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Task 1

Information is a vital resource within an organisation and it is important that the users of this information have instant, appropriate access to it. Information must be shared across the organisation so that everyone can make his or her decisions using it.

1.1

Discuss the role of the following facilities within the context of the provision of information:

- Data bases
- Client servers
- Expert systems and Artificial Intelligence
- Data warehousing

Give brief details of the role each of the above plays in the provision, distribution or use of information.

Data bases

If we were to look at the BIFHE scenario before any integrated systems are put in place, we would see that each department is probably organising their data in a traditional file environment. This will either involve hardcopy's in filing cabinets, data stored on stand-alone computers, or both. This can cause many problems such as: data redundancy, programme-data dependency, inflexibility, poor data security and an inability to share data between applications and departments.

A properly implemented database system would irradiate many or all of these problems. The data from all departments within the organisation can be brought together and centralised therefore minimising redundant data and maximising accessibility. Users with different levels of access would be able to share information with colleagues and other departments much more efficiently. Essentially, a database makes the provision of information much easier as it can be accessed from anywhere within the organisation and as long as users have the appropriate access levels it no longer needs to be distributed.

Client servers

CENTRALISED SYSTEM
In a centralised system, all the data processing is performed by one central host computer or mainframe, which is accessed by many users through terminals or PC's which carry out virtually no processing.

DISTRIBUTED SYSTEM
In a distributed system, the data processes and interface components are distributed among the computers in a network. For example, the server may hold all the data centrally but each users machine by means of a locally stored interface would carry out all the processing of that data.

The later of these systems is by far the most popular, as it is much more efficient and therefore would be well suited for implementation within BIFHE. This would give every user the power to manipulate and process data and information at their own workstations without having to worry about a busy or congested server holding them up.

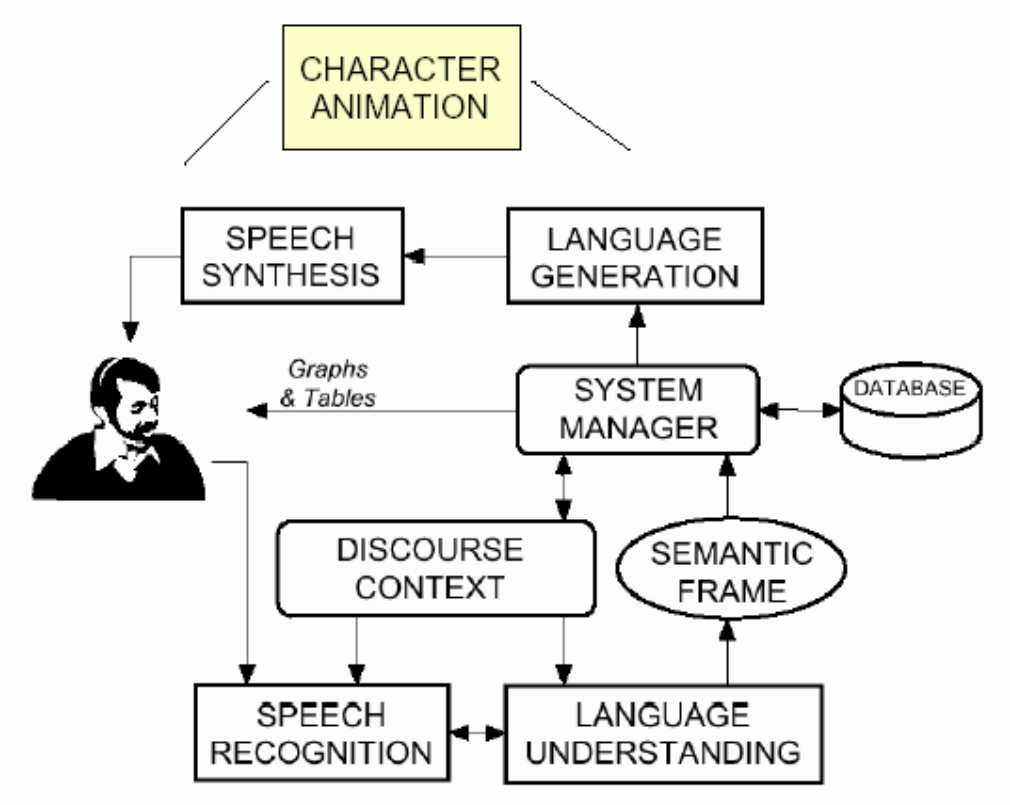
Expert systems and Artificial Intelligence

