What can IT provide
INFO 2

Oliver Boorman-Humphrey

www.oliverboorman.biz

28 May 2013

This Time

Last time, we looked at at the relationship between people and IT systems.

This time we look at what ICT systems can provide to humans.

What ICT can provide?

Most people these days use IT on a daily basis. 50 years almost no-one did. How has that improved/changed society?

Why has IT use become so widespread?

What ICT can provide?

IT system provide 6 key benefits to a user:

➜ Fast, repetitive processing;

➜ Vast storage capability;

➜ Improved presentation of information;

➜ Improved accessibility to information and services;

➜ Improved security of data and processes;

➜ The facility to search and combine data in many different ways that would otherwise be impossible.

Fast, repetitive processing

Weather forecasting systems use a special type of computer called a supercomputer designed to carry out fast, repetitive processing, sometimes called number crunching.

Similar systems for producing utility bills carry out processes like calculations in order to produce an accurate bill.

Robots, designed to create cars, carry out fast, repetitive processing so that the cars produced are all the same and built to the same standard.

These processes are carried out time and time again without making mistakes.

Vast storage capability

Most industrial ICT systems store vast amounts of data.

As computers are now used more and more for systems like the census, shopping online, and online databases (such as the one held by the DVLA), they are required to store a massive amount of data.

Facebook, said in 2012 that it stores over 100 *peta*bytes (PB) of media (photos and videos). Its not unrealistic to say that Facebook probably has a total storage of capacity well beyond that, once you factor in backups and other data (status updates, likes etc), possibly in the 300PB range.

Improved presentation of information

When a computer is used the output looks far more professional than the same work could be if carried out by hand.

If, when the presentation has been produced, it does not match the needs of the client then it can be easily changed without having to produce the whole thing again.

Improved security of data and processes

Files that are not stored on a computer can be locked in a filing cabinet, but if someone gains access to the filing cabinet then these files become vulnerable; on a computer system each file can be encrypted so the data contained is scrambled and then protected with a password.

This means, in general, that any data is far more secure on an ICT system than stored manually.

The increased use of IT brings along a whole host of new security threats though!

The facility to search and combine data

As we previously said, a computer stores massive amounts of data; this data needs to be retrieved quickly for it to be useful.

The Internet is a vast 'database' which has to be searched quickly in order to be effective, for example if you search for the word computer on Google, it will identify 1,920,000,000 websites in 0.21 seconds; this would be impossible to do any other way!

When the data is retrieved it can be merged with other items to produce things like invoices, mail-merged letters etc.

Is the use of ICT systems always appropriate?

ICT systems do have limitations in what they can be used for.

ICT systems improve the way that we process data and make life easier for the operators and help to make work more efficient. However, sometimes even a computer can get it wrong:

➔ Computers only do what you tell them to do!
➔ Computers can not generate information on their own;
➔ An IT system will give you the wrong output if you give it the wrong input (GIGO);
➔ Computer can not detect incorrect input (unless it has been 'trained' by a human!).

Why do ICT systems fail?

The larger the system, the more severe the consequences if a system fails. For example, the failure of Airport Traffic Control software could have truly devastating consequences.

The most common reasons software fails include:

➔ Bugs in the software;
➔ Hardware failures;
➔ Implementing system too quickly;
➔ Insufficient testing;
➔ No end-user involvement;
➔ Insufficient user training;
➔ Inadequate hardware;
➔ New systems that are not compatible with old systems.

Incompatibilities

Different types of computer or even different types of operating system store their data differently, so data sent from one type of computer to another for example from a Mac to a PC may not be understood.

Companies have tried to get round this problem by creating systems that emulate other systems or save data in a common format like RTF (Rich Text Format) or PDF (Portable Document Format).

The Internet is the big success story of this transfer of data in that web pages can be viewed on any computer, irrespective of operating system or type, as they use a common format and programming language.

Types of processing

Data in an IT system can be processes in four different ways:

➜ Batch processing;
➜ Interactive processing;
➜ Transaction processing;
➜ Real-time processing.

Batch Processing

Uses: Production of bank statements, credit card statements, payroll, and utility bills like telephone, gas etc.

This is the simplest of the processing systems and is **not** time dependent.

Large volumes of similar transactions are collected over a period of time, then these batches are processed together, usually at night when the ICT system is quiet.

Data may go out-of-date very quickly and therefore can only be used in situations where this is not important, for example in billing systems.

The operation is usually automatic, therefore if there is a problem there is no one present to sort it out.

Interactive Processing

Uses: Touch screen booking systems, cash machines or kitchen design.

This method allows the user to communicate with the computer. It requires the user to react to the output of the system and then enter more data.

The system operates quickly so that the user can keep reacting to the system.

Transaction processing

Uses: Booking systems.

This method is sometimes called pseudo real-time processing and is widely used in e-commerce.

Data for each transaction is entered at source and processed immediately. Each transaction is completed before the next one is started.

In booking systems where this is used this stops double booking, as the transaction is locked until it is completed.

Real Time processing

Uses: Air traffic control, factory control, nuclear power plant.

This system will react fast enough to influence events outside the ICT system.

This system tends to use sensors and operates all the time. The system uses feedback where the data is processed in time to turn on a device so that the environment is maintained.