

14.6 Human Computer Interaction

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14.6 Objectives

- Describe the psychological factors that affect human/computer interaction, e.g. user friendly, give help to novices, provide short cuts for experts, make use of human long-term memory to maximise efficiency.

Human Computer Interaction

- The design, evaluation and implementation of interactive computer systems.
- The improvement of human computer interaction is important as it allows the users to work more efficiently and more productively.
- Easy of use and navigation can increase job satisfaction and reduce stress.

Physical Factors

- Computers used in the workplace:
 - Ergonomics: the design and functionality of the working environment.
 - Lighting: use of lighting to avoid glare, shades on windows etc.
 - Noise: from printers, fans, photocopiers.
 - Temperature: heat from machinery, air-conditioning.
 - Furniture: seating, keyboards, table height, monitor etc.
 - Environmental conditions: electricity savings etc.

Psychological Factors

- Careful design of programs by software designers, an understanding of how humans receive, process and store information can be used to design effective user-friendly interactive systems.
- To more complex a program appears doesn't always mean that it has many features, it could have poor human interaction.
- Manuals need to be written sympathetically to the users skills without any assumptions being made to their skills level.

Senses

- Sight:
 - The eye is less sensitive to blue light than red or green so important information should not be displayed in blue.
 - Many people are colour blind so reds and greens may be confused.
- Hearing:
 - Mainly used for warning sounds, and distinctive sounds are used for different functions.
- Touch:
 - Important in keyboard and mouse design.
 - Motor skills in pointing and clicking, enlarge targets / icons.

Memory

- Designs to assist:
- Short term memory: used to remember data entries when keying in, i.e. a long string of numbers should be designed into smaller groups.
- Long term memory: storage of information, from facts and experience, limitless capacity, slower access time, and harder to forget.
- Contradicting images: icons should display an image we associate with the command, i.e. printer image for printing, or floppy disk for saving, red colour for stop.

Psychological Factors

- Technophobia:
 - Many people did not desire to learn the new computer technology, many could not understand how to use it. Interfaces should be designed for easy accessibility.
- User friendly:
 - Easier, therefore less stressful to use, documentation clear and unconfusing, people testing software and documentation should be novices.

Psychological Factors

- Easy access to help:
 - Help screen to explain things simply and clearly, wizards to help a user through complicated parts, undo features to retrace steps.
- Short cuts:
 - Key short cuts are good for typists where they do not need to use the mouse. Right click of the mouse to bring up short cut menus.

Improvements

- Choice of command structures and menus:
 - opening menu, and menu structure.
- Screen design:
 - Single screen rather than multiple screens, consistent across all departments etc.
 - Menus not too long, too many choices,
 - Colour and animation used sparingly,
 - Consistent screen design,
 - Help one click away,
 - Navigation back and forth to retrace steps.

Improvements

- Error Messages:
 - To warn as well as offer a suggestion to rectify it. Where this is not possible to offer a good help facility.
- Help and search:
 - Allow the user to search for a particular topic or function easily.
- User friendliness:
 - The ease the software can be learnt and used, different people find different things easier than others, best to evaluate using a range of users with differing skills.

Improvements

- Ease of learning:
 - Similar to other software packages,
 - On-line tutorials that are interactive,
 - User friendly manual aimed at the novice,
 - Anticipation of the user and offer help,
 - Return from trouble by retracing steps, escape,
 - Involvement of lots of users at the design stage to aim to satisfy all levels of skills.

14.7 Human Computer Interface

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14.7 Objectives

- Recall different approaches to the problem of communication with ICT systems and discuss the resource implications of sophisticated Human Computer Interface (HCI).
- Discuss the implications for customising software to develop a specialist HCI.

Resource Implications

- Processor:
 - Greater demands by more powerful OS, may slow the graphics hungry applications.
- Immediate Access Store (IAS):
 - Main memory needs to be large to cope with graphics demand. More windows opened at the same time with loss of performance.
- Backing Storage:
 - Large files need a high capacity hard drive, and high capacity backing storage devices.
- Development:
 - Sophisticated HCI takes more time and cost to develop, balanced against lower customisation and training requirements. Users may solve their own problems faster.

Features

- On-line help,
- Graphical user interface (GUI),
- More ways to perform the same operation,
- Multi-tasking capabilities,
- Faster searching and help assistance.

Customisation

- Some software packages allow user customisation to suit their personal requirements, i.e. Ms Word.
- This can save time as users are working to their own preferred system.
 - Customised toolbars and icons may be created,
 - Customised templates can be created,
 - Menu and toolbar items can be shown or hidden,
 - Customise the file storage directory, and back up frequency.

Database

- Database forms are custom designs for data entry.
- Design is important as users will spend hours each day using them, therefore they will need to be consulted in the design.
 - The form should mirror the paper based data entry to minimise errors.
 - Help or warning messages to assist with data entry.
 - Suitable fonts, sizes and colour.
 - Limitation on the number of fields, uncluttered.
 - Validation checks to ensure data is reasonable.

- Pages:
- Doyle: 316 - 324.
- Heathcote: 331 - 334.
- Activity: 324.