

A Best Practices Design Guide - Survey Glossary -

Purpose

The purpose of this document is to serve as a reference in answering the survey. While it is not necessary to refer to this document, it may be of help or interest to some respondents.

This document is not intended to offer a complete list of aspect related to design.

SECTION 3. DESIGN FACTORS

Q13. Role of the device or technology

Adapted from Bucks, Ashworth, Wilcock, & Siegfried (1996)

Q24. Beliefs and Values

Adapted from Krefting & Krefting (1991), cited in Cook & Hussey (2002, p43)

Q26. Quality of Life

See VandenBos (2007).

Q27 & Q28. Experiences, Abilities and Capacities to Manage Everyday Technologies

Categories are adapted from Malinowsky, Almkvist, Nygård, & Kottorp (2012). Examples are from Nygård & Starkhammar (2007).

Following instructions: e.g. from an answering machine or service

Choosing correct button or command: e.g. using a mobile phone

Identifying services and functions: e.g. online banking information vs. automated teller machines; washing machines vs. dryers

Performing actions in logical sequence: e.g. entering a security code to use a mobile phone

Identifying information and responding adequately: e.g. noticing icons or messages on computer screens; using alarm clocks

Managing a series of numbers: e.g. dialing a phone number

Using appropriate force, tempo and precision: e.g. using the volume button on a remote control

Turning a button/knob in correct direction: e.g. on a radio or oven

Coordinating different parts of a technology: e.g. assembling vacuum components

Identifying and separating objects: e.g. differentiating a remote control from a calculator and selecting the correct item

SECTION 4. TECHNOLOGY ADOPTION AND USE

Q30. Fitness for Purpose

See Dewsbury & Linsell (2011) for complete descriptions of the items below.

Fitness for purpose: 'What does the person want from the system? Does/will the system meet and fit with the broad needs, experiences and wishes of the person and/or their carer?'

Comfort: 'How comfortable is the technology for the person to wear over a long periods?'

Dexterity: Can the person interact with the device appropriately and press the correct buttons easily?'

Portability: 'Can the person carry the system? Does the system need to be carried?'

Timeliness: 'Does the system work in appropriate time frames?'

Responsiveness: 'Does the device produce the correct response?'

Utility: 'How useful is the system solution to the person?'

Q31. Trustworthiness

See Dewsbury & Linsell (2011) for complete descriptions of the items below.

Trustworthiness: 'Can the person trust the system to do what is expected without adverse reactions?'

Reliability: 'How reliable is the system for the person?'

Safety: 'How safe is the system for the person?'

Maintainability / Serviceability: 'How easy is the system to be serviced or maintained?'

Survivability: 'Will the system still work when the power is not available?'

Q32. Acceptability

See Dewsbury & Linsell (2011) for complete descriptions of the items below, with the exception of 'self-confidence' which has been added.

Acceptability: 'Does the person find the technology an acceptable addition to their lifestyle?'

Aesthetics: Does the system look good and blend in with the person's surroundings?'

Capacity: a system 'Can [the] system accommodate the person's lack of acceptance of their condition and/or its consequences?'

Compatibility: 'Does the system solution work well with existing technologies? (interoperability)'

Cost: 'Can the person afford to run and maintain the system?'

Learnability: 'Is the person able to learn how to use the system?'

Self-confidence: 'self-assurance, or trust in one's own abilities, capacities and judgment...a belief that one is capable of successfully meeting the demands of a task' (VandenBos GR, 2007)

Usability: 'How practical is the system solution to the person?'

Q33. Adaptability

Adaptability: a system that is 'able to evolve over time' (Sommerville & Dewsbury, 2007), adjusting to a user's changing needs and also to the needs of multiple users

Configurability: 'the ability of users or equipment installers to adapt the system to cope with a range of human capabilities such as variable hearing, eyesight, balance, etc' (Dewsbury, Sommerville, Clarke, & Rouncefield, 2003)

Openness: 'the system's ability to be extended with new equipment, perhaps from different manufacturers' (Dewsbury et al., 2003)

Variability: 'the ability to adapt to external conditions and respond accordingly' (Dewsbury & Linsell, 2011, p254)

Visibility: 'the extent to which the operation of the system can be made visible to users and installers of that system...' (Dewsbury et al., 2003)

