Computers and the Information Revolution

The Impact of the Information Revolution

What has been the impact of the information revolution, and how should Christians respond? Those are the questions we will consider in this essay. Let’s begin by considering how fast our world shifted to a computer-based society. At the end of World War 2, the first electronic digital computer ENIAC weighed thirty tons, had 18,000 vacuum tubes, and occupied a space as large as a boxcar. Less than forty years later, many hand-held calculators had comparable computing power for a few dollars. Today most people have a computer on their desk with more computing power than engineers could imagine just a few years ago.

The impact of computers on our society was probably best seen when in 1982 *Time* magazine picked the computer as its “Man of the Year,” actually listing it as “Machine of the Year.” It is hard to imagine a picture of the Spirit of St. Louis or an Apollo lander on the magazine cover under a banner “Machine of the Year.” This perhaps shows how influential the computer has become in our society.

The computer has become helpful in managing knowledge at a time when the amount of information is expanding exponentially. The information stored in the world’s libraries and computers doubles every eight years. In a sense the computer age and the information age seem to go hand in hand.

The rapid development and deployment of computing power however has also raised some significant social and moral questions. People in this society need to think clearly about these issues, but often ignore them or become confused.

One key issue is computer crime. In a sense, computer fraud is merely a new field with old problems. Computer crimes are often nothing more than fraud, larceny, and embezzlement carried out by more sophisticated means. The crimes usually involve changing address, records, or files. In short, they are old-fashioned crimes using high technology.

Another concern arises from the centralization of information. Governmental agencies, banks, and businesses use computers to collect information on its citizens and customers. For example, it is estimated that the federal government has on average about fifteen files on each American. Nothing is inherently wrong with collecting information if the information can be kept confidential and is not used for immoral actions. Unfortunately this is often difficult to guarantee.

In an information-based society, the centralization of information can be as dangerous as the centralization of power. Given sinful man in a fallen world, we should be concerned about the collection and manipulation of vast amounts of personal information.

In the past, centralized information processing was used for persecution. When Adolf Hitler’s Gestapo began rounding up millions of Jews, information about their religious affiliation was stored in shoe boxes. U.S. Census Bureau punch cards were used to round up Japanese Americans living on the West Coast at the beginning of World War II. Modern technology makes this task much easier.

Moreover, the problem it not limited to governmental agencies. Many banking systems, for example, utilize electronic funds-transfer systems. Plans to link these systems together into a national system could also provide a means of tracking the actions of citizens. A centralized banking network could fulfill nearly every information need a malevolent dictator might have. This is not to say that such a thing will happen,

but it shows the challenges facing each of us due to the information revolution.

The Social Challenges of Computers

One of the biggest challenges raised by the widespread use of computers is privacy and the confidentiality of computer records. Computer records can be abused like any other system. Reputations built up over a lifetime can be ruined by computer errors and often there is little recourse for the victim. Congress passed the 1974 Privacy Act which allows citizens to find out what records federal bureaucracies have on them and to correct any errors. But more legislation is needed than this particular act and Congress needs to consider legislation that applies to the information revolution.

The proliferation of computers has presented another set of social and moral concerns. In the recent past most of that information was centralized and required the expertise of the "high priests of FORTRAN" to utilize it. Now most people have access to information because of increasing numbers of personal computers and increased access to information through the Internet. This access to information will have many interesting sociological ramifications, and it is also creating a set of troubling ethical questions. The proliferation of computers that can tie into other computers provides more opportunities for computerized crime.

The news media frequently carry reports about computer "hackers" who have been able to gain access to confidential computer systems and obtain or interfere with the data banks. Although these were supposed to be secure systems, enterprising computer hackers broke in anyway. In many cases this merely involved curious teenagers. Nevertheless, computer hacking has become a developing area of crime. Criminals might use computer access to forge documents, change records, and draft checks. They can even use computers for blackmail by holding files for ransom and threatening to destroy them if

their demands are not met. Unless better methods of security are found, professional criminals will begin to crack computer security codes and gain quick access into sensitive files.

As with most technological breakthroughs, engineers have outrun lawmakers. Computer deployment has created a number of legal questions. First, there is the problem of establishing penalties of computer crime. Typically, intellectual property has a different status in our criminal justice system. Legal scholars should evaluate the notion that ideas and information need not be protected in the same way as property. Legislators need to enact computer information protection laws that will deter criminals, or even curious computer hackers, from breaking into confidential records.

