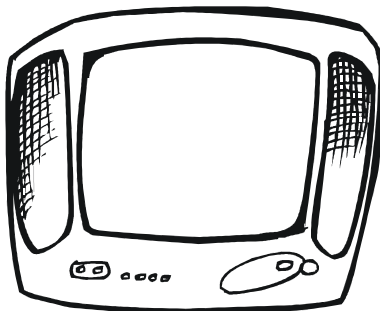


EKSISTERENDE HCI-RETNINGSLINJER FOR DIGITAL / INTERAKTIV TV

Oktober 2006

Redaktør: Riitta Hellman

Karde AS Tellu AS



Dette notatet oppsummerer *eksisterende* retningslinjer for utforming av brukerdialogen på digital/interaktiv TV*. Notatet er en delleveranse fra det IT Funk-finansierte prosjektet 'Norsk OSIRIS og universell utforming'.

Litteraturen som dekker interaktiv/digital TV er stor, samtidig som det er vanskelig å finne kilder som på en genuin måte dekker grensesnittdesign og interaktivitet for TV-mediet i sin helhet. De fleste publikasjoner som er blitt vurdert i denne sammenheng behandler mer avgrensede fagområder. Utforming av elektroniske programguider (EPG) et typisk eksempler på et faglig område med stort volum av publikasjoner også når det gjelder brukbarhet ('usability'). I tillegg til valg av program kan EPG-funksjoner vanligvis:

1. gi overblikk over aktuelle programmer på alle kanaler, ofte ved hjelp av bildemateriale,
2. gi kortfattet sammendrag av program ved at brukeren peker på programmet, eller
3. gi en oversikt over programmer av innenfor for en spesifikk genre.

Bruken av EPGer analyseres ofte som om det var snakk om et web-grensesnitt.

Antropologiske og sosiologiske studier av hjemmet som bruksarenaen for interaktive TV-tjenester er et annet område med omfattende litteratur. Overgangen fra analog til digital TV sysselsetter også mange forfattere både ut fra teknisk perspektiv, og som et samfunnsmessig og politisk tema. Et siste område med stor interesse er metoden knyttet til den tekniske bildekvaliteten når digital overføring blir mulig (High Definiton TV – HDTV).

Vårt perspektiv er *tjenester* samt representasjon og bruk av disse gjennom et TV-grensesnitt. Retningslinjene som er tatt med i denne oversikten et bredt dekkende for dette feltet, og inkluderer de fleste prinsipper som ulike samlinger av retningslinjer og råd inneholder. Eksisterende retningslinjer blir i dette prosjektet brukt som utgangspunkt for

* For enkelhets skyld bruker vi begrepene digital TV og interaktiv TV om hverandre. Vårt arbeidsområde er dog *interaktiv* TV der en kan forutsette toveiskommunikasjon.

prosjektets arbeid med retningslinjer for utforming av *generelle* tjenester på mobiltelefon slik at også prinsippene for universell utforming blir realisert.

Nedenfor presenteres to relativt omfattende samlinger av eksisterende retningslinjer som fanger opp et bredt spekter egenskaper ved digital/interaktiv TV. Begge samlingene er rettet mot "sårbare" grupper, for eksempel eldre. Vi betrakter disse retningslinjene som særdeles interessante når tilgjengelige grensesnitt på digital/interaktiv TV skal utformes. I retningslinjene i Kapittel 1 har vi kun inkludert prinsipper som sorterer under kategorien 'nødvendig' ('essential'), og utelatt kategorien 'ønskelig' ('desirable') fordi hovedsansen er dekket gjennom nødvendig-kategorien. Nødvendig-retningslinjene omtaler både presentasjon av innhold på skjermen og det fysiske utstyret (f.eks hvordan fjernkontrollen bør utformes). Utfyllende materiale kan hentes ut fra retningslinjer som dekker web-grensesnittet.

Det er ikke utarbeidet oversettelse til norsk i og med at disse kun blir brukt som referansemateriale. Vi har også tatt med prinsippene for universell utforming i deres opprinnelige form. Disse prinsippene er styrende for prosjektets målsettinger om universell utforming i TV-brukergrensesnitt.