SECTION 6. RECOMMENDED DESIGN PRACTICES

Q38. General Design Approaches

Cognitive systems engineering: a design approach for Man-Machine Systems intended to 'provide designers with the tools necessary to produce a match between the system's image and user characteristics on a mental or cognitive level' (Hollnagel & Woods, 1999)

Cognitive work analysis: multiple constraints upon a system are studied in order to develop technologies that support user adaptation and autonomy as well as usefulness and usability (Vicente, 1999)

Contextual design: an approach to design, 'emphasizing: interview methods conducted in the context of the user's work, codesigning with the user, building an understanding of work in context, and summarizing conclusions through out the research' (Wixon, Holtzblatt, & Knox, 1990)

Inclusive design: 'The design of *mainstream* products and/or services that are accessible to, and *usable* by, *as many people* as reasonably possible ... without the need for special adaptation or specialised design.' (British Standards Institute, 2005; also see www.inclusivedesign toolkit.com)

Participatory design: users 'involved in the design process through regular meetings between designers and users' (Nielsen, 1992)

Universal design/Inclusive design: technologies intended to reach as wide a user group as possible (Hosking, Waller, & Clarkson, 2010; Story, Mueller, & Mace, 1998)

User- / Human-centered design: characterized by four stages: i) seeking to understand user characteristics early in the design process; ii) adopting empirical techniques such as questionnaires, interviews, observations and focus groups to do so; iii) applying an iterative design-and-test cycle; and iv) employing users, to varying degrees, in the design process (Wickens, Gordon, & Liu, 2004)

Q39. Applying AT-related Models and Frameworks

Note: For more information on entries marked with an asterisk**, see a review of models and frameworks by Lenker & Paquet (2003).

Biopsychosocial framework and 'career path': See (Gitlin, 1998)**

Conceptual model of AT outcomes research and practice: See (J. Lenker & Paquet, 2004)

Dependability model of domestic systems: See (Dewsbury et al., 2003)

Ecological model for quality of life technologies: See (Sixsmith, Gibson, Orpwood, & Torrington, 2007)

Human activity – assistive technology framework: See (Cook & Hussey, 2002)**

ICF core set for matching older adults with dementia and technology: See (Scherer et al., 2010)

Matching person and technology model: See (Scherer, 1998)**

Neurological Dependability Assessment Matrix: See (Dewsbury & Linskell, 2011)

Perceived Attributes Theory: See (Rogers, 1995)**

Responding, enabling, augmenting and failure-free (REAFF) framework: See (Astell, 2009)

Social cognition models: Various. See (J. A. Lenker & Paquet, 2003)**

Q44. Determining User Needs and Preferences

Personas: 'a hypothetical person developed through interviews and observations of real people...[that] represent key characteristics of the user population' (Wickens et al., 2004)

Scenarios: 'Narrative descriptions' of a situation used 'to guide the development of a system that will enable these use experiences' (Rosson & Carroll, 2003)

Q45. Analyzing User Needs

Decision matrix: a tool used to compare stakeholder 'objectives to systems features, allowing designers to see the degree to which the proposed features will satisfy customer needs' (Wickens et al., 2004)

House of quality matrix: 'a systematic methodology used to convert customer needs into design specifications' (Czarnuch & Mihailidis, 2011)

Qualitative analysis template: a template, based on the Ecological model of wellbeing, used to organize and analyze interview data based on enabling and challenging influences (Sixsmith et al., 2007)

Q48. Analyzing Social Environments

Link analysis: this approach 'aims to identify networks of relationships and patterns of behaviour based on the strength and occurrence of associations among people, objects, events, or any other entity of interest' (Pfautz & Pfautz, 2008)

Social network analysis: the approach is intended 'for capturing data about relationships... broadly focused on the analysis of the those relationships to draw conclusion about the nature of social structure' (Pfautz & Pfautz, 2008)

Social and organizational coordination analysis: a tool based on cognitive work analysis (see Vicente, 1999)

Q49 & Q50. Personal characteristics of a Person with Alzheimer's disease & aspects of a Caregiver

Sensory aspects: "sense" includes 'the five primary senses—vision, hearing, taste, touch and smell—as well as the senses of pressure, pain, temperature, kinesthesia and equilibrium' (VandenBos GR, 2007)