A second legal problem arises from the question of jurisdiction. Telecommunications allows information to be shared across state and even national borders. Few federal statutes govern this area and less than half the states have laws dealing with information abuse.

Enforcement will also be a problem for several reasons. One reason is the previously stated problem of jurisdiction. Another is that police departments rarely train their personnel in computer abuse and fraud. A third reason is lack of personnel. Computers are nearly as ubiquitous as telephones or photocopiers.

Computer fraud also raises questions about the role of insurance companies. How do companies insure an electronic asset? What value does computer information have? These questions also need to be addressed in the future.

Computers are a wonderful tool, but like any technology poses new challenges in the social and political arenas. I believe that Christians should be the forefront of these new technologies providing wise direction and moral guidelines. We need Christians in the fields of computer technology and

electrical engineering who can wisely guide us into the 21st century.

Principles for Computer Ethics

I would like to propose some principles for computer ethics. The first principle is that **one should never do with computers what he or she would consider immoral without them.** An act does not gain morality because a computer has made it easier to achieve. If it is unethical for someone to rummage through your desk, then it is equally unethical for that person to search your computer files. If it is illegal to violate copyright law and photocopy a book, then it is equally wrong to copy a disk of computer software.

A second principle is to **treat information as something that has value.** People who use computers to obtain unauthorized information often do not realize they are doing something wrong. Since information is not a tangible object and can be shared, it does not seem to them like stealing since it does not deprive someone of something. Yet in an information-based society, information is a valuable asset. Stealing information should carry similar legal penalties as stealing tangible objects.

A third principle is to remember that **computers are merely tools to be used, not technology to be worshiped**. God's mandate is to use technology wisely within His creation. Many commentators express concern that within an information society, people may be tempted to replace ethics with statistics.

Massive banks of computer data already exert a powerful influence on public policy. Christians must resist society's tendency to undermine the moral basis of right and wrong with facts and figures. Unfortunately, growing evidence indicates that the computer revolution has been a contributing factor in the change from a moral foundation to a statistical one. The

adoption of consensus ethics (“51 percent make it right”) and the overuse of cost-benefit analysis (a modernized form of utilitarianism) give evidence of this shift.

Fourth, **computers should not replace human intelligence.** In *The Society of Mind* Marvin Minsky, professor at the Massachusetts Institute of Technology, says that “the mind, the soul, the self, are not a singly ghostly entity but a society of agents, deeply integrated, yet each one rather mindless on its own.” He dreams of being able ultimately to reduce mind (and therefore human nature) to natural mechanism. Obviously this is not an empirical statement, but a metaphysical one that attempts to reduce everything (including mind) to matter.

The implications, however, are profound. Besides lowering humans to the material process, it begins to elevate machines to the human level. One article asked the question, Would an Intelligent Computer Have a “Right to Life?” Granting computer rights might be something society might consider since many are already willing to grant certain rights to animals.

In a sense the question is whether an intelligent computer would have a soul and therefore access to fundamental human rights. As bizarre as the question may sound, it was no doubt inevitable. When seventeenth-century philosopher Gottfried Wilhelm von Leibniz first described a thinking machine, he was careful to point out that this machine would not have a soul, fearful perhaps of reaction from the church. But this will be our challenge in the future: how to manage new computing power that will most likely outstrip human intelligence.

The Bible teaches that humans are more than bits and bytes, more than blood and bones. Created in the image of God, human beings have spiritual dimensions. They are more than complex computers. Computers should be used for what they do best: analyze discrete data with objective criteria. Computers are a wonderful tool, but they should not replace human intelligence

and intuition.

Biblical Principles Concerning Technology

I would like to present a set of biblical principles concerning technology in general and computer technology in particular.

In essence, technology is the systematic modification of the environment for human ends. Often it is a process or activity that extends or enhances a human function. A microscope, for example, extends man's visual perception. A tractor extends one's physical ability. A computer extends a person's ability to calculate. Technology also includes devices that make physical processes more efficient. The many chemical processes we use to make products fit this description of technology.

