

# The Impact of Modern Technology

## **Computers and employment**

The introduction of computers into commerce , industry and government organisations has undoubtedly caused far reaching changes in patterns of employment, causing hardship to some and bringing new opportunities to others. Perhaps the changes have not been quite as drastic as some people forecast: for example:

"Unemployment in the UK will rise to 25% by 1990"

(Jenkins and Sherman 1979)

"Employment as we know it will be down to 10% in 30 years' time"

(Stonier 1979)

Read through this list of statements below, and indicate your opinion on each with a number 1-5, -where 1=strongly agree, 2=agree, 3=don't know, 4=disagree, 5=strongly disagree.

Over the past decade, the widespread use of computers has:

1. put many people out of work	1.....2.....3.....4.....5
2. changed the nature of many people's work.	1.....2.....3.....4.....5
3. resulted in a de-skilling of some jobs	1.....2.....3.....4.....5
4. made some people's jobs more interesting.	1.....2.....3.....4.....5
5. resulted in an increase in the total number of unemployed people	1.....2.....3.....4.....5
6. enabled some organisations to operate more efficiently	1.....2.....3.....4.....5
7. resulted in an increase in the number of bankruptcies	1.....2.....3.....4.....5
8. created many new job opportunities	1.....2.....3.....4.....5
9. made some people's work environment more pleasant	1.....2.....3.....4.....5
10. forced people to learn new skills	1.....2.....3.....4.....5

In the 1950s and 1960s when computerisation was just beginning, computers were largely used to replace clerical or routine manual tasks. There is no doubt that an

enormous number of clerical jobs has disappeared since the introduction of computers. In banks, for example, clerical staff manually prepared customers' bank statements, counter staff counted out cash for customers making withdrawals, payroll clerks prepared payslips for thousands of employees.

For many years the banks were able to avoid laying off employees owing to the enormous increase in business, but in the late 1990s thousands of bank and Building Society employees have lost their jobs, replaced by cash machines, telephone banking, and electronic funds transfer.

In the 1970s and 80s, huge job losses occurred in industry, with production control systems taking over jobs which were previously performed manually; factories making everything from biscuits to heavy engineering equipment found it more cost-effective to use computer-controlled machines and robots than to hire manual workers.

Name another category of work where computerisation has resulted in job losses over recent years

### The electronic office

The advent of personal computers has brought about a revolution in office life.

- **word processing and desktop publishing** allow easy editing and retrieval of documents, as well as the production of high quality newsletters, brochures or manuals within the organisation, where previously the work would have to have been sent out to a printer for layout and typesetting. Scanners may be used to capture graphics, photographs or text from other sources.
- **databases** have largely replaced manual filing systems, providing fast and easy access to information that in the past would have been time-consuming or impossible to obtain.
- **spreadsheets, accounts software, job-scheduling software** and numerous other applications packages have made the jobs of planning, budgeting, monitoring and accurate record keeping far easier.
- **local area networks** mean that people can share software, data and hardware such as modems and laser printers.
- **wide area networks** allow people to communicate across the world via electronic mail, and access on-line databases anywhere in the world.
- **video conferencing** enables people in different locations, perhaps on the other side of the world, to hold meetings and be able to see each other on their PC

screen. A video camera at each end captures the image and transmits it to the person at the other end via a modem and phone link, while a microphone captures the sound and transmits it simultaneously.

### The impact of the Internet

It is now possible for anyone with a telephone link to connect up to the Internet via a service provider such as CompuServe, Freeserve, Virgin.net, etc.

This gives access to

- electronic mail
- newsgroups on almost any topic
- files of software, photographs, catalogues, games etc which can be downloaded to your own hard disk.
- electronic shopping and banking
- access to databases all over the world via a 'Web Browser' such as Internet Explorer or Netscape.

What is the downside to all this? While the wealthy and educated have the means and skills to shop, bank, enjoy live entertainment and even vote from home, an electronic underclass, denied access to the superhighway society, could create problems of havoc and disorder.

