computers break down, they are a distraction to the classroom.

Try rebooting from a cooked hard disk in front of thirty impatient sixth-graders. Or install a complex piece of software during the ten minutes between classes. This preparation and overhead isn't considered by advocates for the high-tech classroom (p. 127).

The high-tech classroom infringes upon the vital interaction taking place in a student-teacher relationship. Many students are prone to hide behind computer monitors, ignore the instructor to surf the Internet, and avoid taking notes simply because there's a computer terminal where their notebooks should be.

Stoll re-emphasizes his belief that the most comprehensive educational programming and technology systems could never replace a quality teacher. He recalls his own experience in a graduate physics class. The professor is

discussing radiative transfer as Stoll is daydreaming in the back of the classroom. The professor realizes that Stoll isn't quite following the lecture and pauses to ask Stoll a few questions. Caught off-guard, Stoll has to think quickly and come up with a valid response. Fumbling through his first few questions, Stoll is skillfully led to the answer by a talented professor, using the only educational tool available; the Socratic method. Stoll states that there are plenty of computer programs that calculate radiative transfer, and even admits to writing some of them. However he believes that there are no software programs which could have taught him "as effectively as goofing off in Professor Marty Tomasko's class did" (p. 120).

Stoll believes that computers inhibit critical thinking and creative thought. It is his contention that science and math-based software programs feed the student someone else's logic instead of encouraging them to develop their own. Clifford Stoll presents an argument that is recurring in the scholarly literature of technology education. Have we become too technocratic? Has the philosophy of technology education forgotten the social ideas of Dewey, Bonser, and Mossman? Stoll speaks of a teenage computer wizard in Berkeley who began using a computer when he was three, but can't hold a normal conversation with an adult. Will this be the outcome of technology education? Are instructors of technology justified to spoon feed a pre-packaged tutorial to their students and let them work at their own pace? Isn't there more justification to initiating topical conversations and cooperative ventures into the classroom? This could create an atmosphere more conducive to problem solving where students are more comfortable to voice their concerns and ideas. Just think, an arena where a quality teacher is given the opportunity to reach the day dreamer and interact in the learning process!

At first glance, it may seem that Stoll is advocating an Orwellian paranoia directed at technology. To the contrary, Stoll believes there are a few flowers in this garden which are worth acknowledging. He recalls a group of seventh grade students using the Internet to exchange poetry; international collaborations in the sciences and humanities; and using the Internet to send specialized mailings for nonprofit groups. Stoll admits that on the first of every month he's involved in the "Great Internet Hunt." This is a contest which is posted every month consisting of various trivia questions. A competitor receives zero points for correct answers but receives credit for how he or she found the answers. This is an application of technology which he feels promotes creative thought.

This book is directed at Internet aficionados as well as the people who are fascinated and anxious to get on-line. Technology education is never mentioned. So why would I recommend this book to the practitioners of our field? I recommend *Silicon Snake Oil* regardless of its attacks on technology. Clifford Stoll's soliloquy is rambling, quirky, and laden with sarcasm. However Stoll writes with conviction and his arguments are not unfounded. If *Silicon Snake Oil* does anything, it encourages the reader to think critically about technology in our society. And after all, isn't that exactly what we are trying to do for our students?