1. DCMS / DTI: Digital TV Equipment: Vulnerable Consumer Requirements

Kilde:

http://www.digitaltelevision.gov.uk/pdf_documents/publications/digtv_equipment-march06.pdf

Using the instructions manual and documentation

1. The instructions should be easy to read, concise and jargon-free (using plain English) and avoid technical abbreviations.
2. The instructions should have comprehensive, relevant index.
3. The instructions should provide information about the accessibility features of the product and about access services such as subtitling and audio description.
4. The manual should have illustrations to complement the text to help understanding.
5. The manual should have trouble shooting guide, including information about when the user needs to reboot the system.
6. The standard instructions or manual should be printed in clear print (larger typeface).
7. These documents should also be available on audio tape and in braille.
8. The installation guides should have instructions for common home connecting scenarios for common combinations of equipment
9. These documents should incorporate a clear indication of where dedicated information and support services are available
10. On-screen information should be provided to avoid reliance on the manual.

Opening the packaging and setting the system up

11. The packaging should be easy to open for people, given the dexterity problems and sight problems users might have. It should be easy to remove the packaging for these users.

12. There should be a clear notice on the packaging of how to check for digital reception.
13. At least one scart lead should be included in the packaging of the digital receiver.
14. Colour-coding on the digital receiver ports corresponding to respective cables should be applied.
15. External connections should be easily accessible and clearly marked.
16. The on-screen set up procedures should use easy to understand language and should be available to the user after initial set up.
17. All SCART leads supplied with the system should be held in place by a clip as available from mainstream stores to prevent accidental disconnection.
18. A reboot button on the receiver would be valuable to people with mobility problems who might have difficulty switching the system off at the mains.

Using the on Screen Display

19. Ensure that there is information on screen about the system status.
20. Whenever the box or system is doing something on its own (for example scanning for new channels, getting new software over-air), it should clearly indicate on the on-screen display this process to the user to ensure that the user is not left not knowing what it is doing. The box or system should also clearly indicate to the user when it is rebooting or has frozen.
21. Software upgrades should not cause the loss of existing settings (e.g. brightness, contrast etc...).
22. Offer the user the possibility to tailor functionality and interface. For example the user should have the possibility to mask off the more advanced functionality which they might not wish to use regularly and to ensure that it does not add complexity during day-to-day use. (See also programmability of remote controls).
23. Ensure that text on the screen is displayed using good colour contrast. For more detail on the most suitable colour combinations, see the work by Sue Darby.
24. Ensure that the selected menu option is indicated on screen in different colour highlight, offering good contrast but never rely solely on colour to convey information about e.g. selected options.
25. Use a typeface designed for use on television displays and typical TV viewing distances, and optimised to reduce confusion between letter shapes. Tiresias screenfont is generally recommended.
26. Avoid combinations of red and green.
27. Avoid pure red or white colours. Use colours with a maximum of 85% saturation.
28. Provide generous inter-line spacing to minimise problems of visual tracking.
29. Use clear and unambiguous menu terminology.
30. Ensure that menus are intuitive for inexperienced users and give them the ability to return to the previous menu screen by using a common term such as back. This could be accommodated by a special button on the remote control.

31. Use consistent and predictable navigation cues and maximise consistency in button sequences.
32. Use principles derived from good web design practice when drilling down menus.
33. For pop-up menus: number the items in menus and have those numbers directly selectable, for example item 1 can be selected by pressing number 1 on the numeric keypad.
34. Avoid the use of a time-critical user response (where the user only has a certain time to push a key before it times out).
35. Ensure that there is direct correspondence between on-screen prompts/text and button labels on the remote control.
36. Avoid flashing and scrolling text.
37. Text size should be a minimum of 24 lines high on a capital 'V', though being able to read text is not just about size. For example, a smaller sans serif font is usually more readable than a larger serif font. Readability is improved with extra spacing between letters (but take care to increase spacing between words in proportion), words and lines. When choosing a font, consider its readability. Favour a sans serif font over a serif one. Tiresias is generally recommended.
38. Mixed case is ideal, but when choosing one case only, then favour lower case text over upper case.
39. Avoid italic, underlined, oblique, condensed or fancy fonts.
40. Favour left-align against centred or right-align. Avoid justified paragraphs since they result in varied spacing between letters that makes them harder to read.
41. Ensure that words have a clear space around them. Words immediately adjacent to symbols can be more difficult to read.
42. Symbols used should follow internationally recognised standards (e.g. when using visual or audible symbols for access services, refer to the CENELEC standards for symbols for access services – currently under development).
43. For arrows, follow the ISO7001 specification.
44. For numbers, use Arabic numerals (1, 2, 3, 4, 5...) rather than Roman numerals (i.e., I, II, III, IV, V...).