- shopping on the Internet will attract fraudsters and thieves
- information about military bases in various countries, and detailed instructions on how to make bombs, are freely available on the Internet
- paedophilia and other unsavoury material can be downloaded by anyone in the comfort of their own homes.

With the proliferation of desktop PCs and the increasing use of online databases, it has become feasible for many people to work from home ('teleworking'). What are the advantages and disadvantages of this to (a) the employer and (b) the worker?

### Health and safety in the office

Health and safety at work: is not a subject which most office managers would regard as being of great significance to them. Who ever heard of an employee getting caught in the paper shredder or electrocuting themselves on their VDU?

Nevertheless, there are more subtle dangers which arise from the constant use of a keyboard and VDU. These include

- **RSI (Repetitive Strain Injury).** This is a disorder of the arms and wrists which can be caused by using a keyboard for long stretches of time without regular breaks. The sufferer at first feels pain in the arms and wrists which may worsen to the point where even picking up, say, a kettle may be impossible. Moreover, the condition is very difficult to cure. In one recent case, a journalist sued his employers for £250,000 for loss of earnings over an extended period due to RSI.
- **eyestrain.** Problems of glare, flicker and focus all contribute to this problem.
- **radiation.** Some studies show a possible link between VDU use and miscarriages or chromosomal defects.

### Safety and the law

A European Community directive on the health requirements for working with VDU's became law in December 1992. It includes various clauses such as those outlined below.

- Employees work must be planned in such a way that VDU work is periodically interrupted by breaks or changes in activity.
- All employers must undertake an analysis of workstations to evaluate the risks to eyesight, physical problems and menial stress, and take appropriate action to remedy any risks found.
- Technical requirements for the design of workstations are laid down—for example, the keyboard must be separate from the screen, the chair must allow freedom of movement, be adjustable in height and tiltable.

Several firms are developing software to help ensure these requirements are adhered to. Computer Systems has developed a package called Tempus which, after a pre-set time, puts a message on the screen advising a break. The system keeps a log to record when screen breaks have been recommended and whether they were taken.

The AEB has produced an Interactive Multimedia Training package on diskette entitled 'Working With Display Screen Equipment' which combines graphics, animation and interactive questions and answers in an entertaining manner.

Take a look around the computer room. Identify three likely health and safety hazards.

## **Computers and the police**

Computers are widely used in crime detection. Computerised files of fingerprints enable known criminals to be identified, and databases of stolen cars help in the recovery of vehicles. In a 1991 case, computers helped to catch Rodney Witchelo, the man responsible for contaminating Heinz baby food jars, forcing the company to destroy 100 million jars of food worth £32 million.

He attempted to blackmail the company, demanding that they pay large amounts of money into a Halifax Building Society account, which they did, under police supervision. Hundreds of police watched all the cashpoint machines in a targeted area, and the Building Society computers were specially programmed to slow down their response to Witchelo's requests for cash so as to give the police time to identify him. The plan worked, and he was eventually caught.

## **How reliable are computers?**

In some of today's computer applications, our lives may depend on the computer functioning correctly. The computer systems are thoroughly tested. But can testing be sufficiently rigorous to eliminate the possibility of failure? The answer is probably "No".

One example of reliance on computer technology is the system used by the Airbus 320, known as a 'fly by wire' aircraft, in which three computers control all the flight surfaces and the engines. If there is disagreement among the computers they will make a majority decision as to the appropriate course of action, and if the computers disagree with the action of the pilot then the computer decision will be accepted.

In order to minimise the possibility of software error, the three computers were programmed by completely different teams of software engineers, in the hope that any errors which crop up in one would not be repeated in the other two.

In June 1988 when the Airbus A320 crashed spectacularly at an air show while making a low-level pass over spectators, the pilot reported that his instructions to gain altitude had been overruled by the on-board computer. On another occasion, an Indian Airlines plane on a routine flight crashed in perfect weather as it was coming in to land, and an independent investigator found that the A320 did not obey the pilot's commands in the last few seconds before impact.