The biblical mandate for developing and using technology is stated in Genesis 1:28. God gave mankind dominion over the land, and we are obliged to use and manage these resources wisely in serving the Lord. God's ideal was not to have a world composed exclusively of primitive areas. Before the Fall (Gen. 2:15) Adam was to cultivate and keep the Garden of Eden. After the Fall the same command pertains to the application of technology to this fallen world, a world that "groans" in travail (Rom. 8:22). Technology can benefit mankind in exercising proper dominion, and thus remove some of the effects of the Fall (such as curing disease, breeding livestock, or growing better crops).

Technology is neither good or evil. The worldview behind the particular technology determines its value. In the Old Testament, technology was used both for good (e.g., the building of the ark, Gen. 6) and for evil (e.g., the building of the Tower of Babel, Gen. 11). Therefore the focus should not be so much on the technology itself as on the philosophical motivation behind its use. There are a number of important principles that should be considered.

First, **technology should be seen as a tool, not as an end in itself.** There is nothing sacred about technology. Unfortunately Western culture tends to rely on it more than is appropriate. If a computer, for example, proves a particular point, people have a greater tendency to believe it than if the answer was a well-reasoned conclusion given by a person. If a machine can do the job, employers are prone to mechanize, even if human labor does a better or more creative job. Often our society unconsciously places machines over man. Humans become servants to machines rather than the other way around.

There is a tendency to look to science and engineering to solve problems that really may be due to human sinfulness (wars, prejudice, greed), the fallenness of the world (death, disease), or God's curse on Adam (finite resources). In Western culture especially, we tend to believe that technology will save us from our problems and thus we use technology as a substitute for God. Christians must not fall into this trap, but instead must exhibit their ultimate dependence on God. Christians must also differentiate between problems that demand a technological solution and ones that can be remedied by a social or spiritual one.

As Christians we should see the value of technology but not be seduced into believing that more and better technology will solve social and moral problems. Computers and the Internet will tell us more about *how* people live, but they won't tell us how *to* live. Televisions, VCRs, and computers may enrich our lives, but they won't provide the direction we need in our lives. The answer is not more computers and more technology. The ultimate answer to our problems is a personal relationship with Jesus Christ.

A second principle is that **technology should be applied in different ways, according to specific instructions.** For example, there are distinctions between man and animal that, because we are created in God's image (Gen. 1:26-27), call for different applications of medical science. Using artificial

insemination to improve the genetic fitness of livestock does not justify using it on human beings. Christians should resist the idea that just because we can do something we should do it. Technological ability does not grant moral permission.

Many commentators, most notably E. F. Schulmacher, have focused on the notion of appropriate technology. In Third World countries, for example, sophisticated energy-intensive and capital-intensive forms of agriculture may be inappropriate for the culture as it presently exists. Industrial advance often brings social disruption and increasing havoc to a society. Developing countries must use caution in choosing the appropriate steps to industrialize, lest they be greatly harmed in the process.

I believe we should resist the temptation to solve every problem with computers. Our society today seems bent to putting computers in every classroom and in every place of work. As helpful as computers may be, I believe we need to question this seemingly mindless attempt to fill our world with computers. They are a wonderful tool, but that is all they are. We must be careful not to substitute computers for basics like phonics, mathematics, logic, and wise business practices.

Third, **ethics rather than technology must determine the direction of our society.** Jacques Ellul has expressed the concern that technology moves society instead of vice versa. Our society today seems all too motivated by a technological imperative in our culture. The technological ability to do something is not the same as a moral imperative to do it. Technology should not determine ethics.

Though scientists may possess the technological ability to be gods, they nevertheless lack the capacity to act like gods. Too often, man has tried to use technology to become God. He uses it to work out his own physical salvation, to enhance his own evolution, or even to attempt to create life. Christians

who take seriously human fallenness will humbly admit that we often do not know enough about God's creation to use technology wisely. The reality of human sinfulness means that society should be careful to prevent the use of technology for greed and exploitation.

Technology's fruits can be both sweet and bitter. C.S. Lewis writes in *The Abolition of Man*, "From this point of view, what we call Man's power over Nature turns out to be power exercised by some men over men with Nature as its instrument. . . . There neither is nor can be any simple increase of power on Man's side. Each new power won by man is a power over man as well. Each advance leaves him weaker as well as stronger. In every victory, besides being the general who triumphs, he is also the prisoner who follows the triumphal car."

Christians must bring strong biblical critique to each technological advance and analyze its impact. Computers are a wonderful tool, but Christians should constantly evaluate their impact as we live through the information revolution.