Receiving audio feedback of text displayed on the screen

45. Provide speech output of text displayed on the screen for static text such as the TV settings, but also for text that changes and is part of the broadcast stream such as channel identification, programme name, programme length.
46. Provide speech feedback of interactive elements through speaking the highlighted choices and numbers entered.
47. Provide feedback or instant response when a command has been activated.

Using the remote control

48. The remote control should have clear visual markings.

49. Any text and symbols on the remote buttons should be large enough to be clear, legible and contrasted to the colour of the keys or background.
50. The labelling on remote control buttons should be durable and not rub off.
51. Labels should be clear and intuitive and standardised, e.g. a standard abbreviation “I” for information. There should be clarity about what options such as “exit” or “save” on the remote mean.
52. The control should have large buttons that are well separated. The space between buttons should be at least 50% of the width of the button.
53. The buttons should be logically grouped and spaced for easy manipulation. Spaces between groups of buttons that relate to the same function should be greater than the spaces within the groups. For example, number keys relate to a same function and should be set aside from neighbouring keys such as programme up and down.
54. Keys should be tactually discernible. Therefore keys should be raised or have raised edges.
55. There should be a raised marking on the number 5 key on the numeric pad.
56. Keys should have distinct shapes or texture to help distinguish between functions.^{79,80,81} Tactile indications should use international standards such as ES 201 384 “Human Factors telecommunication keypads and keyboards – tactile identifiers”.
57. Provide the user with the option to directly access subtitles and audio description from a dedicated button on the remote control rather than requiring people go through complex menu structure. This button should allow users to select or deselect the service and the user should be able to find out easily from the system whether the service is on or off.
58. Provide feedback when a remote control key is pressed: this should be audible feedback (e.g. clicks or beeps) from the system or set-top box to indicate the pressing of keys (especially if screen response is slow) and visual feedback from the system to indicate that the user request has been received, for example the illumination of a LED.
59. When letters, numbers or figures on keys are used on a remote, it should be done as follows: in sans serif, bold, dark on light background or light on dark background. The labelling of keys should be done in the maximum print size possible to ensure it is readable.
60. The buttons should be placed in an intuitive position for single handed operation. The remote should be comfortable to hold and be used by either left hand or right hand
61. The handset should be coated in an easy grip, non-slippery textured material
62. The directional properties of the infra-red beam should be wide so that they work from any angle to ensure that someone with manual dexterity does not lose signal
63. The remote control should be stable if placed on a flat surface
64. There should not be any redundant buttons on the remote handset
65. Basic functionality buttons should also be included on the digital receiver to remove full reliance on the remote control

66. Access to the battery compartment of the remote should be straightforward without compromising the safety of small children.
67. A multifunctional remote control that can also control the basic functions for other devices such as volume up or down, channel up or down is preferable. This would reduce the need for 2 remote controls when using a Freeview box connected to an analogue TV, a problem that was identified as causing confusion, reliance on having to remember which remote is which and it also requires increased cognitive, visual and dextrous abilities to operate 2 remotes.

Using subtitles

68. Provide the user with the option to select the display of subtitles. The subtitles should appear to the user on his/her TV screen in the manner broadcast, i.e. they should maintain the appearance on screen, the speed, the background and foreground colour. This should be thoroughly tested given current problems that lead to text corruption with some set-top boxes under certain conditions.
69. Give the user the possibility to always have subtitles on rather than having to activate them again each time a channel is changed.

Using audio description

70. Provide the user with the option to listen to audio description. This means providing users with audio description the way the service is intended, i.e. so that the listener can hear the audio description and the original soundtrack at the same time.
71. Give users the possibility to always have the audio description on rather than having to activate it again each time a channel is changed.

Accessing the internet

72. Provide a system that also gives access to the internet.

2. Alex Carmichael: Style Guide for the Design of Interactive Television Services for Elderly Viewers

Kilde:

<http://www.computing.dundee.ac.uk/acprojects/utopia/publications/Carmichael%20-%20DesignStyleGuideFinal.pdf>

1. Text should be presented as large as is reasonably possible.
2. Text presented as single words generally only needs to be satisfactorily legible for older viewers. Whereas text presented for continuous reading needs to be relatively clearer than simply legible to ensure adequate understanding of the content and its inferences.
3. On-screen presentations should not be overfilled with information or otherwise 'busy'. Ideally, a single screen should contain a single 'message' or a single 'activity'.
4. The layout of a screen presentation should be designed to make what it has to offer easily understandable to the user. This may also involve the use of explicit instructions.
5. The 'meaning' of any explicit instructions used should be checked with 'naive' users.