Physical aspects: examples of these aspects these include physical size, strength and fatigue

Cognition: 'all forms of knowing and awareness, such as perceiving, conceiving, remembering, reasoning, judging, imagining and problem solving.' (VandenBos GR, 2007)

Emotions and feelings:

Emotions are defined as 'a complex reaction pattern, involving experiential, behavioural, and physiological elements, by which the individual attempts to deal with a personally significant matter or event.' (VandenBos GR, 2007)

Feelings are defined as 'a self-contained phenomenal experience. Feelings are subjective, evaluative, and independent of the sensory modality of the sensations, thoughts, or images evoking them.' (VandenBos GR, 2007)

Culture: 'the distinctive customs, values, beliefs, knowledge, are, and language of a society or a community' (VandenBos GR, 2007)

Quality of life: 'the extent to which a person obtains satisfaction from life' (VandenBos GR, 2007)

Experience using everyday technologies: this includes experiences, preferences and motivation

Ability to manage everyday technologies: See (Malinowsky et al., 2012) for more information.

Q51. Technical Requirements

Definitions from (NASA, 2007)

Requirement: statements that are 'individually clear, correct, feasible to obtain, unambiguous in meaning, and can be validated at the level of the system structure at which it is stated. (p274)

Technical requirements: 'the approved set of requirements that represents a complete description of the problem to be solved and requirements that have been validated and approved by the customer and stakeholders' (p41)

Environmental requirements: statements related to 'vibration, shock, static loads, acoustic, thermal, contamination,... [and] radio frequency' (p44) etc. for the system of interest

Functional requirements: 'what functions need to be performed' (p41)

Human factors requirements: statements regarding the human capabilities, limitations and characteristics that need to be considered

Maintainability requirements: statements regarding 'the ability of an item to be retained in or restored to specified conditions when maintenance is performed by personnel having specific skill levels, using prescribed procedures and resources, at each prescribed level of maintenance' (p271)

Performance requirements: quantitative descriptions of 'how well these functions must be performed' (p41); for example, 'how often and how well, to what accuracy (e.g. how good does the measurement need to be), what is the quality and quantity of the output, under what stress...or environmental conditions, for what duration, at what range of values, at what tolerance, and at what maximum throughput or bandwidth capacity' (p44)

Reliability requirements: 'the probability that a device, product, or system will not fail for a given period of time under specific operating conditions' (p43). Reliability relates to 'design robustness, failure tolerance, and redundancy' (p41)

Safety requirements: 'Freedom from those conditions that can cause death, injury, occupational illness, damage to or loss of equipment or property, or damage to the environment' (p275)

Security requirements: 'the Information Technology (IT) requirements, Federal and international export and security requirements, and physical security requirements for the system of interest' (p110)

Sustainability requirements: statements related to the protection of the broader human environment (see 'National Environmental Policy Act, p256)

Q 52. Developing Prototypes

Definitions from Houde & Hill (1997).

Look and feel prototypes: 'related to the concrete sensory experience of using an artefact'

Role prototypes: related to 'questions about the function that an artefact serves in a user's life'

Implementation prototypes: related to ‘questions about the techniques and components through which an artifact performs its function—the “nuts and bolts” of how it actually works’

Q53. Developing and Testing a Design

For primary sources related to the first three items below, please see Mihailidis, Boger, Czarnuch, Jiancaro, & Hoey (2012).

Actor simulation: trials involving role-playing, in which ‘Actors [who] have trained extensively to take specified emotions and attitudes ... simulate conditions or situations of interest’ (Mihailidis et al., 2012)

Benchtop trials: ‘trials [that] allow the developers to identify and address numerous physical design requirements, such as the selection of hardware that will be used, the assembly and installation of the device, and communication between device components and external services. (Mihailidis et al., 2012)

In silico trials: ‘debugging and optimising a new technology in a virtual environment on a computer.’ (Mihailidis et al., 2012)

Heuristic evaluation: ‘a systematic evaluation of the product to judge compliance with human factors guidelines and criteria’ (Wickens et al., 2004)

Additional Information

To obtain more information about the Best Practices Design Guide project, please visit our website (see url at the top of the page) or contact Tizneem Jiancaro directly.

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