In hospitals, cases have been reported of people receiving the wrong doses of radiation owing to computer malfunction. In other cases, we could be at risk from criminal or terrorist activity, for example by interfering with the control systems of a nuclear power station,

## **Impact of technology on society in general**

No one in a modern industrialised society is unaffected by computers. In the supermarket, bank, library, hospital and travel agency, we take their presence for granted. Computerised bills and statements, personalised letters inviting us to participate in yet another million pound draw, join a new private health scheme, make a charity donation or add our names to the electoral roll, remind us that our names are on computer databases all over the country.

The first computer was activated on February 14, 1946, at the University of Pennsylvania. It weighed 30 tons and filled an entire room. Today a desktop computer has greater capabilities. Very few people could have foreseen then how computers would affect so many aspects of our daily lives.

In what ways have computers improved the quality of life for the ordinary person? Are there any ways in which the use of computers has contributed to a supposed decline in our quality of life?

**Exercises:**

1. (a) Briefly describe three different systems in which computers are involved in the payment for purchased goods or services. In each case describe clearly the role of the computer.  
  
(b) Do you think that computers will eventually eliminate the need for cash transactions? Explain your answer.
2. Outline two reasons to explain why the continuing Information Technology revolution led to loss of jobs in the early 1990s.
3. Far greater attention is now being given to the potential health hazards of working with computers. Identify two such hazards and explain briefly how their effects can be alleviated.
4. A mail order company which currently uses manual procedures is proposing to modernise its organisation by using computers.  
Discuss, in an essay, the possible effects of this change.  
You should address:
  - how job patterns alter
  - the advantages and disadvantages to the workforce.

## **Case study: The cashless society**

National Westminster Bank has developed an alternative to cash—a plastic card with a microchip which stores "electronic money" and can be topped up over the phone. A year-long trial of the card, called Mondex, will take place in Swindon in 1995, involving about 10,000 people, and will be run in conjunction with Midland Bank and British Telecom.

The system lets people add money to their card by using adapted cash dispensers or telephones to access their accounts. Once charged with money, the card becomes the equivalent of cash. Payments are made by slipping the card into a retailer's terminal.

The sum is transferred from the card to the retailer without need for time-consuming authorisations or signatures. Provided there is enough money on the card, the transaction will take place.

Payments between individuals are carried out by inserting the card into a pocket-sized electronic wallet and making six keystrokes. Customers and retailers can deposit electronic money into their bank accounts over the phone. The system is not intended to replace credit cards, but is designed for both small and large payments.

Small traders, for example a newspaper vendor, could have a battery-powered terminal.

At the moment, cash is still used for 90% of all transactions in Britain, and handling the cash costs the banks more than £4.5 billion a year. The Mondex card would be quicker and more convenient to handle than cash, but if the card was lost or stolen, the money on it would be lost as it would be in a missing wallet. However, cards could be 'locked' to prevent unauthorised use by tapping in a four-digit personal code. Once locked, the money could not be spent without re-entering the code.

Initially, cash dispensers would be adapted to give customers the choice between drawing physical or electronic money. The telephone, however, would be the most important access point, BT is planning to adapt its payphones, and special phones for home use are being designed. Customers will insert the card into the phone, triggering an automatic call to the bank's computer system. After a prompt, the customer will tap in his PIN, and transfer money to the card or vice-versa.

Mondex is a multi-currency system, capable of holding five separate currencies on a card simultaneously. Other British and foreign banks will be invited to join Mondex in due course to create a "global payment scheme".

(Adapted from an article in the Guardian, December 10 1993}

Answer the following questions:

- a. "Britain will become a completely cashless society". Give two reasons why this statement may be true and two reasons why it may never come true. (4 marks)
- b. Give one advantage and one disadvantage to members of the general public of using a Mondex card rather than cash. (2 marks)
- c. Give one advantage to the banks, and two to retailers, of the use of these cards rather than credit cards. (3 marks)
- d. Give three distinct items of information which each card will have encoded on it. (3 marks)
- e. Give two precautions the bank could take to minimise disruption to the system caused by computer hardware failure. (2 marks)
- f. Describe briefly two security risks in this system, and two ways in which these risks can be minimised. (4 marks)