6. Icons that are ‘meaningful’ are more beneficial than abstract or arbitrary ones (although the ‘meaningfulness’ should be previously established with users).
7. Designers of screen layouts and their elements, should consider using a simulated reduction of visual acuity to check the clarity of their design.
8. Various forms of ‘highlighting’ can be useful for drawing users’ attention to ‘important’ areas of the screen. But care is needed to ensure that the ‘highlight’ is suitable, given the context.
9. ‘Highlighting’ (and ‘lowlighting’) can be useful for ‘guiding’ users through a sequence of operations (locations) on a screen.
10. Some interaction tasks that can fit onto one screen may be easier for older people to deal with as a succession of screens containing one operation (and possibly associated instructions) on each.
11. A variety of techniques can be used to constrain progress through an interaction task, which can also ‘guide’ users and will generally minimise errors.
12. It is vital that users are given the opportunity to notice any mistakes they do make and are given the ability to make appropriate corrections or alterations in as efficient a manner as possible.
13. If an on-screen ‘pointer’ is used it must be clearly visible to older users and easy to use accurately.
14. Visual ‘highlights’ and other ‘events’ can often be usefully augmented by sound, which ought to be ‘rich’ (ie not pure tones) and preferably ‘meaningful’.
15. Consider allowing a certain amount of personal customisation of some presentation characteristics.
16. When providing access to large ‘catalogues’ of items, careful consideration should be given to the overall suitability of ‘menu’, ‘keyword’ or other forms of search method.
17. Older users will find it helpful if they are given an (suitable) overview of any large body of information (including the ‘network’ they are navigating through).
18. Whenever possible relieve the burden on older people’s memory by providing equivalent information on-screen.
19. For inherently involved or complex interaction tasks, consider providing an ‘interactive demonstration’ to ‘train’ novice users and prepare them for ‘the real thing’. (However, every effort should have already been made to ensure that the interactive service is effectively ‘walk-up-and-use’ regardless of the level of ability or knowledge of the user.)
20. All effort should be made to ensure that the presentation of interactive services and the operations involved in using them throughout a particular system, are as consistent as possible from the user’s point of view.
21. Give very careful consideration to the control device intended for use with the system, on the basis of easy use by all users (given the operations required of it).
22. Consider the benefits of providing a range of different control devices which are all equally compatible with the system.

3. The Principles of Universal Design

Kilde: http://www.design.ncsu.edu/cud/about_ud/udprinciples.htm

Principle One: Equitable Use

The design is useful and marketable to people with diverse abilities

GUIDELINES

- Provide the same means of use for all users: identical whenever possible; equivalent when not.
- Avoid segregating or stigmatizing any users.
- Provisions for privacy, security, and safety should be equally available to all users.
- Make the design appealing to all users.

Principle Two: Flexibility in Use

The design accommodates a wide range of individual preferences and abilities.

GUIDELINES

- Provide choice in methods of use.
- Accommodate right- or left-handed access and use.
- Facilitate the user's accuracy and precision.
- Provide adaptability to the user's pace.

Principle Three: simple and intuitive

Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.

GUIDELINES

- Eliminate unnecessary complexity.
- Be consistent with user expectations and intuition.
- Accommodate a wide range of literacy and language skills.
- Arrange information consistent with its importance.
- Provide effective prompting and feedback during and after task completion.

Principle Four: Perceptible Information

The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

GUIDELINES

- Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.
- Provide adequate contrast between essential information and its surroundings.
- Maximize "legibility" of essential information.

- Differentiate elements in ways that can be described (i.e., make it easy to give instructions or directions).
- Provide compatibility with a variety of techniques or devices used by people with sensory limitations.

Principle Five: Tolerance for Error

The design minimizes hazards and the adverse consequences of accidental or unintended actions.

GUIDELINES

- Arrange elements to minimize hazards and errors: most used elements, most accessible; hazardous elements eliminated, isolated, or shielded.
- Provide warnings of hazards and errors.
- Provide fail safe features.
- Discourage unconscious action in tasks that require vigilance.

Principle Six: Low Physical Effort

The design can be used efficiently and comfortably and with a minimum of fatigue.

GUIDELINES

- Allow user to maintain a neutral body position.
- Use reasonable operating forces.
- Minimize repetitive actions.
- Minimize sustained physical effort.

Principle Seven: Size and Space for Approach and Use

Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

GUIDELINES

- Provide a clear line of sight to important elements for any seated or standing user.
- Make reach to all components comfortable for any seated or standing user.
- Accommodate variations in hand and grip size.
- Provide adequate space for the use of assistive devices or personal assistance.