Expert systems are an extension of decision support systems, which would be used by the strategic level Management team in an organisation. They basically capture the knowledge of a human expert decision-maker. It then uses this data to make decisions and learn from the outcomes of those decisions, i.e. experience. The system compares expected outcomes with actual outcomes in much the same way as a human would, and then modifies its knowledge base and rules accordingly.
These expert systems need to be implemented in conjunction with Artificial Intelligence technology so they can effectively access and process data in a way that simulates the reasoning of an expert. The rule base is searched using an inference engine for one of the following strategies:

- Forward Chaining
  Simply uses the information entered to conduct a search of the rule base and arrive at a conclusion. Forward chaining systems are often called "production" systems. Each of the rules is actually a miniature procedure called a production. It is used primarily for diagnosis, for all other purposes forward chaining is only feasible when the number of possible outcomes is small. Only then would there be little or no advantages to using backward chaining.

- Backward Chaining
  Behaves more like a problem solver by starting with a hypothesis and searching for more information until it is proved or disproved, by assuming a wanted outcome and then checking to see if the rules are met. This requires fewer operations and therefore makes a more efficient expert system.

Below is a diagram of a typical AI system used for speech recognition, which clearly shows how complex these systems are.

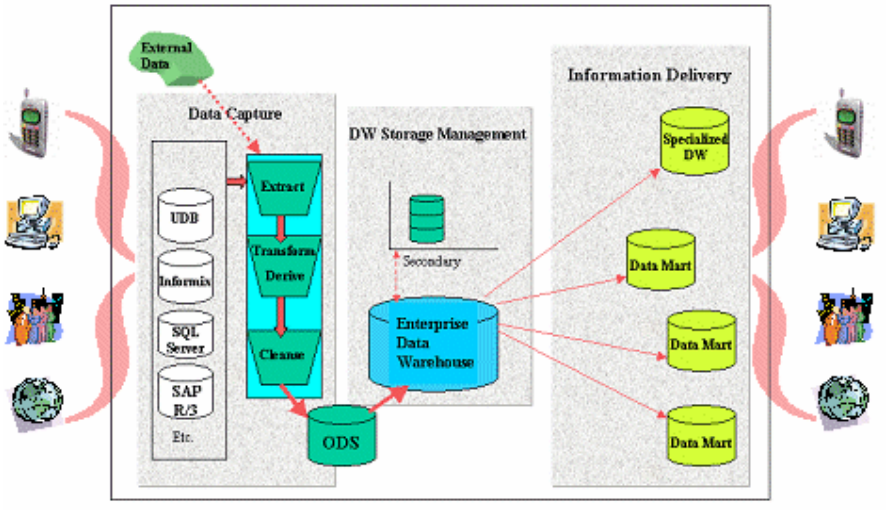


Data Warehousing

Within large organisations data often gets fragmented and isolated within different departments, making it almost impossible to make well informed decisions. Data warehouses are used to store operational and transaction data in a consistent and reliable way, so it can be used for formal and informal reporting.
It is basically a database of current and historical data, which can come from both internal and external sources such as the Internet. This data is all standardised and can be accessed when needed, but once it is stored in the data warehouse it can not be changed.

A data warehouse would be of great advantage to an organisation like BIFHE, as it would make the provision and distribution of appropriate information very efficient and easily manageable. It would allow high-level management reports with great detail and the ability to 'drill down'.

Below is a diagram of a typical data warehouse system.



1.2
Briefly explain the role that the Internet and Intranet could play a part in the search, retrieval, and distribution of information.

