

The fourteen principles of ergonomic systems

1. Suitability for the task The system should support the user in the completion of the task, i.e. when the functionality and the dialogue are based on the task characteristics (rather than the technology chosen to perform the task).

NOTE "task" means used in its widest sense as "activities required to achieve a goal", rather than looking at the specifics of using the dialogue system.

2. Self-descriptiveness At any time it should be obvious to the users which part of the system they are in, where they are within a dialogue, which actions can be taken and how they can be performed.

3. Conformity with user expectations The operation of the system should correspond to predictable contextual needs of the user and to commonly accepted conventions.

4. Suitability for learning The user should be supported and guided in learning to use the system.

5. Controllability The user should be able to initiate and control the direction and pace of the interaction until the point at which the goal has been met.

6. Error tolerance Despite evident errors in input, the intended result should be achieved with either no or minimal corrective action by the user.

NOTE: Error tolerance is achieved by means of: error control (damage control), error correction, or error management to cope with errors that occur.

7. Suitability for individualisation the system should allow users to modify interaction and presentation of information to suit their individual capabilities and needs.

8. Clarity Information content should be conveyed quickly and accurately.

9. Discriminability Displayed information should be capable of being distinguished accurately.

10. Conciseness Users should not be overloaded with extraneous information.

11. Consistency Similar information should be presented in the same way throughout the application, according to the user's expectation.

12. Detectability The user's attention should be directed towards information required.

13. Legibility Information should be easy to read.

14. Comprehensibility Meaning should be clearly understandable, unambiguous, interpretable, and recognizable.

A Human-Centred Approach

A human-centred approach provides a structure for the consideration of Human Element issues. The principles of the human-centred approach are:

- Continuous Improvement, learning from experience, trials or prototypes
- Early, continuing, effective crew input
- The matching of ships and systems to people and tasks
- Teamwork and co-operation between stakeholders.

The human-centred approach supports the development of a safety culture, and helps the crew to act as a safety barrier (rather than be seen as only a source of human error).

A human-centred approach has been found to contribute to business success in a number of sectors of industry. We believe that the human-centred approach also improves job satisfaction, and so leads to better staff recruitment and retention.

Usability and Context of Use

Usability The extent to which a product (ship, system or equipment) can be used by a specified crew to achieve specified goals with effectiveness, efficiency, safety and satisfaction in a specified context of use. The phrase 'safe and effective operation' is broadly equivalent to usability.

The measures of usability are:

- **Effectiveness** Accuracy and completeness with which users achieve specified goals.
- **Efficiency** Resources expended in relation to the accuracy and completeness with which users achieve goals.
- **Satisfaction** Freedom from discomfort and positive attitudes towards the use of the product.

Context of use Users, tasks, equipment (hardware, software and materials), and the physical and social environments in which a product is used.

Further information on human centred design and usability can be found at:

www.usabilitynet.org

www.usability.gov

www.usabilityprofessionals.org

www.useit.com

ISO 13407 *Human-centred design process for interactive systems* is a manager's guide to specifying and evaluating usability.

The principles provided in this handout are adapted from ISO 9241-110 *Dialogue principles* and ISO 9241 *Presentation of information*. Usability and context of use are defined in ISO 9241-11 *Guidance on usability*.