Intranet and Internet

The role that the Internet and Intranet play in today's business world can best be illustrated by looking at a scenario where they are not used and comparing the two.

Before the Internet became such a heavily used computing tool there where two main areas of disadvantage, communication and knowledge sharing. Companies would run their business on the assumption that there would have to be lots of meetings to bring people and information together. Although face to face meetings are still essential in some cases it is definitely an advantage to try and have as few as possible. They cost not only valuable man-hours, but can also be expensive in terms of money. People may need to travel to get to a meeting and if the meeting is long running there may be a requirement for food and/or accommodation.

The knowledge base of an organisation is also at a disadvantage, as there is no central resource for storing and accessing this information. For example, one department of a company may come across a problem and spend X amount of time and money trying to solve it, when another department may have already created a working solution. Without up to date communication and knowledge sharing solutions, this situation is hard to avoid.

Therefore it is easy to see how tools like Intranet and Internet facilities can be a huge advantage to large organisations. The Intranet, for example, can be a wealth of information about the company and the departments within it for all employees and only employees to access. The Internet can then back that up by providing excellent communication tools such as email, video-conferencing and GroupWare. The Internet is also an incredible research tool, which allows users to find and manipulate information on just about anything.

An organisation like BIFHE could also use the Internet for e-commerce, allowing them to expand their business without having to build or move. As long as you have the logistics in place you can use e-commerce to reach customers anywhere in the world, therefore increasing sales and broadening your customer base.

Below is a diagram of a typical client server based web system.

Task 2

Information is a value commodity and as such it must be treated with the appropriate care and attention. The value of a decision is largely determined by the information used in reaching that decision therefore it is necessary to ensure that only information of the best quality i.e. fit for the purpose, is provided.

2.1 Comment on how each of the factors listed below has a bearing on the quality of information.

- Accuracy
- Relevance
- Timeliness
- Cost

Accuracy

The accuracy of information supplied often depends on who requires it. Obviously the information needs to be correct, however its accuracy can vary. For example, a cashier checking the takings in a till needs a report of the transactions processed through that till to the nearest penny but a manager looking at sales forecasts may only need a report that is accurate to the nearest hundred or thousand pounds etc.

Relevance

Information supplied to help a decision-maker must be relevant to the decision in question. Any irrelevant information will simply confuse and lengthen the decision making process, and result in wrong or bad decisions being made. The information must also be supplied in a relevant format. Taking the above example again, the cashier would require a report of figures, whereas the manager would be better off with a graphical presentation.

Timeliness

Information will have a ‘shelf-life’ or ‘best before date’ if you like, depending on the situation facing the decision-maker. If we look at an example of the order clerk in a warehouse, his decision should be based on past sales, while also considering the time of year (summer / Christmas etc). If he is supplied with sales from last month it will be difficult to place an accurate order. However, sales information from the previous week would be much more timely and accurate.

Cost

It is important to measure what it may cost to make a decision against not making a decision. It can take a lot of time, and therefore money, to gather, analyse sort and prepare information to aid the decision making process. If this cost is too great it may be better to not make that decision. However it may be worth the cost or more costly not to act on the information.

2.2 Within the context of legislation governing the gathering and use of information, comment on the impact of the following:

- Data Protection Act
- Computer Misuse Act
- Copyright Act

As they would impact on either the data user or the data subject.

Data Protection Act

The data protection act was put in place to protect people from having data about them used in an inappropriate manner, whether it is held on a computer system or otherwise. It specifies the responsibilities of the person holding the data (data user) and the rights of the person about whom the data is held (data subject). It basically means that if a person discovers that data about them is being used unlawfully or in a way that would somehow harm them, they have the right to take legal action against the data user.

Anyone processing personal data must comply with the eight enforceable principles of good practice. They say that data must be:

- Fairly and lawfully processed
- Processed to limited purposes
- Adequate, relevant and not excessive
- Accurate
- Not kept for longer than is necessary
- Processed in accordance with the data subjects rights
- Secure
- Not transferred to countries without adequate protection

The most shining example of how the data protection act has affected data users is seen on every form we fill in, weather it is a piece of paper or an online submission. The data user is forced to ask us if we want our information to be used or shared with other companies and organisations. We, the data subject, have the option to say yes or no but care should be taken as these questions are often in ‘small print’ and can be worded very awkwardly.

Computer Misuse Act

The computer misuse act deals with crimes relating to the misuse of computing equipment, such as hardware and software, rather than the data held by them. It is there to protect the general public and organisations alike, against the likes of computer hacker's etc. The main offences include:

- Unauthorised access to computer material.
  A person is guilty of this if they use a computer to access data they are not authorised to use.
- Unauthorised access with intent to commit or to facilitate commission of further offences.
  A person is guilty of this offence if they commit the first offence with intent to use the data for unlawful purposes, or let others do the same.
- Unauthorised modification of computer material.
  A person is guilty if they do anything to change the contents on a computer and they know what they are doing at the time.

This act has an effect on both the data user and data subject, as it is there to protect them both from unauthorised use of their information, while it is held within a computer system. However it could also be used against people who don't even know they are committing a crime. A person 'could' gain access to information they are not supposed to through no fault of their own.

Copyright Act

The copyright act provides protection for authors of "original works of authorship". This can include anything from music to art to software. The act basically says that nothing can be done with the work of authorship without the authors express permission.

This has become especially prevalent in recent times with the massive use of the Internet. File sharing programs and the availability of imagery, music and software make it very easy to abuse this act. Data users and subjects both need to be very careful when producing public documents, such as leaflets,magazines or even WebPages if they have used the internet for any kind of research.

2.3 The effectiveness of an information system can be judged by the degree to which it enables correct decisions to be made resulting in the required outcome.
Write brief notes on how you could evaluate the effectiveness of an information system making particular reference to the criteria that you would choose to measure effectiveness.

To properly measure the effectiveness of an information system after implementation I would address four main areas:

- Initial User Requirements
- User Opinions
- Volume of Problems
- Financial Gain

Initial User Requirements

Does the solution provided, deal with and cover all of the initial system requirements as laid down by the user and agreed to by he systems analyst, if not, why not? In most cases the initial requirements will have been fulfilled, and others will have been added, as user requirements tend to grow with a project.

If it is discovered that a requirement has not been addressed during this process then it should be dealt with as soon as possible at no extra cost, as this could be the source of any subsequent problems.

User Opinions

At some stage after implementation, a survey should be taken across the whole company at all levels to gauge individual user opinions of the information system. It should pose questions such as:

Does the new information system make your job any easier?

Does the new information system make your decision making process any more efficient??

Etc. etc. The responses to such a survey are bound to be broad and varied, maybe even colourful, but it will give a good overall view of how effective the new system is. A survey like this becomes even more effective when conducted more than once at appropriate intervals, as opinions may change over time.

Volume of Problems

Most information system implementations will have a period of warranty, where the systems analysts, designers and programmers will provide support to the users of the system. This will nearly always come in the form of a helpdesk where users can call a number and get immediate support for the problem they are facing. The volume of calls and variety of problems would be an excellent measure of how well a system is working as well as how effective the user training has been.

Financial Gain

99% of systems are implemented to create some sort of long-term financial gain through greater efficiency. This may be visible in the short term via the need for less manpower, however in most cases this is something which will need to be measured over a long period of time, against the cost of implementation. If there is no significant financial gain or worse, a loss of money then the system is not doing its job.

Summary

It is clear to see that data and information are very valuable commodities and should be used and managed appropriately. When using computers to manage data, companies and organisations must ensure the correct hardware; software, networks, databases and security measures are in place to protect the structure of their business. One decision can make or break an organisation so it vitally important that the information used to make such decisions is accurate, relevant, timely and secure.

It is also vital to consider the cost of information management. I work for a global company who, within the last four years, spent £44 million pounds on a new system, which has been upgraded twice since the initial go live. That sort of money could financially 'kill' smaller companies, but we must ask the question, will they survive without spending it? After all, "You've gotta spend money to make money!!!"

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Diagrams used from the following sources:

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